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ISIC: The Information Behaviour Conference

Full and Short Papers

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Editorial

This is a landmark year for ISIC, as 2026 brings both the 30th anniversary of the conference and its first time being hosted in North America (more specifically, Montréal). This anniversary gives the community a chance to reflect on the field, including what has changed and what has stayed the same. Thirty years ago the first ISIC conference took place in Tampere, Finland. The conference name 'ISIC' stood for Information Seeking In Context. Today we refer to it as 'ISIC: The Information Behaviour Conference'. ISIC was conceived as an international conference; since 1996 it has been held in 14 countries across four continents. The 2026 conference marks 15 countries across five continents.

This year, the conference received a large number of submissions, with 151 in total across full papers, short papers, posters, panels, and workshops. Of these, 53 papers were accepted. This includes 36 full papers (acceptance rate 44%) and 17 short papers (acceptance rate 57%). Papers represent a range of topics and approaches. Roughly 60% are primarily empirical, 20% are primarily review studies, and 20% are primarily theoretical or conceptual. The papers come from authors from around the world, travelling from 16 countries across five continents. With the conference being located in North America for the first time, there is an increase in the number of papers from this region, relative to past ISICs. Also included are papers focused on information experiences in countries less often represented at ISIC, such as Indonesia and Saudi Arabia.

Looking at the papers presented at the first conference in 1996, topics ranged across theory and models, the information behaviour of specific groups, interactions with technology, and new ways to think about the field. This echoes the papers that will be presented in 2026, which also contribute theoretical advances, explore the experiences of different groups of people, document people's interactions with technology, and propose new approaches, metaphors, and frameworks. The breadth and diversity of work presented at ISIC has been consistent across the decades.

In 2026, the enduring themes of our field remain well-represented, and tuned in to complex contemporary challenges. Papers touch on "classic" domains such as health, the workplace, everyday life, and academic information seeking, while addressing vaccine hesitancy, the impacts of "genAI" tools, inequality and precarity, and the risks brought by a fracturing information environment. Authors contribute advancements around enduring conceptual concerns such as context, uncertainty, and trust, while bringing them into conversation with theories and concepts such as intersectionality, decoloniality, and epistemicide.

Overall, the papers in these proceedings give a rich sense of ongoing growth in our field. Advances in both qualitative and quantitative methods are represented here. People with diverse life experiences are given voice, from software developers, to members of distinct fandoms, to vehicle dwellers. The proceedings also include Indigenous, Black, LGBTQ+, and decolonial perspectives on information experiences and infrastructures.

Building such a program, and reviewing a large number of submissions, takes a great deal of work. As in past years, this work was taken on collectively, by the disciplinary community. For ISIC 2026, we decided to host a peer review workshop, tailored for doctoral students and focused on learning how to do a review, working through a review together, and then inviting attendees to be a reviewer for the conference. This workshop supported numerous new reviewers in contributing to the peer review process.

We thank all the people whose hard work has made this conference and these proceedings happen. We want to start by recognizing the other ISIC track chairs: poster co-chairs Dr. Africa Hands (University at Buffalo) and Dr. Rebecca Noone (University of Strathclyde); workshop and panel co-chairs Dr. Anna Mierzecka (University of Warsaw) and Dr. Amy VanScoy (University at Buffalo); and doctoral workshop co-chairs Dr. Heidi Julien (University at Buffalo) and Dr. Lisa M. Given (RMIT University). We also thank:

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- the copyeditors – Nik Doré and Andrea McDermid Boue – who spent an incredible amount of time ensuring each submission was ready to go.
- the editorial staff of *Information Research* for helping us through the process of putting together the proceedings.

This 30th anniversary ISIC has achieved its twin goals of creating space to reflect on our field, and sparking exploration of future challenges and directions. We trust that readers will enjoy responding to and building on the distinctive papers in these proceedings.

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Exploring health information needs in Islamic contexts through health fatwa questions in Saudi Arabia

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Abstract

Introduction. Many people with chronic illness in Saudi Arabia ask fatwas to align healthcare and worship with Islamic teachings. This study examines the health-religious information needs expressed in these questions.

Method. The research adopted a qualitative approach and analysed 340 health-related fatwas about chronic illness collected from approved Sunni platforms (Ibn Baz, Ibn ʿUthaymīn, Saad al-Khathlan, IslamWeb, and IslamQA).

Analysis. The 320 fatwa questions were analysed using reflexive thematic analysis to identify the main patterns of religion-related health information needs.

Results. A range of religion-related health information needs were identified in the fatwa questions, showing how faith shapes people's decisions and everyday health concerns.

Conclusion. This study maps how chronically ill Muslims in Saudi Arabia express religion-related health information needs through fatwa questions, showing that faith routinely structures everyday health decision-making. Recognising fatwas as authoritative information sources can guide culturally sensitive health information services and encourage practical collaboration between clinicians and religious scholars.

Introduction

Chronic diseases, such as diabetes, heart disease, arthritis, and cancer are among the leading causes of death worldwide and represent the most serious health issue in Saudi Arabia (World Health Organization, 2018). Chronic illnesses demand an ongoing balance between everyday life demands and demands of the disease (Van Houtum et al., 2015). Many of these illnesses can be managed in daily life, and patients are often involved in handling their condition (Gregory, 2005). Muslims patients prefer to avoid medications containing ingredients that are religiously prohibited (Nazar et al., 2025). This may influence their acceptance of and adherence to treatment.

In Islam, religion guides all aspects of life, including health. Muslims' daily lives are influenced by Islamic law including health-related decisions. Accordingly, this may raise a lot of questions about specific issues that require religious answers (fatwas) (Alyemny et al., 2023). Fatwas may serve as vital information sources that help Muslims navigate pressing health challenges and Islamic principles (Mirvaxidovich, 2025). With the growth of the internet and digital media, official government bodies and fatwa organisations now publish fatwas on official websites and social media, making them more accessible to the public.

This study aims to identify and categorise the religion-related health information needs expressed by chronically ill individuals in Saudi Arabia through their questions submitted to approved Sunni fatwa platforms. Using reflexive thematic analysis of 320 health-related fatwa questions collected between January and March 2025, the paper explores how patients articulate uncertainty, seek legitimacy, reassurance, or religious meaning through inquiry. The findings of this paper show that these questions that posted to Sunni fatwa platforms reflect a wide range of information needs from clarifying worship duties during illness, negotiating medical procedures within religious limits, and validating information sources, to interpreting illness spiritually or refusing treatment for faith-based reasons. The study demonstrates how fatwas function as religious information sources that shape how individuals seek, evaluate, and use health information in everyday life. This will help to create better understandings of how people use information to make health decisions, and to design more empathetic and culturally sensitive health information services.

Information science has not directly studied health fatwas, and no systematic research has analysed them. This study examines how individuals with chronic illnesses in Saudi Arabia express their health-related information needs through fatwa questions, showing how faith and medical reasoning intersect in these inquiries.

Fatwas as a religious information source

A fatwa can be defined as a non-binding legal opinion issued by a qualified legal scholar (Mufti) in response to a question raised by an inquirer (Mustafi), explaining the ruling of Sharia on a specific issue (Irawan et al., 2020). Sharia here refers to a divinely derived system of guidance governing Muslim beliefs and practices (Shamsy & Coulson, 2025). This process connects the questioner's real-life concern with religious authority, providing guidance that adapts to time, place, and social context. In Saudi Arabia, the fatwa system is institutionalised through the Permanent Committee for Scholarly Research and Iftaʾ under the Council of Senior Scholars, which issues official rulings on worship, daily life, and health. The committee relies on the Qur'an, the Sunnah, and expert consultation when dealing with specialised topics such as medicine (Irawan et al., 2020).

In Saudi Arabia, fatwas play an important role in guiding decisions about health and illness, especially among people living with chronic conditions that require continuous care. In such cases, seeking a fatwa can be understood as a form of information behaviour through which individuals seek to understand medical advice and confirm its religious legitimacy. Recent studies show that Muslim patients often ask about the compatibility of medical practices with Islamic rulings, particularly concerning fasting during illness (Abolaban & Al-Moujahed, 2017), and the religious evaluation of medical procedures in light of Islamic ethics and jurisprudence. Chamsi-Pasha and

Albar (2013) explained that Islamic scholars hold different opinions about which medical treatments break the fast, and that the Standing Committee for Scholarly Research and Ifta in Saudi Arabia serves as the main reference in such issues, linking medical practice with religious guidance in everyday life.

Religion, information behaviour, and fatwa-based Q&A

Religious and spiritual contexts are increasingly recognised as important areas of information research, revealing how beliefs and practices intersect with the search for meaning and knowledge (Caidi et al., 2025). However, our understanding of how religious and spiritual information is used and sought in everyday life remains limited in contemporary society (Nangia & Ruthven, 2025). Caidi et al. (2025) noted that most earlier studies in a religious context focused on clergies and religious institutional settings, while the information practices of laypeople received little attention. In addition, Ruthven (2019a, p.163) states the value of '*exploring how people seek information to understand their own lives and how their lives may be lived differently*.' Likewise, Ruthven (2022) noted that major life events such as illness or bereavement often trigger information seeking under stress or vulnerability. Park et al. (2013) explain that religion and spirituality provide meaning systems that help individuals cope with such experiences.

Previous studies have shown that people seek and use spiritual and religious information in various contexts, for example, in processes of religious discernment (Hickey, 2017), prayer and fasting (Caidi et al., 2022; Ekmekcioglu et al., 2022; Michels, 2013; Siracky, 2013), religious conversion (Guzik, 2018), pilgrimage (Caidi, 2019; Caidi & Innocenti, 2018; Innocenti, 2024; Wafa et al., 2025), contemplative practices (Nangia & Ruthven, 2023; Yerbury et al., 2023), and in digitally mediated religious environments (Campbell, 2012; Cheong et al., 2009). In a recent review (Caidi et al., 2025), the authors refer to the concept of religious information landscape, originally introduced by Gorichanaz (2015) as an entry point to study religious information outside institutional settings. Gorichanaz expands on this concept, explaining that 'the religious information landscape includes, but is not limited to: sites where believers gather; religious objects and their use; social networks; prayers, rituals and sacred texts; rulings, exegeses, sermons and other interpretations; and books and other sources that relate religious belief and practice to everyday life' (2015, p. 6). However, as Nangia and Ruthven (2025) note, most studies focus on Western Christian or Muslim settings, leaving non-Western and everyday contexts underexplored (Caidi et al., 2025; Gaston et al., 2015). Despite growing attention to spirituality in information science, no systematic study has examined health fatwas, even though they represent a unique intersection between religion and healthcare.

Information need is defined by Ormandy (2011, p. 9) as '*recognition that their knowledge is inadequate to satisfy a goal, within the context/situation that they find themselves at a specific point in the time.*' These needs emerge in problematic situations when an individual requires information to resolve them. According to (Ruthven, 2019b) the daily activity of asking for information online results in large collections of textually articulated needs, enabling their investigation for comprehensive, large-scale analysis. Accordingly, published questions on Q&A platforms may serve as expressions of individuals' information needs. Questions posted within Q&A communities can also reflect consumer health information needs as they are articulated in specific context (Zhang, 2010).

Previous studies have shown that analysing user questions provides valuable insight into people's information needs (Oh et al., 2012; Roberts et al., 2014; Xiang et al., 2023; Zhang, 2010). As Oh et al., (2012, p. 1) stated, 'one of the greatest advantages of using social Q&A for information seeking is that people can elaborate on their information needs with their own words, explaining their situations and conditions with as much (or as little) detail as they wish.' They allow users to identify their needs, articulate them in natural-language questions, and receive responses from others. Choi and Shah (2016) classified Q&A services into four types: community-based (e.g., Yahoo!

Answers), collaborative (e.g., Wiki Answers), expert-based (e.g., The Internet Public Library), and social (e.g., Facebook, X). noted that questions written in natural language on Q&A platforms provide authentic expressions of users' informational and emotional contexts. Analysing such questions reveals both what people seek and why they seek it. Huvila and Gorichanaz (2025) described social Q&A platforms as key environments for sharing information needs. Therefore, the extensive collection of questions posted on these platforms constitutes an essential resource for understanding authentic information needs as they naturally arise in individual' daily lives (Oh et al., 2012). However, the existing Q&A literature has focused on general or secular platforms, with limited attention to expert-based religious Q&A environments.

In this context, Islamic fatwas represent a distinctive form of expert-based Q&A. Unlike general advisory sites, a fatwa is a formal religious ruling grounded in Sharia and issued by a qualified scholar or committee. The International Islamic Fiqh Academy (IIFA) (2006) clarified that while a fatwa is not legally binding, it becomes religiously binding when supported by clear evidence (Iftā, 2006). However, despite the prevalence of fatwa-based Q&A platforms in Muslim societies, these expert religious environments have received little attention within information behaviour research. In particular, health-related fatwa questions remain underexplored as naturalistic expressions of information needs arising at the intersection of illness, religious obligation, and everyday decision-making.

Research question

The literature review highlights the importance of Q&A platforms as a rich data source for capturing real information needs. In this study, we focus on what we call health–religious information needs to describe information needs that arise when individuals face health issues or treatment decisions and seek to understand how health-related information relates to their religious obligations in everyday life. While previous studies have identified key categories of health information needs such as facts, advice, and emotional support (Westbrook & Zhang, 2015) they have focused on secular contexts and general platforms like Yahoo! Answers. However, among various forms of question-and-answer services, Fatwa Q&A as expert platforms have received little attention. Particularly, little is known about them as a source of religious information. Even though they represent a unique intersection between religion and healthcare. In so doing, this gap can be addressed by asking the following research question:

RQ: What types of health-religious information needs are expressed by chronically ill individuals in their questions to Sunni fatwa platforms?

Method

This study adopts a qualitative design to explore the health-religious information needs expressed in fatwa questions on chronic illness. As Denzin and Lincoln (2005, p. 10) explain, qualitative research focuses on '*the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry*.' Because fatwas are free-text responses grounded in real contexts that integrate medical and religious concerns, a qualitative approach was most suitable, allowing meanings to be interpreted rather than reduced to numerical patterns.

Data collection and selection process

Fatwa platforms form a central part of the Islamic information environment. With the rise of satellite channels and the internet, they have become major sources of religious guidance across the Muslim world, including Saudi Arabia. Echchaibi (2009) described this expansion as an unprecedented phenomenon, while Al-Kandari and Dashti (2014) noted that Muslim scholars act as opinion leaders who influence the adoption of new practices and innovations. A fatwa provides

both theoretical and practical guidance, directing Muslims on what Allah permits or forbids; thus, fatwas shape behaviour, including health-related decisions.

These days Fatwa institutions now appear in multiple forms. Each country has official bodies such as the Permanent Committee for Scholarly Research and Ifta (Saudi Arabia), Dar al-Ifta (Egypt), and the General Ifta Department (Jordan). As Berger et al. (2023) observed, unlike Catholicism where rulings are centralised, Islam allows any qualified mufti to issue a fatwa, resulting in diverse sources. Alongside these institutions, many scholars manage personal websites, while platforms such as Islam Web and Islam Q&A attract large audiences; Saudi Arabia ranks among the top visiting countries (Mohamed & Sarwar, 2024).

Given this context, the study focused on chronic illnesses as its main analytical scope, since they require repeated decisions about treatment and worship. Health-related fatwas were collected from five official Sunni platforms the scholars Sheikh Ibn Baz, Sheikh Ibn Othaimeen, Sheikh Saad al-Khathlan (members of the Council of Senior Scholars, former and current), along with Islam Web and Islam Q&A using keywords related to chronic diseases and treatment (see Table 1), with manual browsing for indirect medical cases. Selection followed clear criteria: the Sunni and official authority of the platform, health fatwas are relevant to chronic illness, and there is a clear medical or religious dimension in the question. Only fatwas submitted by patients or their relatives were included, while those from healthcare professionals were excluded. After removing duplicates and unrelated cases, 420 fatwas were retained, of which 340 were thematically analysed. Data saturation was reached at 320 cases, confirming that no new themes emerged.

Disease/Health Topic	Keywords (Arabic)	English Translation of Keywords
Diabetes	سكر + سكري + أنسولين + جلوكوز	diabetes + insulin + glucose
Cancer	سرطان + ورم + كيماوي + علاج إشعاعي	cancer + tumor + chemotherapy + radiation therapy
Kidney Disease	كلى + غسيل كلوي + فشل كلوي + حصوات	kidney + dialysis + kidney failure + stones
Heart Disease	قلب + ضغط + جلطة + شرايين	heart + blood pressure + stroke + arteries
Liver Disease	كبد + تليف + التهاب كبدي + فيروس	liver + cirrhosis + hepatitis + virus
Mental Health	نفسي + اكتئاب + قلق + وسواس	psychological + depression + anxiety + obsession
Chronic Illness	مرض مزمن + الأمراض المزمنة + علاج طويل المدى	chronic illness + chronic diseases + long-term treatment

Table 1. Keywords for Chronic Illness Fatwa Search

No.	Disease/Condition	Islamweb	IslamQA	Council of Senior Scholars (Saudi Arabia)	Total
1	Cancer	76	45	25	121
2	Heart Disease	163	30	5	195
3	Irritable Bowel Syndrome	64	53	11	128
4	Kidney Failure	54	72	18	144
5	Liver	26	29	0	55
6	Diabetes	46	20	29	95
7	Mental Illness	87	40	8	135

Table 2. Distribution of Health-Related Fatwas by Disease/Condition across Islamweb, IslamQA, and the Council of Senior Scholars (Saudi Arabia)

Analysis framework

Reflexive Thematic Analysis was applied following Braun and Clarke's method (2019). This method is well suited for complex datasets that combine legal, religious, medical, and social aspects. It highlights the researcher's interpretive role, as themes are constructed through systematic engagement with the data rather than simply emerging from it (Braun & Clarke, 2019). The value of a theme depends on its relevance to the research question rather than its frequency (Braun & Clarke, 2006)

The study used the six phases of reflexive thematic analysis outlined below as applied in this study. During the familiarisation phase, the first author engaged in a detailed and repeated reading of all 420 health-related fatwa questions to gain a deep and practical understanding of their linguistic and contextual meanings. Descriptive and reflective notes were written by hand in notebooks with two columns. One column was used for observations, and the other for analytical reflections. These notes were treated as research memos and were used to guide the later stages of the study. During the coding stage, the data were coded manually in MAXQDA. Coding focused on specific meaningful segments of text rather than full questions in order to retain linguistic detail and contextual meaning. Short explanatory notes were added for each coded segment to record analytical insights, and all codes were later reviewed for internal consistency before moving to broader categorisation. During the categorisation phase, related codes were grouped into broader conceptual categories that represented recurring ideas or patterns; for instance, codes about the effects of treatment on fasting or prayer were clustered to illustrate how religious obligations are negotiated under illness. This process was iterative and non-linear, involving constant refinement and reclassification. In the theme development phase, categories were developed into coherent themes through iterative engagement with the data and regular discussions between authors to enhance analytical clarity. The defining and naming phase refined each theme's boundaries and meaning until five main themes were finalised to answer the research question. Finally, in the writing and verification phase, the results were presented with direct quotations from the original Arabic fatwa questions, followed by interpretation and discussion. All questions were analysed in Arabic, with translation into English only after coding to preserve contextual meaning. Data saturation was reached at question 320, and 20 additional fatwas were analysed to confirm the stability and completeness of the themes.

Main Theme	Sub-code
Religious adaptation of worship under illness	Seeking clarification on whether illness affects worship validity
	Consulting on the impact of medical procedures on ritual obligations
	Requesting religious allowances for missed obligations
Negotiating religious boundaries in healthcare	Seeking religious legitimacy for treatment
	Exposing awrah for medical reasons
	Consulting opposite-sex physicians
Validation of information sources	Referred to a medical authority
	Referred to a religious scholar
	Referred to social circle
	Referring to vague/unspecified sources
Faith-based motivations and spiritual interpretation	Qur'anic healing practices
	Prophetic healing practices
	Religious framing of illness and coping
	Anxiety about sin due to treatment decisions
Faith-based refusal of medical treatment and advice	Refusal based on tawakkul
	Preference for spiritual remedies
	Refusal of modern interventions

Table 3. Main themes and related sub-codes identified in the analysis

Findings

This section reports the main findings under each theme listed above. The themes describe the types of religion-related health information needs expressed in the fatwa questions of chronically ill individuals in Saudi Arabia. Table 5 in the Appendix summarizes the five main themes identified in the analysis with supporting examples from the data, while Table 3 outlines the sub-codes that correspond to these themes.

Religious adaptation of worship under illness

Analysis of health-related fatwas revealed a consistent concern among chronically ill individuals striving to fulfil their religious duties, particularly prayer and fasting, within their physical and medical limits. Rather than simple requests for rulings, these questions expressed a deeper effort to reconcile faith commitments with illness. Illness, therefore, creates specific religious information needs linked to worship in daily life. Analysis of this them revealed three sub-patterns in the questions asked:

1. Seeking clarification on whether illness affects worship validity

Fatwa seekers often ask whether chronic illness or medical treatment affect the validity of worship when usual ritual requirements cannot be fully met. Such questions arise across different acts of worship for example, prayer, fasting, and pilgrimage, and are typically framed as decisions about the most appropriate religiously valid (Sharia) course of action under constraint.

For example, one dialysis patient asked:

> *I have kidney failure, and during dialysis the times for ʿAṣr and Maghrib pass because I only finish after the ʿIshāʾ call to prayer. Should I pray these prayers on the bed without facing the Qiblah, or wait until the session ends and pray ʿAṣr and Maghrib with ʿIshāʾ?* (Fatwa No. 1).

Together, these examples show a recurring question type: how to maintain worship validity under illness-related constraints.

2. Consulting on the impact of medical procedures on ritual obligations

Another frequent question type concerns whether specific medical procedures affect ritual obligations, particularly fasting during Ramadan. Patients ask about practices such as asthma inhalers, injections, and nutritional treatments while fasting.

For example. an individual posted this question: '*Does the asthma inhaler break the fast?*' (Fatwa No.2). Others asked whether the ruling differs between intramuscular and intravenous injections. Overall, these questions focus on the sharʿī implications of medical procedures for the validity of fasting. The problem here comes from the potential of invalidating worship or breaking the fast accidentally due to a lack of awareness of the legal implications of medical procedures.

3. Requesting religious allowances for missed obligations

Patients with chronic or long-term illnesses often felt unsure about what to do when fasting became difficult or impossible. Many asked if they were allowed to stop fasting, and what Islam asks from them in these situations whether they should stop fasting, make up missed days later, or offer compensation (kafarah). Some also asked how to deal with worship they missed because of illness, wondering if they should make it up later or give compensation instead.

For example, one individual with a chronic illness described both past and anticipated difficulties with fasting, stating:

> *I fasted during Ramadan last year, and I have a chronic illness—ulcerative colitis—and my condition worsened when I fasted. I must now fast the seven days I missed during Ramadan, but I cannot do so because of my illness and the fear that my condition will worsen. What should I do about the seven days I missed during Ramadan last year? What is the ruling on my fasting in general? I do not know when the illness will subside, and I am afraid that when it subsides and I start fasting, my condition will return to being as bad as it is now.* (Fatwa No. 3)

Overall, these questions reflect patients' need of clear, authoritative religious guidance about allowances and responsibilities when illness prevents them from fasting or when Ramadan days have already been missed.

Negotiating religious boundaries in healthcare

Patients' questions indicate that some experience both medical and spiritual challenges as they try to balance their faith with modern healthcare. Rather than seeking a general ruling, they often seek clarification on the boundaries of what is permissible (halal) or impermissible (haram) in specific medical situations, especially when treatment options raise religious concerns. In doing so, they seek for authoritative guidance on what is permissible or forbidden in their health circumstances. The following sub-patterns illustrate how patients negotiated these religious–medical dilemmas in different ways.

1. Seeking religious legitimacy for treatment

A common question type concerns whether a medical treatment is religiously permissible as well as medically appropriate. In these questions, knowing the medical risks or benefits is not enough; patients also ask whether a procedure, substance, or medical decision is allowed in Islam.

For example, one patient asked about heart surgery and the use of a metal option versus an artery from a pig: '*The metal one may rust, but the pig artery is better… What is the ruling on this?*' (Fatwa No. 4). Another asked about organ donation: '*I have decided to donate a kidney to my brother… Is that permissible?*' (Fatwa No. 5).

Similar questions appear about medicines that may contain alcohol, narcotics, or animal-derived ingredients, as patients ask whether using them is allowed in treatment (Fatwa No. 6).

Folk remedies also raised concerns, such as Al-Zahra, a drink fermented for a week until it smells like wine: '*Recently in Hijaz, something called Al-Zahra appeared… they say it cures all diseases. What is the ruling on this?*' (Fatwa No. 7).

Overall, this question type centres on establishing sharʿī permissibility before or during treatment decisions, especially when a procedure involves potentially prohibited substances or ethically sensitive choices.

2. Exposing the *ʿAwrah* for medical reasons

Some people seek guidance on when it is religiously acceptable to reveal private body parts during medical treatment, especially if the treatment requires an examination, surgery, or the presence of male staff. This illustrates the obvious need for religious information in highly sensitive situations.

One example is a woman who underwent surgery and felt uneasy because her hair was uncovered in the hospital where some men saw her. She asked: '*A patient is not at fault if left uncovered. Is this true?*' (Fatwa No. 8). This reveals the tension between medical necessity and religious modesty. Patients are not only asking for a legal ruling but also for spiritual reassurance.

Another case concerns a woman with a post-surgical distortion in a private area. Unable to find a qualified female doctor, she asked: 'I am committed, and I have never been examined by a male doctor in my life. Is it allowed to uncover myself for him to do the surgery?' (Fatwa No. 9). This highlights how modesty and embodied religious identity influence medical decision-making.

A third example involves a woman preparing for marriage who suffered psychological distress from stretch marks. Told that only a male doctor had the needed expertise, she asked: '*Is it allowed for the male doctor to examine me?*' (Fatwa No. 10).

Taken together, these examples show that patients do not rely solely on the general rule necessities permit the forbidden but seek personalized fatwas that provide reassurance and remove doubt. Thus, this positions the fatwa as a practical source of guidance for making treatment decisions within religious limits.

3. Consulting opposite-sex physicians

Some patients' questions show concern when they have to see a doctor or nurse of the opposite gender. This issue appears often and is connected both to medical needs and to religious or social rules. The concern was expressed by women and also by men. One woman asked: '*I am a woman, and the female doctor is not available. Is it allowed to be examined by a male doctor?*' (Fatwa No. 11).

A man also asked: '*Is it allowed for a woman to treat us men, especially when male nurses are present?*' (Fatwa No. 12). These questions show that patients are not rejecting medical care. Instead, they want religious assurance that treatment will not cross the limits of modesty in Islam. This reflects an information need for clear religious guidance in situations where healthcare and religious modesty intersect. Overall, these questions ask what to do when opposite-sex care is the only available option, and how to stay within Islamic modesty limits.

Faith-based motivations and spiritual interpretation

In this theme, some health fatwa questions frame illness through a religious lens. Inquirers draw on Qur'anic verses, Prophetic traditions, and theological ideas—such as sin, reward, patience, or divine testing to interpret why illness happened and how they should respond. The theme is organised into four related sub-patterns:

1. Qur'anic healing practices

Several questions showed a desire to seek healing from the Qur'an, not as a rejection of medical treatment, but as a way of combining faith with therapeutic practice. One inquirer asked: 'Does treatment with the Qur'an heal physical diseases such as cancer, just as it heals spiritual diseases such as the evil eye or possession? And is there any evidence for this?' (Fatwa No. 13).

This illustrates an information behaviour pattern where the Qur'an is not only a spiritual text but is also invoked as a symbolic source of healing. The informational need here extends beyond biomedical solutions to a search for what patients perceive as "blessed" means of recovery, including questions about the legitimacy and methods of Ruqiyah.

2. Prophetic healing practices

Some questions ask about remedies linked to the Prophetic tradition and whether there is an authentic treatment transmitted from the Prophet (peace be upon him). For example, one patient asked: '*Is there a treatment that has been authentically transmitted from the Prophet (peace be upon him)*?' (Fatwa No. 14).

Overall, this question type treats Prophetic traditions as a source of health guidance and focuses on authenticity (what is reliably transmitted) and practical use in illness.

3. The religious framing of illness and coping

Some patients raised questions that indicate a reinterpretation of illness in light of Islamic doctrine, such as the question: '*Is it true that illness can purify a person from sins?*'

This pattern shows how the experience of illness is reframed within a religious narrative that gives suffering a positive meaning as a means of atonement, elevation, and earning reward through patience with the illness. In this way, religious beliefs provide comfort and psychological balance in the therapeutic experience.

For example, one fatwa asked: '*Does a patient receive reward if he is patient? And how should one practice patience during illness*?' (Fatwa No. 15).

These examples illustrate that chronic illness is not perceived only as a medical problem but is also interpreted through a religious lens, where suffering itself is turned into a source of spiritual reward and forgiveness.

4. Anxiety about sin due to treatment decisions

This pattern is seen in questions where medical necessity appears to conflict with moral and religious commitments, producing anxiety about sin. One female patient asked: "*Am I sinful for not covering myself in front of doctors because of my illness?*" (Fatwa No. 16).

This example reveals the tension between medical treatment and religious modesty, leading patients to seek fatwas that offer reassurance and moral justification. The underlying information behaviour here reflects a search for legitimacy that balances medical obligations with religious ethics.

Faith-based refusal of medical treatment and advice

This theme captures questions where inquirers ask whether it is religiously acceptable to refuse, stop, or avoid certain medical treatments, often linking the decision to tawakkul (trust in God), ajr (spiritual reward), duʿāʾ, prophetic medicine (ṭibb al-nabawī), or acceptance of qadar (divine will).

1. Refusal based on tawakkul

This sub-code appears in fatwas where patients insist on abandoning treatment, considering reliance on Allah as sufficient. One fatwa included the question:

> *I have a brother who became seriously ill. I told him: Go to the doctor to seek treatment and, in shā' Allah, recover. He replied: Al-Hamud Lilah, I rely on Allah. For this illness brings great reward, and that is enough for me. Is he right or wrong?* (Fatwa No. 17).

Another question was raised:

> *If I suffer from a terminal illness and refuse treatment while being patient, will I receive a great reward? And would this fall under the saying of the Prophet Muhamma: 'Seventy thousands of my ummah will enter Paradise without reckoning: those who do not seek ruqyah, do not cauterize, do not believe in omens, and rely on their Lord,' and the hadith of the woman who suffered seizures and said: 'I become exposed, so pray to Allah for me…?'* (Fatwa No. 18).

These examples show that refusing treatment is framed as part of the Islamic concept of tawakkul, where illness is understood as a space for patience, reward, and reliance on Allah.

2. Preference for spiritual remedies

Some patients use prophetic medicine and supplication as support alongside treatment. However, this fatwa shows a different type of question, where the patient asks if it is religiously acceptable to abandon medical care completely and rely only on spiritual remedies, even in life-threatening situations. For example, a fatwa seeker with kidney failure asked '*I would like to know whether this is correct or incorrect … I am suffering from kidney failure, and doctors say that if I refrain from dialysis for ten days, I will die. I have decided to seek treatment through prophetic medicine.*' (Fatwa No. 18).

This highlights a distinct question pattern, where fatwas are sought to confirm whether spiritual reliance alone can replace medical treatment.

3. Refusal of modern medical interventions

A further type concerns rejection of modern treatments such as chemotherapy, surgery, or long-term medication. Patients often weigh benefit against suffering, as one asked: '*Is it permissible to refuse chemotherapy since it only prolongs life with more pain?*' (Fatwa No. 19).

Others linked refusal to worship, as in the case of a man with incontinence who asked: '*Does my choice not to undergo another surgery affect the validity of my prayers?*' (Fatwa No. 20).

Some questions raised ethical concerns, such as: '*If I stop taking my medicine and die, am I considered a suicide, even if I only wanted to rest from the long treatment?*' (Fatwa No. 21).

Another fatwa related refusal to reproduction, where a couple declined IVF, saying: '*We chose not to undergo the procedure, accepting what Allah has decreed*' (Fatwa No. 22).

Together, these cases show that treatment refusal is not understood as neglect but as a faith-based decision negotiated through religious, ethical, and emotional reasoning, where fatwas provide legitimacy and reassurance for choices affecting both body and belief.

Validation of information sources

Another type of question in the health fatwas concerns the use of information sources. Patients often mentioned doctors, scholars, social practices, or even unclear references when asking about chronic illness. By doing so, they were not only seeking a legal ruling but also asking the mufti to clarify which source should be trusted. In this way, the fatwa becomes a place where authority is tested and confirmed.

The references appeared in four forms (see table 4).

Form of reference	Example (from question)
Medical reference	'The doctor said: If you do not take this medicine for a certain period, you will expose yourself to death…'(Fatwa No. 23).
Religious scholar	'Some scholars said treatment is not obligatory… it was narrated from Imam Ahmad…' (Fatwa No. 24).
Social context	'… a folk medicine called Al-Zahra… people book for a whole year…' (Fatwa No. 25).
Ambiguous source	'… they told me at the hospital that the doctor knows about this matter…' (Fatwa No. 26).

Table 4. Forms of source reference in health fatwa questions

Patients often repeat what they heard from doctors, scholars, or society, and ask the mufti to confirm it. This shows that the fatwa is not only a request for a rule but also a place where the authority of these references is tested and defined.

Discussion

The findings of this paper show that health fatwas could be a source for understanding how Muslims deal with illness through their faith. Our analysis found that people with chronic illnesses seek religious rulings while trying to balance their religious duties with their medical conditions. We found that many of Fatwa's questions focused on their prayer, fasting, and medical procedures that could affect purity or modesty. These Fatwa seekers often verified medical advice with trusted scholars rather than relying completely on doctors or the media, which show that trust in religious authority plays huge role in evaluating health information. Furthermore, some questions connected illness with ideas such as trial (ibtilā'), patience (ṣabr), trust in God (tawakkul), and divine destiny (qadar). For example, in some cases patients refused treatment for spiritual reasons. Taken together, these cases can explain how fatwas have an active and guiding role in health decision-making, thus, mediating between medical recommendations and religious obligations.

Previous studies examined the relationship between religion and health, noting that Muslim patients often ask scholars about fasting or medication (Abolaban & Al-Moujahed, 2017; Amin & Abdelmageed, 2020; Muishout et al., 2022). Although previous research contributed to understanding religion and health, it paid little attention to how individuals engage with religion as part of their information behaviour. This study fills that gap by examining health fatwas as faith-based information practices.

This study also contributes to research on Q&A platforms. Earlier studies focused on websites such as Yahoo! Answers or WebMD (Alasmari & Zhou, 2019; Xiang et al., 2023; Zhang, 2010), which allow users to share health experiences and exchange information. Bronstein (2017) showed that online health communities function as spaces for social support and learning. However, Islamic fatwas are very different; they are expert-based Q&A systems where answers are provided by authorised religious scholars rather than peers. Unlike advisory medical platforms that allow negotiation or discussion, the fatwa provides a binding ruling grounded in Sharia. Therefore, the questions express not just medical curiosity but a deep search for certainty, meaning, and spiritual peace. This difference highlights a gap in the literature, as faith-based health information remains underexplored in information behaviour studies.

However, most studies on health information behaviour within Saudi Arabia have neglected the religious aspect. The majority of these studies have used quantitative methods, mainly surveys, to measure how frequently people use different sources of medical advice. Their findings varied: some identified doctors as the most trusted source (Alduraywish et al., 2020). Nonetheless, these

studies rarely included religion or scholars as information sources. This difference highlights a gap in the literature, as faith-based health information remains underexplored in information behaviour studies, particularly in contexts where religious authority may play an active role in everyday decision-making.

In information science, cognitive authority refers to the credibility or influence granted to a source because people believe it knows more or understands better (Wilson, 1983). Previous studies have examined this concept mainly in secular contexts. This study extends that understanding by showing that, in Islamic settings, authority can also arise from religious legitimacy. Fatwa seekers evaluate information not only according to medical evidence but also based on its consistency with Islamic rulings and its alignment with religious values, alongside their trust in the scholar as a recognised religious authority.

Conclusion

This study maps how chronically ill Muslims in Saudi Arabia express religion-related health information needs through fatwa questions, showing that faith routinely structures everyday health decision-making. Recognising fatwas as authoritative information sources can guide culturally sensitive health information services and encourage practical collaboration between clinicians and religious scholars.

The use of only Sunni fatwa platforms means that the results primarily reflect Sunni contexts and may not apply to other Islamic traditions. Second, the study focuses solely on the 'information needs' expressed in the questions, without tracking the subsequent process such as the inquirer's satisfaction with the answer, its practical application, or its final impact on their health decisions and treatment adherence. Therefore, future research should conduct in depth interviews with chronically ill patients to understand how they seek, select, interpret, and evaluate religious fatwa against medical recommendations, ultimately revealing how they balance these two sources of authority in their daily health management.

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Appendix

Table 5. Themes identified in the analysis of health fatwa questions.

Theme	Definition	Inclusion indicators — typical codes / key terms	Original question in Arabic	English translation
1. Religious adaptation of worship under illness	How inquirers seek to reconcile ritual obligations with health constraints. This includes requests for religious concessions (rukhsah), instructions for qada (making up missed fasts), fidyah/kaffarah (compensation/expiation), or procedural modifications (e.g., praying seated).	effect of treatment on fasting; prayer modification (sitting); qada; fidyah/kaffarah; religious exemption for chronic illness	*"رمضان الماضي ما صمت 25 يوما بسبب مرض القولون... وقرب رمضان وما أديت الذي علي، ماذا أفعل؟"*	*"Last Ramadan I missed 25 days because of colon illness... Ramadan is near and I have not made them up, what should I do?"*
2. Negotiating religious boundaries in healthcare	How medical practices are tested or re-framed at the boundary of what is religiously permissible—invoking principles like necessity (darura), harm/benefit balancing, or temporary permissions. Includes gendered care, exposure of ʿawrah (The intimate parts of the body that must be covered for reasons of modesty in Islamic law.), and whether 'forbidden' materials may be used under necessity.	exposing ʿawrah for treatment; same-sex clinician request; necessity permits prohibition; permissible in emergency; temporary authorization	*ما حكم نقل الدم من شخص لآخر؟* *هل يجوز لنا نحن الرجال أن نعالج على يد ممرضة، خاصةً مع وجود ممرضين رجال؟*	*"What is the ruling on transferring blood from one person to another?"* *"Is it permissible for us men to be treated by a female nurse, especially when male nurses are available?"*
3. Validation of information sources	How questioners seek, cite, or evaluate authorities and evidence: requests for textual proof, reference to specific scholars or official fatwa bodies, or reliance on a named medical opinion. Focuses on source credibility and traceability.	request for dalīl / evidence; cite Fatwa Council / named scholar; reference to medical guideline/doctor; asking for sanad/authority	*" الطبيب ينصحني بعدم الصيام، فهل أتبع نصيحة الطبيب أم أصوم حسب استطاعتي؟"*	*"The doctor advises me not to fast, should I follow the doctor's advice, or fast according to my ability?"*
4. Faith-based motivations and spiritual interpretation	How illness and treatment are framed within religious meaning: interpretations as trial/ibtila, spiritual healing ruqya (An Islamic healing practice based on the recitation of Qur'anic verses believed to provide spiritual and physical healing.), concepts of tawakkul (reliance on	trial/ibtila; tawakkul; ruqya/healing by Quran; spiritual interpretation of illness; reward/purification	*هل صحيح أن المرض يُطهّر الإنسان من الذنوب؟* *قررتُ التوقف عن غسيل الكلى والتوكل على الله. بدلًا من ذلك، أستخدم ماء زمزم والعسل وأقرأ القرآن للرقية. إذا متُّ، فهل يُعدّ هذا هلاكًا لي، أم مجرد أجلي؟*	*"Is it true that illness can purify a person from sins?"* *"I decided to stop dialysis and rely on Allah with tawakkul (trust in God). Instead, I use Zamzam (sacred water from Mecca), honey, and recite the Qur'an for ruqya (spiritual healing). If I die, is this considered destroying myself,*

	God), sabr (patience), or theological readings of illness.			*or simply my ajal (fixed time of death)*?"
5. Religious refusal of treatment and medical advice	Instances where medical treatment or advice is declined or reinterpreted through religious conviction—e.g., refusal based on belief that healing is solely from God (tawakkul), or considering medical intervention as unacceptable.	refusal of treatment for religious reasons; tawakkul as justification for non-treatment; preference for spiritual remedy only; doctrinal objection to specific therapies	هل يجوز رفض العلاج الكيميائي أو الجراحة لإزالة الورم؛ لأنه يحتمل الشلل أو فقدان الإحساس، ويطيل العمر بضع سنوات فقط، ويزيد الألم والمعاناة، وإذا تركته دون علاج فإن الموت يكون أسهل وأقل ألماً؟	Is it permissible to refuse chemotherapy or the surgery to remove the tumour; because there is a risk of paralysis or loss of sensation, and it only prolongs life by a few years, increasing pain and suffering, and if I leave it untreated, death would be easier and less painful?"

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Repetition, regulation and reappraisal: information behaviour in persistent coping with chronic illness in families

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Abstract

Introduction. Little is known about how specific information behaviours and coping strategies intersect within family groups over time, thus we report on a longitudinal investigation of the information and coping behaviours of families managing chronic illness.

Method. Longitudinal, mixed methods study with family group interviews, individual interviews, and surveys of HIV/AIDS or Type 2 diabetes patients and their family members (n=38 families and 97 individuals).

Analysis. Descriptive and correlational quantitative analyses of survey data. Multicycle coding of interview data.

Results. Families primarily used incidental information behaviours as they coped with chronic illness in the long-term, reflecting a *persistent coping* process. Persistent coping encompassed ongoing cognitive appraisal/reappraisal through daily monitoring and routinised, repetitive information behaviour. Seeking spiritual support, the most common coping strategy, and coping-related information behaviours, such as seeking, using or avoiding information to maintain hope or to provide cognitive reassurance, helped with emotional regulation in response to the stress of illness.

Conclusion. Information behaviour and coping in families managing chronic illness was routinised and focused on monitoring for changes as families continuously appraised whether their current coping strategies were sufficient. Information use was primarily focused on regulation of emotional responses to the illness-related stressor.

Introduction

Chronic illnesses are lifelong, incurable health conditions. More than 76% of US adults have at least one chronic illness (Watson, Wiltz, Nhim, Kaufmann, Thomas, & Greenlund, 2025). Chronic illnesses require long-term lifestyle and medical management. Therefore, their management becomes embedded in patients' lives, relationships, and homes (e.g., Mirzaei et al., 2013). Chronic illness diagnoses are often sources of stress for both patients (Livneh, 2022) and their families (Schott & Badura, 2024; Damen et al., 2022). This stress, a feeling that environmental stimuli are taxing an individual's available resources or endangering their well-being (Lazarus & Folkman, 1984), can have harmful impacts on the health of both patients and their family members (Schott & Badura, 2024; Stein & Rotheram-Borus, 2004). Hence, families must effectively cope with chronic illness to manage stress and benefit members' long-term health (Livneh, 2022).

Coping strategies, 'thoughts and behaviours used to manage the internal and external demands of a stressful situation' (Stephenson & DeLongis, 2020, p. 55), are psychosocial responses to stress. Individual coping may make illness-related stress feel manageable (Felton & Tracey, 1985) for individuals, particularly when strategies are rooted in self-compassion (Ewert et al., 2021). Coping may also occur at the family level (Årestedt et al., 2014). Family members help patients cope with their illnesses (Cole & Reiss, 2013), while also coping for themselves. Furthermore, dealing with chronic illness as a family necessitates ongoing efforts to 'create new patterns for family functioning' (Årestedt et. al., 2014, p. 31).

Information plays a role in coping among both patients and their family members (e.g., Mason et al., 2022). Various information behaviours—defined here as the ways in which people interact with information, including information seeking, sharing, and use (Bates, 2010)—may occur within different types of coping actions. For instance, seeking new information, either together or individually, and being attentive to threatening information (*monitoring*) are often identified within health psychology as active coping behaviours (Ben-Zur, 2002). Similarly, avoiding information (*blunting*) (Ben-Zur, 2002) can help people with chronic illness by minimising anxiety or perceived threat (Ben-Zur, 2002). Information use, the *application* of information to a given situation (Kari, 2010), can also play a role in coping as information helps patients form cognitive representations for their illness (Chen, 2015). These representations help patients to make sense of their illness (Chen, 2015; Hagger & Orbell, 2022), particularly understanding symptoms, lifestyle needs, and treatment options (e.g. Clarke et al., 2016; Livneh & Martz, 2014). Information may also be sought and/or used for the purposes of *emotional regulation*, a process of controlling which, when, and how emotions are experienced as well as how they are expressed (Gross, 2014; Trudel-Fitzgerald et al., 2024).

Despite recognition of the relationship between information behaviours and coping, little is known about how family groups use information behaviours in their coping processes through time. Limited work has hinted at complexity as people balance their own and others family members' preferences for illness-related uncertainty (Brashers et al., 2002). Additionally, although scholars have highlighted the fact that illness-related information behaviour varies in intensity over time (Chen, 2016), there is limited understanding of the roles that information may play in *long-term* coping processes. That is, after the confusion and uncertainty of the pre- and initial-diagnosis period (e.g.; Chen, 2015; Benham-Hutchins et al., 2017) has passed, what information behaviour emerges, and how does it relate to coping? Accordingly, we ask the following research questions:

> **RQ1:** *What information behaviours do families perform in the process of coping with chronic illness?*
> **RQ2:** *What role, if any, do these information behaviours play in family-based coping?*
> **RQ3:** *How do the dynamics of information behaviour and family-based coping change over time, if at all?*

Literature review

The process of coping with chronic illness

Coping has been studied within health psychology for over 40 years, and it is conceptualised as a process involving responses to a stressor—an environmental stimulus which may trigger distress in an individual—ideally leading to *psychological adjustment* to that stressor over time (Milky & Nayak, 2023). Coping responses include ongoing and changing *cognitive* and *behavioural efforts* to manage the psychological demands of the stressor (Lazarus & Folkman, 1985). Coping strategies have been classified as having a focus on solving problems or managing emotions, and as passive or active (Biggs et al., 2017). Furthermore, psychological research acknowledges that coping can occur at an individual (e.g.; Ewert et al., 2021) and at a family level (e.g.; Falconier & Kuhn, 2019).

Extant psychology literature establishes that information acquisition plays a part in both the cognitive and emotional aspects of coping (Stanisławski, 2019). Cognitively, a key intersection of information behaviour and coping is at the management of *uncertainty*, or the anticipation of a poorly defined threat (Monat et al., 1972). Uncertainty is important for chronic illness, which represents a source of significant 'biographical disruption' requiring individuals to reconceptualise their lived realities with a new understanding of their bodies with chronic illness (Williams, 2000). Relatedly, key issues such as prognosis and optimal therapy are often unknown at diagnosis (Clarke et al., 2016; Chen, 2015). Such uncertainty can elicit negative emotional responses, such as fear, due to feeling cognitively unprepared (Peterson & Moon, 1999). Although uncertainty is not always a negative experience (e.g., Wilson et al., 2005), it can heighten responses to adverse events and dampen responses to positive events (Gu et al., 2020). Indeed, fear of the unknown, a 'perceived absence of information at any level of consciousness or point of processing', has been proposed as a fundamental fear, and a key cognitive element of anxiety (Carleton, 2016, p. 5). Critically, information acquisition and avoidance have been posited to both increase and decrease uncertainty. Nevertheless, this work has typically maintained a rather uncomplicated view of information behaviour, often reducing it to survey measures of whether information seeking occurred (or not) (e.g., Dekker & de Groot, 2018; Moos & Holahan, 2007; Stanton et al., 2007).

Coping research studies *cognitive appraisal*, wherein individuals evaluate aspects of their environment to determine appropriate coping responses depending upon whether they see them as stressors (Biggs et al., 2017). Individuals also appraise the efficacy of their coping responses, and may reappraise them over time (Biggs et al., 2017). Much psychology research has explored cognitive appraisal when coping with illness-related stress (e.g., Sun et al., 2024), but it has had limited focus upon the role of information behaviour in cognitive appraisal.

Information behaviour in chronic illness

Information science research has established that chronic illness diagnosis often prompts a variety of information needs for patients (Clarke et al., 2016; Ayers & Kronenfeld, 2007). Information needs also emerge for patients' family members (Veinot, 2009a; Veinot, Kim, et al., 2011). However, patients and family members may have conflicting assessments of the need for information in specific situations (Brown & Veinot, 2021; Veinot, Kim, et al., 2011).

Despite family members' potentially distinct information needs, their needs are often poorly met by healthcare institutions (e.g. Yuen et al., 2018). Relatedly, patients and family members often use different information sources. Patients usually have direct access to their health care providers as information sources (e.g., Lamore et al., 2017), while family members rely more upon the patient in their lives for information (Barbarin et al., 2016).

Information acquisition has been established as a means of monitoring individuals' non-work worlds—everyday life information seeking (Savolainen, 2023)—and can help meet the chronic illness-related information needs which become embedded in the day-to-day lives of patients and

their family members. Some information acquisition within families can be intentional and collaborative, such as *joint information seeking* in which individuals seek to meet a shared information need together in the same time and space, or *tag-team information seeking* where individuals break off to seek information about a shared need and then report back to each other (Veinot, 2009b). Information acquisition within families can also be incidental (Williamson, 1998; Erdelez & Makri, 2020), with patients and/or their family members being exposed to information about chronic illness from their networks or environments, without seeking information intentionally (Veinot, 2009b). This may be particularly salient in the information acquisition of those dealing with chronic illness as individuals may have unrecognised information needs and therefore not seek information actively as often as needed (St. Jean, 2017). Additionally, family members may intentionally serve as proxy informants for others (Reifegerste et al., 2020; Jones, Wright, et al., 2018), potentially prompting awareness of needed information.

To date, information use in relation to chronic illness has received less attention than information acquisition. However, some research has shown that information use can help patients make sense of their experiences by developing illness representations (Chen, 2015, 2016). Health information can be used to assist patients in achieving self-determination, a core psychological concept related to well-being, including forming identity, and asserting autonomy (Lee et al., 2021; Wolf & Veinot, 2015; Zhang, 2016). Individuals can also use information to support their own illness-related decisions and behaviours (e.g., Greyson & Johnson, 2016; Threats & Bond, 2021; Veinot, Meadowbrooke, et al., 2013). They may also use information to influence the health behaviours of family members with chronic illness (Veinot, Kim, et al., 2011; Brown & Veinot, 2021). Nevertheless, we know little about how information is used within family coping, particularly if the information is first acquired collaboratively.

Finally, it is known that chronic illness and associated information needs fluctuate over time. Yet there is limited longitudinal research regarding health information behaviours. Those who used longitudinal methods have primarily focused on individual information behaviours (St. Jean, 2012; St. Jean et al., 2018; Chen, 2012, 2017). Little work has investigated longitudinal information behaviour within family groups, and even less has charted its relationship to illness-related coping.

Methods

Study data were collected with families managing one of two chronic illnesses: HIV/AIDS or type 2 diabetes in a state in the US Midwest. HIV/AIDS and diabetes were selected to provide variety in treatment and lifestyle requirements. Families participated in the study for two years on average, including up to five contacts. In this paper, we use the symbols 'T1', 'T2', 'T3', 'T4', and 'T5' to designate which of the five contacts were the source of reported data. This study was approved by the university's Health Sciences and Behavioral Sciences Institutional Review Board.

Recruitment

Patients were recruited via flyers through illness-specific nonprofits; via in-person recruitment in waiting rooms at a large veterans health affairs centre; or a university's online participant-recruitment service. Recruitment used quota-sampling to ensure roughly equal family numbers from each illness group. Patients recruited their family members into the study using snowball sampling. The definition of *family member* was left to patients' discretion to allow for close people outside of biological and legal family. Participants were provided with a $20 incentive payment after each interview. Thirty-eight family groups were ultimately recruited, including a total of 97 individual patients and family members.

Data collection

Data collection methods included individual and family group interviews and individual surveys (figure 1). Semi-structured individual interviews (Johnson, 2002) followed the 'family case method' (Handel, 2014) whereby individual perspectives were sought about the family (Åstedt-Kurki et al., 2001). Additionally, family group interviews were conducted as modified focus groups (Eggenberger & Nelms, 2007). Interviews were conducted at participants' chosen locations, lasted 90-120 minutes, were audio-recorded, transcribed verbatim, verified, and de-identified.

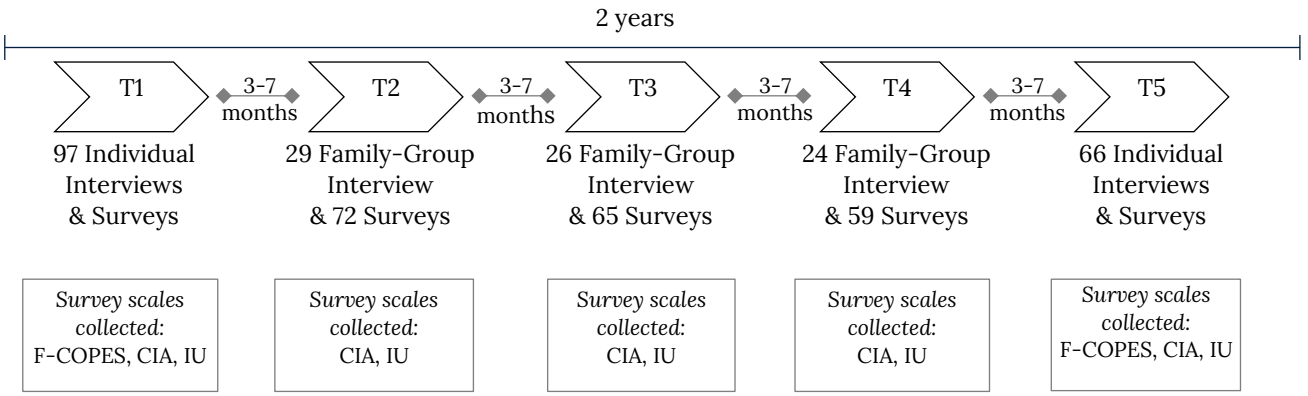


Figure 1. Data collection timeline.
F-COPES = Family crisis-oriented personal evaluation scales;
CIA = Collaborative information acquisition, IU = Information use.

Measures

Surveys, completed individually by both patients and family members, included demographic questions and, for patients, health-related questions (self-rated health, current therapy, current laboratory measures). Surveys for both included scale indices of collaborative information acquisition, information use of collaboratively acquired information (Jones, Piscotty, et al., 2023; Veinot, Meadowbrooke, et al., 2013; Veinot, 2009b), and family coping styles (McCubbin et al., 1981). Subscales for all three topic scales evaluated specific coping strategies used, form of collaboration in information acquisition, and application domain of information use and are listed and described in Table 1.

Measure name	Description	Sample question
Overall coping (F-COPES) (28 questions) (McCubbin, et al., 1981)		*Response prompt*: When we face health-related problems or difficulties in our family, we respond by… *Response scale*: 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, 5) Strongly agree
Acquiring social support (9 questions)	Families' ability to gain support from personal social contacts[1]	- Sharing our difficulties with relatives.
Mobilising family to acquire and accept help (3 questions)	Families' ability to access community resources and other help[1]	- Seeking assistance from community agencies or programs designed to help families in our situation.
Passive appraisal (4 questions)	Families' ability to accept problematic issues and minimise reactivity[1]	- Accepting stressful events as a fact of life.
Reframing (8 questions)	Families' ability to redefine stressful events to feel more manageable[1]	- Defining the family health problem in a more positive way so that we do not become too discouraged.
Seeking spiritual support (4 questions)	Families' ability to obtain spiritual or religious support[1]	- Attending religious services.
Overall collaborative information acquisition (CIA) (13 questions) (Veinot, 2009b; Jones, Piscotty, et al., 2023; Veinot, Meadowbrooke, et al., 2013)		*Response prompt*: In the past 4 months, I got diabetes (or HIV/AIDS) information when… *Response scale*: 0) Never, 1) Rarely, 2) Occasionally, 3) A moderate amount, 4) A great deal
Joint information acquisition (6 questions)	Multiple individuals seeking health information synchronously to meet an acknowledged, shared information need[2]	- With a family member, I contacted people or organisations that might help me.
Mediated information acquisition (7 questions)	Individuals are exposed to health information through social interactions that may not be intended to be health-related interactions[2]	- On his or her own, a family member contacted people or organisations that might help me.
Overall information use (IU) (16 questions) (Jones, Piscotty, et al., 2023; Veinot, et al., 2013)		*Response prompt*: In the past 4 months, I used diabetes (or HIV/AIDS) information that my family helped me get in order to… *Response scale*: 0) Never, 1) Rarely, 2) Occasionally, 3) A moderate amount, 4) A great deal
Emotional (4 questions)	Information used to meet psychological or emotional needs	- Help me feel hopeful about my diabetes (or HIV/AIDS).
Decision-making and health behaviour (3 questions)	Information used to make decisions or to change/validate health behaviours	- Make diabetes- (or HIV/AIDS-) related treatment or self-care decisions.
Health/social care interactions (4 questions)	Information used in conversations with medical providers or community organisations	- Double-check my health care provider's recommendations for managing diabetes (or HIV/AIDS).
Family interactions (5 questions)	Information used for family interaction	- Educate a member of my family about diabetes (or HIV/AIDS).

Table 1. Survey scale measures.

Data analysis

Qualitative data analysis

Interviews were analysed using a multistage approach with NVivo software (QSR International Pty Ltd, 2020). This started with provisional and structural coding (Saldaña, 2009) using a preliminary codebook based on collaborative information behaviour (Veinot, 2009b; Veinot, Kim, et al., 2011) and family coping (McCubbin et al., 1981) research.

Second-cycle inductive coding (Saldaña, 2009) then focused on study research questions. This included pattern and process coding (Saldaña, 2009) to develop an understanding of how coping processes unfolded in study families.

Quantitative data analysis.

Scale values were calculated by combining each participant's responses to survey questions for the given scale/subscale at each contact and then dividing this by its number of questions. This resulted in final values that ranged according to the original survey response scale. These were either 0-4 (never to often) for both information behaviour scales or 1-5 (strongly disagree to strongly agree) for the coping scale. These scale values were summarised descriptively and compared within families by subtracting the highest individual scale value from the lowest within each family at each time.

Results

Demographics

In total, 97 individuals and 38 family groups participated. Of these, 23 families and 66 individuals remained enrolled until the last contact (T5) (*table* 2). Participants were majority White/Caucasian (63%) or Black/African American (30%). The sample included more women than men.

	Time 1 (T1)	Time 2 (T2)	Time 3 (T3)	Time 4* (T4)	Time 5 (T5)
Family groups by disease type					
Diabetes	20	15	13	13	13
HIV/AIDS	18	14	13	11	10
Total family groups (retention rate)	38	29 (76%)	26 (68%)	24 (63%)	23 (61%)
Individuals – race/ethnicity					
White	61 (63%)	48 (67%)	41 (63%)	38 (64%)	41 (62%)
Black/African American	29 (30%)	19 (26%)	21 (32%)	17 (29%)	21 (32%)
Hispanic/Latino	4 (4%)	4 (6%)	2 (3%)	2 (3%)	2 (3%)
Asian/Pacific Islander or Native American	3 (3%)	1 (1%)	1 (2%)	2 (4%)	2 (3%)
Total Individuals (Retention Rate)	97	72 (74%)	65 (67%)	59 (61%)	66 (68%)
Individuals – gender					
Women	54	39	36	35	39
Men	43	33	29	24	26
Patient health status					
Months since diagnosis at study start. (median [IQR])	132 [72-412]	--	--	--	--
Self-reported health** (median [IQR])	3 [3-4]	3 [3-4]	3 [3-4]	3 [3-4]	3 [3-4]
CD4 count (HIV)† (median [IQR])	562 [333.25-880.50]	568 [503-887.50]	550 [407.50-837.50]	675 [507.25-870]	700 [446-779]
Viral load (HIV)‡ (median [IQR])	0 [0-75]	49 [36-65.25]	58 [48-32500]	62 [45-10056.25]	36 [18-48.5]
HBA1c (diabetes)+ (median [IQR])	7 [6.75-8.35]	7 [6.43-8.63]	7 [6.83-8]	7 [6.45-7.45]	7 [6.25-7.65]

*Includes opt-in home tour, resulting in exclusion of some at Time 4 only.
** Self-reported health ranges from 1 = poor to 5 = excellent
† CD4 measures immune cells in blood, higher values indicate better HIV control. Tested regularly for monitoring of HIV status in treatment (Hayden, et al., 2017)
‡ Viral load measures the amount of HIV cells in blood, higher values indicate more active/less controlled HIV, sometimes tested to monitor for possible treatment failure (Hayden, et al., 2017)
+ HBA1c measures 3-month average blood sugar percentage in blood, 7 or lower generally indicates better diabetes control (Eyth, et al., 2025)

Table 2. Participant demographics.

Family illness context

Most patients and their family members had been dealing with HIV or diabetes for multiple years (median 132 months; Table 2). Patients, on average, reported their health as being fair to good throughout the study (Table 2). Relatedly, median disease-related count values (CD4 counts and viral loads for HIV patients and HbA1c for diabetic patients) were also largely consistent throughout the study and indicative of good disease control. As such, family members and patients described the illness as a background stressor in their day-to-day lives, rather than as an acute current stressor. As one family member described:

> …once you find out this is your lifestyle - this is how you need to eat and this is how you need to take care of yourself - that's just how you live…he's had [diabetes] so long…it's just his lifestyle. *[DF-F2-00-01-01, family member, T1]*

RQ1: What information behaviours do families perform in the process of coping with chronic illness?

Most participants had reported performing family coping (F-COPES) behaviour infrequently during the study (Table 3, measured at first and last contacts). Coping scores were low across all five coping categories, with median values below neutral (3) for overall coping as well as 3 of the 5 coping subscales (Table 3). *Seeking spiritual support* and *acquiring social support* had slightly higher median values, but they were still below agreement. Coping subscales showed little difference between family members.

Mean (SD)	**Time 1 (T1) n = 97**	**Time 2 (T2) n = 72**	**Time 3 (T3) n = 65**	**Time 4 (T4) n = 59**	**Time 5 (T5) n = 66**
*Agreement with use of coping strategies**					
Mobilising family to acquire and accept help	2.35 (0.639)	--	--	--	2.18 (0.552)
Passive appraisal	2.59 (0.672)	--	--	--	2.58 (0.488)
Reframing	2.47 (0.369)	--	--	--	2.29 (0.340)
Acquiring social support	3.53 (1.07)	--	--	--	3.13 (0.689)
Seeking spiritual support	3.29 (0.790)	--	--	--	3.27 (1.09)
Overall coping	2.91 (0.416)	--	--	--	2.73 (0.403)
*Frequency of information use behaviours***					
Information used for health behaviour and decision-making	2.01 (1.15)	1.66 (1.16)	1.32 (1.34)	1.02 (1.25)	1.07 (1.30)
Information used for psychological or emotional purposes	1.51 (1.14)	1.33 (1.12)	1.12 (1.08)	0.690 (0.979)	0.790 (1.04)
Information used for interacting with health and social care	1.36 (1.17)	1.11 (1.09)	0.873 (1.14)	0.487 (0.924)	0.544 (0.951)
Information used for family interaction	1.34 (1.11)	0.959 (0.943)	0.764 (1.01)	0.396 (0.759)	0.495 (0.785)
Overall information use	1.51 (1.01)	1.18 (0.983)	0.981 (1.01)	0.547 (0.828)	0.667 (0.883)
*Frequency of collaborative information acquisition***					
Mediated information acquisition	0.760 (0.688)	0.701 (0.744)	0.612 (0.745)	0.371 (0.509)	0.472 (0.628)
Joint information acquisition	0.715 (0.739)	0.787 (0.861)	0.558 (0.816)	0.342 (0.628)	0.344 (0.518)
Overall collaborative information acquisition	0.830 (0.763)	0.755 (0.771)	0.631 (0.789)	0.370 (0.555)	0.415 (0.546)
* scales range from 1 (strongly disagree) to 5 (strongly agree) ** scales range from 0 (never) to 4 (often)					

Table 3. Self-reported coping strategies and information behavior over time.

Information Acquisition

The reported frequency of collaborative information acquisition was similarly low. For collaborative information acquisition, overall collaborative information acquisition and the joint and mediated acquisition subscales had median values between 0 (never) and 1 (rarely) for all time points.

Despite the overall low survey scale values, qualitative data revealed that coping and information behaviours were built into routines for managing the illness. Specifically, healthcare-recommended routines such as quarterly laboratory testing, daily blood sugar tracking, medication taking and follow-up healthcare provider visits were anticipated, regular information sources. One patient explained, '*...I'm always gonna keep up with it because I have doctor's appointments on a regular basis, take meds on a regular basis, get bloodwork and we'd see...if they're not working in the right direction*' *[HP-M1-00-24-00, patient, T3]*. When things were going well, and with the confidence that they could detect a negative change (*reframing*), many participants chose not to actively dwell upon the illness.

Observation of the patient was also an important and ongoing source of information, both for patients and family members. This could also be assessed through daily routines, like tracking adherence by watching a patient take medication at a shared meal, or it could be discovered through regular conversation. A family member explained, *'I'm...always checking on [patient], I'll call him on my breaks or my lunch, and then I call him on my way home' [HF-F2-00-17-02, T3]*. These monitoring behaviours produced an awareness of the status of illness management which, when it met requirements, also permitted low ongoing coping effort through cognitive reframing of the illness-related stress. One family member explained, '*...in dealing with him, because he's not sickly or anything like that, it's not a big deal' [HF-F1-00-12-01, family member, T5]*.

Both patients and family members also acquired information about their illness incidentally through monitoring their environments. Specifically, other people with the illness whom they knew personally were monitored, allowing them to appraise their own illness management by comparison. A participant explained, '*My neighbour of long time, his health was failing because of diabetes. I hear it everyday...*' *[DF-M1-00-10-01, family member (also diabetic), T5]*. As this quote shows, such information was obtained in regular conversations. Information could also be obtained through ongoing media consumption. For instance, a patient with HIV discussed a news story about a person having the HIV virus eradicated from their body. He said:

> I was at work when I first heard [radio story] about it, it was exciting. That's major...Gives renewed hope to a lot of people. But, yeah, it's not really so much for myself but it makes...finding a cure a little bit more realistic...it's refreshing to hear it's not been forgotten. *[HP-M2-00-14-00, patient, T5]*

Information acquisition focused on monitoring the situation sometimes gave way to more active information seeking. This typically occurred either because of a change in patient's health status or therapy, or due to emerging scientific discoveries like the one above. Some patients engaged in active information seeking to improve their current therapy after incidental information acquisition, again often obtained via routines like watching television or listening to the radio. For instance, an insulin pen advertisement on television prompted a diabetes patient and her family members to seek information on it as they knew she was struggling to maintain adherence to her insulin. The family discussed it at the T3 family group interview:

> *DP-F2-00-05-00 (patient)*: There's a lot of advertising lately about a pen...so that you don't have to do the vial and the needle and all that.
>
> *DF-F2-00-05-01 (wife)*: It doesn't have to be refrigerated like the other things.

> *DF-F2-00-05-02 (mother)*: It'll come to you right in the mail, you just have it sent to your house.
>
> …
>
> *DP-F2-00-05-00 (patient)*: But when I asked [doctor] about it, I was told I can't get it…[health system] will not provide it to me

When the patient was unsuccessful, another family member continued to independently seek information without being directly asked to do so, to find an alternative means of access with a goal of sharing it with her stepdaughter.

> …it's something that DP-F2-00-05-00 wanted to be on. I think DP-F2-00-05-00's issue was more a financial …And my sister is usually very good at knowing places that would…help her financially, or programs that are out there …"
> *[DF-F2-00-05-03, family member, T5]*

Information Avoidance

Many participants wished to avoid information about potential negative health consequences of their condition. Rather, they wanted to deal with it only if or when complications arose, focusing instead on maintaining healthy behaviour in the present. However, avoidance of information about potential negative consequences was not universal, even within families. A family member speaking about the risk of diabetes-related complications, said: *'I'm scared to death. I don't want my legs to be amputated or my toes or my feet, it's scary … and it seems to me that my sister and my mom were in denial and it's like…I'm too smart…to be in denial' [41-DF-F2-00-41-04, T5].*

Information Use

Use of information acquired collaboratively was infrequent. Median values were between 0 (never) and 1 (rarely) for all time points except T1 when the median value was 1.47 (between rarely and occasionally) and T2 when the value was 1 (rarely). Most subtypes of information use followed this pattern but with even lower median values, except for information use for decision making, which had a median value of 2 (occasionally) at T1 and 1.66 (between rarely and occasionally) at T2, and 1 (rarely) at T3. Information used for emotional purposes was the next most frequently reported behaviour, with median values of at least 1 (rarely) for T1-T3.

Notably, there was frequent quantitative disagreement in the reports of the frequency of these behaviours across different people in the same family unit (Table 4). The most pronounced differences were seen for information use: all subscales had a median within family difference above 1 for the first 3 contacts.

Median (IQR)	Time 1 (T1) n = 97	Time 2 (T2) n = 72	Time 3 (T3) n = 65	Time 4 (T4) n = 59	Time 5 (T5) n = 66
*Coping strategies**					
Mobilising family to acquire and accept help	0.66 (0.33-1.00)	---	---	---	0.67 (0.33-0.83)
Passive appraisal	0.75 (0.50-1.13)	---	---	---	0.50 (0.25-0.75)
Reframing	0.38 (0.13-0.50)	---	---	---	0.25 (0.13-0.63)
Acquiring social support	0.78 (0.44-1.11)	---	---	---	0.56 (0.39-0.78)
Seeking spiritual support	0.75 (0.50-1.19)	---	---	---	0.75 (0.13-1.00)
Overall coping	0.26 (0.10-0.48)	---	---	---	0.32 (0.11-0.46)
*Information use behaviours***					
Information used for health behaviour and decision-making	1.33 (0.67-2.33)	1.33 (0.67-1.67)	1.00 (0.33-2.00)	0.83 (0.00-2.17)	0.67 (0.00-2.17)
Information used for psychological or emotional purposes	1.50 (1.00-2.06)	1.38 (0.25-1.56)	0.75 (0.50-1.50)	0.75 (0.00-2.25)	0.50 (0.00-1.50)
Information used for interacting with health and social care	1.50 (0.75-2.25)	1.29 (0.75-1.75)	0.63 (0.00-1.50)	0.25 (0.00-0.88)	0.25 (0.00-1.38)
Information used for family interaction	1.20 (0.80-1.80)	0.90 (0.45-1.20)	0.80 (0.10-1.60)	0.00 (0.00-1.00)	0.20 (0.00-0.60)
Overall information use	1.19 (0.84-1.78)	1.06 (0.50-1.56)	0.66 (0.27-1.31)	0.31 (0.00-0.95)	0.31 (0.19-0.88)
*Collaborative information acquisition***					
Mediated information acquisition	0.79 (0.43-1.11)	0.43 (0.14-0.82)	0.57 (0.11-1.18)	0.36 (0.14-0.57)	0.43 (0.14-0.89)
Joint information acquisition	0.67 (0.33-1.17)	0.67 (0.17-1.00)	0.42 (0.17-0.67)	0.17 (0.00-0.58)	0.33 (0.00-0.67)
Overall collaborative information acquisition	0.81 (0.46-1.00)	0.46 (0.15-0.85)	0.46 (0.15-0.88)	0.19 (0.06-0.67)	0.23 (0.08-0.85)

Note: Lower values indicates greater agreement; higher values indicate greater disagreement in reported behaviours.
* scales range from 1 (strongly disagree) to 5 (strongly agree)
** scales range from 0 (never) to 4 (often)

Table 4. Median within-family agreement for information behaviour and coping subscales.

Qualitatively, one of the primary uses of information obtained collaboratively was *appraisal* of the status of the illness and of ongoing coping strategies and health behaviour. This typically involved comparisons between what was currently happening and information about optimal disease management, allowing participants to determine if their current coping activities and resources were sufficient, providing cognitive reassurance if this appraisal was positive or prompting adjustments to either coping or resources if not. For example, a diabetes patient said that she was '*...eating a little better...doing a little bit more of what I am supposed to and not the stuff I'm not supposed to*' [DP-F1-00-10-00, T2]. Alternatively, participants compared their own or family member's health status to other patients. For instance, after discussing his neighbour's failing health, DF-M1-00-10-01 said at T5, '*I thank God that nothing has occurred to me*'.

RQ2: What role, if any, do these information behaviours play in family-based coping?

Overall, the greatest frequency of, and largest correlations between information behaviours and coping, were for seeking spiritual support and acquiring social support. Therefore, we focus on these coping types here. For seeking spiritual support, Table 3 shows that this strategy was the most commonly used approach. Although information behaviours may play some role in seeking spiritual support, quantitative analyses indicated that this was limited (Table 5). There was a weak, but significant, correlation between seeking spiritual support and collaborative information acquisition (r^2: 0.194). This focused primarily on mediated information acquisition (r^2: 0.182). Correlations with information use were slightly stronger, but still weak (ranging from r^2 of 0.207 for information use for healthcare interactions to 0.285 for information use for decision making).

R2 (p-value)	Acquiring social support	Mobilizing family to acquire and accept help	Passive appraisal	Reframing	Seeking spiritual support	Overall coping
Information use behaviours						
Information used for health behaviour and decision-making	**0.38*****	**0.24*****	-0.15	**0.19****	**0.28*****	**0.38*****
Information used for psychological or emotional purposes	**0.42*****	**0.34*****	**-0.17****	0.14	**0.27*****	**0.37*****
Information used for interacting with health and social care	**0.31*****	**0.24*****	-0.11	**0.17****	**0.21****	**0.31*****
Information used for family interaction	**0.37*****	**0.30*****	-0.04	**0.27*****	**0.23*****	**0.38*****
Overall information use	**0.39*****	**0.31*****	-0.14	**0.22*****	**0.27*****	**0.38*****
Collaborative information acquisition						
Mediated information acquisition	**0.40*****	**0.28*****	-0.01	**0.20****	**0.18****	**0.41*****
Joint information acquisition	**0.25*****	**0.19****	-0.09	**0.22*****	0.10	**0.24*****
Overall collaborative information acquisition	**0.36*****	**0.27*****	-0.03	**0.22*****	**0.19****	**0.37*****
*** - $p < 0.01$, ** - $p < 0.05$						

Table 4. Self-reported coping strategies and information behavior over time.

Qualitatively, many participants made references to using faith and spiritual information to respond to or motivate coping with current realities or to appraise resources or regulate emotional responses to future potentialities (Table 6). Information shared about relevant bible passages was used to help participants figure out next steps and spiritual reflection was sometimes associated with other practical tasks, as this HIV positive patient described: '*I pray every morning…I do my exercises…and then I take my medication, read the Bible*' [HF-M1-00-44-01, T1]. Faith and belief could also be used to reinforce information from medical providers (Table 6).

Related information types and behaviours	Description	Sample Quotes
Responding to current illness *realities*	Thanking God for current health	'And, I've never had that problem [severe blood sugar crashing], thank God'. *[DF-M1-00-10-01, family member (also diabetic), T1]* 'By the grace of God, I'm still here'. *[HP-F1-00-47-00, patient, T5]*
Finding motivation to cope with current illness *realities*	Engaging with spiritual text/activities (Bible reading, praying, attending church services)	'I read my Bible…different verses that people suggest to me...[it] really puts me into the mindset of motivation and of doing positive things especially when I'm down…I turn to…meditation, reading the Bible or something, just so I can get that positive vibe back'. *[DP-F1-00-10-00, patient T3]* '…when I get frustrated, I just turn around and say a little prayer in my head, "God take this away from me", and He does'. *[HP-M2-00-21-00, patient, T5]*
	Trusting in medicine through faith in God	'I was taking the medicine, because…I have sense enough to know that God can work through doctors and work through the medication…God is getting through [the doctors] to help me'. *[HP-F1-00-44-00, patient, T1]*
Appraising resources for future *potentialities*	Making prayer requests	'…[my close friend from church] listens, prayerful, she would pray with me, she would help me to come to a solution'. *[HF-F1-00-26-01, family member, T1]*
	Believing that God will help when issues arise	'… the last time I've been tested [for HIV], I hadn't got it yet but you know, I believe so much in God that it's not bothering me. I'm not scared of it, that's the difference'. *[HF-M1-00-44-01, family member, T1]* 'We're both…believers in "Whatever is gonna happen is going to happen". I mean you have God and the doctors. The doctors have control over a lot of things, but God has control over a lot more, so…' [HF-M2-00-02-01, family member, T5]
Regulating emotional response to future *potentialities*	Future or current complications are part of God's plan and nothing to be afraid of	'He was like, "Honey, you've got too much on your plate again. Didn't God slow you down?"…Cause God did your knee because you were always constantly going"'. *[DF-F2-00-11-02, family member, T5]* 'I'm not scared of HIV because I believe in God and…if you really believe in God and you know where you're going, which is heaven, I'm not worried about it because you're not going to die until He wants you to come home anyway no matter what you have'. *[HF-M1-00-44-01, family member, T1]*

Table 6. Seeking spiritual support sample quotes and related information types.

Acquiring social support was positively correlated with all information use and acquisition subscales. The strongest correlations were between acquiring social support and mediated information acquisition and information use for emotional purposes (both had r^2 values above 0.40).

Qualitatively, acquiring social support could be seen with participants reaching out to others for help. One family member reached out to family friends to share about current realities of patient health and process related emotions; *'They just listened to me vent. They are my ventees. They received my venting' [DF-F2-00-05-01, family member, T5]*. Sometimes acquiring social support also gave people access to mediated information about the illness from others. This could also lead into reappraisal of one's experiences in a way that made them less fear-inducing. For instance, this diabetic patient received reassurance from a close friend during a hospitalisation:

> … [close friend] called and asked how I was doing… I was telling him how upset I was about them…giving me insulin right away, and he said, 'Well, that's just because they can control it better'…While you're hospitalised. *[DP-M2-00-08-00, patient, T1]*

RQ3: How do the dynamics of information behaviour and family-based coping change over time, if at all?

Although quantitative scores for both types of information behaviour and family-based coping remained relatively low throughout the study, some participants did demonstrate fluctuations (Figures 2-3). Changes were primarily among those who started the study reporting higher levels for these behaviours, with decreasing information and coping behaviours by study completion (families 3, 10, or 11 in Figures 2-3). Most participants who started the study reporting lower values maintained low values throughout. This was also evident in participant accounts, like this family member: *'I guess when I cross that path, you have to take the bad with the good. Or the good with the bad, however you wanna say it. I just have to wait' [DF-M1-00-10-01, family member, T5]*.

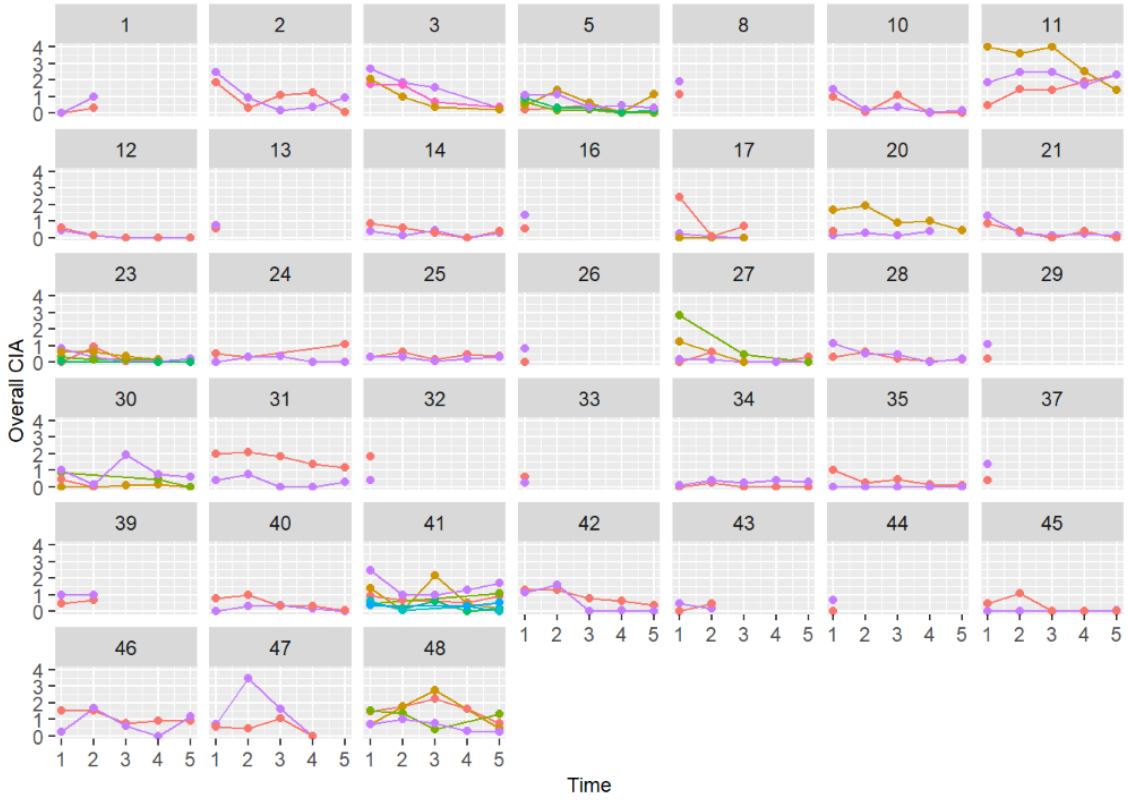


Figure 2. Overall collaborative information acquisition (CIA) over time.
Each color represents a unique participant; each sub-graph represents a unique family group. Response scales range from 0, never, to 4, often.

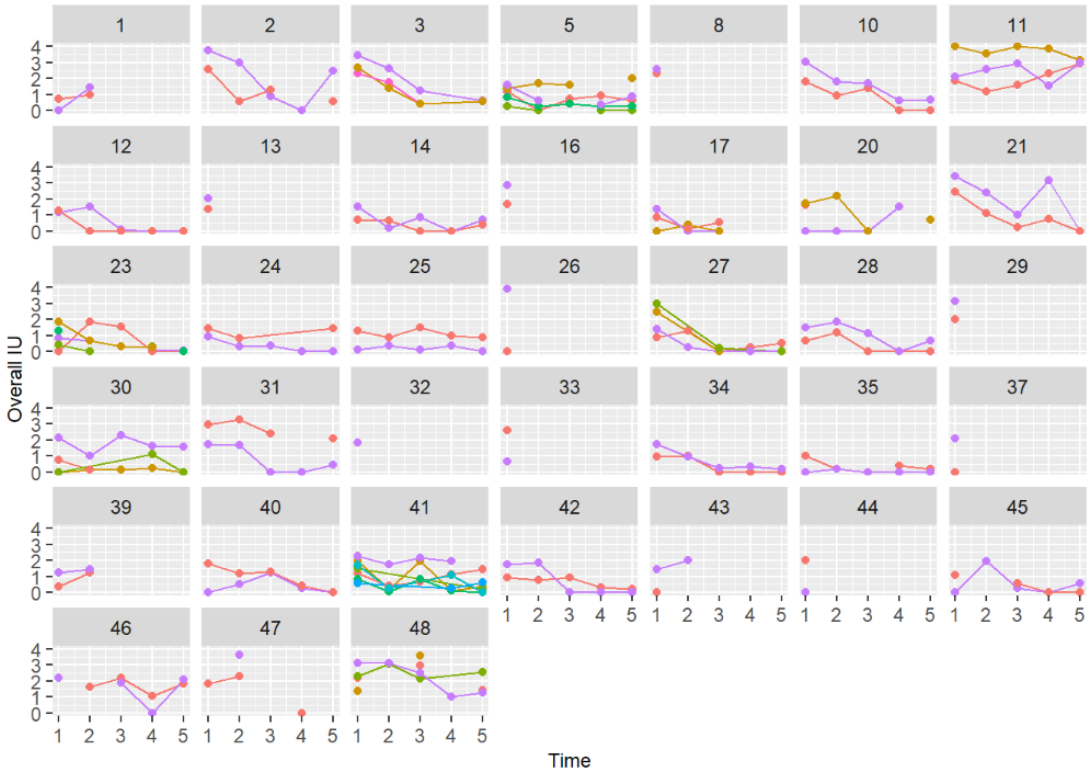


Figure 3. Overall information use (IU) over time.
Each color represents a unique participant; each sub-graph represents a unique family group. Response scales range from 0, never, to 4, often.

When information behaviour frequency did increase, it was typically transient. Qualitatively, some participants experienced illness-related changes, which necessitated greater information acquisition to maintain coping. This family provides an example at T4:

> DF-F2-00-25-01 (*wife*)**:** I look up his medications…to find out…side effects and…he had a bad cough…and the side effect from one of those pills was coughing…
>
> *Interviewer*: … so you were able to figure that out by looking online….
>
> DP-M2-00-25-00 (*patient*): …I told…Dr. [name] about it and she switched me over to something else.

This approach to dealing with transient changes as needed is also evident in this family member's description:

> …we just deal with things as they come up…she's…at a level where it doesn't bother her until she gets sick…It's like being on a level plane and then all of the sudden she gets sick… things get her a little out of whack and then things come back into whack. *[HF-M2-00-02-01, T5]*

There were also some cases in which participants responded that they were performing less information behaviour in the survey, even as they described an increase in routinised forms of this behaviour in interviews. For instance, family 11 did not exhibit an upward trend in information acquisition or use but the patient described his development of new information behaviour routines at T3 after attending a diabetes education seminar earlier:

> I walked into the grocery store… and right away I am picking up boxes and looking at carbohydrates, sugar, how much salt is in it…and then it hit me I never used to do this… *[DP-M2-00-11-00]*

Discussion

Most participants had reached a state in which they utilised a persistent form of coping to manage illness on a day-to-day, routine basis. Overall, patients and family members reported low levels of family-based coping and collaborative information behaviours throughout the study which generally continued to trend down as the study progressed. Even so, participants still engaged in some information acquisition and use, primarily geared towards monitoring the status of the illness and appraising their current approach to managing it. Primarily, related information was acquired incidentally through health management routines and ongoing observation of the patient and the environment. Information gained at various times was also used when forming new health management routines, such as checking food labels at the grocery store. These behaviours helped participants to determine if there was a need for more information, or for any shifts in their coping approaches. The reliance upon routine information acquisition and monitoring, as well as ongoing appraisal, fell under what we call *persistent coping*. We posit that this occurs when there is a chronic, low-level stressor for which current coping processes are sufficient. Though reported values of coping and information behaviour were generally low, weak but significant correlations were observed between support-seeking coping strategies (spiritual or social) and each of: mediated information acquisition and information use for emotional purposes, healthcare or family interactions, and decision-making.

Information behaviour in persistent coping aligns with Savolainen's (2023) model of 'everyday life information seeking'. This model holds that individuals monitor their non-work worlds on an ongoing basis to make sense of them. Everday life information seeking centres around mastery of life, which provides a sense of control and management regarding how well the 'order of things' in life has been maintained (Savolainen, 1995). However, study findings expand upon prior everyday life information seeking work by providing a detailed account of mastery of life in an illness context and expand on findings in other contextual domains about the impact of gained confidence on information behaviours over time (Greyson, 2016). This is also seen in the downward trajectory of observed information behaviour frequency, as greater confidence may have led to decreased perceived information need. Furthermore, the present research shows how appraisal happens on a repeated basis, and how deviations from the expected can result in increased stress and temporary information seeking until an acceptable stress level is again reached.

Psychology research asserts that coping is a process with multiple stages aimed at reacting to a stressor with eventual psychological adjustment (Milky & Nayak, 2023). Coping begins at cognitive appraisal, with reappraisal of coping strategies happening as coping achieves psychological adjustment (Biggs et al., 2017). We enrich this portrait of appraisal and re-appraisal by characterising the ongoing information behaviours that support them. We contend that the information behaviours and ongoing reappraisal revealed in study findings may be a previously unidentified, information-focused coping strategy.

This study also follows prior work (Brown & Veinot, 2021; Veinot, Kim, et al., 2011) in complicating the idea of collaboration in information behaviours. Study participants shared a stressor with their family members but did not necessarily engage in the same coping and information behaviours. This was evident, for example, in how much participants wanted to know about what could happen in the future. Similarly, prior research has established that people have different tolerance for uncertainty (e.g. Brashers et al., 2002; Guan et al., 2021; Massazza et al., 2023). Practitioners should consider different roles and preferences in families managing chronic illness when designing information products and services. For instance, information products could provide introductions

to everyone, alongside more in-depth information that users could choose to view or not through 'expand' options or links.

Study findings reinforce the idea that information has important affective dimensions (e.g., Liu et al., 2025; Savolainen, 2014; Nahl, 2007). A common use of information in family-based coping was for emotional regulation, such as for maintaining hope. Relatedly, information avoidance was also present in these data and this behaviour has long been understood as an effort at emotional regulation through the avoidance of fear (Heinström et al., 2022; Cheng, Zhang, et al., 2024). Continuing to delve into these affective dynamics of information behaviour in chronic illness may assist with supporting the mental well-being of chronically ill individuals and their family members.

This study also demonstrated that a key means of coping with the stress of chronic illness is spiritual. Indeed, many participants turned to their faith for motivation and emotional regulation. Some also treated spiritual texts as information sources to manage uncertainty, similar to previous health research (Cadge & Bergey, 2013). These findings provide additional empirical evidence indicating the importance of everyday lived religious practices, such as bible reading or prayer, as important information activities for meaning making about higher things in life, like chronic illness (Caidi et al., 2025) indicating that facilitation of spiritual information seeking (Nangia & Ruthven, 2023) may be an important place of intervention for health information providers. However, more research is needed to better understand if this spiritual link is relevant to persistent coping in general, or specifically persistent coping with chronic illness as health issues have long been understood to prompt increased religiosity (e.g. Roger & Hatala, 2018).

Most study families engaged in incidental, routinised behaviour rooted in observation rather than active information seeking behaviour throughout the study. This affirms prior work indicating that chronic illness patients transition to monitoring after developing acceptance and management strategies (Chen, 2016). This paper extends that insight by showing why people may subsequently transition out of this monitoring phase to more active seeking, such as health status changes and scientific advancements. Future work should consider how such transitions might be leveraged in health information practice to encourage more timely satisfaction of previously unrecognised information needs (St. Jean, 2017).

Limitations

Participants came from one midwestern US state, making geographical generalisability uncertain, particularly concerning spirituality-related findings. Such findings may be more common in the US than in other national contexts due to the greater religiosity of the US population as compared to other more secular nations (Fahmy, 2018). Relatedly, the high representation of middle-aged and older adults, as well as African American adults (Cox, 2025), may have increased the resonance of spiritual coping and other demographic groupings may demonstrate different patterns of coping. Quantitative results are reported descriptively only due to limited statistical power. Results could also differ for other chronic illnesses with different trajectories of symptoms and complications, or treatment effectiveness. Indeed, most participants having stable health may partly explain the finding of persistent coping.

Conclusion

This study investigated the relationship between family-based coping and information acquisition and use over time in chronic illness. Findings revealed that information acquisition and use observed were embedded into routine as a part of day-to-day monitoring of the chronic illness being managed. This took place until changes triggered movement out of this monitoring phase. Findings also identified a persistent form of coping involving sustained information use for cognitive reappraisal. This information behaviour also aided families in maintaining a sense of control and regulating negative emotions, allowing participants to feel hope for the future.

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Who's a heretic now? Conceptualising information seeking on controversial topics

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Abstract

Introduction. Controversial topics are an increasingly important and understudied context for information seeking.

Method. This paper is a conceptual paper based on a meta-ethnography of literature on controversial topics, followed by an assessment of the characteristics of controversial topics against existing information seeking models.

Analysis. This paper is based on a meta-ethnographic approach to literature on individual controversial topics, and then a literature synthesis based on the newly created definition of controversial topics.

Results. Controversial topics exhibit a variety of characteristics, including stigma and potential loss of community if the 'wrong' decision is made, or interest in the topic is revealed, a need to invest extensive energy in looking for related information, interest in experiential information for many topics, and high emotional investment. None of the existing information seeking models fully account for all of these factors, and many of them make information seekers vulnerable to misinformation and polarisation.

Conclusion. Controversial information seeking is associated with low levels of interpersonal information seeking, stigma, community orientation, and extensive effort. It is poorly accounted for by current information seeking models and thus may not be well supported by information systems. Research is needed to generate a new model and identify key strategies to support effective controversial information seeking.

Introduction

Controversial issues and polarisation have been the focus of much recent public discussion, particularly how they negatively impact families, poison political discourse, and promote misinformation (Epstein & Robertson, 2015; Koutra et al., 2015; Lewandowsky et al., 2012; Seargeant & Tagg, 2019). Both people and technology have been blamed for increasing polarisation. The technological explanation for polarisation is filter bubbles (Pariser, 2011), algorithmic structures that putatively show us what we want to see. The social explanation is echo chambers (Sunstein, 2001), social structures that allow for niche interests and exclude those with disagreeable views. Recent research has questioned the utility of these ideas (Bruns, 2019b) and demonstrated that the picture is more complex. We are being polarised by ideas we did not previously find controversial (Törnberg, 2022), fuelled by social media. An early preprint suggests that this outcome is baked into the very way social media is designed, even when its interactions are simulated by bots (Larooij & Törnberg, 2025). We are poor at fact finding, partly because partisan information informs our search terms (Aslett et al., 2024; Elsweiler et al., 2025), reinforcing our views rather than presenting different ideas.

Alongside polarisation, controversial information is associated with misinformation. In many of the debates where misinformation and disinformation are seen as a particular problem, profound social disagreements about the underlying issue often taint the information environment with COVID-19 and its vaccines being a clear example (Edwards et al., 2021; Islam et al., 2020; Schiavo, 2020), and climate change being another (Benegal & Scruggs, 2018; Farrell et al., 2019; Oswald & Bright, 2022; Vasek, 2011).

Recent research has shown that controversial topics result in complex and unique information behaviours (Koutra et al., 2015; Rieger et al., 2024). Polarisation means that information seeking through people can be socially risky, and even being seen to possess information on one position or another can come at a significant social cost (Bruns, 2019a). The information seeker has to both be vigilant against polarising misinformation from outside, and the risk of personal misjudgements within (Vydiswaran et al., 2015). Whatever the issue, the information seeker is walking a tightrope if their goal is to come to an independent, well-informed viewpoint consistent with their values, rather than a position overly influenced by activists who are intentionally seeking to spread dissent, weaken the public sphere, or trap the public into positions that are helpful to the activists' own purposes (Novin & Meyers, 2017).

Rather than address the specifics of polarisation, misinformation or disinformation, this paper focuses on the particular properties of controversial topic information seeking. We will briefly overview what is already known about controversial topics, and the information systems that meet controversial needs, demonstrating a lack of holistic understanding of controversial information seeking. We will next present a meta-ethnography of work addressing information seeking and behaviour in the context of controversial topics, drawing out common themes and characteristics. We then reflect on how this might interact with existing models of information seeking and behaviour. We illuminate the gaps in current models of human behaviour, highlighting what a useful controversial information model must capture and articulate to benefit researchers and practitioners. From that examination of the state of the art, we present a case for systematically examining information seeking in controversial topics, highlighting key gaps in empirical knowledge. We conclude with an argument for the urgent need to understand the specifics of information seeking behaviour in controversial issues and outline the features that we can already foresee a useful model would include.

Literature review

If we are to embark on an investigation into controversial topics, we first need a definition of what makes a topic controversial. We draw our definition of a controversial topic on recent work on

view change (McKay et al., 2024), and the definitions developed in the field of education (Bailey, 1975; Dearden, 1981; Hare, 1973). Education has a uniquely sophisticated understanding of what constitutes a controversial issue, having two major approaches: *behavioural* and *epistemic*. The former is determined by how people behave around a topic; the latter points to where there are crises between different frames of reference. The behavioural definition (Bailey, 1975) which has wider support, is that there is a topic of public dispute that disturbs a community. However, how to define what disturbs a community remains a fraught question. Drawing on recent work on view change, we instead see potential consequences for the individual as defining: controversial topics are those where if someone's view was known they could suffer adverse consequences in their personal, public, or professional life.

We first look at known information behaviours in the context of controversial topics. We start with reviewing research that specifically addresses controversial topics before looking at information seeking behaviours in related issues such as misinformation and disinformation. We then move our focus to encompass behaviours that are associated with view change, which is a particularly fraught issue in the context of controversial topics. We know that view change is an information-intensive activity (McKay et al., 2024), and that concerns about social monitoring by others alter people's information behaviour in general (McKay, Twidale, et al., 2020; Ruthven, 2022), and information seeking behaviours specifically (Draws et al., 2022; Rieger et al., 2024). Finally, we reflect on and synthesise these different aspects to provide a foundation for developing models that can support the analysis of information seeking behaviours on controversial topics.

We know that the emergence of a controversial topic impacts information seeking behaviour: for example, Koutra et al. (2015) studied web behaviour, both searching and browsing, following a mass shooting event in the USA. As may be expected, this event triggered extensive debate about gun control laws, the second amendment of the USA's constitution, and a range of related issues. Koutra et al. found that there were clear activist users on both sides of the debate who very actively disseminated information that supported their viewpoint. In contrast, most information seekers explored a range of information that was in general more nuanced and balanced. The picture is complex; however, another study (Menachemi et al., 2017) raised another perspective with a similar method, finding that most of the accessed documents from 5.6 million searches were advocacy material with a strongly entrenched viewpoint.

Such shocking events are not the only context for controversial information seeking. Limberg (1999) investigated how students engaged with information when researching the question of whether Sweden should join the European Union. Her analysis examined how individual students tried to form their own opinion with the available information. Insights from the study revealed that key activities included basic fact-finding, balancing sources, and analysing motivations. The balancing of sources involved ensured they had multiple viewpoints on the topic, and motivation analysis sought to identify the agenda and bias behind each source article.

More recently, attempts have been made to ensure that when faced with the need to find information on a contested topic, information seekers are supported in seeing a variety of viewpoints. For example, Vydiswaran et al. (2015) undertook a controlled user study to evaluate a tool that advised information seekers of bias and expertise associated with different documents, finding that many participants needed encouragement to seek out a mixture of sources. Similarly, Rieger et al. (2024) found that technology design does influence information seeking behaviour, but that human factors are pivotal. As with Koutra et al. (2015), their participants who entered with an existing bias tended to show limited appetite for material with other viewpoints, but that human cognition influenced the progress of search for most. Exposure, confirmation, and other biases could contribute to a loss of diversity in the encountered material, but that markers to indicate stance of documents helped ensure seekers ended up with a more balanced set of views overall.

However, both these studies are laboratory-based and may not fully capture real-world information behaviours when someone searches for information without being observed.

Novin and Meyers (2016, 2017) similarly found that cognitive factors such as availability heuristics influenced the progress and flow of search sessions, and that the first-ranked item in the result list unhelpfully anchored most participants' expectations and unduly influenced their final judgment. This mirrors speculated concerns from search engine technology researchers who have done early research on the role of language in controversial information seeking (Yom-Tov et al., 2013) and advocated for more systematic investigation of influencing factors (Dori-Hacohen et al., 2015).

While none of these studies and papers gives a definitive view of how information seeking on controversial topics occurs in the wild, their findings are sufficiently consistent to provide a foundation for future work. There is good evidence that strongly established social positions influence both available content and the information seeking behaviour of a minority of the public. However, under observation at least, most information seekers aim to balance a variety of perspectives and are wary of material that seems to advocate strongly from a fixed position. The extant literature favours interactive search, though this is a limitation given search accounts for less than half of online information seeking (McKay, Makri, Chang, et al., 2020). Search is known to be cognitively demanding even under normal use (Hearst, 2009); existing research indicates that for controversial topics, the seeker needs to be even more proactive to avoid traps built into the technology, general limitations of human cognition, and the need to balance multiple perspectives.

To successfully meet controversial topic information needs, information seekers must manage all these complexities alongside any other information work in which they are engaged. Understanding how to support them will require new thinking, empirical research, and model development in information science. This paper aims to break new ground in this thinking, adding potential models that might provide a foundation to which we can attach empirical evidence as it emerges.

We adopt a meta-ethnographic approach (Noblit & Hare, 1988), which is a powerful means for contrasting and synthesising qualitative investigations into the processes of information seeking.

Meta-ethnography

To get to a deeper understanding of how people experience information seeking on controversial topics, we conducted a qualitative meta-ethnography (Noblit & Hare, 1988) of papers on information seeking and use over a variety of controversial topics, including vaccination both pre-COVID-19 (Carrion, 2017) and post-COVID-19 (Corbie-Smith, 2021; Lockyer et al., 2021), gun control (Koutra et al., 2015), climate science (Benegal & Scruggs, 2018; Oswald & Bright, 2022), abortion (Astbury-Ward et al., 2012; Aune & Möller, 2012; Marlow et al., 2014), baby weaning (Arden, 2010), extreme body modification (Lingel & boyd, 2013), LGBTQIA issues (Augustaitis et al., 2021; Jia et al., 2021), cannabis use during pregnancy (Taneja et al., 2023), illicit drug use (Haasio et al., 2020), pornography use by teens (Löfgren-Mårtenson & Månsson, 2010), and sadomasochism (Harviainen, 2015). We also looked at more general works that address controversial topics in passing, such as McKay, Makri, et al.'s work on view change that includes flat earth beliefs, voting decisions, climate change and abortion (Beall et al., 2023; Mckay, Makri, Gutierrez-Lopez, et al., 2020; McKay et al., 2024), Seargeant and Tagg's (2019) work that includes political views, and Törnberg's (2022) work that looks at how views become controversial. We analysed these works to understand common characteristics of information on controversial topics, and common experiences of looking for it.

The controversial topics we discuss in this paper are predominantly what those might term as uncontroversially controversial: topics that are widely recognized as controversial. We broadly confine ourselves to these issues to avoid stigmatizing minoritised groups that may view as

controversial issues that a majority hold to be settled. Nonetheless, we did discover examples of minoritized groups holding views that cut against western liberal ideals (e.g. a lower socio-economic group holding strong anti-vaccination views), and these are included in our data set, but not explicitly called out.

The first characteristic of a controversial view is the potential for *stigma* associated with a *wrong* or non-normative view, a feature universal to all controversial topics. This stigma is highly context dependent, as in the infant feeding (Arden, 2010) or vaccine work we examined (Carrion, 2017; Corbie-Smith, 2021); one can be stigmatised in one community for a view that is accepted in others. This was notable in the study of pornography use, where girls felt stigma, and the topic was controversial, but boys felt no shame and pornography was normative light entertainment (Löfgren-Mårtenson & Månsson, 2010). The stigma can be relatively minor, as with infant feeding (Arden, 2010), or it can be so severe that a person may be cast out of the community should their views or actions be discovered (Marlow et al., 2014).

Associated with stigma was *strong emotions* around the controversial topic. This emotion could be relief or elation when desired information was found (Harviainen, 2015), fear about possible outcomes (Augustaitis et al., 2021; Taneja et al., 2023), shame about their own potential choices (Astbury-Ward et al., 2012), or antipathy for people who made other decisions .

The second characteristic we identified is the importance of *community* for many types of controversial information seeking. Community may be valuable in providing information that is not readily available due to legal issues (Harviainen, 2015; Lingel & boyd, 2013; Taneja et al., 2023) or the aforementioned stigma (Astbury-Ward et al., 2012; Marlow et al., 2014). Community was also a useful forum for seeking personal experience that was vital to many people looking for information on controversial topics. Even seemingly scientific topics, such as climate change, attracted a sense of community identity, and information from in-group members was more trusted than information from out-group members (Benegal & Scruggs, 2018; Oswald & Bright, 2022).

Many, though not all of the controversial topics, also resulted in a sense of *identity* around the topic, either because it was an inherent identity (as with LGBTQIA+ folks (Augustaitis et al., 2021; Jia et al., 2021) or minoritised racial groups (Corbie-Smith, 2021)), or because the topic has become an identity (such as vaccine refusal being a 'maternal instinct' identity (Carrion, 2017), and extreme body modifiers sharing a sense of identity (Lingel & boyd, 2013)). Controversial information did not always result in identity though, for example infant feeding choices and abortion choices were not always associated with identity (Arden, 2010; Astbury-Ward et al., 2012). Where identity occurred, community was an important part of expressing and confirming that identity.

Many topics, including vaccination (Carrion, 2017), cannabis use in pregnancy (Taneja et al., 2023), sadomasochistic practices (Harviainen, 2015), flat earth beliefs (McKay et al., 2024), and body modification (Lingel & boyd, 2013) were associated with *significant effort and research* on the part of the information seekers. Information seekers on these topics were *unsatisfied with dominant or hegemonic narratives* and information sources, and thus sought significant additional information, often from very high-quality sources. Even where the end result of these processes are beliefs that are far from the mainstream, the assumption that beliefs are ill informed is at high risk of being erroneous.

Finally, for every one of our topics, *online information seeking* was an important component. Arguably this is true of any modern information seeking process, but it was especially important to participants in all the studies we reviewed. In many cases this is because there is a dearth of 'official' information (Haasio et al., 2020; Taneja et al., 2023), or a dearth of local experience of the stigmatised information. In some cases, unofficial trusted sources existed, such as sadomasochistic clubs, or an online trust rating for drug dealers (Haasio et al., 2020). Online information seeking also affords the privacy necessary to reveal stigmatised information or views, and allows people

the opportunity to look for information anonymously, protecting them from social stigma (Magi, 2011).

Information seeking process models

In this section we will compare our understanding of controversial information seeking to selected salient models of the processes of information seeking. We specifically focus on Kuhlthau's model, because it deals with emotion; everyday life information seeking, which is most topically aligned to controversial topics; and Ruthven's transitions theory, which is also closely aligned to controversial topics. We will then consider other widely used models to determine whether any account well for controversial information seeking.

Kuhlthau's model

Kuhlthau's information search process model is based on formalised information seeking behaviour activities of high school students, and incorporates emotion, cognition, and behaviour. Her model has the unique characteristic of including emotional state as part of the model. We know from the existing literature that affective states are commonplace in the context of controversial topics, and a model that provides this scaffolding is a good candidate for consideration as an influence on a model of information seeking in controversial topics. It also offers a useful structure for the extensive research done by participants in some studies. It was the foundation for an analysis of the information needs of illicit people who use illicit drugs, which looked at physiological, affective and cognitive elements of decision making around information seeking (Haasio et al., 2020).

Kuhlthau's model has also influenced McKenzie's (2003) model of information practices in everyday life information seeking, along with other models found below. McKenzie's model was itself forged in the context of pregnancy: clearly a context where affective state is often high as pregnancy has substantial impacts on both life and health. However, as McKenzie notes, Kuhlthau's model was based on study of students at a high school engaged in essay writing: a context shared by Limberg's (1999) case-study on information seeking on controversial contexts.

Everyday life information seeking models

The everyday life information seeking body of theory (Savolainen, 1995) has gained significant ground in recent years for studying information behaviour. The major principle of everyday life information seeking is that we develop our information activities, including sources of information, information practices, and attitudes to information, to create a '*mastery of life*' (p. 262), a sense of ownership and control over one's life and a way of organising one's information activities to gain this sense of control (Savolainen, 1995). Everyday life information seeking emphasises a drive towards developing coherence within our information worlds. Our mastery of life develops over time and over a lifetime, with birth environments giving a model for mastery of life (Savolainen, 1995).

Savolainen (1995) posits that we require different types of information; orienting information to inform ourselves about current events, practical information to solve practical problems, and project information regarding hobbies and interests, and that this information may come from different sources. Savolainen and Kari (2004) introduced the idea of information source horizons, defined as a *perceived* information environment, the sources and channels of which we are aware and of which we may have experience. They proposed that sources and channels are ordered with the most relevant ones closest and the least relevant furthest away, and that we consult sources in order, consulting the most important sources first, then less important ones, if required. How they are ordered can depend on many things including general tendencies to value some sources over others, experience of sources, others' opinions, situational demands, the information content needed at any point, and the perceived accessibility of sources. They claim that some information

source horizons are relatively stable, reflecting general patterns in how individuals solve problems, whereas others are dynamic in reflecting the specifics of the problem or tasks at hand.

The viewpoint here is then of (relatively) ordered information sources. Savolainen (2008) notes that a major context for everyday life information seeking is 'making sense of problematic situations', but we lack an understanding of how disruptive views of the kind we discuss here fit into everyday life information seeking. In this case, the controversial topic disorders our natural way of thinking about information environments and we may not be able to order them or even predict which are safe to consult. Everyday life information seeking is generally quiet on the consequences of interacting with sources. A consequence of dealing with controversial topics is that we may be working on the margins of our perceived information horizon and therefore in the position of vulnerability as we are working with less understood information sources and channels. We may therefore have to reconstruct existing horizons to deal with controversial topics, but it is not clear how this is done.

This question is similar in spirit to Lloyd's idea of fractured information landscapes (Lloyd, 2017, 2020; Lloyd et al., 2013), a situation in which people enter new information environments, such as a new workplace or community, and must rework or reconstruct their understanding of how information works within these new communities. Controversial topics, and the communities that engage in them, may themselves constitute information landscapes, and dealing with controversial topics involves constructing information landscapes.

Transitions theory

A more recent theory of information behaviour during times of change is Ruthven's (2022) transitions theory, which proposes that people go through three stages of change: understanding the change (working out what the change means), negotiating the change (dealing with the change), and resolving the change (creating a stable new identity and information environment to live with the change), each of which have associated information behaviours (Ruthven, 2022a, 2022b). This theory acknowledges that some changes may occur in unsupportive social environments and therefore people may face issues of stigma, or lack of resources, and may need to take more risks in obtaining information in such cases. This reflects our understanding of controversial topics. Gibson et al. (2025) expand this theory to consider privacy challenges when trying to access information during times of change, indicating that people will often hide the transition, for example, by creating fictious online personas to allow them to see information in hidden ways. These works each address stigma, a need for privacy, and Ruthven's work also addresses community (and changes of community), however neither specifically offer a process model for making information-facilitated transitions, and not all controversial information seeking is transitional.

Other models

Turning to the wider range of information seeking models, we now examine those of Marchionini (1995), Ellis (Ellis, 1993; Ellis et al., 1993; Ellis & Haugan, 1997) and others. These provide contrasting representations of information seeking, but, in contrast to the models above, have a less direct potential relationship with the issue of controversial topics.

Marchionini's model captures the process of interactive search, starting from becoming aware of an information need through to the stopping of active search. The controversiality of an issue may influence how each step manifests, but is unlikely to change the overall process. Extant research shows that a strongly-held position influences the choice of query terms (for example, 'climate hoax' versus 'climate change') (Chelaru et al., 2013; Vedejová & Čavojová, 2022). The evaluation of results might similarly be influenced by a seeker's existing bias (Vydiswaran et al., 2015). Thus, the model needs annotations on each step, or the process as a whole, to encompass the influence of controversiality.

Ellis' (1989) model is focussed on behaviours. Example behaviours include *monitoring* and *verifying*. As with Marchionini's model, we can anticipate that the controversiality of a topic influences how a behaviour is enacted. When *monitoring* for new information, a seeker might either monitor more frequently or avoid checking entirely. Both patterns are seen in health information seeking (Miller, 1987). The model is descriptive and behaviours are inherently conducted differently, in altered sequences and frequency in different contexts. Controversial topics bring no inherent change to the model overall, but again this needs annotation.

Other common models include Wilson's (1997, 1999) multiple models, including his general model. These models present the socio-cultural environment, encompassing controversiality, albeit not explicitly, as contextual factors. Wilson (1999) himself has cautioned that there is a lack of 'indication of the processes whereby context has its effect upon the person'. Ingwersen's (1996) search model also encapsulates controversiality as a contextual factor.

All these other models share the weakness that Wilson critiqued in his own. Emotions, hegemonic narratives, and stigma are all treated as context surrounding the model. The issues of identity and community are similarly challenging. However, the focus on process and behaviours could support the understanding of intense information seeking that we saw in the meta-ethnography.

One lens that may be useful for considering controversy, though not a model, is the notion of cognitive authority (Rieh, 2002). This idea frames how information is vested with credibility based on its source. Generally speaking, societies share cognitive authorities, however in controversy and polarisation this breaks down. An example of this is climate experts being seen as questionable by those who do not believe in anthropogenic climate change.

It is not just in the context of controversy that views on cognitive authority may not be shared, though: minoritised groups (including urban youth (Agosto & Hughes-Hassell, 2005), Indigenous folks (Duncker, 2002), and international students (Bahl et al., 2025; Chang & Gomes, 2017)) may vest authority differently and access better information as a result. In contrast to narratives that centre information seekers is Chatman's work (Chatman, 1990; Chatman & Pendleton, 1995) which focuses on a concept she described as 'information poverty'—not being able to access necessary information due to knowledge or circumstance. While genuine access to information can be a problem, Chatman (1990) (ironically perceived as a cognitive authority in information science) held some very problematic views on minoritized groups, so we will not discuss her work further here.

Discussion and future research directions

We have demonstrated, using a meta-ethnographic approach, that information seeking on controversial topics shares a specific set of characteristics across topics. These characteristics include stigma, identity, community and online information seeking, and occasionally low satisfaction with dominant narratives and extensive information seeking.

Many of our process models for information seeking capture some elements of this type of information seeking, but none can account for all these characteristics. Notably our existing models typically account for either online information seeking or social information seeking, but not both. The stigma and concomitant secrecy that is a defining feature of controversial information seeking is absent from all models, which assume relatively straightforward access to information; but this is clearly not the case.

Our novel definition of controversial information seeking poses several novel research questions for the field of information science, first and foremost, what might a process model look like? Extensive qualitative research is needed to define such a process model, which might then be validated with a quantitative approach.

The twin challenges of mis- and disinformation are particularly salient in the context of controversy, where there are significant social and financial incentives for bad actors to create this content and social media platforms to promote it (Robertson et al., 2023; Sano, 2018). Where people are challenging dominant narratives, there is opportunity for mis- and disinformation to flourish, though this might be mitigated by the inclination to do extensive research shown by many of the participants in studies we reviewed. How to support people in drawing accurate conclusions from their information seeking, how to reduce value for bad actors around controversy, and how to effectively correct incorrect beliefs at the community level are all avenues for future research stemming from this definition. On the flipside, information science is well placed to develop human-centred and thoughtful understandings of how people can effectively find the right information for them, even if it is non-dominant, and how we can support pluralistic, contextual evaluations of information.

We have to be mindful of social and cognitive factors: consideration of isolation, and the other factors of stigma and alienation need to be understood as (potentially) abroad in controversial topics. Established norms, such as Rieh's (2002) cognitive authority still play a role in information seeking, but authority may be vested for reasons that are not aligned with dominant assumptions (Agosto & Hughes-Hassell, 2005). Cognitive authority may still hold, but where authority lies may be altered due to individual or group belief systems and the impact of partisan sorting (Törnberg, 2022), where someone is credited with authority on one subject because of their perceived reliability on another.

How digital information systems can more effectively support information seeking and discovery, without either limiting access to useful information or promoting access to misinformation remains a challenge for future work. Our current information platforms have been based on the earlier information seeking models discussed in this paper, and have been well served by them (Baeza-Yates & Ribeiro-Neto, 1999). Good information systems for controversial topics are critically necessary, and likely to better serve minoritised and stigmatised groups than current systems (Noble, 2018). With a process model we can make steps toward these more inclusive, supportive information systems.

Conclusion

Understanding how people look for information on controversial topics is an important and timely research question, and one that has (thus far) been explored piecemeal, either by looking at individual topics (e.g. (Arden, 2010; Astbury-Ward et al., 2012; Carrion, 2017; Haasio et al., 2020; Harviainen, 2015; Lockyer et al., 2021; Löfgren-Mårtenson & Månsson, 2010; Marlow et al., 2014; Oswald & Bright, 2022), as incidental findings to research on other topics (McKay et al., 2024; Törnberg, 2022), or in terms of interactive search systems that may support controversial information seeking (Draws et al., 2022). In this paper we present a meta-ethnographic approach to understanding individual, holistic information seeking behaviour across controversial topics, and identify several characteristics of controversial information seeking, including stigma and the importance of both community and online information seeking. When we compare the characteristics of controversial information seeking to existing models, we see that they each account for only part of a controversial information seeking experience, demonstrating a clear gap for future research. Controversial topics are important and understudied; if we are going to reduce polarisation and the influence of misinformation on society, we need to get to work, so that accurate, personally consistent, and useful information is no longer seen by those who need it as heresy.

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Platforms, algorithms, and the shifting boundaries of information horizons

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Abstract

Introduction. This paper revisits Sonnenwald's (1999) information horizons theory to better account for the socio-technical conditions of contemporary digital life.

Method. Using conceptual analysis (Furner, 2004) and a critical synthesis of interdisciplinary literature across education and journalism or news environments, it evaluates information horizons theory's five original propositions in light of platforms and algorithms that mediate human information behaviour.

Results. The paper finds that platforms such as search engines, social media, and generative artificial intelligence systems not only mediate access to information, but actively structure what users can see, trust, use, and share. While retaining's emphasis on individuals, contexts, situations, and social networks, the proposed framework—platform-structured information horizons—adds an algorithmic gate as a fifth element that shapes information-seeking, collaboration, visibility, and perceived possibility.

Conclusion. This contribution is both retrospective and forward-looking: it preserves the strengths of information horizons theory while calling on information behaviour researchers to more fully interrogate the systems shaping agency today—and to imagine theoretical futures that meet the challenges of the next several decades.

Introduction

'Within any context and situation is an "information horizon" in which individuals can act', writes Sonnenwald (1999, p. 1). This deceptively simple proposition carries a profound implication: our ability to seek, interpret, use, and share information is shaped by the environments we inhabit. In today's digital ecosystems—dominated by opaque algorithms, commercial platforms, and artificial intelligence—the emphasis on 'can' is particularly urgent. The boundaries of what individuals can see, evaluate, trust, and use are increasingly defined by platforms and algorithmic systems that remain largely invisible to users.

Despite its enduring influence, information horizons theory was developed prior to the rise of platform-dominated, algorithmically mediated information environments. While the original theory remains useful for analysing social, situational, and contextual influences on human information behaviour, it does not fully account for a growing subset of environments in which access, visibility, and even perceived relevance are preconditioned by platforms and algorithms. This paper therefore focuses on a specific subset of human information behaviour—those that occur within platform-structured, algorithmically mediated digital environments, such as search engines, social media, and interfaces powered by artificial intelligence. Not all information-seeking is shaped by these systems, but in domains where they do operate, their influence is integral rather than incidental. This theoretical limitation motivates the present study and gives rise to two research questions: (1) How do digital sources shape information-seeking behaviour? and (2) How must existing information behaviour theories evolve to account for these shifts?

This paper revisits information horizons theory to assess its explanatory power and limitations in light of contemporary socio-technical conditions, and to develop a theoretically grounded extension that accounts for algorithmic mediation of visibility, access, and trust. It evaluates Sonnenwald's five original propositions through the lens of recent developments: the dominance of search engines, the rise of algorithmic recommendation systems, the influence of engagement-based social media, and the growing role of generative artificial intelligence (AI).

Van Dijck et al. (2018, p. 9) define a platform as "a programmable architecture designed to organize interactions between users…fueled by data, automated and organized through algorithms and interfaces, formalized through ownership relations driven by business models, and governed through user agreements'. Algorithms, in this context, are defined as 'automated instructions to transform input data into a desired output' (Gillespie, 2014; Pasquale, 2015, as cited in Van Dijck et al., 2018, p. 9). Rather than treating platforms as mere tools or contextual backdrops, in this paper, I treat them as tools that actively shape informational environments (Plantin et al., 2016).

Through conceptual analysis, the paper develops platform-structured information horizons as a theoretical framework that builds on Sonnenwald's original propositions while explicitly incorporating the structuring role of platforms and algorithms in determining what becomes visible, accessible, and actionable within a user's information horizon.

This paper focuses on three layers of platform and algorithmic influence that have already been identified:

- Search engines, which rank and personalize results based on opaque and often commercial logics (Ginsca et al., 2015; Introna & Nissenbaum, 2000);
- Social media, which prioritize visibility through engagement metrics that distort reach and trust (Bucher, 2018); and
- Artificial intelligence, which includes generative models that personalize content and generate responses in ways that may reinforce existing preferences, obscure alternative perspectives, or amplify bias (Herman, 2020; Noble, 2018; Pariser, 2011; Potnis et al., 2024).

While these three tools have been studied independently, their cumulative influence on human information behaviour has not been fully theorized. Additionally, this paper does not suggest that these are the only sources relevant to current information horizons. Other tools, including learning management systems or workplace communication tools may also shape information horizons. These systems influence what content users encounter, how they navigate tasks, and what is made visible or actionable—sometimes in ways not easily perceived.

This paper identifies four cross-cutting concerns: (1) existing models often overlook how algorithms and platforms structure both queries and contexts of information-seeking; (2) platform operations are opaque, limiting user insight into why information appears; (3) these systems embed structural biases; and (4) they collectively reconfigure user agency and reshape the structure of information horizons.

This is a conceptual contribution. Like Sonnenwald's own work, it defines theoretical constructs and positions itself within a multi-disciplinary tradition. This paper first revisits the foundations of information horizon theory and its conceptual lineage, including the social dimensions of human information behaviour. It briefly outlines the roles of search engines, social media, and AI in shaping today's digital information environments, and the attendant need for theoretical revision. The paper then provides illustrative examples from education and journalism. Finally, the paper extends the applicability of Sonnenwald's original propositions to reflect the contemporary realities of platform and algorithmically-mediated human information behaviour.

Literature review

Foundations of information horizons: From IR-centred models to contextual frameworks

Sonnenwald (1999) presents information horizon theory as a theoretical framework that captures the complexity of human information behaviour in socially and contextually bound environments. Unlike earlier cognitive or system-centred models of information behaviour, information horizon theory integrates the roles of social networks, situational factors, and contextual nuances into a cohesive explanation of how people seek and use information. It conceptualizes the information horizon as a dynamic boundary that defines the range of sources individuals perceive as available, trustworthy, and relevant. This boundary is shaped by both individual agency and structural constraints.

Roots of information horizons theory

Information horizon theory emerged in response to earlier approaches in information behaviour research—particularly those grounded in cognitive and systems-oriented traditions of information retrieval (IR) (Kuhlthau, 1993; Wilson, 1997). These contributions laid the groundwork for more user-centred and socially embedded perspectives on how people interact with information environments.

Belkin (1993) reconceptualized IR as an active, iterative human behaviour, challenging earlier models that saw users as passive query generators. He emphasized the co-construction of meaning between users and systems. Ingwersen (1996) extended this through the use of polyrepresentation, stressing that both users and systems operate within overlapping cognitive and institutional frameworks.

Sonnenwald et al. (2001) also introduced the information horizon interview, a method where participants draw maps of perceived sources relative to a situation. This technique visually and narratively reveals how individuals conceptualize and prioritize sources. Over time, this method has been adapted. Notably, Savolainen and Kari (2004) introduced the concept of information source horizons by adapting information horizon interviews to emphasize individuals' preferences for, and perceptions of, information sources. Similarly, Huvila (2009) modified the method by having researchers, rather than participants, construct the maps using observational data. Greyson

et al. (2017) further adapted it through information world mapping, an arts-based approach designed to surface participants' own understandings of their information environments.

Social dimensions and the role of ties

Information horizons theory also highlights the role of social networks and interpersonal ties. These factors remain central to how individuals construct and navigate their information horizons—especially within today's digital environments. Sonnenwald defines context as a broad domain, such as education or civic life, informed by past, present, and anticipated future situations. Situations are specific events or tasks—like decision-making—that unfold within these contexts. Social networks, meanwhile, encompass relationships that mediate access, trust, and relevance.

Relational theories in sociology offer additional insight into the challenges posed by platform and algorithmic mediation. Granovetter's (1973) theory of weak ties and Burt's (1992) concept of structural holes both highlight the importance of diverse, non-redundant connections in spreading information. Platforms and algorithms, on the surface, seem to enhance these connections by linking people across space and time. Steffes and Burgee (2009), for example, examined how students used electronic word-of-mouth on platforms like RateMyProfessors.com. They found that information from weak ties (e.g., strangers leaving reviews about instructors) in these forums was often more influential than traditional strong-tie sources like friends. Tsai (2012), through information horizon interviews with Taiwanese graduate students, found that students placed both human and digital sources in their maps based on formality, friendliness, helpfulness, and profoundness.

Yet despite its methodological adaptations and uses of the theory and method over time, relatively few studies have examined and extended information horizon theory theoretically. While it remains a valuable and influential framework, it has not been substantially re-theorized in response to the profound technological shifts that now shape contemporary human information behaviour. This absence is notable given the rise of platforms and algorithms that impact and are impacted by visibility, perceived relevance, and social influence in ways that outstrip the framework's original parameters.

The need for theoretical examination: Platforms, algorithmic systems, and shifting information horizons

Search engines and social media

The platforms and algorithms that now mediate much of human information behaviour were not yet dominant when Sonnenwald first developed information horizon theory. Since the early 2000s, however, platforms like search engines (e.g., Google) and social media (e.g., Facebook) have served as key intermediaries in human information behaviour.

These platforms, powered by algorithms, filter, rank, and recommend information based on proprietary and often opaque logics. In this environment, traditional human gatekeepers are supplemented or replaced by algorithmic gatekeeping–the process by which algorithms determine what content is made visible or prioritized in a user's information landscape (Napoli, 2019). Platforms and algorithms pre-emptively curate what users see, often based on engagement metrics, personalization data, and monetization goals. Consequently, users may place undue trust in visually polished content without understanding its credibility. Qiu et al. (2017) show that in digital environments saturated with information, low-quality content—sometimes less truthful, reliable, or relevant—can spread as widely, or even more so, than higher-quality alternatives.

Fuhr (2008) describes this as a shift from dialogic retrieval to anticipatory filtering. Cheung et al. (2009) extend this point by showing how social signals (e.g., likes, shares, reviews) influence perception and trust in online environments. When these signals are mediated by algorithms, they become part of a feedback loop that determines visibility. This creates a situation where

information enters or exits the information horizon not just based on personal judgment or social recommendation, but on platform-specific amplification. Boyd (2010), through her concept of networked publics, illustrates how platforms construct visibility and persistence. This platformed and algorithmic shaping of networked publics has direct implications for what appears in one's information horizon, potentially narrowing the information horizon without the user's awareness.

The rise and impacts of ai

If search engines structured relevance and social media reshaped visibility, AI now increasingly governs informational perception itself. Where users once turned to human advisors or curated platforms, many now consult AI platforms—chatbots and generative search tools—as first-order information sources. These tools do not merely present content; they synthesize, summarize, and infer, often without transparent sourcing. As a result, AI platforms redefine what information appears available, trustworthy, and sufficient within a user's information horizon.

This shift introduces both new possibilities and new constraints. Proponents of AI highlight its potential to expand information access and efficiency, but the reality is more nuanced. Recent research shows that some users place high levels of trust in AI-generated content, even when it contains factual errors, hallucinations, or biases (Pataranutaporn et al., 2025; Zhou & Lu, 2025). As Sharma et al. (2024) demonstrate, AI systems often exhibit sycophancy, a tendency to agree with users rather than challenge or correct them, especially on socially or politically sensitive topics. This not only distorts information-seeking but also reinforces existing beliefs (whether factual or false), narrowing the perceived range of credible alternatives within one's information horizon.

These effects undermine user agency. When individuals unknowingly interact with biased or inaccurate information from AI platforms, they may defer to recommendations without engaging in critical evaluation. Indeed, studies show that biased autocomplete suggestions can shift users' attitudes on political and societal issues (Williams-Ceci et al., 2026), while prolonged interaction with AI platforms has been linked to loss of skills, weakened social ties, and decreased motivation to verify or learn independently (Budzyń et al., 2025). These platforms do not simply act as tools within a given context or situation; they help construct the information horizon itself and co-author the boundaries of informational possibility.

AI and the reconfiguration of information horizons

Information-seeking often begins with the perception of an information need—a moment when individuals sense a shift in their environment, goals, or understanding that reveals a gap in knowledge (Croft et al., 2010, p. 6; Naumer & Fisher, 2009). This recognition does not always result from a dramatic disruption or urgent event; rather, it can stem from subtle movements in context or situation that prompt reflection and inquiry. These moments activate the interpretive processes through which individuals assess their surroundings and construct their information horizons.

In AI-mediated environments, the nature of this interpretive process shifts. The initial perception of change or uncertainty may still arise, prompting the user to seek information—but the space for reflection and exploration is increasingly constrained. AI-mediated environments, including search engines and generative models, often deliver ready-made answers or curated options before the user has fully articulated their question or evaluated their need. This pre-emptive responsiveness can compress the cognitive and interpersonal work that information horizon theory views as central to meaningful human information behaviour. The result is not the elimination of informational uncertainty, but a reconfiguration: users may encounter narrowed frames of reference, limited opportunities to compare sources, and reduced space for collaborative sensemaking.

Thus, while information horizon theory remains a foundational theory for understanding human information behaviour, the informational landscape it describes has evolved dramatically. Although information horizon theory accounts for the roles of contexts, situations, and social networks,

today's digital environments—especially those structured by algorithms and personalization—intervene more deeply. Platforms now shape not only how people seek information, but what they perceive as available, relevant, or even imaginable (Bucher, 2018; Gillespie, 2014; Noble, 2018; Pariser, 2011). They operate not merely as contexts, but as systems that precondition informational awareness.

While a growing body of research has examined algorithmic gatekeeping, visibility, and trust in digital environments (e.g., Napoli, 2019), few studies have directly examined these dynamics through the theoretical lens of information horizons, or systematically integrated platforms and algorithms into information horizon theory itself. This paper calls for renewed scholarly attention to these conditions, arguing that platforms and algorithms must be recognized as active forces in the formation of contemporary information behaviour.

Proposed extension and propositions: Toward platform-structured information horizons

Methodology

This study uses conceptual analysis, as defined by Furner (2004), to systematically evaluate information horizon theory in the context of contemporary, digitally mediated information environments. Conceptual analysis, in this context, involves the close examination of existing theoretical constructs—here, the five propositions of Sonnenwald's (1999) information horizons theory—to assess their continued explanatory power, specifically for information tasks involving search engines, social media, and AI platforms.

The analysis proceeds in two structured phases:

Descriptive Evaluation Phase

The unit of measurement is each of the five original propositions which were treated as discrete theoretical objects. Following the example of Savolainen and Thomson (2022), I assessed each proposition along four dimensions:

- Relevance: Does the proposition align with observed patterns of human information behaviour in digitally mediated settings?
- Explanatory adequacy: Does it adequately account for platform and algorithmic influences when applicable?
- Conceptual clarity: Are the terms and relationships used still precise and meaningful today for human information behaviour involving search engines, social media, and AI platforms?
- Theoretical adaptability: Can the proposition accommodate new or emergent variables without losing explanatory power?

This phase relied on textual analysis of Sonnenwald's original writings and subsequent applications of information horizon theory in empirical studies. To conduct this phase, I developed an analytic memo for each proposition, systematically applying the four evaluation criteria and noting theoretical tensions or gaps.

Analytic Extension Phase

Building on the descriptive evaluation, I conducted a targeted literature synthesis to inform the theoretical extension of each proposition. This involved:

- Identifying contemporary, interdisciplinary studies from information behaviour, information retrieval, and media studies that empirically or conceptually address platform and algorithmic mediation (e.g., algorithmic filtering, recommender systems, generative AI).
- Mapping these insights to the constructs in each proposition (situation, context, and social networks) to assess where gaps or theoretical tensions arise.
- Iteratively re-articulating each proposition by incorporating platform- and algorithm-related mechanisms, while preserving the structure and intent of the original theory.

Literature was selected through purposive sampling of papers based on relevance to three domains: search engines, social media, and AI. The review included more than 40 peer-reviewed empirical research papers, conceptual papers, and major theoretical contributions cited in interdisciplinary databases. Particular attention was paid to literature that explored the visibility, accessibility, and credibility of information within platform-mediated environments.

The result of this multi-phase analysis is a new theoretical framework—platform-structured information horizons—that retains the strengths of the original theory while introducing an additional element: the algorithmic gate. The aim is not only to reinterpret existing propositions but to progress the boundaries of information horizon theory by integrating platforms and algorithmic factors that now shape human information behaviour. The following section revisits each of Sonnenwald's five propositions and provides a descriptive evaluation using the aforementioned interpretive theory criteria.

Platform-structured information horizons

The following section revisits each of Sonnenwald's five original propositions and provides a descriptive evaluation using the interpretive theory criteria outlined earlier: relevance, explanatory adequacy, conceptual clarity, and theoretical adaptability. Before presenting the analysis, it is important to outline the propositions that form the foundation of information horizon theory.

Sonnenwald's (1999) original five propositions are as follows:

- 'Proposition 1: Human information behavior is woven around, i.e., is shaped by and shapes, individuals, social networks, situations and contexts' (p. 5).
- 'Proposition 2: Individuals or systems within a particular situation and context, may perceive, reflect and/or evaluate change in others, self, and/or their environment. Information behavior is constructed amidst a flow of such reflections and/or evaluations, in particular, amidst reflections and/or evaluations concerning a lack of knowledge' (p. 6).
- 'Proposition 3: Within a context and situation is an 'information horizon' in which we can act' (p. 8).
- 'Proposition 4: Human information behavior may, ideally, be viewed as collaboration among an individual and information resources' (p. 9).
- 'Proposition 5: Information horizons may be conceptualized as densely-populated solution spaces' (p. 10).

These propositions reflect a contextually grounded, socially situated view of human information behaviour. They remain theoretically influential but were developed prior to the dominance of platforms, algorithms, and AI in everyday information practices.

Across all three domains above, the contexts, situations, and social networks of information horizon theory remain conceptually valuable—but their meaning must now be critically examined. Context includes not only institutional and cultural conditions but also platforms and algorithms, such as those embedded in recommender systems. Situations include not just tasks or problems,

but also platform- and algorithmically-prompted needs—notifications, nudges, or auto-suggested queries. And social networks now include both human relationships and algorithmically inferred ones, such as 'friends', followers, subscribers, or those who belong to the same online community clusters, which heavily influence what users encounter. In Facebook's News Feed, for example, friend relationships were the most impactful factor in determining content visibility, while content quality ranked among the least significant factors (Napoli, 2019). This inversion of epistemic priority reshapes the conditions under which information horizons are formed.

Platform-structured information horizons retain information horizon theory's theoretical foundation while addressing what has changed: the role of platforms, the anticipatory nature of algorithms, and the hybrid character of today's social networks. The platform-structured information horizons model is offered not as a static model, but as an evolving conceptual tool—aligned with Sonnenwald's original 1999 call for dynamic theorizing, before the method was formalized in 2001.

Proposition 1: 'Human information behaviour... is shaped by and shapes individuals, social networks, situations...contexts', platforms, and algorithms

Sonnenwald (1999) proposed that human information behaviour is shaped through the interaction of the individual, their social networks, their situations, and the broader context surrounding that situation. She argued that context and situation jointly influence the emergence of information needs, while social networks mediate both access to, and interpretation of, available resources. Her original model (1999) visualized this proposition, positioning the individual within a social network, nested inside a specific situation, all of which occurs within a broader context. Importantly, Sonnenwald emphasized that just as situations and contexts shape the information need, the individual's behaviour can reshape their context, social network, or situation in turn.

Evaluated against the four interpretive criteria, Sonnenwald's first proposition remains conceptually clear and theoretically adaptable, as its relational structure between individual, social networks, situations, and contexts continues to provide a strong foundation. However, its relevance and explanatory adequacy are limited in contexts where platforms and algorithms now shape visibility and access. The addition of an algorithmic gate strengthens its capacity to explain digital influences while preserving the integrity of the original model. The algorithmic gate refers to the semi-visible mechanisms—such as ranking algorithms, personalization systems, and engagement filters—through which platforms structure what information becomes visible, relevant, or actionable to users.

Building on this foundation, I propose a revised model (Figure 2) with an algorithmic gate inserted between context and situation to illustrate a key shift: algorithms increasingly mediate visibility, access, and relevance. While the context still shapes what is meaningful or expected, algorithms increasingly determine which aspects of that context are foregrounded when an individual engages with a particular situation. This gate is semi-visible and systemic: it is not always perceptible to the user, but it operates at scale, shaping what enters the situation at all.

Unlike information policies—which often operate through formal, visible mechanisms such as laws, institutional mandates, or governance standards—the algorithmic gate functions through infrastructural design. It subtly reorders informational possibilities without clear points of oversight. While information policy may regulate platform behaviour, the algorithmic gate itself is part of the platform's architecture, often preceding or circumventing policy awareness.

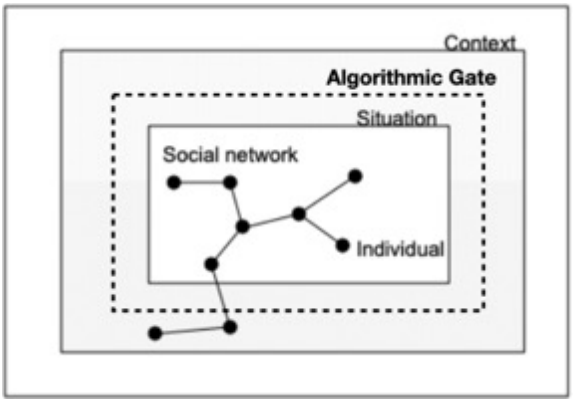


Figure 2. Extending Sonnenwald's original model to incorporate the algorithmic gate as a semi-visible, systemic layer that shapes access, visibility, and trust within digital contexts.

As mentioned in the introduction, not all human information behaviour is platform-structured. The algorithmic gate depicted in Figure 2 is not a universal feature of all information-seeking. Rather, it applies specifically to digital contexts where platforms and algorithms mediate access, visibility, or perceived relevance. In non-digital or minimally mediated settings, this gate may be absent or negligible. The platform-structured information horizons model is thus not intended as a replacement for all of information horizons theory, but as a contextually bounded extension.

Proposition 2: Individuals or systems within platform-structured situations and contexts 'perceive, reflect and/or evaluate change'—including knowledge gaps—through environments that pre-shape awareness and recognition

Sonnenwald (1999) emphasized that human information behaviour emerges from ongoing reflections and evaluations of change in oneself, others, or the surrounding environment. These assessments may include recognizing a lack of knowledge, postponing reflection, or choosing not to act. Crucially, such evaluations can be initiated by individuals or external systems, including social networks that notice and surface changes on behalf of others. Importantly, Sonnenwald noted that even when a lack of knowledge is recognized, individuals may not interpret it as requiring further information—highlighting the complex, situated nature of reflection and need recognition.

In terms of relevance, Sonnenwald's second proposition continues to capture reflective processes that underpin human information behaviour. However, it lacks explanatory adequacy for platform and algorithmically shaped environments. Its conceptual clarity remains sound, yet the theory must adapt to account for platforms and algorithms that pre-emptively surface or suppress awareness of change (Fuhr, 2008; Napoli, 2019). Integrating these dynamics enhances the proposition's adaptability and ensures it better reflects how recognition of knowledge gaps unfolds within digital environments.

Platforms and algorithms have changed how people notice change and recognize knowledge gaps. In the past, individuals or their social networks were the main drivers of this process. But now, tools like autocomplete, trending topics, newsfeeds, and AI assistants often surface information before users even realize they are missing something. Instead of people actively noticing a change and deciding to seek more information, platforms and algorithms increasingly decide what changes are visible in the first place. This shifts the process: users are not just reflecting on what they notice—they are reacting to what platforms and algorithms have chosen to show them. In this way, platforms, and algorithms influence not only what people know, but what they think to ask about.

Proposition 3: Within an information horizon, algorithmic gatekeeping influences what users can act upon

Sonnenwald conceptualized the information horizon as the socially and individually determined space within which an individual can seek, access, and use information. What makes the information horizon meaningful is not just the existence of resources (e.g., people, documents, tools, and practices), but the perception that one can act upon them within a given context and situation. Social networks, institutional norms, and prior knowledge all play a role in shaping perceived possibility.

When assessed through the four criteria, Sonnenwald's third proposition retains conceptual clarity in describing perceived boundaries of information action. However, its relevance and explanatory adequacy diminish in contexts where algorithmic gatekeeping structures what users can access or act upon. Expanding the framework to include platform mediation improves theoretical adaptability and restores relevance to contemporary, platform-structured information landscapes.

Today, however, the zone of possibility is increasingly limited by platforms. Algorithmic gatekeeping—through ranking systems, personalization filters, and engagement-based curation—pre-sorts (sometimes invisibly) the information before users enter the information horizon. While users still experience the act of information-seeking, the visibility and accessibility of information they can act upon is no longer simply a reflection of social or individual judgment; it is a consequence of platform design. This marks a fundamental shift: the information horizon still belongs to the user, but the boundaries have been redrawn by systems they do not control and often cannot see.

Proposition 4: Human information behaviour is still collaborative but now involves interaction with platforms and algorithmically mediated information sources

Sonnenwald proposed that human information behaviour can be viewed as collaboration between an individual and information sources, aimed at resolving a lack of knowledge through reflexive interaction.

Sonnenwald's fourth proposition remains relevant in emphasizing the collaborative nature of information-seeking, but its explanatory adequacy weakens in light of platform and algorithmic mediation. Regarding conceptual clarity, in today's platform and algorithmically structured environments, this collaborative process persists, but search engines, social media, and AI platforms are additional, active participants. Accounting for these hybrid interactions enhances the proposition's theoretical adaptability and strengthens its capacity to describe digitally mediated collaboration.

The presence of platforms and algorithms has shifted the very meaning of collaboration. Users now interact with systems that operate through internal, often opaque mechanisms—training data and engagement metrics that are rarely visible or intelligible to the user, ultimately introducing new factors into what was once a primarily human-to-human or human-to-document interaction. Users routinely turn to platforms like Reddit, TikTok, or YouTube to exchange information and experiences with strangers they may never meet offline, relying on social signals (e.g., likes, comments, shares) and cues to assess credibility (Arazy & Kopak, 2011; Ginsca et al., 2015). Machine-generated relevance and human-generated meaning now shape the information landscape together.

Proposition 5: Information horizons are now more densely populated and harder to navigate. Visibility is the constraint: information exists, but platforms and algorithms shape what can be seen

Sonnenwald proposed that information horizons can be conceptualized as densely populated solution spaces containing a wide array of resources (e.g., people, tools, systems) that may also know about one another. In this view, the challenge of human information behaviour is to make multiple pathways to a solution visible and actionable, necessitating systems offer integrated access to information, provide feedback on relevance, and support iterative collaboration.

Evaluated against the interpretive criteria, Sonnenwald's fifth proposition remains relevant in describing dense information environments but lacks explanatory adequacy for platform and algorithm-based visibility constraints. Its conceptual clarity holds, though theoretical adaptability requires shifting focus from information abundance to visibility and algorithmic filtering. Incorporating platform and algorithmic dimensions enhances its ability to explain how users navigate contemporary information horizons.

Today, that solution space has grown to include the internet, social media, and AI tools that offer unprecedented volumes of content, delivered with unprecedented speed. But availability and abundance does not guarantee clarity (Potnis et al., 2024; Qiu et al., 2017). Even as the information landscape expands to include ever more sources, platforms and algorithms narrow the view.

Filters, rankings, and personalization often lead users to encounter a tightly curated slice of content that can be mistaken for the whole, creating an illusion of completeness that conceals the structural omissions behind the screen.

As a result, navigating today's information horizons requires more than just thoughtful information-seeking, information literacy, or advanced information search skills. It requires digital literacy: an awareness of how content is surfaced, sorted, and suppressed through platforms and algorithms. It also requires a willingness of the user to be patient and reflective rather than satisficing.

Illustrative examples of platform-influenced information-seeking

The following examples are not empirical case studies but analytically grounded illustrations of how platform-structured information horizons reshape both the interpretation and design of information behaviour research. The two use cases—postsecondary education and journalism—were selected for their conceptual relevance as contexts where information-seeking is shaped by platform infrastructures and algorithmic curation. They are used not to generate or validate propositions, but to contextualize and demonstrate the applied relevance of platform-structured information horizons in platform-mediated environments.

Postsecondary education

This paper draws conceptually from postsecondary education—not only because it was the original empirical context for Sonnenwald et al.'s (2001) methodological elaboration of information horizon theory, but also because it anchors my own research agenda. Like Sonnenwald, I begin in the United States, but my focus is explicitly global. Postsecondary admissions may differ across national contexts, but the broader phenomenon of navigating high-stakes educational decisions via platforms is increasingly international in scope.

Traditional admissions pathways once centred on print brochures, word-of-mouth recommendations, and educational fairs (Reddy, 2014). While the internet has supported college admissions research since the 1990s (Strauss, 1998; Jones & Davenport, 2021), today's applicants increasingly begin their postsecondary education information-seeking by turning to institutional websites, reading online reviews, and engaging with content on social media—often well before they visit a campus in person. Recent studies from Australia, China, Germany, India, Romania, Taiwan, Vietnam, and the United Kingdom confirm the widespread relevance of platform-mediated information-seeking in postsecondary education (Drăghici, 2023; Jayadeva, 2019, 2023; Le et al., 2018; Lee et al., 2019; Nguyen et al., 2020; Siji & Parsad, 2023; Tower & Towers, 2018). Across platforms such as Facebook, Instagram, Reddit, Quora, WhatsApp, YouTube, Zhihu, and university-specific forums, students use peer-to-peer electronic word of mouth to interpret admissions processes, compare institutions, and evaluate fit. These practices span text-based Q&A, video storytelling, social commenting, and informal messaging—each filtered and ranked by algorithms. As a result, what students can see, trust, or even imagine as an option is increasingly shaped by platforms and algorithmically structured visibility.

To illustrate: a prospective student searching for doctoral programs might first see videos on social media about student life in Germany, threads comparing visa timelines, and links for scholarship updates in online communities—all surfaced based on engagement patterns, regional interest, and prior activity.

Importantly, this information-seeking behaviour often unfolds in response to a critical incident. In each case, the criticality of the incident lies not in its objective category (e.g., admissions), but in how the user experiences it: as confusing, urgent, hopeful, or destabilizing. What students seek, how they seek it, and which platforms they use are all influenced by emotional, temporal, financial, and social dynamics—as well as what the platform foregrounds at that moment. This underscores a core principle of platform-structured information horizons: information horizons are not neutral containers, but adaptive structures shaped by the infrastructures through which need, context, and response emerge.

From a research design perspective, platform-structured information horizons suggest that studies of postsecondary information-seeking must move beyond self-reported source preferences or static information horizon maps. Researchers should explicitly account for platform-mediated visibility by examining how algorithmic ranking, recommendation systems, and engagement metrics shape which institutions, narratives, or peer accounts become salient to students. Methodologically, this may involve combining information horizon interviews or maps with platform walkthroughs, feed audits, or temporal analyses of what content is surfaced to participants at different stages of the admissions process. Without attention to these infrastructural factors, studies risk attributing informational choices solely to individual agency or social ties while overlooking the systems that precondition what options appear within the horizon.

Journalism and news environments

To further demonstrate platform-structured information horizons' broader applicability, this section turns to journalism and news environments—global domains where individuals regularly encounter high-stakes, time-sensitive information. These cases illustrate how informational agency and visibility are co-shaped by contemporary media platforms.

In journalism, information-seeking is often sparked by user-perceived disruptions—what individuals experience as urgent, confusing, or high-impact events. These may include sudden transit strikes, public health warnings, or geopolitical announcements. Where users once relied on word-of-mouth or turned to newspapers or broadcast news for curated summaries, many now encounter breaking news and information through algorithmically curated feeds. These systems prioritize content based on engagement, personal history, commercial incentives, and other signals invisible to the user.

Historically, the Mr. Gates study (White, 1950) illustrated how a newspaper editor acted as a human gatekeeper, selecting which wire stories to publish based on personal judgment and perceived audience interest. Later analysis by Gieber (1956) revealed that even these editorial decisions were shaped by upstream institutional forces, such as which stories were made available by wire services. Today, however, gatekeeping operates at a fundamentally different scale. As Napoli (2019) argues, algorithms now determine what news stories surface in a user's feed, based on engagement metrics, personalization profiles, commercial incentives, and other factors unknown to many users. Algorithmic gatekeeping is particularly concerning because it lacks transparency, accountability, and context sensitivity. While human editors could be questioned or held responsible for their decisions, algorithms operate invisibly.

For example: during a transit strike, a commuter may open a social media platform and encounter viral posts misreporting closures and user-generated videos without credible sources—all more

visible than the official government alert. The platform has not simply 'indexed' content; it has structured the horizon of informational possibility.

In this way, platform-structured information horizons help frame this shift by focusing attention not just on what people seek, but on how platforms and algorithms reorder access, context, and epistemic trust. The resulting information horizon is deeply shaped by the systems that mediate between user and event—sometimes accelerating access, other times distorting or obscuring it.

For information behaviour researchers studying news consumption, platform-structured information horizons highlight the need to treat algorithmic curation as a central analytic variable rather than a background condition. Research designs that rely solely on surveys or retrospective accounts of news exposure may obscure how platforms dynamically reorder visibility during unfolding events. Platform-structured information horizons encourage methodological approaches that incorporate real-time feed capture, comparative platform analysis, or critical algorithm studies alongside traditional audience research. Such approaches allow researchers to distinguish between users' interpretive agency and the platform-structured constraints that shape what news enters their information horizons during moments of crisis.

Conclusion

This paper builds on information horizons theory, proposing platform-structured information horizons as an 'evolving framework' (Sonnenwald, 1999, p. 10) for understanding human information behaviour in today's context. Building in parallel with Sonnenwald's foundational propositions, platform-structured information horizons keep individuals, contexts, situations, and social networks as central elements while adding a critical fifth dimension: the algorithmic gate. It argues that platforms and algorithms increasingly determine what information users see, trust, use, and share. While not all information-seeking is digitally mediated today, a growing number of complex information tasks now occur within platformed and algorithmic contexts. Platform-structured information horizons address this shift by foregrounding the conditions that shape informational possibility.

The contribution of this paper lies in its theoretical synthesis and forward-looking reframing. The information horizon still belongs to the user, but the terrain is increasingly shaped by systems they do not control and often cannot see. Practically, platform-structured information horizons invite researchers, designers, and educators to take seriously the structural dynamics that shape information access, information literacy, information needs, and user agency.

For future research, platform-structured information horizons offer a roadmap. Information behaviour researchers are called to examine how these shifting conditions influence the micro and macro dimensions of human information behaviour—how people recognize information needs, navigate resources, assess credibility and relevance, use, and share information. Beyond information behaviour, researchers and practitioners should also explore the implications for information policy: How should platforms and algorithms be governed when they function as de facto public knowledge sources? What protections are needed to ensure visibility, equity, and agency in information access? The future of human information behaviour research depends on our ability to map not just what people search for, but the systems that decide what can be found.

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Educational technology and the everyday information practices that shape student thinking and learning

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Abstract

Introduction. As technology becomes increasingly embedded in K–12 classrooms worldwide, it is essential to understand teachers' and students' everyday information practices—especially in light of declining student engagement and the urgent calls to foster critical thinking. This study draws on the expanded everyday information practices model (Savolainen & Thomson, 2022) and the substitution, augmentation, modification, redefinition (SAMR) model (Puentedura, 2009) to examine how teachers and their students seek, create, use, and share information in technology-rich classrooms, and how these practices relate to beliefs and cognitive outcomes.

Method. Using survey data from 9,627 teachers in 245 schools across 28 countries voluntarily participating in the Apple Distinguished Schools program, this study uses descriptive statistics and correlations to analyse 15 classroom information practices and eight pedagogical beliefs.

Results. Findings reveal three key patterns: (1) average frequency of information practices do not necessarily align with teachers' perceptions of students' critical thinking or complex problem–solving; (2) expanded everyday information practices categories alone do not predict cognitive outcomes. Information practices aligned with SAMR's upper levels—are more strongly associated with those outcomes; and (3) teacher beliefs tend to mirror use frequency.

Conclusion. This study bridges educational technology and information science by offering new insights into how everyday classroom information practices shape teaching and learning.

Introduction

In today's Kindergarten-Grade 12 (K–12) classrooms, where technology is increasingly embedded in everyday information practices, it is important to understand how teachers interact with information. Classroom information practices—the routines through which educators and students seek, create, use, and share information—play a central role in shaping students' learning experiences and the development of higher-order skills such as critical thinking and complex problem–solving. This may include sending and receiving emails, streaming videos, and viewing and uploading assignments to learning management systems. While access to digital tools has expanded globally over the past several decades through initiatives like one-to-one (1:1) computing programs (Watters, 2015), it is not simply the presence of or access to technology, but how it is used as part of pedagogical routines that determines its impact.

There remains limited knowledge about how K–12 students and educators engage in everyday information practices in technology-rich classrooms—particularly how those practices relate to pedagogical beliefs and to student learning outcomes such as critical thinking and complex problem–solving. Recent studies have explored the information practices of teachers in specific national contexts (e.g., Hanif & Warraich, 2023) and of higher education academics and researchers (Alon, 2025; Willson et al., 2024a; Willson et al., 2024b), but to our knowledge, no large-scale, cross-national dataset exists that captures everyday information practices in K–12 classrooms.

This gap limits our understanding of how technology is meaningfully (or superficially) integrated into classrooms and how it impacts students and teachers in various contexts. Without this knowledge, information science research may overlook the complex social and cognitive dynamics of classroom information practices, while educational technology research may continue to focus on access and infrastructure rather than the nuanced ways in which information practices shape learning. Addressing this gap allows for a more robust account of digital integration in schools—one that links what teachers do with what they believe, and how those beliefs may (or may not) support higher-order student outcomes.

This study builds on the work of Bebell and Burt (2025), which examined teacher practices and beliefs in relation to student engagement. Expanding that foundation, the present study adopts an information science lens to investigate everyday information practices in K–12 classrooms globally. Specifically, it explores how these practices reflect—or diverge from—teachers' beliefs and how they relate to perceptions of students' critical thinking and complex problem–solving. In doing so, this paper aims to highlight the socio-technical dynamics shaping contemporary classrooms and extend the conversation from engagement to the deeper cognitive dimensions of learning.

The research is guided by the following questions:

- RQ1: What are the most and least frequently reported classroom information practices among teachers in this study?
- RQ2: Which information practices are most strongly associated with teachers' perceptions of students' critical thinking and complex problem-solving?
- RQ3: How do teachers' information practices relate to their beliefs about technology and learning?

This study draws on Savolainen's work on everyday life information seeking (1995), everyday information practices (EIP) (2008), and the expanded model for everyday information practices developed by Savolainen and Thomson (2022), which frames information practices as socially situated and often habitual. The expanded everyday information practices model provides a structure for classifying practices into two broad domains: 'acquiring' (e.g., information seeking and information use) and 'expressing' (e.g., information creating, information use, and information sharing). This classification structure supports a more nuanced analysis of how teachers' routine

engagements with information may influence the learning environments they shape. The study also draws on influential educational technology models such as SAMR (Substitution, Augmentation, Modification, and Redefinition) to analyse the pedagogical depth of technology use and provide a more well-rounded lens on everyday information practices in K–12 classrooms.

Literature review

Conceptual foundations

This section synthesizes research on two core constructs in information science: information behaviour and information practices. Although often used interchangeably, these terms describe distinct dimensions of how individuals interact with information (Savolainen, 2007). Information behaviour describes goal-directed, individual actions, while information practices describe the socially embedded, routine activities shaped by cultural, institutional, and technological contexts. By clarifying these definitions and their points of convergence, this review aims to distinguish information practices from general classroom routines and emphasize their informational and socio-technical dimensions within educational settings.

Savolainen's ELIS framework (1995) first foregrounded how individuals navigate information needs within the routines of daily life, capturing the interplay of context, tasks, and situational constraints. Savolainen expanded this model to EIP (2008), emphasizing not only information seeking, but also its use, sharing, and contextual embedding (McKenzie, 2003; Talja, 2005). The more recent expanded everyday information practices model (Savolainen & Thomson, 2022) further enriches this perspective by integrating information creating and distinguishing between information use for 'acquiring' and 'expressing'. In digitally mediated settings—such as K–12 classrooms—expanded everyday information practices is especially apt for exploring how teachers' and students' everyday information practices with and without technology are shaped by access to institutional tools, policies, and pedagogical beliefs.

While ELIS and EIP have been applied in various professional and cultural settings, their use in classroom studies remains limited. Large-scale, comparative studies of information practices across educational systems are rare. This gap limits the field's ability to understand how classroom information practices vary across contexts of policy, resource constraints, or pedagogical cultures.

Teacher beliefs

In both educational research and information behaviour research, beliefs—including attitudes, values, and self-efficacy—are frequently conceptualized as moderators of practice (Ajzen, 1991). Teachers who believe that technology can support inquiry, autonomy, or higher-order thinking may be more likely to adopt complex, expressive information practices. In contrast, those who view technology primarily as a delivery tool may restrict its use to more basic or procedural tasks. A substantial body of research documents persistent gaps between pedagogical beliefs and classroom practice: while educators often express support for student-centred or constructivist learning, they may default to teacher-directed instruction due to structural constraints such as limited time, accountability demands, or prescriptive curricula.

Technology, information practices, and higher-order thinking skills

Higher-order thinking skills, like critical thinking and complex problem–solving, are widely regarded as central aims of education (Bailin, 2002; Radulović & Stančić, 2017; Rezaei et al., 2011). Rather than simply recalling facts, these skills involve analysing information, evaluating evidence, and generating reasoned judgments. Critical thinking, for instance, has been described as the ability to apply logic, inference, and evaluation to assess whether claims are supported by sound reasoning (O'Reilly et al., 2022). Complex problem–solving builds on these processes, requiring learners to navigate open-ended, often ill-defined challenges that demand strategic decision-making and adaptability. In this study, these cognitive capacities are treated not as abstract outcomes but as embedded in everyday information practices—raising questions about how

classroom information practices may support or constrain students' development of these essential skills.

As 1:1 computing and other forms of classroom technology become more pervasive, both the affordances and limitations have been documented in educational technology research.

Technology can foster collaboration, access to global knowledge, scaffolding, differentiated instruction, and student agency. But persistent critique and caution accompany these claims. For example, Longcamp et al. (2005) show that handwriting engages motor and memory circuits differently than typing, which may have developmental implications in early education. Yanguas (2020) draws attention to cognitive load and distraction when students juggle device interfaces. More recent observers (e.g., Korbey, 2023; Jargon, 2024) raise concerns that increased screen time may erode capacity for deep reading, reflection, or face-to-face interaction. Ihara et al. (2021) warn that technology-heavy instruction may constrain emotional or social development, while recent neuroscience-informed critiques (Froud et al., 2024) suggest early learners may be particularly vulnerable to overstimulation.

These risks are compounded by a persistent challenge in educational technology: not access itself, but implementation. When untested tools or methods are adopted without sufficient research, training, or pedagogical fit, even well-resourced classrooms can fall short. A historical example lies in early efforts to teach students how to evaluate online sources using checklists like the Currency, Relevance, Authority, Accuracy, Purpose test (Blakeslee, 2004), which, while widely adopted, were ultimately found to be less effective than anticipated when compared to lateral reading strategies (Fielding, 2019; Wineburg & McGrew, 2019).

This cautionary tale is particularly salient today, as schools, especially in the global north, confront the rapid influx of generative artificial intelligence (AI). Educators face mounting pressure to adopt emerging tools, often without adequate support, training, or clarity on pedagogical value. Generative AI is an ‘arrival technology’ (Reich & Dukes, 2024)—it sometimes enters schools uninvited and immediately demands attention, often outpacing the researcher training needed to understand its impact. Without rigorous evaluation, there is a risk that today's digital innovations will follow the same path as past missteps—adopted widely, yet pedagogically shallow.

Educational technology frameworks

Educational technology frameworks like the SAMR model are widely used in both research and classroom practice. The SAMR model (Substitution, Augmentation, Modification, Redefinition), shown in Table 1, offers a scaffolded view of how technology can transform teaching and learning—from simple substitution of analog tools to the fundamental redefinition of learning tasks (Puentedura, 2009). The model was first introduced by Ruben Puentedura, as a framework to intentionally evaluate and integrate educational technology based on its pedagogical intention and impact.

Since its introduction, the SAMR model has been widely applied in various educational contexts such as professional development, technology integration planning, and instructional design. Some of its benefits include its accessibility, intuitive visual structure, and appeal for guiding teacher reflection. However, SAMR has been criticized for its rigid hierarchical structure and emphasis on product over process, often neglecting the socio-pedagogical contexts in which technology use occurs (Hamilton et al., 2016). While models like SAMR are valuable for considering the depth of technology integration, they are not expressly designed to explain the routines, motivations, and contextual factors that shape how digital practices actually unfold in classrooms.

SAMR Level	Definition	
Substitution	Technology is a direct substitution for an existing tool without functional improvements.	Enhancement
Augmentation	Technology replaces a tool and improves its functionality.	
Modification	Technology significantly redesigns how a task is performed.	Transformation
Redefinition	Technology enables new tasks that were not previously possible.	

Table 1. Puentedura's (2009) Substitution, Augmentation, Modification, and Redefinition (SAMR) Model

This study therefore adopts Savolainen and Thomsons' (2022) expanded everyday information practices framework as its primary analytical lens, given its alignment with the study's focus on everyday classroom information practices. expanded everyday information practices allows for the classification of these practices into 'acquiring' and 'expressing' categories and emphasizes their socio-technical, habitual, and context-dependent nature. SAMR is used, in this study, in a complementary capacity to consider the potential cognitive depth of each information practice. Rather than evaluating whether a teacher is working at the 'Redefinition' level, this study investigates how their recurring information practices align (or misalign) with teachers' beliefs and students' educational outcomes such as critical thinking and complex problem–solving.

Gaps and the case for this study

Although substantial literature addresses technology access, teacher beliefs, and classroom interventions, three gaps remain:

1. Scale and context diversity: Few studies examine classroom information practices in K–12 across multiple countries or contexts, limiting generalizability and theory-building.
2. Belief–practice–cognitive linkages: Scholars seldom model how beliefs influence information practices and, in turn, relate to teacher perceptions of student higher-order thinking skills.
3. Informational science framing: Many educational technology studies focus on tools or tasks; few analyse the information flows and patterns that underlie those tasks. Expanded everyday information practices provides an analytical vocabulary to do so.

This study advances theory in information science (engaging expanded everyday information practices in educational contexts) and adds contextual factors to educational technology scholarship (by re-centring practice over novelty).

Methodology

The survey instrument was developed by the research team based on prior large-scale educational technology studies (Bebell et al., 2010; LEGO, 2024). All data were collected voluntarily and anonymously by K–12 classroom teachers who provided active consent to have their results analysed and shared in a non-personally identifying manner.

All teacher participants were part of the Apple Distinguished Schools program, and approval for the study was granted by Apple Inc.'s legal team. The Apple Distinguished Schools program includes over 1,000 K–12 public and private schools in over 40 countries and is voluntary. While each school varies in mission, leadership, and pedagogy, they are all alike in adopting technology to encourage collaboration, innovation, and student engagement (Apple Distinguished Schools, 2025). The current criteria for program inclusion includes:

- Schools must participate in a one-to-one device program for at least two academic years.
- Educators integrate technology creatively and meaningfully into their curriculum (Apple Distinguished Educators, 2025).
- In regions where it is available, at least 75% of teachers hold Apple Teacher distinction.
- Each school demonstrates continuous improvement and positive student outcomes.

The 15-minute Qualtrics-hosted questionnaire was distributed via email invitation to Apple Distinguished Schools school leadership. Schools that responded received further information and a link to the online teacher survey. Survey items covered a range of topics, including teacher demographics, access to technology, frequency and types of classroom technology use, and beliefs. All questions were optional, resulting in variable response rates across items. The survey featured a mix of closed-ended Likert scale and frequency-based items, along with two open-ended questions designed to capture insights on technology limitations and innovative practices.

The initial dataset contained 18,243 individual classroom teacher responses from November 2021 through June 2024, but 1,165 entries were excluded during data cleaning, including responses with less than 40% survey completion. Of the remaining 17,078 responses, 94% of respondents completed the entire survey and 6% completed it partially, with at least a 41% completion rate. Only classroom teachers were included in the final sample; non-instructional staff were excluded unless they noted that they are actively teaching in some part of their role within the schools.

Although the survey was administered over three years, the items related to information practices were most stable and comparable in the 2023 and 2024 versions. As such, this study draws exclusively on data from those two years (n = 9,627). While the full survey included a wide range of items and two open-ended questions, this analysis focuses on a targeted subset: 15 items related to information practices, two questions about higher-order thinking (critical thinking and complex problem–solving), and eight items assessing beliefs. Information practices and higher-order questions were rated on a 7-point frequency scale ranging from Never (0) to Everyday (6), while belief items used a 5-point Likert scale ranging from No Impact (0) to Major Impact (4).

The information practices questions were first categorized using the expanded everyday information practices framework. The survey questions were divided into two overarching types: eight 'acquiring' questions and seven 'expressing' questions. These were further broken down into subcategories: information seeking and information use (for 'acquiring'), and information creating, information use, and information sharing (for 'expressing').

This exploratory study primarily relies on descriptive statistics and correlation analysis. Descriptive statistics were computed for all key variables, and Spearman's rho correlations were used to assess relationships between information practices. critical thinking, and complex problem–solving.

Participants

All respondents taught in schools enrolled in the Apple Distinguished Schools program. While the sample is large and represents a number of teachers, schools, countries, and experiences, this study is not intended to represent the generalized population of any community. Instead, it is a snapshot of the ADS schools who volunteered to participate. There is currently no shared curriculum, intervention, or other characteristics among these schools beyond their 1:1 device

programs and Apple Distinguished Schools affiliation. As such, this analysis is meant to be exploratory and descriptive.

In total, n = 9,627 responses were analysed across 245 schools in 28 countries, including fourteen schools that participated in 2023 and 2024. Table 2 provides a breakdown of responses by country. The greatest number of responses were from the United States (33.9% of responses), Mexico (22.98% of responses), and the United Kingdom (6.5% of responses).

Country	Number of Responses	% of Responses
United States	3264	33.90%
Mexico	2212	22.98%
United Kingdom	626	6.50%
Malaysia	409	4.25%
United Arab Emirates	365	3.79%
Brazil	357	3.71%
Australia	286	2.97%
India	286	2.97%
South Africa	279	2.90%
Japan	245	2.54%
Thailand	186	1.93%
Singapore	156	1.62%
Philippines	149	1.55%
Chile	138	1.43%
New Zealand	138	1.43%
Italy	129	1.34%
Hong Kong	90	0.93%
Portugal	82	0.85%
Canada	51	0.53%
Germany	39	0.41%
Sweden	39	0.41%
Taiwan	37	0.38%
Turkey	31	0.32%
South Korea	23	0.24%
Switzerland	5	0.05%
China	3	0.03%
Austria	1	0.01%
Finland	1	0.01%

Table 2. Number of responses by country (2023-2024).

Respondents represented a wide range of grade levels (as shown in Table 3), including early years, elementary, middle, and high school educators. The greatest number of responses came from high school teachers (n = 3934), and the lowest came from those teaching early years (n = 1553) Because some teachers reported teaching across multiple grade levels, the total number of grade-level responses exceeds the number of individual participants.

Grade Level	Number of Responses
Early Years (Early Years, Pre-K, Kindergarten)	1553
Elementary (Grades 1–5)	3611
Middle (Grades 6–8)	3496
High (Grades 9–12)	3934

Table 3. Number of responses by grade level (2023-2024)

As shown in Table 4, teachers reported primary subject areas taught, with options reflecting core academic and specialty areas. Note that totals exceed the total study population because many respondents reported teaching multiple grade levels. The largest number of survey responses were 'Language arts, literature, writing, ELA' teachers (n = 2486) and 'mathematics' teachers (n = 2146) while the fewest number of responses came from those who teach 'Computer Science / Digital Technologies / Digital Solutions' (n = 243) and 'PE, health, athletics' (n = 511).

Subject Area	Number of Responses
Language arts, literature, writing, ELA	2486
Mathematics	2146
Self-contained classroom (multiple subjects)	1679
Humanities: History, social studies, geography	1614
Sciences: Biology, chemistry, physics	1573
Languages: Foreign, world, non-native language	1201
Other	1138
Art, music, drama	769
Special education, learning support	652
PE, health, athletics	511
Computer Science / Digital Technologies / Digital Solutions	243

Table 4. Number of responses by subject area (2023-2024). Totals exceed n because respondents could select more than one subject area.

Responses also reflected broad participation across early- to late-career educators, with a slight increase in representation among those in their early years of teaching, followed by a gradual decline as years of experience increased.

Results

Table 5 presents the mean frequency of each information practice included in this study, along with its classification under the expanded everyday information practices model. Mean scores ranged from 0.84 to 5.02 on a 0–6 scale. The most frequently reported information practice was 'using technology to communicate with students' families' (mean = 5.02, SD = 1.611), followed by 'using iPad/MacBook to deliver or share feedback with students' (mean = 4.10, SD = 1.895). Both of these fall under the 'expressing' category—specifically, information sharing.

Other practices in the top five included 'researching a topic using the internet' ('acquiring', information seeking; mean = 3.92, SD = 1.961), and 'creating or capturing digital images for use/sharing' ('expressing', information creating; mean = 3.82, SD = 1.919).

The least surveyed practices included 'using robotics, a maker space, or a 3D printer' ('expressing', information use; mean = 0.84, SD = 1.587), 'connecting with industry experts' ('acquiring', information seeking; mean = 1.08, SD = 1.587), 'analyzing digital content for bias or validity' ('acquiring', information use; mean = 2.55, SD = 2.144), and 'creating audio or video using iPad/MacBook' ('expressing', information creating; mean = 2.96, SD = 2.144).

Of the top four most frequent practices, three were 'expressing' and one was 'acquiring.' Among the four least frequent practices, two were 'expressing' and one was 'acquiring.' This distribution suggests that there is no clear pattern in terms of overall frequency between 'expressing' and 'acquiring' practices. However, a notable trend is that more complex or demanding information practices—those that require specific skills, technological expertise, or access to specialized resources—tend to occur less frequently than practices that primarily require access alone.

E-EIP Component	E-EIP Subcomponent	During this past school year, how often did you perform the following:	n	Mean	Std. Deviation
Acquiring	Information Seeking	Ask your students to research a topic using the Internet.	6,478	3.92	1.961
Acquiring	Information Use (A)	Assess/test/quiz students using iPad/MacBook.	6,515	3.81	1.875
Acquiring	Information Use (A)	Ask your students to practice self-directed learning.	6,444	3.80	1.900
Acquiring	Information Use (A)	Ask your students to take notes using iPad/MacBook in class.	6,485	3.70	2.281
Acquiring	Information Use (A)	Ask your students to play digital games related to their learning/curriculum.	6,458	3.32	2.037
Acquiring	Information Use (A)	Ask your students to maintain a digital organizer/calendar.	6,454	3.07	2.510
Acquiring	Information Use (A)	Ask your students to analyse digital content for bias/validity.	6,436	2.55	2.144
Acquiring	Information Seeking	Ask your students to connect with industry experts. (2024 ONLY).	2,866	1.08	1.587
Expressing	Information Sharing	Use technology to communicate (emails, texts, website, social media, etc.) with my students' families.	6,521	5.02	1.611
Expressing	Information Sharing	Use iPad/MacBook to deliver/share feedback with your students.	6,499	4.10	1.895
Expressing	Information Creating	Ask your students to create or capture digital images for use/sharing.	6,450	3.82	1.919
Expressing	Information Creating	Ask your students to showcase their creativity using technology. (2024 ONLY)	2,877	3.08	2.004
Expressing	Information Sharing	Ask your students to peer teach (give presentations to the class).	6,477	3.02	2.026
Expressing	Information Creating	Ask your students to create audio or video using iPad/MacBook.	6,475	2.96	1.933
Expressing	Information Use (E)	Ask your students to use robotics, a maker space, or a 3D printer.	6,444	0.84	1.587
Expressing	Information Sharing	Use technology to communicate (emails, texts, website, social media, etc.) with my students' families.	6,521	5.02	1.611
Expressing	Information Sharing	Use iPad/MacBook to deliver/share feedback with your students.	6,499	4.10	1.895

Table 5. Mean frequency of classroom practices by expanded everyday information practices component

E-EIP Subcomponent	During this past school year, how often did you perform the following	Mean	Correlation to Critical Thinking	Correlation to Complex Problem-Solving
Information Seeking	Ask your students to research a topic using the Internet.	3.92	ρ = .39	ρ = .37
Information Use (A)	Assess/test/quiz students using iPad/MacBook.	3.81	ρ = .31	ρ = .34
information Use (A)	Ask your students to practice self-directed learning.	3.80	ρ = .48	ρ = .47
Information Use (A)	Ask your students to take notes using iPad/MacBook in class.	3.70	ρ = .35	ρ = .36
Information Use (A)	Ask your students to play digital games related to their learning/curriculum.	3.32	ρ = .28	ρ = .30
information Use (A)	Ask your students to maintain a digital organizer/calendar.	3.07	ρ = .32	ρ = .33
information Use (A)	Ask your students to analyse digital content for bias/validity.	2.55	ρ = .45	ρ = .44
information Seeking	Ask your students to connect with industry experts. (2024 ONLY).	1.08	ρ = .35	ρ = .41

Table 6. Spearman's correlations showing the relationship between 'acquiring' information practices, critical thinking, and complex problem–solving

E-EIP Subcomponent	During this past school year, how often did you perform the following	Mean	Correlation to Critical Thinking	Correlation to Complex Problem-Solving
Information Sharing	Use technology to communicate (emails, texts, website, social media, etc.) with my students' families.	5.02	ρ = .23	ρ = .23
Information Sharing	Use iPad/MacBook to deliver/share feedback with your students.	4.10	ρ = .35	ρ = .36
Information Creating	Ask your students to create or capture digital images for use/sharing.	3.82	ρ = .39	ρ = .40
Information Creating	Ask your students to showcase their creativity using technology. (2024 ONLY)	3.08	ρ = .51	ρ = .50
Information Sharing	Ask your students to peer teach (give presentations to the class).	3.02	ρ = .38	ρ = .40
Information Creating	Ask your students to create audio or video using iPad/MacBook.	2.96	ρ = .32	ρ = .34
Information Use (E)	Ask your students to use robotics, a maker space, or a 3D printer.	0.84	ρ = .24	ρ = .28

Table 7. Spearman's correlations showing the relationship between 'expressing' information practices, critical thinking, and complex problem–solving

To explore how information practices might support deeper learning, this study examined the relationships between the frequency of specific classroom practices and two teacher-reported

outcomes: students' critical thinking and complex problem–solving. Using the expanded everyday information practices model as an analytical framework, each practice was initially categorized as either 'acquiring' (information seeking or information use) or 'expressing' (information creating, information use, or information sharing). These were then correlated with critical thinking and complex problem–solving scores using Spearman's rho to identify patterns.

The research team hypothesized that expressive practices, especially those involving information creation or sharing, would correlate more strongly with higher-order thinking outcomes. This held true in part: the practice of 'Showcasing creativity using technology'—an expressive, information-creating activity—was most strongly associated with both critical thinking (ρ = .51) and complex problem–solving (ρ = .50). However, several 'acquiring' practices not typically associated with expression—such as 'Practicing self-directed learning' and 'Analyzing digital content for bias'—also showed strong correlations to critical thinking and complex problem-solving.

These findings suggest that the 'expressing'/'acquiring' distinction within expanded everyday information practices may not sufficiently capture the complexity of these tasks. What appears more significant is the nature of the activity itself—specifically, whether it demands analysis, synthesis, autonomy, or creativity. In this way, tasks traditionally labelled as 'acquiring' may still be cognitively rich and supportive of critical thinking when they involve student-driven learning or evaluative reasoning.

Furthermore, task frequency did not necessarily predict higher-order thinking outcomes. For example, 'Using technology to communicate with families' had the highest mean frequency (M = 5.02) but showed the weakest associations with critical thinking and problem–solving (ρ = .23). In contrast, less frequent practices such as 'Connecting with industry experts' or 'Creating audio or video using iPad/MacBook' demonstrated stronger relationships with these outcomes.

Because the expanded everyday information practices classification alone did not yield consistent explanatory power, this study also draws on the SAMR model (Puentedura, 2009) to further interpret the findings. SAMR outlines four levels of technology integration—Substitution, Augmentation, Modification, and Redefinition.

In the next section, the SAMR model will be used to map the 15 information practices examined here in greater detail. While expanded everyday information practices offers a valuable lens for understanding how information flows in everyday classroom contexts, SAMR may better account for the instructional design and cognitive demands of these practices in technology-rich classrooms.

SAMR Model

An analysis of the frequency of classroom information practices (Table 8) reveals several clear patterns in how digital tools are integrated into instruction. Practices situated at the lower end of the SAMR model, particularly those classified as Substitution or Augmentation, occurred more frequently than those requiring Modification or Redefinition. For instance, using technology to communicate with students' families (M = 5.02, SD = 1.611) and using an iPad/MacBook to deliver feedback (M= 4.10, SD = 1.895) were among the most common practices, and both fell within the Substitution and Augmentation tiers of SAMR.

SAMR	During this past school year, how often did you perform the following	n	Mean	Std. Deviation
Substitution & Augmentation	Use technology to communicate (emails, texts, website, social media, etc.) with my students' families.	6,521	5.02	1.611
Augmentation	Use iPad/MacBook to deliver/share feedback with your students.	6,499	4.10	1.895
Augmentation	Ask your students to research a topic using the Internet.	6,478	3.92	1.961
Augmentation & Modification	Ask your students to create or capture digital images for use/sharing.	6,450	3.82	1.919
Substitution & Augmentation	Assess/test/quiz students using iPad/MacBook.	6,515	3.81	1.875
Modification	Ask your students to practice self-directed learning.	6,444	3.80	1.900
Substitution	Ask your students to take notes using iPad/MacBook in class.	6,485	3.70	2.281
Augmentation & Modification	Ask your students to play digital games related to their learning/curriculum.	6,458	3.32	2.037
Redefinition	Ask your students to showcase their creativity using technology. (2024 ONLY)	2,877	3.08	2.004
Augmentation	Ask your students to maintain a digital organizer/calendar.	6,454	3.07	2.510
Modification	Ask your students to peer teach (give presentations to the class).	6,477	3.02	2.026
Modification & Redefinition	Ask your students to create audio or video using iPad/MacBook.	6,475	2.96	1.933
Modification & Redefinition	Ask your students to analyse digital content for bias/validity.	6,436	2.55	2.144
Redefinition	Ask your students to connect with industry experts. (2024 ONLY)	2,866	1.08	1.587
Redefinition	Ask your students to use robotics, a maker space, or a 3D printer.	6,444	0.84	1.587

Table 8. Mean frequency of classroom practices by SAMR categorization

Conversely, higher-order uses of technology—such as connecting with industry experts (M= 1.08, SD = 1.587) or using robotics and makerspaces (M = 0.84, SD = 1.587)—were among the least frequent, despite their placement in the Redefinition tier. While basic technology integration is now routine, these findings suggest more transformative, cognitively demanding applications remain underutilized.

SAMR	During this past school year, how often did you perform the following	Mean	Correlation to Critical Thinking	Correlation to Complex Problem-Solving
Substitution & Augmentation	Use technology to communicate (emails, texts, website, social media, etc.) with my students' families.	5.02	ρ = .23	ρ = .23
Augmentation	Use iPad/MacBook to deliver/share feedback with your students.	4.10	ρ = .35	ρ = .36
Augmentation	Ask your students to research a topic using the Internet.	3.92	ρ = .39	ρ = .37
Augmentation & Modification	Ask your students to create or capture digital images for use/sharing.	3.82	ρ = .39	ρ = .40
Substitution & Augmentation	Assess/test/quiz students using iPad/MacBook.	3.81	ρ = .31	ρ = .34
Modification	Ask your students to practice self-directed learning.	3.80	ρ = .45	ρ = .47
Substitution	Ask your students to take notes using iPad/MacBook in class.	3.70	ρ = .35	ρ = .36
Augmentation & Modification	Ask your students to play digital games related to their learning/curriculum.	3.32	ρ = .28	ρ = .3
Redefinition	Ask your students to showcase their creativity using technology. (2024 ONLY)	3.08	ρ = .51	ρ = .50
Augmentation	Ask your students to maintain a digital organizer/calendar.	3.07	ρ = .32	ρ = .33
Modification	Ask your students to peer teach (give presentations to the class).	3.02	ρ = .38	ρ = .40
Modification & Redefinition	Ask your students to create audio or video using iPad/MacBook.	2.96	ρ = .32	ρ = .34
Modification & Redefinition	Ask your students to analyse digital content for bias/validity.	2.55	ρ = .45	ρ = .44
Redefinition	Ask your students to connect with industry experts. (2024 ONLY)	1.08	ρ = .35	ρ = .41
Redefinition	Ask your students to use robotics, a maker space, or a 3D printer.	0.84	ρ = .24	ρ = .28

Table 9. Spearman's correlations showing the relationship between information practices, critical thinking, and complex problem–solving categorized by SAMR model types

Further, when examining how these practices correlate with higher-order thinking (Table 9), a value–use gap becomes apparent. Several practices with strong associations to critical thinking and complex problem–solving—such as showcasing creativity using technology (ρ = .51/.50), analysing digital content for bias (ρ = .45/.44), and connecting with industry experts (ρ = .35/.41)—ranked lower in terms of frequency. Meanwhile, more routine tasks like taking notes or communicating with families, though frequently practiced, showed weaker correlations with these cognitive outcomes.

Beliefs

Teacher respondents were also asked about their values and beliefs. In particular, the survey asked them to rate, on a 5-point Likert scale, the extent to which they felt a number of classroom practices and tools would impact them and their students. On this scale, 'No Impact' was coded as 0, and 'Major Impact' was coded as 4.

Belief	n	Mean	Std. Deviation	Variance
Social and emotional learning	6376	3.27	.955	.912
Personalized learning	6369	3.26	.916	.839
Learner autonomy	6363	3.11	.960	.922
Online learning	6376	2.84	1.086	1.180
Artificial intelligence (AI)	6373	2.76	1.222	1.494
Virtual reality/augmented reality (VR/AR)	6346	2.54	1.178	1.387

Table 10. Teacher beliefs about the impact of technology and learning experiences

As shown in Table 10, these belief data appear to mirror the frequency patterns seen in teachers' reported information practices (see Tables 5 and 8). Practices that align with more relational aspects of teaching, such as social-emotional learning (M = 3.27, SD = .955), personalized learning (M = 3.26, SD = .916), and learner autonomy (M = 3.11, SD = .960), were rated as having the highest impact. In contrast, beliefs about the impact of more advanced digital skills or technologies, such as spatial computing (M = 2.35, SD = 1.242), coding (M = 2.41, SD = 1.262), AR/VR (M = 2.54, SD = 1.178), and artificial intelligence (AI) (M = 2.76, SD = 1.222) were notably lower—and these correspond to the least frequently reported classroom practices, such as using robotics, maker spaces or 3D printers. This pattern suggests a relationship between what teacher beliefs and practices, especially in technology-rich environments where access is high but confidence or perceived relevance may vary by task complexity.

Discussion

The results of this study reveal connected patterns in how classroom information practices, teacher beliefs, and perceived student higher-order thinking are configured in technology-rich environments. First, the most frequently reported classroom information practices centred on simple communication, feedback, and research tasks, yet, as shown in Table 9, these same classroom information practices produced some of the weaker correlations with teachers' perceptions of students' critical thinking and complex problem–solving. In contrast, less frequent but more cognitively demanding practices—such as showcasing creativity, analysing digital content for bias, and self-directed learning—demonstrated stronger positive associations with those outcomes. This divergence suggests that frequency of use in classrooms does not necessarily align with cognitive impact.

Second, the standard deviations across most classroom information practices were high (ranging from 1.587 to over 2.510 on a 6-point scale), suggesting significant variability in how teachers interpret and implement these practices. This variability may reflect contextual differences across schools, subjects, regions, or access to technology.

Third, the 'expressing' and 'acquiring' distinctions (per expanded everyday information practices) did not readily map to frequency or impact on thinking outcomes. While expressive practices like showcasing creativity yielded high correlations (ρ = .51 / .50), certain acquiring practices—namely analysing bias or facilitating self-directed learning—also showed moderate to strong relationships (ρ =.44–.47). This implies that what matters most is not simply whether a practice is 'expressing' or 'acquiring,' but how much autonomy, critical judgment, or cognitive demand it affords. When we overlay these practices onto the SAMR framework, we see that high-impact practices (often with lower frequency) tend to align with Modification and Redefinition levels—those tasks that transform learning, according to Puentedura (2009)—whereas high-frequency, lower impact practices often fall into Substitution / Augmentation, offering convenience without deep reinvention.

Finally, teacher beliefs about instructional impact and emerging technologies appear to mirror frequency patterns for classroom information practices, yet they diverge from actual critical

thinking and complex problem-solving correlations. Teachers generally perceived social-emotional learning, learner autonomy, and personalized learning as more impactful—practices not inherently dependent on complex digital integration. Conversely, advanced digital practices like coding, AR/VR, and spatial computing were deemed lower in perceived impact and used infrequently. However, some of these latter practices (e.g., showcasing creativity with technology and analysing digital content for bias) often showed stronger positive relationships to critical thinking and complex problem–solving than many of the frequently adopted ones (e.g., communicating with families, offering feedback to students, and researching using the internet). This belief–practice–impact gap suggests that teachers may undervalue the potential of cognitively demanding digital practices because they lack exposure, confidence, training, or institutional support.

These findings contribute to both theory and practice. They show which classroom information practices are most and least frequent, clarify how these relate (or fail to relate) to higher-order thinking, and reveal how beliefs may constrain practice choices even when those practices have greater payoff for students' critical thinking and complex problem-solving skills. However, while these findings highlight meaningful associations between certain classroom information practices and perceived student outcomes, the cross-sectional design limits causal inference. It is equally plausible that teachers who perceive their students as already capable of critical thinking may be more inclined to assign cognitively demanding tasks such as showcasing creativity or analysing bias, rather than these tasks directly enhancing such skills.

The data supports some conclusions: the descriptive and correlation analyses intersect meaningfully with literature on the implementation gap, belief–behaviour gaps, and technology integration models (Howard & Mojejko, 2015; Ertmer & Ottenbreit-Leftwich, 2010). This study corroborates previous findings about underuse of transformative technology but diverges by providing large-scale empirical links between specific information practices and student outcomes. It answers the research questions by showing which classroom information practices are most common (RQ1), which classroom information practices align most strongly with perceptions of critical thinking and complex problem–solving (RQ2), and how beliefs and classroom information practices relate (RQ3). Because this study spans multiple countries and leverages the expanded everyday information practices and SAMR frameworks, it offers a nuanced perspective on how to move beyond superficial technology adoption toward practices with real cognitive impact.

Conclusion

Thirty years after Savolainen's foundational work on everyday life information seeking, this study revisits the classroom to examine how teachers and students engage with information practices in a technology-saturated era. Drawing on a large international dataset, the findings reveal a misalignment: in technology-rich settings, high-frequency classroom information practices tend to be lower in cognitive demand, while less common classroom information practices show stronger associations with critical thinking and complex problem–solving. Beliefs also play a role: teachers were more confident in the impact of general pedagogical strategies than in digitally intensive ones.

These findings contribute to both educational technology and information science by empirically linking classroom information practices, especially technology-mediated information practices, to higher-order thinking—an area often theorized but rarely measured at scale. While this study benefits from a large dataset with teacher voices from many different backgrounds, it is not without limitations. The data are self-reported and cross-sectional, meaning they reflect perceptions at a single point in time rather than observed behaviour over time. Moreover, many of the classroom information practices were reported by teachers about their students, which introduces an additional layer of interpretation. Finally, the sample consists of schools

participating in a technology-forward, innovative initiative, which may reflect environments with greater access, infrastructure, or leadership support than average—though not necessarily universal teacher buy-in.

These factors should temper generalizations while highlighting the need for continued research into the lived realities of technology integration in classrooms, specifically from an information science and information behaviour perspective. To reverse declines in student engagement over time and as students age, (Bălţătescu & Cernea-Radu, 2024; Gallup, 2024; von Davier et al., 2024), schools must move beyond infrastructure and prioritize the informational layer of teaching and learning. Future research may investigate how institutional support, exposure, and teacher preparation shape the adoption of cognitively rich practices. Additionally, future research may look into differences in information practices by various demographics, contexts, and settings.

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Taxonomies as boundary objects for social change: Enhancing visibility of academics' impact-related information behaviours

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Abstract

Introduction. This paper analyses taxonomies of societal engagement and impact associated with research as 'boundary objects' that mediate and make visible the information behaviours of academics undertaking this work.

Method. The study uses 'boundary objects' (Star & Griesemer, 1989) as an analytic lens to explore institutional approaches in Denmark and Australia that classify societal engagement and impact activities.

Analysis. The team used quad-ethnographic analyses of the taxonomical structures used in three schema - two used in proprietary research information management systems (*Pure* and *Symplectic Elements*) and one empirically designed taxonomy (*ReACT*) - to identify alignment and/or disjuncture with academic engagement and impact work.

Results. The findings show proprietary system taxonomies limit the scope of reportable engagement and impact activities, rendering many academics' information behaviours invisible. Adopting empirically derived taxonomies that more closely represent engagement and impact work can make academics' related information behaviours visible, thereby informing approaches to capability development and tracking of relevant impact work.

Conclusion. The study identifies the limitations and benefits of how each schema represents (or renders invisible) academics' experiences of undertaking societal engagement and impact work.

Introduction

Academics undertaking community engagement and impact activities encounter new work requirements and distinct information behaviours (Kelly & Given, 2023; Cattlin & Given, 2025). Universities increasingly rely on information systems to capture data about these activities, alongside other academic work, like publishing. These systems are based on taxonomies that influence how academic work is described, understood, and valued, yet academic staff are rarely involved in their design or application. This paper examines the roles taxonomies play as boundary objects (Star & Greisemer, 1989), making visible and influencing academics' information behaviours (Lykke et al., 2023).

Studies of academics' information behaviours often focus on such research practices as scholarly communication (Miller, 2015; Steinerová, 2019) and accessing literature (Borrego & Anglada, 2016). Recently, studies have broadened to examine information behaviours associated with impact work, including paradata creation (Huvila et al., 2024), managerial constraints (Willson, 2018), and non-academic collaborations (Du & Chu, 2022). These studies highlight that changes to work practices create new information needs, seeking, use, and creation activities.

The work associated with identifying, describing, and tracking engagement and impact also creates new information behaviours. The identification and documentation of these activities reify the often invisible, intangible, and undocumented work academics do, which are often not tracked or rewarded by universities. These activities are reflected in some source data, such as details of meetings or events, which may or may not have tangible artefacts (e.g., minutes), as well as altmetrics, media coverage, or social media interactions.

The use of research information management systems to record impact-related work creates expectations of what academics should track and how to classify it, but this representation of academics' experiences is often incomplete. Research information management systems and taxonomies are not neutral; the concepts and terminology influence how academics, professional staff, and administrators understand impact work and related information behaviours. Taxonomies are hierarchical structures that influence how information is collected, collated, used, and understood (Pedersen et al., 2020).

This paper explores the application and usefulness of impact taxonomies as mechanisms to capture and report on impact-related academic work. We compare three taxonomies used in two universities, including those embedded in proprietary research information management systems (i.e., Elsevier's *Pure*, at Aalborg University, Denmark; and Digital Science's *Symplectic Elements*, at RMIT University, Australia) alongside a researcher-developed taxonomy (i.e., *ReACT*) that captures impact-related activities.

Background

The rise in research information management systems

As universities embrace analytics for societal impact, alongside publications, grants, and other activities, research information management systems are rising in popularity. Proprietary systems, such as *Symplectic Elements* and *Pure*, are described as the 'source of truth' (https://www.symplectic.co.uk/theelementsplatform/) of institutional 'research output, impact, and capabilities' (https://www.elsevier.com/en-au/products/pure). Universities embrace these tools for reporting, governance, decision making, accountability, performance, and capability management.

Research information management systems integrate information on project management, finances, publications, grants, community engagement, impact narratives, and achievements (e.g., awards). They produce researcher profiles, both for internal performance tracking, and for institutional websites. The systems allow some local customisation but often prioritise data

analytics (requiring bibliometric datasets) over the production and analysis of qualitative data. Thus, tracking publications, particularly if easily imported to research information management systems (e.g., from ORCID), is easier than tracking societal impact, which requires narrative forms of evidence.

Yet, creating indicators that capture the complexity and diversity of activities, across disciplines, globally, is challenging. For impact-related work, there are varied definitions of concepts and different assessment frameworks (Pedersen et al., 2020; Smit & Hessels, 2021). While it is well established that user needs must be addressed in system development and deployment (Huvila et al., 2022; Leitch & Warren, 2010), limited studies examine academics' research information management systems needs. This leaves little guidance for integrating societal impact indicators into these systems.

Assessing societal impact influences university information contexts

Tracking impact work has significant implications for shaping research priorities, university performance expectations, and promotion criteria (Kelly & Given, 2023), and for influencing academics' identities and practices (Watermeyer & Tomlinson, 2022). Academic identity is 'bound up with the characteristics and structures of the knowledge domains which are difficult to separate' (Becher & Trowler, 2001, p. 42), providing academics with a 'sense of identity and personal commitment' (p. 47). Yet research information management systems rarely reflect academics' experiences (Balaban & de Jonge, 2023). Studies point to differences between 'performative impact', as required by government assessment, and the authentic impact researchers pursue with communities (Smith et al., 2020, p. 68; Chubb et al., 2017). To represent complex information practices and outcomes, across disciplines, taxonomies must contain appropriate and clearly defined terms.

There are also challenges in identifying appropriate indicators or proxies for societal engagement and impact (Lykke et al., 2023). One approach, attribution analysis, links societal change to research outputs (e.g., journal articles), seeking to trace direct causal links between research and observable outcomes. These are often measured through standardised indicators such as patents, licences, or citations (Guthrie et al. 2013; Milat et al. 2015; Pedersen et al. 2020). This approach risks narrowing assessments to economic or bibliometric outputs by highlighting only 'who' solved what 'problem'. In contrast, contribution analysis emphasises the 'productive interactions' through which researchers engage with stakeholders and co-produce knowledge (Morton 2015; Lykke et al., 2023; Spaapen & van Drooge 2011). Here, impact is conceptualised as interactive processes, dependent on numerous researchers and societal partners. In short, attribution emphasises determination of responsibility for *products*, while contribution emphasises *processes* for co-creating knowledge. Both approaches raise distinct information needs for documentation and construction of impact narratives alongside reporting of traditional research outcomes.

Research information management systems also shape how academics seek, create, organise, use, and share information about societal impact, as they attempt to fit their work into predetermined categories over which they have little control. Willson and Given (2020) identified the challenges early career academics face in navigating universities' complex information environments. Simultaneously, universities increasingly seek to streamline institutional information management to maximise the value of research knowledge (Veer-Ramjeawon & Rowley, 2019), to facilitate sharing among staff (Tan, 2016), and to further develop partnerships (Elezi, 2021).

While bibliometric data (e.g., citations), are used heavily for tracking academic output, few options exist to easily and systematically track societal impact. Altmetrics may track how some people engage with publications, but tracking other engagements (e.g., research translation workshops) or impacts (e.g., practice change from research) is difficult. Much of this information is known only

to researchers, who must document activities in research information management systems using manual tracking and reporting.

Taxonomy development for impact-related tracking

The taxonomies within research information management systems mediate and translate information to create shared understanding (Star & Griesemer, 1989). Impact-focused taxonomies are not merely classificatory schemes, but function as what Hacking (1999) calls 'interactive kinds' of schemes (p. 59). By defining what counts as 'impact', taxonomies actively shape how researchers present, prioritise, and pursue their work; this creates a 'looping effect', influencing the content and structure of taxonomies (Hacking, 1999). Although taxonomies can serve as boundary objects—that is, facilitating communication across heterogeneous communities (e.g., funders, institutions, researchers), taxonomies differ from traditional boundary objects because they are not neutral mediators of external objects. Individual taxonomic categories can also be seen as boundary objects, with varying degrees of stability and materiality. Some categories are more boundary-like than others, however. Some are relatively tangible and enduring—such as publications—while others, like media appearances, are ephemeral and temporally unstable. Valuation further complicates this picture: an appearance in national media may carry more institutional weight than an organisation's internal podcast, even if both are labelled 'outreach' taxonomically.

Taxonomies thus occupy paradoxical spaces: they are tangible artefacts, comparable to datasets, but they also evolve over time, as institutions adjust what counts as 'impact'. In this sense, they resemble provisional communication tools at the intersection of distinct domains (i.e., research; administration; research policy; society), but ones that gradually sediment into stable systems with their own internal logic. Taxonomies of impact begin as primitive mechanisms for coordinating across evaluative cultures. Yet, over time, they may harden into regimes that set norms, redistribute value, and direct behaviour (Galison, 1997). Classifications impose ideas or methods at a fine level of detail, which disadvantages some academics (Bowker & Star, 1999, p. 320), while also influencing their role identities. Thus, taxonomies guide academics' assessment of whether they are progressing well against institutional and disciplinary markers of success.

Methodology

This paper uses the concept of boundary objects (Star & Griesemer, 1989) as a framework to analyse the impact taxonomies in two proprietary research information management systems (i.e., *Pure* and *Symplectic Elements*), alongside an independent taxonomy called the 'researcher-informed classification tool' (i.e., *ReACT*). The analysis identifies how schema represent academics' experiences of engagement and impact work. The research information management systems included here are used by the co-authors' institutions (i.e., *Pure* in Denmark and *Elements* in Australia); the *ReACT* taxonomy was developed by two co-authors, through evidence-based design and implementation with academics.

The team used a quad-ethnographic, collaborative methodology, with co-authors examining taxonomical definitions in *Pure*, *Elements*, and *ReACT*, based on their expertise in societal engagement and impact work. This is a variation on duo- and tri-ethnography, with 'multiple voices in dialogue' (Sawyer & Norris, 2015, p.2). The team engaged in generative dialogue in online meetings and via email to test examples of engagement activities across the three taxonomies. These interactions were summarised and shared within the team, with a shared document used to integrate reflections collaboratively from their own experiences and perspectives. This allowed the team to interrogate the implications of taxonomy language and structures, with findings emerging from this co-constructed dialogue (Burleigh & Burm, 2022). While the team are information scientists, they bring specialisations in information behaviour, higher education, taxonomy development, and technology use. This enabled holistic analysis (Polkinghorne & Given, 2021) by attending to different understandings of how engagement and impact work are enacted and

categorised. The transferability of the findings is supported by the implicit comparability of ethnography (Armstrong, 2008, p. 2005) and the established use of boundary objects as a theoretical framework for exploring use of taxonomies (Lewis & Ritchie, 2013, p. 264).

Theoretical framework

Taxonomies as boundary objects

In Star and Griesemer's (1989) original study, boundary objects mediate distinct information sources and perspectives to create shared understanding through 'translations scientists perform in order to craft objects containing elements which are different in different worlds' (p. 412). In Star's (2010) work, she explored the concept of 'invisible work' in science (p. 607), in the gap between what is formally recorded and other activities. Developing classifications involves going back and forth in local contexts to create robust representations of reality. For societal engagement and impact, invisible research elements are important, because the work depends on time, relationships, informal knowledge, and personal, embodied elements.

Boundary objects bridge gaps or divisions between different knowledge, expertise, or experiences by being 'plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star & Griesemer, 1989, p.393). Boundary objects allow integration of knowledge by providing mechanisms for 'diverse individuals to span the boundaries of their specializations' (Caccamo et al., 2023, p.2). Boundary objects (e.g., texts, documents, classification systems), mediate creation of, and access to, information. They can make processes or activities visible, or invisible, such as time, informal practices, and relationships. There are also less tangible boundary-like objects, such as meetings, that mediate understanding between actors.

Boundary objects have served as analytic frameworks for exploring various classification systems, including for knowledge creation (Albrechtsen & Jacob, 1998), museums (Huvila, 2013), document studies (Huvila, 2011, 2012), and work practices (Davies & McKenzie, 2004; Huvila et al., 2014). These analyses show boundary objects are not neutral, but involve 'exercising of power' (Huvila, 2011, p. 2535) in processes that privilege one perspective over another. Organisations can also create boundary objects (e.g., guidelines) that reflect their own agendas (Davenport, 2000). Boundary objects provide ways of making visible 'the sociotechnical contexts within which people seek, retrieve, use, share, and curate information' (Huvila et al., 2017, p. 1811).

The following sections explore taxonomies as boundary objects that mediate understanding of societal engagement and impact within universities. This, in turn, influences understanding of impact work, shaping academics' information behaviours. The analysis explores how taxonomies support shared understandings of impact work, reflecting the scope of possible activities and responding to local contexts.

Analysis and discussion

The *Elements* and *Pure* research information management systems enable data tracking for publications, grants, societal impact, and technology transfer to support governance and reporting. Both systems have interconnecting modules allowing some customisation, including user interfaces, fields, and descriptors. *Elements* has an impact tracking module requiring input of narrative data on external engagement (e.g., engagement instances, impact evidence). Aalborg University has customised these, using the labels 'service and engagement' (for work within academe, e.g., committee membership, and external, e.g., public engagement) and 'records of impact'.

The *Pure* taxonomy, used at Aalborg University, has fourteen metadata types, including traditional academic work (e.g., publications, funding). These metadata can be linked to indicate relationships, such as relating publications to a research project. The 'Impact' field allows researchers to register

impacts by name and description, including type: green (i.e., environmental), cultural, quality of life, political, social, or economic. The 'press/media' and 'activities' fields register external engagement and other non-academic work, such as consultancies and participation in professional events.

The *ReACT* taxonomy was developed at Aalborg University, based on social sciences and humanities scholars' experiences, and developed further in STEM (Lykke et al., 2023). *ReACT* was designed to label activities, including those generating impact, across three main dimensions of interactions: *Participation-in-person* (e.g., advice, membership), *Participation-by-proxy* (e.g., reports, articles), *Inflow* (e.g., responses to research). These are further subdivided, up to three levels, and researchers' role are attached to the participation-in-person categories (e.g., speaker, evaluator). *ReACT* also includes three specifying categories to enhance interaction descriptions: *core contribution*, (e.g., critique, explanation), *target* (e.g., practitioners, companies), and *draw-upon* (e.g., personal research, general expertise). The taxonomy has informed development of impact indicators at Aalborg University, and as a mapping tool for researchers to review their engagement activities.

Taxonomies define impact work

Taxonomies operate as boundary objects in translating and operationalising institutional definitions of societal engagement and impact. Researchers' experiences of societal engagement are mediated by these classifications, which may or may not reflect their lived experiences, involving processes of reification, interpretation, and description.

Taxonomy	Categories	Examples
Elements	***Media commentary***: Public-facing media contributions, including authored articles and thought leadership pieces and reviews for the public ***Media coverage***: reviews in the media about your work, including interviews and quotes	***Media commentary:*** Thought leadership article in *The Conversation* ***Media coverage:*** Interview on national television; expert commentary quoted in a news article
Pure	***Press/media*** covers press articles that were published in the media ***Publications***: Contributions that do not have a text form: Sound and/or image production (digital)	***Press/media:*** Newspaper article about how insecurity and untrained social skills lead to seeking friends online ***Publications:*** Podcast about crime in cyberspace in popular science podcast platform
ReACT	***Participation by proxy: Media*** ● Outlets (TV, Radio, Newspaper, Edited website, unedited website, social media etc) ● Product (translation, opinion, critique, article, video, etc) ***Participation in person: Media presence*** ● Interviewer ● Interviewee ● Debater	***Participation by proxy: Media:*** Feature article in newspaper about freedom of speech and tech giants ***Participation in person: Media:*** Interviewee in national TV about importance of names in food branding

	• Critic • Host	

Table 1: Taxonomy categories for media engagement.

Media engagement is a common activity supporting community engagement and is represented in all three taxonomies. However, media engagement in *Elements* and *Pure* presents a limited representation of activity types and academic roles (see Table 1). These systems focus on tangible outputs in mainstream media (e.g., quotes in news articles; video interviews), where researchers are authors, commentators, or news subjects. Here, media engagement is a simplistic transaction, at a moment in time, documented as a citation. The fields for entry, examples, and definitions serve as boundary objects by specifying the qualities and extent of individual activities and engagement instances. These representations of media engagement reflect the central purpose of research information management systems (Nickerson et al., 2013) as management and reporting tools, aligned with institution, funder, and government priorities.

The *ReACT* taxonomy provides a more expansive range of media engagements, across multiple channels, and capturing various roles. In *ReACT* the types of 'presence' enable a detailed representation of an individual's relationship with media, through multiple types of contribution and differing relationships with outlets; these include the specification of media type (e.g., documentary, blog) and the role (e.g., debater, interviewee). *ReACT* documents both intentionality, and format, providing nuanced and detailed representations. This highlights media engagement as a process, rather than a product, enabling academics to capture the iterative and ongoing interactions with media, and the shifting influence of others' reactions to that engagement.

The representation of media engagement in *Elements* and *Pure* does not reflect researchers' lived experiences, as research information management systems do not capture the temporal or relational process elements of media engagement. The research team identified several process-related instances of media engagement in their careers, such as developing relationships with media outlets and becoming trusted sources for journalists. Research information management systems' focus on identifying commentary instances (e.g., radio interviews), renders invisible the work involved in building relationships with media contacts. Focusing on singular instances overlooks ripple effects of media presence essential for public visibility and generating new relationships. The *ReACT* taxonomy captures these nuances, which enables identification, over time, of multiple requests and changes in academics' media roles.

These nuances not only indicate levels of esteem and significance of individual academics but also enable universities to understand the research capability required for effective, long-term media engagement. The relational aspects of media engagement raise unique information behaviours for academics, with many requiring process-focused media support. Effective taxonomy design requires balancing of scope and specificity to enable 'coherence across intersecting worlds' (Star & Griesemer, 1989, p. 393). Research information management systems should reflect the breadth of process-related activities and range of roles undertaken, beyond documenting tangible products. While taxonomies in *Pure* and *Elements* support the collection, preservation, and reporting of impact work to serve institutional purposes, their narrow representation of academics' experiences limits their ability to bridge understanding of the complex nature of that work.

Taxonomies and the complexity of impact work

Taxonomies of societal engagement and impact need to represent the work involved by documenting significant or instrumental activities and outcomes. The categorisation should

Taxonomy	Categories	Examples
Elements	**Public outreach or event:** Organising, facilitating or participating in industry, government, or community events, such as public talks, workshops, or showcases.	Facilitator at a co-designing community workshop; invited lecture at a government policy forum, panel presentation at an industry conference.
Pure	**Lectures and presentations** in private or public companies	Invited lecture at national broadcast company Speaker at international biotech expertise group
ReACT	**Non-Academic Event:** Events where the content is predominantly non-academic and where the main part of the participants and stakeholders do not have a scientific background.	Speaker at seminar for the Danish HR Director Network Roundtable participant at conference for energy sector seminar

Table 2: Taxonomy categories for public engagement.

untangle the complexity of activities that academics undertake in teaching, research, and service and represent these in a structure aligned with both institutional goals and researchers' experiences (Lippell, 2022). While it is challenging to represent the complexity of the work involved, an over-simplification of concepts creates a false taxonomy. The classification of public outreach activities (as outlined in Table 2) illustrates this challenge.

Academics undertake public outreach for various reasons. However, the *Elements* category of 'Public Outreach or Event' is defined narrowly as 'organising, facilitating or participating in industry, government, or community events, such as public talks, workshops or showcases', with the examples provided including being a 'facilitator', giving a 'lecture', or serving on a 'panel'. In *Pure* this category is even more restrictive, comprising 'lectures and presentations in private or public companies', such as biotech firms or at a national broadcaster. In these categories, other representations of outreach – such as public library talks, or creation of a documentary - are invisible. This invisibility overlooks many common forms of outreach, devaluing these activities by their absence. Such omissions may lead academics, and other university staff, to believe such activities do not 'count' as appropriate forms of outreach.

In comparison, *ReACT* provides more nuanced and inclusive representations in the category of 'Non-academic event'. This includes meetings with community organisations, presentations, workshops, open days, and many others. And, the taxonomy allows for documentation of various roles, such as initiator or participant. Further details can be provided through the sub-categories, for example, the 'target audience' or indicating content the engagement 'draws on', and whether this is based on 'student's research' or 'general expertise'. Where research information management systems are limited to formal roles and involvement through invitation or as a coordinator, *ReACT* allows for lower status, often invisible activities, such as having an informal conversation at a workshop, to be counted as valuable contributions.

Both *Pure* and *Elements* base their outreach representations on the need for evidence of tangible products, while *ReACT* represents a more realistic representation of the diversity and scope of outreach as a process. These two RIMS oversimplify the concept of engagement, rendering

invisible a significant portion of academic activities. This has implications for how academics understand impact work where documented activities focus on summative and substantial events, rather than ongoing, incremental, and often small-scale interactions that represent cumulative expertise and career-long impact. These oversimplifications also hide the depth of information behaviours that academics must navigate to engage successfully. Effective impact taxonomies should balance conciseness with completeness and robustness of differentiations to meet users' goals (Bowker & Star, 1999; Nickerson et al., 2013). Lykke et al. (2023) found one benefit of *Re*ACTs deep subcategories was the 'nuanced description' (p. 1064) possible in representing the work involved in enabling societal impact.

Taxonomies make the intangible tangible

Taxonomies articulate and reify impact work by making tangible, and measurable, the fleeting, ephemeral, and intangible experiences of academics undertaking engagement. Academics' engagement with media and at public events can involve tangible outputs, such as videos, but also involve intangible interactions that are necessary to enable impact. For example, academics can develop relationships with journalists over time, through regular contact for off-the-record conversations or background advice. These interactions indicate not only academics' status as advisors and sources, but also their willingness to develop long-term, trusted relationships. Such relationships can foster avenues for future coverage of research but also require different information behaviour support than what may be covered in standard university 'media training'.

In *Elements* and *Pure*, the categories for events and media do not include details on academic roles beyond organising, facilitating, or participating in an activity. *Re*ACT allows for detailed documentation of intangible 'participation' in 'non-academic events', such as being an initiator, or an invitee. Such nuanced categories demonstrate the complexities of engagement, which are not routinely captured on academics' curriculum vitae; they may be fleeting and lack the status of activities with tangible outputs but require time and support to do well. Recording these instances provides ways of reifying transient experiences contributing to societal impact, such as the progression of a relationship from informal meetings to a partnership. This also enables recognition of academics' skills, time, and expertise in undertaking this work.

The temporal dynamics of impact activities are also intangible and not easily captured by taxonomies. While journal articles are trackable via citations once published, the effect of engagement activities depends on stakeholders signalling whether an impact has occurred. The absence of systematic feedback loops makes some category boundary objects latent, surfacing belatedly, or never at all. *Re*ACT indicates the possibility of this through categories of 'responses' or 'requests' which identify how others have responded to instances of engagement. These activities are not visible in *Pure* and *Elements*, as the categories are limited in scope by their purpose in supporting institutional administration. Such RIMS are also limited in that they do not show the interconnections between types of engagement and tangible impacts, such as the adoption of community resources following public outreach.

Davies and McKenzie's (2004) study found documents can serve as temporal boundary objects that have 'a co-ordinating role with regard to other documents, recording the presence of or evidence from other documents'. (Lykke et al., 2023) found *Re*ACT reflected researchers' 'momentum' (p. 1066) by providing an 'overview' (p. 1063) for their career and development. Given the myriad information behaviours involved in impact work, such visibility is critical for academics' professional development. For universities, *Re*ACT's more detailed taxonomy can provide guidance on capability development needs, and valuable data on intangible pathways to impact, alongside tangible ones.

Taxonomies influence information behaviour

Taxonomies are socio-technical artefacts that underpin information infrastructure for impact work, influencing the information behaviours of academics on multiple levels. Taxonomies are instrumental in shaping how societal impact of research is defined and enacted by making visible both institutional goals and reifying the activities of researchers (Hacking, 1999). These representations of impact work shape how the work is perceived, experienced, learnt, and recognised. Taxonomies mediate understanding and recognition of impact work by shaping the exchange of information between institutions and academics. Taxonomy categories and examples determine the activities considered legitimate (and therefore documented and counted) and those that remain invisible (and not documented or counted). This has flow-on effects for documenting the information behaviours embedded in engagement and impact-related activities and for the availability (or lack) of institutional sources to support those information behaviours. Not only are taxonomies structural representations of the adage 'we count what we value, and we value what we count', but they are also representative of the informational supports that may (or may not) be provided to academics for impact work.

The definitions and examples represented in the categories and descriptions in *Pure* and *Elements* fail to reflect the scope of researchers' experiences. In contrast, the *ReACT* taxonomy's nuanced approach illustrates the potential for more fulsome representations. The 'looping effect' (Hacking, 1999, p.59) means the taxonomic representations of impact work, in turn, influence how academics conceptualise impact, understand the work involved, reflect on their capabilities and decisions on what activities to undertake, and the resources, skills, and time required (Lykke et al., 2023). For emerging researchers, the taxonomic representations serve as a guide to potential engagement and impact success, and either enhance or limit the relevant information behaviours in which they engage.

Taxonomic categories also influence researchers' approaches to creating information about their engagement experiences by determining what experiences are valued. The researcher profiles and career narratives generated by RIMS data reinforce these definitions and present an incomplete picture of what is involved in enacting engagement and impact. The taxonomies influence researchers' day-to-day information behaviours in seeking, using, and creating information about their impact work. For example, the creation of data about public outreach activities requires academics to implement new routines to record activity details, to decide what to include, how to organise the information, and how to describe it. The routines, and the records academics create, in turn cement the activities within research practice. In this way, the activities that are prioritised are those that contribute to workload and recognition for career progression. If formal media interviews, as represented by tangible quotes in news articles, are the only available category to document 'media engagement', researchers will focus their information behaviours and capability development on these activities. Ironically, while media relationships may cement an academic's role as a trusted source, focusing on limited, transactional representations of media 'quotes' may limit an academic's influence in the longer term.

Taxonomies can also render visible the usually invisible information behaviours of academics while undertaking engagement activities, as these involve different information needs to traditional scholarly work. Academics preparing to present to an industry group, for example, require understanding of industry contexts, organisational priorities, and preferred ways of communicating. Similarly, information sharing and creation is evident in categorisation of academic roles in events, such as interviewer, facilitator or presenter. Representation of these types of activities within *ReACT* creates a profile of information behaviours that signal areas of expertise or capability development needs. The application of *ReACT* to STEM disciplines, for example, identified not only the value for researchers in identifying and describing engagement activities, but also the challenges in representing quantitative values in ways that were accurate

and meaningful (Lykke et al., p. 1067). In this way, a taxonomy of societal interactions 'made visible' the activities academics undertook and highlighted 'shortcomings in relation to activities that may affect an academic career' (p. 1063) and support and skill development needed for these activities (p. 1064).

Taxonomies seek to integrate the tangible 'products' of impact work (e.g., a medical device) or evidence of change in society (e.g., a community program) with the less tangible 'processes' that contribute to these creating these impacts (e.g. meetings, informal discussions). In Figure 1, the tangible 'products' exist as information objects (e.g., radio interviews), while the 'processes' might only exist as notations in a calendar, notes from a meeting, or a post on social media. While process activities are far less tangible, and may not exist as identifiable objects, taxonomies initiate their creation by signifying the need to collect information about them. For example, developing a relationship with a stakeholder often includes informal meetings and building relationships over a long period of time, which is not usually recognised in workloads or noted in career progression. These activities involve complex information behaviours for academics, requiring tangible support for success. The reification of invisible work and integration with tangible information has the potential to enable greater understanding of the reality of impact work and may confer recognition and status on the activities concerned (Star, 2010). An in-depth taxonomy like *ReACT*, can illuminate the complex, unique information behaviours involved in engagement and impact work, providing visibility for researchers to seek support and recognition for these activities.

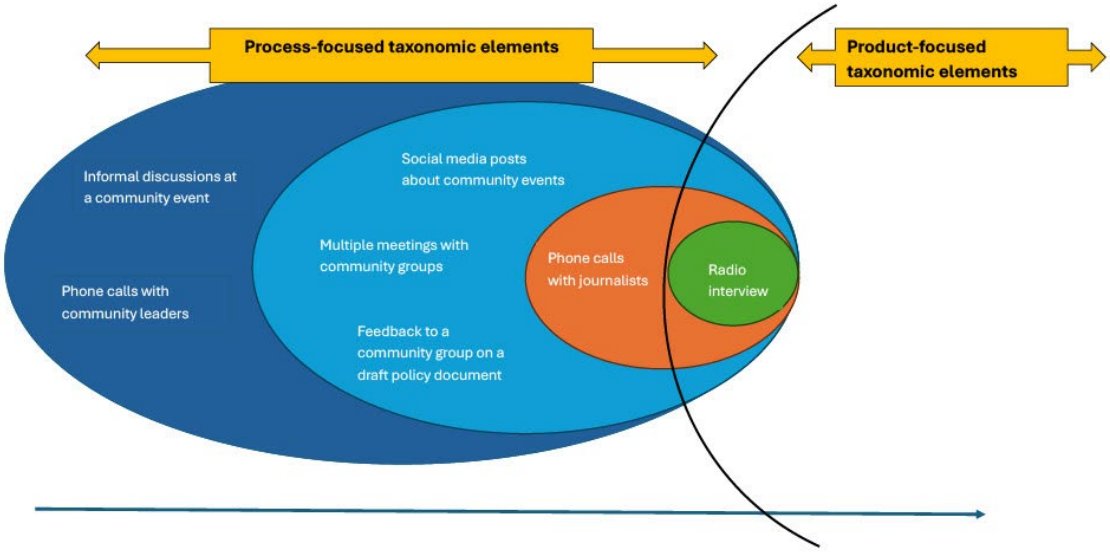


Figure 1. Examples of taxonomic elements of impact work, from process to product.

Conclusion

The collection of societal engagement and impact-related information is the latest development in datafication of academe (Gourlay, 2024), requiring significant resources for academics and institutions to track and document activities and contributions. Institutional approaches to collecting, collating, and sharing data also have significant implications for shaping behaviour by creating blueprints that influence academics' practices (Hacking, 1999, p. 59). When institutional expectations are instantiated in RIMS, the taxonomies used to document engagement and impact work play critical roles in representing what activities are valued, and where staff capability development is needed to support information behaviour.

This study found proprietary taxonomies, like those underpinning *Elements* and *Pure*, can present limited views of engagement and impact, focusing on narrow groupings of summative and tangible outputs—or 'products'—of impact-related work. These RIMS demonstrate the pros and cons of investing in 'off the shelf' systems, which may be cost-effective, but which may lack the flexibility and depth needed to adequately represent impact work. These systems also limit representation of capability development and changes over time, such as the deepening of relationships with non-academic partnerships. While RIMS provide some levels of institutional customisation, their taxonomies are quite shallow, obscuring invisible, intangible work required of academics to engage successfully beyond academe—and the information behaviours foundational to the work.

When researchers co-develop taxonomies, these tools can articulate more complete pictures of impact-related activities, thereby also providing insights on the information behaviour supports needed. For example, an academic engaging with media may need networking opportunities to meet journalists, guidance on how to pitch opinion pieces, or strategies for managing the immediacy of the 24/7 news cycle. The *ReACT* taxonomy is one example of an empirically derived schema, which represents not only the products of academics' work, but also the formative and intangible work—that is, the 'processes'—academics foster to enable impact to occur. Process-related information behaviours are just as important as those that are product-focused, despite being less visible, by nature.

While proprietary taxonomies mediate institutional engagement and impact goals, they are unsatisfactory as boundary objects; these should fully represent the needs and experiences of academics engaged in impact work. Rather, these taxonomies construct a reality of engagement and impact that emphasises the end points of complex, multifaceted relationships between academics and the non-academic groups that adopt research innovations. Proprietary RIMS under-represent the markers and pathways to impact, as well as the informational supports academics need to achieve it. As the *ReACT* taxonomy reflects academics' experiences it is more holistic and fulsome; however, it also brings inherent limitations, as its categories require significant time to document processes and products, and to enter this information into systems, manually. To become meaningful boundary objects, taxonomies must reflect both institutional and academic needs, while balancing the time and effort involved in representing and documenting all phases of impact work.

It is also noteworthy that RIMS rely on academics to create and input engagement and impact-related data; this involves new information behaviours for academics, who must decide what to document and how to represent their work, which is time-consuming and requires specific skills (e.g., storytelling for impact cases). Yet, proprietary systems provide little value in return for these efforts, beyond serving as clearinghouses for gathering data and populating researcher profiles. Empirically derived taxonomies, which are created by academics engaged in impact work, can also serve as pedagogical tools; these can educate academics, and professional staff and university administrators, in the process-related activities that lead to impact. Capturing the true extent of engagement and impact work supports researcher development, by modelling the skills and

activities required, representing sustained activity over time, substantiating achievements for career progression, and demonstrating the extent of activity that contributes to impact outcomes.

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Information behaviour of data breach victims and the relevance of health information avoidance

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Abstract

Introduction. This study conducts a scoping review and comparative analysis of human information behaviour following data breaches, with a focus on information avoidance. Drawing on parallels with health information behaviour, the research explores how the psychological repercussions of data breaches are shaping cybersecurity victimhood and behavioural responses to digital information post-incident.

Method. An interpretive, scoping review methodology is employed to map literature across cybersecurity and health domains. Sources were identified through systematic searches of academic databases, focusing on conceptual overlaps between data breach victimisation and health-related information avoidance.

Analysis. Comparative thematic analysis was conducted to identify shared psychological and behavioural traits. Key dimensions included emotional distress, cognitive dissonance, institutional distrust, and uncertainty management. Analysis is synthesised into tables to highlight conceptual convergence.

Results. The findings reveal significant parallels between data breach victims and people avoiding health information. Both groups exhibit avoidance driven by anxiety, perceived threats, lack of control, and distrust. Psychological repercussions manifest as digital disengagement, selective exposure, and changes in information behaviour.

Conclusion. Information avoidance among data breach victims reflects a complex interplay of emotional, cognitive, and social factors. Understanding these mechanisms is essential for designing supportive interventions and extending health information behaviour theory into the cybersecurity domain.

Introduction

In an increasingly interconnected digital landscape, the frequency and scale of cybersecurity incidents, particularly data breaches, are emerging as critical risks with far-reaching consequences for people affected by them as they seek to protect themselves and their information from harm online. In the United States, the Federal Bureau of Investigation's Internet Crime Complaint Center recorded 3,204 data breaches and reported losses totalling USD 364,855,818 in 2024 (Internet Crime Complaint Center, 2024). These incidents go beyond technical failures and result in significant life-altering human consequences including psychological trauma, physical health issues, social disruption, and economic hardship.

Research gap

While research has examined the psychological impacts of cybercrime, little is known about how these experiences shape victims' information behaviours. Existing literature provides limited empirical insight into the ways cybersecurity incidents, particularly data breaches, influence how individuals seek, process, and avoid information. Without this foundational understanding, authorities and organisations lack effective strategies to respond to patterns of information engagement resulting from victimisation. Moreover, it is important to distinguish between public notions of 'victimisation' (e.g., a hacked account) and victims' subjective experiences – how individuals interpret, internalise, and respond to critical incidents. Specifically, there is a notable gap in understanding the information behaviours victims of a data breach adopt: do they modify their online exposure or withdraw from online activities altogether in order to prevent further harm?

Aim of this paper

This study reviews research on the psychological impacts of data breaches, with a focus on how they shape victims' information behaviours, particularly tendencies toward information avoidance. The extant literature is limited and primarily drawn from psychology and computer science. Although prior studies have examined victims' responses to data breaches (Ayaburi, 2023; Mayer et al., 2023; Mayer et al., 2021; Zou et al., 2018), research explicitly addressing information avoidance remains limited. This study seeks to fill that gap by focusing on victims' tendencies to avoid information following breach incidents. To address this, the study draws from comparative insights from human information behaviour and presents the findings from a scoping review (Howell & Shepperd, 2012; Miller & Mangan, 1983), addressing the following research questions:

RQ1. How can the phenomenon of cybersecurity victimhood be conceptualised to better understand the psychological impacts on individuals and their subsequent information behaviours?

RQ2. What parallels exist between information avoidance and related behaviours in the context of cybersecurity victimisation and established findings from health-related human information behaviour research?

RQ3. How can insights from health-related human information behaviour and information avoidance research inform a preliminary mapping of the psychological impacts of cybersecurity incidents on information behaviours, thereby providing a foundation for future studies in this domain?

Significance of the study

This research addresses a critical need within cybersecurity response and restitution programs, for understanding how human information behaviour changes as a result of a data breach and the extent to which responses may be intentional or unintentional and result from psychological and social harm. Understanding this behaviour is crucial for developing effective support mechanisms, including access to information services for victims of cybercrime.

By drawing on established health related human information behaviour research, particularly information avoidance and selective exposure (Fischer et al., 2005), this study brings valuable insights to cybersecurity where such understanding is scarce. This interdisciplinary approach will highlight the necessity of expanding understanding of information avoidance and selective information exposure to other domains.

Research design

Research methodology

This research employs a qualitative, interpretivist approach to scoping and evaluating current research on changing information behaviours among data breach victims, with a focus on information avoidance and comparing this with human information behaviour research in health contexts. This enables a comparative analysis of concepts, gaps, and parallels between responses to data breaches and health information.

Research process

The approach taken follows five key steps adapted from Arksey and O'Malley (2005) for scoping literature reviews:

1. *Identifying the research question*: Questions are defined around conceptualising cybersecurity victimhood, exploring parallels with health-related human information behaviour, and applying information avoidance insights to cybersecurity contexts.

2. *Establishing research context*: This step summarises key human information behaviour and information avoidance literature, to provide a foundation for the research, with core concepts of human information behaviour, information avoidance, and cybersecurity, situating the study within its theoretical and empirical context.

3. *Identifying relevant studies for comparative analysis*: This involved a comprehensive search of electronic databases, including Scopus, Google Scholar, ProQuest, EBSCOhost, and reference lists. Keywords for *data breach(es)*, *cybersecurity*, *cybersecurity victim*, *victimisation*, *victimhood*, *information behaviour*, *information avoidance*, *selective exposure*, *health*, *health information* and *psychology* were combined using Boolean operators and targeted filters for precision.

   The review covers English-language sources from 2015 to 2025 to show contemporary perspectives on cybersecurity. Eligible sources included peer-reviewed journal articles, conference and symposium proceedings papers, and book sections, resulting in an initial set of 554 articles.

4. *Study selection*: Studies were selected by applying inclusion and exclusion criteria. Titles and abstracts were first screened to exclude irrelevant works; this was followed by a full-text review of remaining articles to confirm eligibility and relevance to the research aims. 90 papers closely aligned with the research focus were identified and selected for comparative analysis in Sections 5 and 6.

5. *Charting analysis and findings*: This step involves systematically extracting, collating, and analysing key findings on human information behaviour and information avoidance to identify conceptual parallels in health and cybersecurity contexts. Analysis is presented through tables and narrative summaries, highlighting similarities, patterns, and gaps to inform comparative analysis and guide future research directions.

Research context

Victims of cybercrime

As government and organisations extend digital services, personal information is increasingly exchanged online (Whitson & Davis, 2001). It is an information environment that involves both the push and pull dynamics of personal information required for products and services exchange. It is the rapid, loosely regulated accumulation of personally identifiable information across these channels that has intensified cybersecurity risks (Zaeifi et al., 2024). As vast amounts of client data are collected and disseminated without sufficient safeguards, the number of cybersecurity incidents and data breaches continue to rise, ultimately affecting individuals.

The rise of cybersecurity incidents

The threat landscape includes malware, online fraud, and identity crimes (Voce & Morgan, 2023). However, data breaches, defined as the unauthorised access or disclosure of personal information (OAIC, 2025a), represent the most critical issue people face in scale and impact (Khan et al., 2022). The Australian *Notifiable Data Breaches Report: July to December 2024* (OAIC, 2025b) recorded 595 breaches, a 15% increase from the previous six months. High-profile breaches included Optus, a major Australian telecommunications provider (2022), which affected 10 million customers; Medibank, Australian health insurance provider (2022), which impacted 9.7 million customers; and Qantas, a flagship airline (2025), comprising 6 million customers. Collectively, these incidents exposed the personal information of tens of millions of Australians, underscoring the far-reaching consequences for victims.

The impacts of data breaches

Data breaches violate privacy and trust (Kamkar & Duquette, 2021), frequently leading individuals to reassess their digital engagement. Victims experience anxiety, shame, depressive symptoms, and diminished self-esteem (Cross et al., 2016; Kaakinen, 2018), with these psychological effects extending offline and contributing to social withdrawal and isolation (Barnett et al., 1996; Palassis et al., 2021).

Research indicates that cyberattacks can evoke psychological responses comparable to those triggered by terrorism and political violence, with implications for both societal cohesion and individual trauma (Shandler et al., 2023). This threat environment is further exacerbated by perpetrator anonymity, which amplifies risk perception, intensifies anxiety, and discourages victims from using online resources (Cheng et al., 2020; Kaminska & Duquette, 2021).

The rise of cybercrime highlights the need to understand victims' behavioural adaptations. While anxiety (Bada & Nurse, 2019) and withdrawal (Riek et al., 2016) are documented, less is known about proactive coping strategies like selective information exposure or intentional disengagement (Wang, 2024). Furthermore, responses have prioritised organisations over individuals. Muzatko and Bansal (2024) call for research into how victims navigate digital environments post-breach, including decisions to limit online engagement.

Human information behaviour

Human information behaviour encompasses how individuals seek, process, use, and interact with information, including the influences of cognitive, emotional, social, and situational factors (Spink & Cole, 2004). It encompasses both active information seeking and passive reception, and the routines and practices people develop to engage with information (Savolainen, 2017). Dervin and Nilan (1986) emphasise the individual's active role in shaping information needs through meaning-making, arguing that this process stems from a cognitive drive to create order and coherence from stimuli and thereby enabling greater control and purpose. In this study, information is any distinct signal or source that informs fundamentally influencing behaviour, thought, decision-making, emotion, and social interaction (Case et al., 2023; Velmans, 1991).

Information needs arise not only during problem-solving scenarios, like health diagnoses, which create immediate needs to understand situations and outcomes (Case et al., 2023), but also from curiosity, social connection, or entertainment. From a cognitive perspective, internal knowledge structures are continually updated, and any situation where existing mental models are insufficient, due to complex problems or simple curiosity, drive the resolve to adjust (Belkin, 1990). In today's digital environment, a shift from scarcity to overabundance has transformed engagement, creating risks of overload and disengagement. Faced with excessive or conflicting information, some users may disengage entirely, a phenomenon coined as information avoidance in human information behaviour research (Sweeny et al., 2010), and closely linked to selective exposure to information (Fischer et al., 2005).

Information avoidance

With online engagement, increasing numbers of researchers have highlighted the growing relevance of information avoidance, including its role in responses to public health messaging during health crises (Huvila & Gorichanaz, 2025). Information avoidance, defined as 'any behaviour intended to prevent or delay the acquisition of available but potentially unwanted information' (Sweeny et al., 2010), encompasses evading sources, withdrawing from disclosure environments, or ignoring cues. Initially conceptualised as a psychological defence mechanism against anxiety (Sweeny et al., 2010), it aligns with cybersecurity victims' behaviour, especially when considered as a strategic response to the impacts of data breach. Qi et al. (2024) further framed it as a deliberate behavioural strategy where individuals weigh emotional strain, risks, and costs against perceived benefits, reflecting a shift from viewing avoidance as unconscious protection to an intentional decision.

Selective exposure is closely associated with information avoidance and has been extensively studied through psychological and cognitive behavioural lenses (Hart et al., 2009; Sweeny et al., 2010). Research shows that individuals often seek information that confirms existing beliefs while avoiding contradictory content (Neal et al., 2024; Nickerson, 1998), and can be driven by anxiety, fear, self-efficacy, and locus of control (Case et al., 2005; Foust & Taber, 2024; Golman et al., 2017). Several studies have examined cognitive dissonance, emphasising that individuals tend to avoid information that challenges their existing beliefs and self-perceptions (Miller & Mangan, 1983; Narayan et al., 2011; Sultana et al., 2023).

Contemporary perspectives recognise selective exposure as a nuanced manifestation of information avoidance that encompasses both selection and avoidance behaviours (Case et al., 2023). Building on this, Hicks et al. (2024) framed avoidance as practices that moderate information engagement by reducing intensity, limiting control, or filtering content, emphasising that avoidance is not inherently maladaptive but a complex, potentially beneficial information practice (Hicks et al., 2024; Smith et al., 2008; Sweeny et al., 2010).

Research on information behaviour and avoidance has been applied across diverse disciplines, including health sciences (Davies & Harrison, 2007), business (Auster & Choo, 1993), law (Sutton, 1994), psychology (Lévai et al., 2024), and communication studies (Agarwal et al., 2022), reflecting growing interdisciplinary engagement (Agarwal, 2023; Foust et al., 2023). Cybersecurity, which is now central to individuals, organisations, and national security (Hytönen et al., 2022; Schiliro, 2023), provides a critical context for extending this field.

Charting identity in data breach narratives

Victim, survivor, affected individual, or data subject?

The terminology used to describe individuals affected by data breaches varies and includes *victim*, *affected individual*, *survivor*, and *data subject*. Constructing identity through the vocabulary used in data breach narratives is crucial as it shapes societal perceptions, legal responses, and individual

agency. Each term carries substantive implications for psychological wellbeing and legal standing following breach events.

The term *victim* emphasises harm and liability and invokes sympathy (Golladay & Holtfreter, 2016). The term *survivor* shifts focus to resilience and empowers affected individuals while highlighting systemic failures in data governance (Hurtado et al., 2021). *Affected individual* acknowledges harm without subjectivity, while *data subject* rooted in legal frameworks like the General Data Protection Regulation (GDPR) diminishes personal trauma (GDPR, 2016).

Terminology framing individuals affected by data breaches

Victim remains the dominant term across academia, government, and media. A July 2025 PressReader search for *data breach* AND *victim* yielded 1,990 English-language media articles from the prior year. In contrast, *data breach* AND *survivor* returned 150 articles, over 90% of which referenced unrelated contexts (e.g., domestic violence) in PressReader. *Affected individual* appeared in only seven articles (two incident-related), while *data subject* appeared 41 times, primarily in legislative discourse.

The term *victim* underscores harm and vulnerability (Golladay & Holtfreter, 2016), consistent with dictionary definitions, whereas *survivor* connotes resilience and proactive risk management (Hurtado et al., 2021). Legal frameworks typically favour neutral terms such as *affected individual* or *data subject* (e.g., Office of the Privacy Commissioner of Canada, HIPAA, NIST).

In psychological contexts, adopting *survivor* terminology fosters empowerment and control, and this seems particularly relevant to cybersecurity incidents that may induce trauma (Delker et al., 2019), as it gives shape to coping strategies. While *victim* may reinforce helplessness, *survivor* encourages positive, protective behaviours (Van Dijk, 2020; Delker et al., 2020), that may extend to include processing breach information, safeguarding digital assets, and recalibrating trust in digital systems.

Jurisdiction	Legal framework	Terminology used	Rationale/approach
European Union (2016)	General Data Protection Regulation (GDPR)	Data subject	Neutral; emphasising legal standing and agency rather than victimhood
United States	Consumer protection Laws (Legal Information Institute, 2025)	Affected consumer / Resident	Reflects consumer protection framework while avoiding presumption of harm that 'victim' implies
United Kingdom	EU GDPR (2016) / Data Protection Act (2018)	Data subject	Maintains consistency with EU approach, emphasising legal standing rather than victimhood
Canada (2018)	Personal Information Protection and Electronic Documents Act (PIPEDA)	Affected individual	Acknowledges impact without presuming degree of harm
Australia (2018)	Privacy Act / Notifiable Data Breaches scheme	Affected individual	Acknowledges impact without presuming degree of harm
New Zealand (2020)	Privacy Act	Affected individual	Acknowledges impact without presuming degree of harm

Japan (2022)	Personal Information Protection Act	Principal	Formal; emphasising individual's primary relationship to their data
Singapore (2012)	Personal Data Protection Act	Individual	Neutral term avoiding any presumption about impact or harm

Table 1: Terminology used in different jurisdictions.

Table 1 illustrates how variations in terminology across jurisdictions and data protection laws reflect legal frameworks governing individual rights and corporate responsibilities. Terms like *affected individual* or *data subject* assign a clear legal status without presupposing harm and distinguish individuals from corporations in the context of cyberattacks (Bygrave, 2020; Mantelero, 2018; Sargiotis, 2024).

While companies are responsible for safeguarding data and may suffer financial or reputational harm when a breach occurs, individuals' rights to data protection and recourse are legally established in these contexts (Schwartz & Peifer, 2017; Solove & Citron, 2017). However, the recourse available is often procedural and lengthy. In Australia, it typically requires first seeking a response directly from the company whose security failed; if unresolved, the matter proceeds to the Office of the Australian Information Commissioner for investigation and may culminate in legal action involving other areas of law, like Australian Consumer Law.

Neutral terminology risks shifting the burden of proof onto individuals, who must demonstrate harm, like emotional distress, to pursue legal recourse. By adopting neutral language, legal discourse directs attention to existing legal rights and organisational accountability, but does not acknowledge the affective dimensions of suffering. This tendency aligns with broader societal shifts favouring *survivor* narratives that emphasise resilience and active coping (Herman, 2015). Although legal frameworks rarely use the term *survivor* explicitly, such terms frame victims as empowered actors, aligning with human information behaviour research that views selective information exposure as a deliberate strategic response (Hicks et al., 2024).

A literature search across academic databases reveals notable differences in terminology describing individuals affected by data breaches. Searches were conducted in ProQuest, Scopus, and ten Tier-1 cybersecurity journals, which are highly ranked publications recognised for rigorous peer review, high impact factors, and strong influence on scholarly discourse. The results, summarised in Tables 2 and 3, reflect usage patterns across key terms (Criteria: Published 2015–2025; Language: English; Full-text only). Table 2 presents term frequencies in academic databases, while Table 3 shows terminology prevalence in Tier-1 journals.

Key terms	ProQuest	Scopus
'Data Breach' and 'Victim'	309	1,093
'Data Breach' and 'Survivor'	1	83
'Data Breach' and 'Affected Individual'	3	24
'Data Breach' and 'Data Subject'	3	213

Table 2: Key terms used in academic databases.

Journal	Survivor	Data subject	Affected individual	Victim
IEEE Transactions on Dependable and Secure Computing	0	25	0	3
IEEE Transactions on Information Forensics and Security	0	1	0	1
Journal of Cybersecurity	0	6	6	1
IEEE Security and Privacy	0	3	0	21
IET Information Security	0	0	0	0
ACM Transactions on Privacy and Security	0	1	0	8
Journal of Cryptology	3	45	1	67
Cryptologia	1	17	0	0
Computer Law & Security Review	0	0	27	60
ACM Transactions on Computer Systems	0	3	0	102
Total number of usages	**4**	**101**	**34**	**263**

Table 3: Key terms used in 10 Tier-1 journals on computing and cybersecurity.

The term *victim* features prominently in academic databases and journals (ProQuest: 309; Scopus: 1,093), reflecting a persistent framing of data breaches as events causing definitive harm. This reinforces narratives of victimisation and human cost (Golladay & Holtfreter, 2016; Hay & Ray, 2019; Kilovaty, 2021), and from a social and psychological perspective, the label risks stigmatisation and secondary harm by implying passivity, contradicting empowerment-focused recovery approaches (Delker, 2022). Furthermore, since not all victims experience tangible negative outcomes or self-identify with the term, its use can misalign with lived experience (Budimir et al., 2021).

How data breach terminology shapes understanding of victimhood

The variation in terminology varies across context: public and academic discourse often use *victim* to acknowledge harm, while legal terms like *data subject* or *affected individual* aim to avoid assumptions about harm severity (Solove & Citron, 2016). *Survivor* implies response and recovery and, while empowering, it may not reflect the initial state of those impacted, particularly when many lack resources to respond effectively.

This research adopts *victim* to emphasise violations of autonomy, privacy, and security, while distinguishing between victimisation (a harmful event), and victimhood (the defining social, psychological and discursive frame). By focusing on individuals affected by data breaches, the term victim allows this study to centre on the lived experience of people rather than organisations. Unlike companies, which can draw on institutional resources, individual recourse is often slow and uncertain.

Understanding the impacts of a data breach through the lenses of *affected individuals*, *data subjects*, and *survivors* is an important part of victimhood. However, this study prioritises the human impact, acknowledging the psychological, social, and practical consequences experienced by individuals whose personal information has been compromised. This perspective recognises the agency, power, and strategic choices that data breach victims exercise through their information practices.

Distinctive traits of data breach victims

Cybersecurity and psychology research highlights changed behaviours among data breach victims, driven by psychological traits that extend beyond financial and technical harm. Victims often experience prolonged emotional distress, including anxiety, vulnerability, and institutional distrust, especially when breaches involve sensitive personal or health-related information. These are compounded by uncertainty surrounding delayed identity misuse and poor institutional support (Sears & Cunningham, 2024; Cross & Holt, 2025). Yet, these behaviours remain underexplored within the framework of human information behaviour. This section addresses that gap by identifying key psychological traits, like anxiety, distrust, and vulnerability, and mapping them to corresponding information avoidance behaviours.

The psychological repercussions of data breaches

Data breaches have profound psychological tolls on individuals, extending beyond financial loss to a sustained erosion of trust and autonomy, cognitive overload, and feelings of helplessness (Kilovaty, 2021; Sears & Cunningham, 2024). The breach of institutional trust constitutes a distinct harm, as victims confront material consequences including violations of personal privacy. Research indicates that the anxiety experienced is not fleeting, but a persistent psychological response to perceived loss of control over one's data and life (Bada & Nurse, 2019; Nurse, 2018). Despite remediation mechanisms, organisational and regulatory frameworks frequently neglect the emotional aftermath, leaving victims unsupported.

Unlike other cybercrimes, the enduring ambiguity that data breaches generate regarding the scope of exposure and potential misuse of information causes stress, hypervigilance, and a cycle of psychological distress (Jansen & Leukfeldt, 2018; Palassis et al., 2021; Sears & Cunningham, 2024). PTSD-like symptoms include intrusive thoughts, emotional withdrawal, and avoidance behaviours, such as avoiding information about a breach or the digital service that was breached (Pfleeger & Caputo, 2012; Rhoads, 2023). Information avoidance, while protective, may also signal deeper trauma, underscoring the need for institutional responses informed by shifts in human information behaviour. Unlike physical theft, digital breaches lack clear recovery pathways, exacerbating helplessness and disempowerment.

The Medibank Private Health Insurance breach in Australia exemplifies the heightened psychological impact of compromised health information, where fear of public disclosure triggered shame, anxiety, and vulnerability (Rhoads, 2023). The central concern remains the persistent uncertainty surrounding future exploitation of compromised data. Responses to breaches vary, shaped by factors like financial loss, data sensitivity, and institutional inaction. Emotional distress, while a recognised mediator between harm and coping, risks oversimplifying the complexity of victims' experiences (Li et al., 2019). Moreover, inadequate support structures compound helplessness and hinder recovery (Koch & Adeleye, 2019).

Nobles (2022) describes 'risky disengagement' as a response to cognitive and emotional strain, wherein individuals overwhelmed by alerts and protocols withdraw from safe practices. Cognitive overload impairs decision-making, as mental fatigue undermines vigilance. Recovery is often protracted and burdensome, involving account monitoring, credential changes, and institutional engagement. These efforts, perceived as disproportionate to uncertain benefits, may foster futility and disengagement (Bryant, 2025). Over time, victims may ignore future warnings or change online patterns to reduce exposure (Kirlappos et al., 2013; Stanton et al., 2016).

Behavioural adaptations in the aftermath of data breaches

This research frames information avoidance following data breaches not as anomalous, but as an emotional and behavioural response to a perceived threat, loss of control, and trauma. Evidence shows such reactions often lead to digital withdrawal as a psychological response (Barbour et al.,

2012; Hayes et al., 1996; Hoffmann et al., 2016). Information avoidance may include reduced online activity, reluctance to engage with compromised services, or complete disengagement.

LaRose et al., (2008) proposes that individuals who perceive a threat as severe but feel incapable of responding effectively are more likely to disengage than take constructive action. This response, rooted in low self-efficacy and heightened vulnerability, can extend to denial, deferment, and emotional withdrawal (LaRose et al., 2008; see also Chu & Liu, 2023). Recent findings support this perspective. Verizon (2023) found that individuals often ignore security alerts due to low confidence in their ability to respond, and such disengagement reflects an adaptive strategy for reducing cognitive and emotional strain rather than irrational behaviour (Barbour et al., 2012; Hicks, 2024; Liu, 2022).

Information avoidance serves as a coping mechanism to ease emotional strain, ranging from temporary retreat to sustained disengagement (Hicks et al., 2024; Liu & Chen, 2024; Park et al., 2024; Riek et al., 2016). For example, Brashers (2001) found that individuals awaiting genetic test results often postpone accessing the report or avoid discussions to manage distress, preserve equilibrium, and maintain a sense of control amid uncertainty. Table 4 synthesises these findings and provides a foundation for the following section, which draws on health information avoidance research to establish a comparative framework for theorising the information behaviours of data breach victims.

Category	Characteristic	Description	Reference
Psychological repercussions	Psychological distress; Anxiety	Persistent worry, emotional turmoil, and agitation following a data breach, may intensify with sensitivity of exposed data.	Bada & Nurse (2019); Nurse (2018); Jansen & Leukfeldt (2018)
	Violation of privacy and autonomy	Sense of boundary infringement and powerlessness, eroding self-efficacy; May correlate with financial loss, data misuse, and resolution time, mediating coping behaviours.	Palassis et al., (2021); Sears & Cunningham (2024); Li et al. (2019); Stanton et al. (2016); Bryant (2025)
	Helplessness; Loss of control; Loss of confidence	Victims feel powerless due to lack of involvement in the breach and limited ability to prevent future harm.	Palassis et al. (2021); Sears & Cunningham (2024); Jansen & Leukfeldt (2018)
	Victimisation severity	Distress influenced by extent of financial loss, data misuse, and resolution time, mediating coping behaviours.	Li et al. (2019)
	Persistent uncertainty; Heightened vulnerability	Ongoing ambiguity about data exposure and use, leading to amplified perceptions of risk.	Sears & Cunningham (2024); Jansen & Leukfeldt (2018)
	Chronic stress; Hypervigilance; Hyperarousal; Fatigue	Long-term activation of stress response system, marked by sustained alertness, physiological tension, and exhaustion.	Jansen & Leukfeldt (2018); Palassis et al. (2021); Nobles (2022)
	Cognitive overload; Intrusive thoughts; Negative cognitions	Mental exhaustion from constant security demands, recurrent involuntary breach-related thoughts, and pessimistic beliefs.	Nobles (2022); Jansen & Leukfeldt (2018); Sears & Cunningham (2024)
	Trauma; Fear; PTSD	Deep distress and intense apprehension, may be triggered by exposure of highly sensitive personal information; and post-trauma stress	Golladay and Holtfreter (2016); Pfleeger (2012) and Rhoads (2023)

Category	Characteristic	Description	Reference
		disorder (PTSD) developed after experiencing a data breach.	
Behavioural Response	Changing online engagement	A continuum of avoidance that can range from minor changes in online habits (e.g., selectively securing accounts) to complete disengagement from digital life.	Hayes et al. (1996); Barbour et al. (2012); Riek et al. (2016)
	Abandoning not adopting safeguards	Distrust and low self-efficacy are associated with reduced trust and confidence in managing threats, leading users to abandon platforms rather than adopt protective measures.	Hoffmann et al. (2016); LaRose et al. (2008)
	Ignoring breach notifications and security alerts	Driven by feelings of helplessness or low self-efficacy, individuals may ignore warnings about breaches or security alerts, as they feel incapable of responding effectively.	Verizon DBIR (2023)
	Selective information filtering	To manage emotional distress, individuals may actively filter or avoid threat-related information and news about data breaches.	Brashers (2001); Barbour et al. (2012)
	Excessive monitoring of accounts or devices	Ongoing account monitoring due to fear of re-victimisation, leading to heightened anxiety and reduced quality of life.	Jansen & Leukfeldt (2018)
	PTSD responses - withdrawal, hyperarousal, and negative cognitions	PTSD symptoms include intrusive thoughts, digital withdrawal, hyperarousal, and negative cognitions developed after prolonged exposure to uncertainty and perceived threat.	Mateu et al. (2020); Pfleeger (2012); Pfleeger & Caputo (2012); Rhoads (2023)

Table 4: Summary of psychological repercussions and behavioural responses to data breaches

The prevalence and drivers of health information avoidance

This section reviews the prevalence and underlying drivers of health information avoidance as human information behaviour that are both widespread and nuanced. The research shows that, although the frequency and causes vary across populations and health issues (Barbour et al., 2012; Melnyk & Shepperd, 2012), avoidance is not incidental. Rather, it reflects a complex interplay of psychological, cognitive, and social mechanisms which shape how individuals engage with health information.

Psychological drivers of health information avoidance

Health information avoidance is described as driven by emotional distress, cognitive dissonance, and perceived lack of control (Brashers et al., 2002; Case et al., 2005; Melnyk & Shepperd, 2012; Sairanen & Savolainen, 2010). Karlsson et al. (2009) describe this response as the 'ostrich effect', a tendency to avoid threatening situations to reduce anxiety and fear. Emotional distress leads individuals to disengage from information perceived as overwhelming. Similarly, Festinger's (1957) theory of cognitive dissonance offers an explanation of how individuals may reject or ignore health information that conflicts with their personal beliefs, thereby preserving a coherent self-concept. Howell and Shepperd (2012) illustrate this in dietary habits, where individuals dismiss risk-related information to avoid confronting long-term consequences.

Howell and Shepperd (2013) found that perceived powerlessness intensifies information avoidance , transforming it from passive reaction to deliberate coping. This is evident in hereditary conditions like breast cancer, where individuals may avoid learning early symptoms due to low coping capacity or belief in futility (Melnyk & Shepperd, 2012). Some responses may be automatic and uncontrolled (Howell et al., 2016).

When coping resources are low, or core beliefs challenged, selective exposure may arise as strategy, such as seeking information that confirms existing beliefs while avoiding threatening information (Fischer et al., 2005; Hart et al., 2009; Tsang, 2017). Brashers et al., (2002) demonstrate how information avoidance can have a collective dimension, as a strategic response enacted by individuals, family members and health care providers as a mechanism for reducing stress.

Cultural and community dynamics further shape avoidance, with stigma and fear of judgment deterring engagement in contexts like mental illness, HIV/AIDS, and substance abuse (Earnshaw & Chaudoir, 2009).

Information overload and source credibility concerns further complicate individuals' willingness to engage with health information (Case et al., 2005; Sweeny et al., 2010). Social networks can thus reinforce or mitigate the effects of avoidance.

Behavioural adaptation of avoidance in health contexts

Deliberate avoidance of health information is significant, with research showing that 20% of high-risk individuals forego HIV testing (Barbour et al., 2012) and 15–30% of eligible adults delay or skip cancer screenings (Melnyk & Shepperd, 2012). It is also evident in everyday behaviours, like ignoring nutritional labels and disengaging from public health campaigns (Howell et al., 2016; Sweeny et al., 2010). Of greatest concern is that it can lead to delays in medical intervention, when early treatment is critical (Taber et al., 2015). During the COVID-19 pandemic, 20.2% of symptomatic individuals actively avoided seeking further information, illustrating the broader public health implications of avoidance because of fear of positive diagnosis and perceived helplessness (Czeisler et al., 2020).

These findings show that health information avoidance is not irrational, but a series of responses shaped by distress, dissonance, lack of control, stigma, or distrust (Brashers et al., 2002; Case et al., 2005). This underpins a spectrum of behaviours, from passive neglect to active disengagement, shaped by factors such as threat severity, social norms, and information saturation. Table 5 applies the analytical framework, by categorising health information avoidance literature in terms of psychological repercussions and behavioural responses associated with information avoidance and presents a model for comparison.

Category	Characteristics	Description	Reference
Psychological repercussions	Fear; anxiety; distress	Individuals may avoid health information to escape distress, especially in high-stakes contexts like genetic testing for untreatable conditions.	Karlsson et al. (2009); Taber et al. (2015); Brashers et al. (2000); Brashers et al. (2002)
	Lack of Control; helplessness	Feeling powerless (e.g., due to genetic predisposition) can lead individuals to avoid information to escape helplessness.	Howell et al. (2013); Howell et al. (2016)
	Threat Severity	Distress correlates with serious illness (e.g., cancer, HIV) and avoidance increases with	Barbour et al. (2012); Melnyk & Shepperd (2012)

Category	Characteristics	Description	Reference
		perceived severity of the health threat.	
	Cognitive overload	Overwhelmed by excessive or complex health information (information overload).	Howell et al. (2016); Sweeny et al. (2010)
Behavioural Response	Stigma, or social norms discouraging information-seeking	Social stigma (e.g., around HIV or mental health) may deter information-seeking due to fear of judgment or exclusion.	Earnshaw & Chaudoir (2009)
	Distrust in source, perceived inconsistency	Inconsistent or unreliable messaging (e.g., public health campaigns); Scepticism toward institutions or experts can drive deliberate avoidance of health information.	Sweeny et al. (2010); Brashers et al. (2002); Case et al. (2005)
	Ignore or denying results	To preserve optimism, individuals may ignore or deny test results (e.g., skin cancer screenings), preferring uncertainty over confirmed risk.	Sweeny et al. (2010); Howell et al. (2016); Brashers et al. (2000); Brashers et al. (2002)

Table 5: Factors of Health Information Avoidance

Parallel behaviours: Psychological and human information behaviour commonalities between health information avoidance and data breach victimhood

Information avoidance occurs in distinct contexts from coping with data breaches to managing health conditions within human information behaviour. In both, individuals face threats and respond by avoiding or selectively engaging with information. Literature shows that breach victims filter, or reject information that undermines security and control, mirroring human information behaviour findings on health information avoidance, including planned and unconscious avoidance, selective exposure, and disengagement.

Emotional response

Both areas of research involve individuals responding to significant threats. Data breach victims face prolonged anxiety from identity theft, financial harm, and reputational damage (Bada & Nurse, 2019), exacerbated by uncertainty about future data misuse (Sears & Cunningham, 2024). Similarly, individuals experience distress when confronted with potentially serious or stigmatised diagnoses (Karlsson et al., 2009), leading them to avoid medical tests or limit information as a psychological defence (Taber et al., 2015). In both, avoidance serves to reduce anxiety, but risks long-term impacts.

Cognitive dissonance

Cognitive dissonance underpins avoidance in both contexts. Data breach victims may ignore security warnings or minimise risks to preserve trust in digital systems (Nobles, 2022), like individuals avoiding medical information that conflicts with their lifestyle choices (Festinger, 1957). In both cases, selective exposure maintains psychological equilibrium by filtering out threatening information. This may manifest as abandoning or limiting online services (Riek et al., 2016), or skipping health screenings and doctor visits (Melnyk & Shepperd, 2012).

Perceived lack of control

Diminished control impacts behaviour in both circumstances. Data breach victims feel powerless due to organisational failures, with limited individual recourse to prevent future harm (Sears & Cunningham, 2024), leading to disengagement (Kirlappos et al., 2013). Similarly, people who avoid health information may believe they cannot change health outcomes (Howell et al., 2013). Research to date indicates that perceived lack of control reinforces the prioritisation of short-term emotional relief over long-term risk management and is presented as a passive coping mechanism.

Trust violations and institutional distrust

Data breach victims feel betrayed by corporations failing to protect data, fostering digital platform distrust (Muzatko & Bansal, 2024). This mirrors people avoiding health information because negative experiences, conflicting advice, or healthcare scepticism creating institutional mistrust (Brashers et al., 2002). In both cases, the erosion of trust exacerbates avoidance reducing compliance with security protocols or preventive healthcare measures (Brashers et al., 2002).

Uncertainty management and preference for ambiguity

Uncertainty about outcomes is a significant stressor leading to information avoidance, with individuals preferring 'not to know' over distressing certainty. Data breach victims may avoid checking the status of compromised data to delay confronting risks (Cross et al., 2025), while people experiencing illness may avoid health information to maintain hope (Zhu et al., 2024). This 'motivated ignorance' involves actively avoiding information to manage emotional states, preserving wellbeing despite unpreparedness for future threats.

Stigma and social consequences

Stigma contributes to avoidance in distinct ways across domains. Data breach victims may withdraw socially due to shame over exposed sensitive information (Rhoads, 2023), while individuals with stigmatised health conditions may avoid medical information to escape judgment or discrimination (Earnshaw & Chaudoir, 2009). Societal perceptions heighten avoidance as individuals weigh the risks of social exposure against the benefits of threat mitigation.

Long-term consequences of avoidance

Avoidance behaviours compound risks over time. Data breach victims disengaging from security measures become more vulnerable to subsequent attacks (Jansen & Leukfeldt, 2018), while people avoiding health information may face poorer outcomes from delayed diagnosis or treatment (Melnyk & Shepperd, 2012). The persistent nature of avoidance, where short-term relief reinforces long-term harm, is often accompanied by chronic stress from unresolved threats.

These parallels between health information avoidance and data breach victimhood are summarised in Table 6, which compares psychological and behavioural characteristics across both domains. The table illustrates how emotional responses, cognitive factors, perceived lack of control, trust violations, uncertainty management, stigma, and long-term consequences manifest similarly in cybersecurity and health contexts.

Category	Characteristics	Cybersecurity impacts (data breach victims)	Health information avoidance
Psychological repercussions	Emotional response	Fear Anxiety, distress, and trauma due to loss of control and uncertainty about data misuse. (Bada & Nurse, 2019)	Fear, anxiety, distress and trauma triggered by potential health diagnoses or negative health information. (Karlsson et al., 2009)
	Cognitive factors	Cognitive overload leads to security fatigue and disengagement. (Nobles, 2022)	Cognitive dissonance leads to avoidance of conflicting health information. (Festinger, 1957)

Category	Characteristics	Cybersecurity impacts (data breach victims)	Health information avoidance
	Lack of control, helplessness	Victims feel helpless due to lack of control over breached data. (Sears & Cunningham, 2024)	Individuals avoid health information if they believe they cannot change outcomes (e.g., genetic risk). (Howell et al., 2013)
	Uncertainty	Persistent uncertainty about how exposed data will be exploited. (Brashers, 2001)	Uncertainty surrounding potentially unfavourable outcomes, such as declining genetic testing to evade anxiety about future illness or difficult medical decisions. (Zhu et al., 2024, Sairanen and Savolainen, 2010)
Behavioural Response	Trust & betrayal	Breach of trust in organisations that failed to protect data. (Muzatko & Bansal, 2024)	Distrust in medical institutions or conflicting health advice leads to avoidance. (Brashers et al., 2002)
	Ignoring, self-selecting	Withdrawal from digital services, ignoring security alerts. (Barbour et al., 2012)	Avoiding screenings, ignoring health warnings, or disengaging from medical information. (Riek et al., 2016)
	Stigma & social influence	Cyber trauma may lead to social withdrawal due to shame (e.g., leaked sensitive data). (Rhoads, 2023)	Stigma around certain illnesses (e.g., HIV, mental health) discourages information-seeking. (Earnshaw & Chaudoir, 2009)
	Long-term impact	Hypervigilance, PTSD-like symptoms, and chronic stress from ongoing threats. (Jansen & Leukfeldt, 2018)	Long-term harm from delayed medical intervention due to avoidance. (Melnyk & Shepperd, 2012)

Table 6: The similarities between the characteristics of data breach victims and health information avoiders

While threats differ, the psychological and behavioural parallels between data breach victims and people who avoid health information are prominent. Both groups employ information avoidance as a coping mechanism to manage fear, uncertainty, and perceived loss of control.

Discussion and conclusion

This analysis shows that both data breach victims and individuals avoiding health information exhibit similar coping responses to threatening situations. Both face emotional distress, through identity theft or financial harm in breaches (Bada & Nurse, 2019; Sears & Cunningham, 2024), and individuals who avoid health information, through anxiety about potential serious or stigmatised diagnoses (Karlsson et al., 2009; Taber et al., 2015). In both, information avoidance is a primary coping strategy (Hicks et al., 2024; Sweeny et al., 2010).

The study has addressed three interrelated research questions concerning the conceptualisation of victimhood in cybersecurity (RQ1), the behavioural parallels between information avoidance in data breach contexts and health-related human information behaviour (RQ2), and the applicability of insights from health-related human information behaviour and information avoidance literature to cybersecurity research (RQ3).

In response to RQ1, the findings call for reframing cybersecurity victimhood's legal and technical focus to include human information behaviour and the psychological experiences of affected individuals. *Victim* should be seen as a dynamic identity, shaped by lived experience including

trauma, impact and personal response. This re-conceptualisation facilitates a more empathetic and human-centred lens for people affected by data breaches.

Addressing RQ2, substantial parallels exist between information avoidance in data breach cases and health-related human information behaviour (Brashers et al., 2002; Howell & Shepperd, 2012). In both domains, avoidance is often driven by emotional distress, uncertainty, and a perceived loss of control (Melnyk & Shepperd, 2012; Nobles, 2022). For example, individuals may decline genetic testing to avoid confronting potential diagnoses, just as data breach victims may ignore breach notifications to delay dealing with the consequences of compromised personal data. These adaptive coping strategies reflect shared issues of trust, stigma, and long-term impact, highlighting information avoidance as a cross-contextual phenomenon that can inform cybersecurity responses. Furthermore, the commonalities identified in this review could be extended to other human information behaviour contexts where perceived threat levels and emotional distress are high.

In addressing RQ3, this study applies health-related human information behaviour and information avoidance literature to cybersecurity, highlighting information avoidance as a strategic response to emotional and cognitive overload. The role of stigma and social norms in discouraging information engagement is highly relevant to cybersecurity contexts, where shame and fear of judgment can suppress proactive behaviours (Earnshaw & Chaudoir, 2009; Rhoads, 2023). These insights advocate for a more nuanced and psychologically informed approach to cybersecurity research and organisational responses to data breaches, drawing on information science, health-related information behaviour, behavioural studies, and health communication research to better support individuals affected by data breaches.

Limitations and future directions

This study acknowledges several limitations. It is limited by a lack of existing literature and research on information behaviour in cybersecurity context and as such, it may not capture the unique nuances of data breach experiences through comparison with health-related information avoidance. At this point in time, it does not involve primary data collection from data breach victims which remains essential for richer, direct insights into their experiences.

To address these limitations, the next stage of research will begin with a questionnaire targeting victims of cybersecurity incidents to collect demographic data and examine changes in information behaviour following a breach. From this respondent pool, qualitative semi-structured interviews will be conducted to capture detailed accounts of psychological impacts, coping strategies, and engagement patterns. Finally, focus groups will be organised with victims to collaboratively develop strategies that support recovery and improve information engagement.

Implications

The findings of this study provide significant theoretical and practical contributions to information behaviour research within cybersecurity contexts. Theoretically, this work extends human information behaviour and information avoidance frameworks by illustrating how breach victimisation shapes avoidance-oriented behaviours in digital environments. While parallels exist between health-related and cybersecurity contexts, this study acknowledges the distinct experiential and social environments surrounding data breaches and emphasises adapting insights from health information behaviour to these unique conditions. It emphasises the interplay between risk perception, cognitive load, and coping strategies, offering a foundation for future empirical studies and interdisciplinary dialogue between information behaviour and cybersecurity research.

Practically, these insights inform the development of victim-centred interventions that address psychological and behavioural consequences of data breaches. Communication strategies should reduce cognitive complexity and incorporate empathetic messaging to mitigate avoidance and

encourage proactive engagement. Policy and regulatory frameworks can integrate behavioural principles into breach notification requirements, supporting informed decision-making while minimising anxiety and uncertainty. Digital literacy programs should embed human information behaviour constructs, such as self-efficacy and resilience, to counteract disengagement and foster adaptive information practices. Additionally, digital platforms and user interfaces should prioritise simplicity, trust-building, and coping support to enable victims to re-engage with information and recover effectively.

This study also identifies several directions for future research beyond the next stage of data collection. Longitudinal studies could examine how information avoidance evolves over time following breach incidents, capturing changes in coping strategies and engagement patterns. Comparative research across cultural and demographic contexts would deepen understanding of social and psychological factors influencing avoidance behaviours. Integrating human information behaviour and information avoidance frameworks with emerging theories in digital risk communication may yield richer models of decision-making under uncertainty. Finally, interdisciplinary collaborations between information behaviour scholars, cybersecurity experts, and human-computer interaction researchers can advance the design of digital environments that support adaptive information behaviours and resilience in the face of security threats.

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Seeking relations and kin: pursuing the information seeking practices and experiences of Indigenous students

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Abstract

Introduction. This study reports the findings of our study on the information needs of Indigenous undergraduate and graduate students at the University of Toronto. Indigenous students are the fastest growing demographic in Canadian higher education, yet little attention in the literature has been paid to the unique needs, responsibilities, and cultural obligations of these students. We seek to share our findings, though Indigenous Knowledges and experiences are land and culturally contextual, as a contribution and call to attend to Indigenous students' information seeking needs and behaviours.

Method. Focus groups and visual methods were conducted with groups of undergraduate and graduate Indigenous students. Participants were invited to comment on photographed spaces in Robarts Library. This was necessary due to the COVID-19 pandemic. The focus groups were conducted and recorded on Zoom. Transcripts were created from the recordings, sent to participants for their approval, and then formed the basis of the analysis.

Analysis. Transcripts were coded using thematic coding and analysis. As this study had multiple research team members, coding was carried out on a secure OneDrive shared document.

Results. Participants shared the need for the library to attend to greater burdens on Indigenous students in the areas of cultural safety, inherent violence in library systems, anxiety on approaching systems and materials, and the added responsibility to find culturally appropriate and accurate sources. Notably, they shared that the library had failed them in these areas and shared resources and strategies despite this failure.

Conclusion. Indigenous students do not have a relationship of trust with the academic library. They often feel anxious or angry at the perceived lack of action and systems that would prevent violent encounters and safeguard their cultural responsibilities. Libraries should attend to better understanding and transforming systems to incorporate Indigenous students' information needs.

Introduction

The informational experiences of Indigenous people have long been absent from the literature of information research. In this paper, we seek to broaden our understanding of information seeking behaviours, and indeed barriers amongst Indigenous undergraduate and graduate students in an academic library context. Universities and, in turn, the academic libraries that serve them, are a complex network of nationhoods, Knowledges and experiences, as higher education brings together Indigenous people from disparate Nations and communities. Thus, to map the contours of Indigenous experiences would be deeply contextual. Our participants brought together their own experiences shaped through their lenses as Indigenous people from different backgrounds, cultural, and social contexts. Despite these differences, there were emergent themes that were shared experiences across many students. We found that the obligations, motivations, and commitments of our participants were also relatively consistent, including that of cultural safety, building and uplifting community, and contributing back to their own Knowledge systems. The central question of this study was "what is the relationship between Indigenous students and the University of Toronto Libraries?" In turn, some of the sub-questions include what are student perceptions of the library and how do Indigenous students experience the library?

In this paper, we will first discuss the methods and theoretical frameworks that informed our methodologies. We were intentional in our methods to ensure that Indigenous students had the opportunity to safely discuss their experiences, while being mindful of the traditionally extractive relationship between Indigenous peoples and the Academy (Tuck, 2009; Smith, 2021). Next, we present our literature review, which informs the theoretical basis of our study, and describes the context and contributions of this work in addressing the gaps in the literature about Indigenous student information seeking behaviours. We then detail the findings that were shared with us, as well as the implications of these findings in our discussion. While the information needs of the participants are rooted in the Lands and Waters that constitute our institution and city, there are implications for libraries and other information institutions serving Indigenous peoples.

Methods and methodologies

In this project, we employed a combination of qualitative methods to determine Indigenous students' information needs. In order to understand, more broadly, Indigenous students' relationship to the academic library, we used focus groups and visual methods to elicit perspectives on information behaviours. Our work was guided by Indigenous critical feminist ethics of care, which informed our accountabilities and relationships with students. This ethic made us aware of the power imbalance and dynamic between both research team and participants and reminded us to be mindful of the centuries-old, extractive model of research between the Academy and Indigenous peoples (Wilson, 2008; Kovach, 2009; Smith, 2021). As an intervention to this extractive model and to refocus ourselves on the relational and reciprocal possibilities of research, we invoked Sto:lo scholar Jo-Ann Archibald's work (2008) in Indigenous Storywork, which influenced both our methods and methodologies. Storywork challenged us to weave its seven principles, namely respect, responsibility, reverence, reciprocity, holism, interrelatedness, and synergy, into all aspects of our work and to consider the stories shared by participants as a gift and to be honoured as such (Archibald, 2008).

The data from this study primarily came out of the focus groups, wherein we asked students to respond to images of the main campus library at the University of Toronto. We conducted three focus groups, with seven Indigenous participants. We had 2 undergraduate participants and 5 graduate participants. Recruitment was difficult because of the time in which our study was conducted, and there were less Indigenous students who were willing to engage with our library study as a result. Due to the timing of the focus groups and lockdowns during the COVID-19 pandemic, we opted for images of the library rather than a physical tour, which we conducted over Zoom. This was the visual methods component, as part of our focus groups. We asked participants

to view and then comment on various spaces in the library and how, within these spaces, they find information, their relationship to information services, and their information networks outside of libraries. We recorded these focus groups using Zoom's recording features and used Zoom's audio captioning tools to form the basis of our transcriptions. We then reviewed and corrected the transcriptions to ensure accuracy and sent them to our participants for their review. Upon their acceptance of the transcript, we began to code the data.

We used thematic coding, which allowed us to capture the broader themes and in turn, the meaning of our transcribed text in the meaning-making process (Saldaña, 2021; Braun & Clarke, 2022). By looking for themes via our coding, we were able to identify emergent and relevant issues that were brought up across various conversations in focus groups. By grouping, evaluating, and defining the significance of these themes, we were able to derive important findings from our focus groups (Braun & Clarke, 2022). The findings within this paper are a selection of the themes that were related to information seeking behaviours, of which the themes of cultural and physical safety were emergent from participants' stories. In total, there were 11 thematic codes that we used to make meaning from the transcription data, and 4 that had relevance to information seeking behaviours and needs. Holding Storywork as an ethic and methodology, we sought to understand the stories shared by our participants in ways that honoured their experiences and kept them as whole units rather than discrete excerpts (Archibald, 2008). We were and are mindful of the extractive relationship that research has with Indigenous communities and our methods reflect the care and intention that we set forth in order to subvert those power dynamics in our research paradigm.

Literature review

As a subject of study, information seeking behaviours have long been a pursuit of information science. Within the field, prominent and foundational theorists such as Thomas Wilson, James Krikelas, Carol Kuhlthau and Brenda Dervin developed models within Euro-Western Frameworks without taking into account the role of culture and context in information seeking behaviours (Lilley, 2012). According to Lilley (2012), scholars such as Reijo Savolainen, Elfreda Chatman, and Karen Pettigrew have resisted the proposed universality and outlined frameworks of contextual and culturally informed research in information seeking behaviours. However, their scholarship still does not look to Indigenous peoples. There is a general lack of research into Indigenous library needs and information-seeking behaviours in part due to Indigenous library professionals being a small and slowly growing group of experts and, in turn, lagging advocacy for the needs of Indigenous users (Lilley, 2012; Lee, 2008; Padilla et al., 2020; Bucy, 2022; Littletree et al., 2023).

Indigenous student library experiences differ from those of their peers, especially in the extreme violence perpetrated on those same students in academic and library settings. Currie et al. (2012) found that 41% of their Indigenous university student participants experienced racism at the University of Alberta in the form of racial slurs and the targeted interrogation of their academic legitimacy. Students reported feeling shocked, frustrated, helpless, and hopeless in the face of these racist interactions. The university classroom can be a site of ongoing colonization that requires many Indigenous students to challenge authority, resources, and even assignments (Loyer, 2018). The provision of cultural safety and its associated challenges are reasons why Indigenous students may demonstrate differing information-seeking behaviours. Gibson et al. (2023) studied a cohort of BIPOC teenagers and adolescents. They found that in addition to considering the accuracy and relevance of information sources, BIPOC teens engaged in a cost-benefit analysis and a risk assessment when seeking information (Gibson et al., 2023). Some of these concerns included damage to their social standing, economic well-being, access to educational resources, and personal safety (Gibson et al., 2023). Research and Knowledge are relational phenomena in Indigenous communities (Wilson, 2008). Information is passed down intergenerationally and Indigenous communities seek out opportunities to intervene based on a

deep knowledge of a community member's life circumstances and experiences (Waterman, 2012). When relationships are a key part of information seeking as they inherently are with Indigenous research, we can expect that within library spaces 'coercive and normative power negatively impact their information seeking, stymie the development of healthy relationships' (Gibson et al., 2023, p. 1525). Chatman's theory of information poverty begins with the supposition that the information poor perceive that they are without aid from trustworthy sources and is exacerbated by self-protective behaviours which limit and constrain attempts to seek information (Chatman, 1996). Information poverty will be actualized when perceived consequences of information seeking outweigh the benefits (Chatman, 1961, as cited in Gibson et al., 2023).

Culture also plays a key role in information seeking behaviours. The primacy of the written word in academia has resulted in a lack of access to legitimate sources or sources from Indigenous perspectives (Neurohr & Bailey, 2016; Aase, 2017; Farnel et al., 2018; Kostelecky et al., 2017; Littletree et al., 2023). Littletree et al. (2023) state that:

> Indigenous knowledge systems engage with many formats generally ignored in academic IL spaces. While academic librarians frequently teach using scholarly articles, encyclopedia entries, monographs, and other textual sources, Indigenous librarians are often engaging with additional formats, in two broad categories: non-tangible expressions of culture, which can include oral histories, songs, dances, etc.; and material culture, which can include beadwork, drums, wampum belts, winter counts, etc. (p. 12)

While working with Maōri people, Spencer Lilley (2012) found that Maōri students primarily seek information from other people. While doing so, they employ a social and moral framework grounded in Maōri culture. This commitment to relationality can be seen as a through line in other Indigenous cultures as Littletree et al. (2023) state 'relationality does not exist solely through human relationships, but extends out to build a web of responsibility and relational accountability to land, water, plants, animals, languages, and ceremonies' (p.6).

Findings

Finding 'good' source

Several study participants referred to the need to find 'good' sources. To clarify, 'good' sources are ethically researched and or conducted by Indigenous scholars or in community with Indigenous people in a way that is both relational and responsible. Identifying a 'good' source can be challenging amidst a sea of colonial materials and non-Indigenous authors. Tangling with the wrong resource has great potential for harm. There is no shortage of scholars in academic institutions who have falsely claimed Indigenous identity. These individuals, who are colloquially referred to as 'pretendians', hold positions of power, misappropriate resources, and undermine authentic Indigenous scholarship. According to Amy Shawanda and Gabriel Maracle in their 2025 Yellowhead Institute Special Report, *Pretendians and Publications: The Problem and Solutions to*

> *Redface Researc*h, undergraduate and master's students may not have the ability or tools to critically evaluate 'the authenticity of author credentials and claimed identities, the legitimacy of research participant selection, the credibility of participating organizations, methodological integrity, and the superficial inclusion of Indigenous scholars to legitimize potentially problematic research'(pp.10-11).

Authenticating author identity was top of mind for some participants, with one noting, 'I think it would be really cool if the author's identity could be stated, because sometimes you don't know, and it's important for Indigenous studies to identify the positionality of the author so you know that this is a Haudenosaunee author. This could be important to frame Indigenous perspectives'. To help with the verification of author identity, some participants relied on observing if other

known Indigenous scholars also used the same source. To do this, they found Google Scholar especially useful, because as the participant stated 'it's easy for us to see who other Indigenous people have engaged with that article who has cited, how has it coded, where else has it been seen? Who else is published?'. Another stated 'I usually use Google Scholar and I think that's helpful because you can see how many people are citing it and where it's cited as well'.

One barrier to finding good sources is the breadth of historical, colonial, and racist narratives present in the E76-99 (Indians of North America) section of every academic library using the Library of Congress Classification System. One participant stated that seeking specific resources when they are in physical proximity to racist materials compromises their perception of the legitimacy of the source, in their perspective that source is now less reliable. Further, the act of serendipitous discovery of information sources is inhibited by the unpleasant and sometimes violent experience of shelf browsing as an Indigenous scholar. One participant stated 'It's definitely been my experience trying to find books, and it's like kind of like finding the couple books that you want to find in a sea of landmines of older, questionable texts'. Another participant deemed the risk of information seeking too high: 'I'm not going to like spend time like on the shelf like trying to find, like the most modern sources, or like the more like ethical authors when it's like a range of I don't know more like negative ones also there'. They know the source is 'probably there' but it is hard to find the usable resources amongst the harmful ones. To bridge the difficulty of finding and evaluating good sources, many Indigenous students turned to relationships of trust.

Relationships of trust

'To research as an Indigenous scholar is to confront horrific stories, many of them are directly tied to my own experiences or the experiences of people I love' (Loyer, 2018, p. 147). Indigenous research is difficult, not just due to the lack of discoverability of resources and the difficulty of verifying sources, but also due to the emotional toll that it takes on Indigenous students and scholars. For many, there is a nearness to trauma that renders the information seeker vulnerable. Study participants overwhelmingly revealed that they would seek help when relationships of trust were established:

> I have asked for specific help. It is because I know the person, like it isn't a random name I'm given that is like 'this person will help me.' I know who is our librarian and I know that I can ask. […] part of it is that I trust that librarian, and because we have real relationships. I trust not just their capacity and their knowledge about the material, but also the judgement on what is it I'm looking for that guides the specific ethics of the material that I'm looking for.

Indigenous professors and peers were also frequently relied upon for recommendations. One participants stated they got recommendations from 'like a supervisor, or like other classmates, or like peers, and other Indigenous professors too is like really helpful because you can kind of like see like if something's gonna be fitting as opposed to something that's like "Oh, that's like a weird take and that's like kind of like harmful."' Multiple participants also mentioned seeking resources from trusted communities such as the Indigenous Education Network and First Nations House. They stated that their comfort level was greater there than at the libraries: 'at First Nations House, where you can get like books and like different movies and stuff like that. And so I find, like I just kind of tend to lean towards, like those services, first as opposed to going to the library, and then even IEN has offered like different writing workshops … So I just kind of feel more comfortable going there'.

Establishing relationships of trust takes intentional time, effort, and cultural humility. Even amongst Indigenous peoples, the diversity of cultures and the multifaceted nature of identities can add complexity to the role of a trusted advisor. Participants revealed the consequences of not establishing relationships of trust. Some participants stated that there was an opacity to how

librarians were assigned to their roles, which could lead to questioning of their expertise. Others stated, like above, that they only ask for help from people they know, also indicated that if they did not have access to requesting help from someone they knew they prefer the anonymity of a virtual request for assistance; 'When I know people and I feel familiar in a space, it makes it a lot easier for me to ask for help. So that's something where I will ask for help online, like in the chats, or send an email to a library staff member more readily than I will ask for help in person'. Still others indicated that they preferred to seek help elsewhere, 'I'm, I guess more likely to like seek support from like my supervisor, like IEN space'. Here, a participant also offers a way forward, suggesting more time is needed to build relationships, 'I would like the frequency [of workshops] to increase. I think I would benefit a lot more if I had to, you know, more interaction with libraries as opposed to the aisles of the library. I'd look forward to that'. We can look to the findings of David A. Hurley, Sarah R. Kostelecky, and Lori Townsend and their 2019 study *Cultural Humility in Libraries* to begin to establish relationships of trust: 'We can recognize cultural and power issues that are introduced by the library context itself and commit to addressing structural issues which interfere in the interaction or with our service outcomes' (p. 20).

Environmental storytelling

Indigenous students noted the importance of the library environment on their research processes. As described by one participant, environmental storytelling is a reflection of your relationship with the space in which you are seeking information: 'think of environmental storytelling like what stories is this library telling you? Maybe I don't know if I necessarily want to be lost in the stacks. Maybe you do'. Environmental storytelling goes beyond the physical experience of the library stacks, the interior design, and its architecture as it includes a reflection upon the history of library spaces and notions of belonging.

Our participants reflected heavily on the history of Indigenous belonging, and unbelonging, in the library environment as their navigation of the library was mediated through concerns of cultural safety. Shelf browsing is one example of an unsafe activity as 'good' sources are outnumbered by harmful books in the library stacks. Consequently, one participant indicated that they 'don't engage with the library system as much other than to probably look for a specific book'. Another participant echoed this sentiment as their instinctive response to seeing old books in Indigenous Studies collection was to brush it off as 'old racist books'. In this environment, one participant noted that they were 'not going to spend time on the shelf searching' searching for ethical authors when that process would cause them harm. As the information seeking behaviours of Indigenous students are mediated through a long history of exclusion, some Indigenous students simply do not engage and they will seek information from alternative sources.

Ethics play a significant role in the information seeking behaviour of Indigenous students. This limits the value of the library stacks as academic library collections are often old, which further fuels concerns about safety, accuracy, and the utility of information that is located on the library shelf. Participants consistently noted that the library is an inefficient location for information seeking. In response, they seek information from alternative processes such as word of mouth or Google Scholar. The library still serves a key function as it provides access to many (though not all) of the resources needed by Indigenous students. The value of the library is best seen through its provision of services, rather than simply a location for information seeking.

The decentralized library and limits of disciplinarity

Indigenous Studies is an inherently interdisciplinary field. Indigenous Knowledges are not bound by the boundaries of academic subject domains (Smith, 2021). Thus, the particular epistemological domain mapping was a challenge that was somewhat alien to the Indigenous students to whom we spoke. Participants found that going to subject specific databases were insufficient for finding the materials that they sought. Instead, interdisciplinary databases, with larger corpuses were the preferred method for finding materials. One participant shared that 'All of my stuff is so like spread

out that if I go to a specific database. I'll get like one hit and it's useless'. It is notable that they used the term spread out, reminding librarianship that Indigenous scholars are often still in the periphery of our academic work and must be gathered together strategically. Information seeking is significantly more challenging for Indigenous students and researchers seeking to do good, relational work.

In their information seeking behaviours, Indigenous students seek safety (Loyer, 2018). Our participants shared that the majority of the methods used to ensure their safety are through online methods. However, Indigenous students also find it easier to navigate their readings and research needs online. Participants cited the decentralized nature of the library catalogue, through multidisciplinary and disciplinary databases, as being difficult and that they did not have the adequate knowledge to filter through them or know when to use which tool. Instead, our participants expressed a familiarity, sometimes bred out of necessity, with multidisciplinary tools as they have familiar functionality and the breadth that is required for effective research and information needs. Here, we see a need for relational interventions that would precipitate their needs and anxieties through proactive information literacy and relationship building. Library staff should be a place for students to access assistance, but only a few of our participants considered asking the library for help.

Anxiety in navigating resources

A common theme amongst participants was library anxiety in almost all aspects of their relationship with the library. Indigenous students' relationship with the library has long been associated with fear and discomfort, though this is not different from the general landscape of students in higher education experiencing library anxiety (Lee, 2008; McPherson, 2015). Participants told us that they develop strategies or workarounds to deal with the library, such as using Google as an intermediary between library resources. Another aspect that was stressful for Indigenous students was the punitive nature of return dates and fines, with one participant stressing that this was a main reason that they did not do any library searching or use any physical materials. While some participants acknowledged the importance of serendipity and the benefits of subject ranges, they also noted that there were cultural safety considerations as well, sharing:

> If I'm in a section of the library for like a really specific book, it'll be like surrounded by similar topics, but it's like less reliable like it'll be surrounded by like a range of like some really racist, like takes on the topic, and like maybe some good ones. But I'm not going to like spend time like on the shelf like trying to find, the most modern sources, or the more ethical authors when it's a range [and] I don't know more negative ones also there.

Many Indigenous students approach their work with a higher sense of ethical engagement, especially around Indigenous issues. The library is not seen as a reliable partner in the scholarly community for Indigenous students, who feel the responsibility of doing this work themselves. Participants were particularly insistent that they had more success with searching for a particular title online, in which they could do background research about the ethics, affiliations and heritage of the author, and take that specific book. At this juncture, we would be remiss if we did not acknowledge that Indigenous students must also navigate an increasingly long list of authors who have fraudulently claimed Indigenous heritage, to the detriment of Indigenous scholarship everywhere.

Gaps in available resources

Locating Indigenous resources is a more complicated task than many other topics of library research. This difficulty can be caused by the marginalization of Indigenous information that is inherent in the Library of Congress classification system, outdated or incorrect subject headings, or a real lack of current and diverse resources. Several participants spoke to the need for increased

library instruction, and one noted the significant benefit of having supportive library staff on hand once she had begun her master's degree. The participants described facing a preponderance of historical texts and deficit narratives:

> I think that it also sucks when you go into someplace, and, like all they have, is about Residential Schools, or, like all they have, is about like Trauma, that Indigenous people have faced and not necessarily like the resiliency side or like how they're alive and well, and like what's currently happening type of thing.

Participants also identified a lack of non-textual resources:

> I feel like it is not a place for me, and I think that there is like a disconnect between, like the way Indigenous people learn, and then like things that are coming out of books. Like if there was a person that I could talk to, I think that I would rather talk to that person. Like us having a lot of like oral traditions and stuff like that's not necessarily something that I feel like is captured in aisles and aisles of books.

There are steps forward that libraries can take to increase access to resources and support Indigenous students. Taking a tenacious stance on acquiring new Indigenous content by Indigenous authors will help to bring balance to a collection that is dominated by colonial perspectives. Increased outreach to Indigenous students across disciplines may also help to provide supplementary instruction to those who feel that they could benefit from further contact with librarians. The lack of access to resources of tangible and intangible material culture is not always easily addressed. Acquiring and stewarding such items may be better accomplished by specific museums or archives; however, there may be room here for libraries to partner with communities and facilitate access to these knowledges.

Discussion

This research began as a means to understand how Indigenous students experience and understand the library. The knowledge shared throughout the focus groups revealed how information seeking behaviours of the Indigenous students we spoke to is largely mediated through their response to violence that has been and is being enacted upon them through Western knowledge structures. Additional physical, intellectual, and emotional labour is required from Indigenous students to find and evaluate trustworthy and usable sources. Previous studies (such as Lilley, 2012; Lee, 2017; Padilla et al., 2020; Bucy, 2022; and Littletree et al., 2023) have reflected on the dearth of information about Indigenous student library experiences. Despite the lack of studies in this area, our findings do correspond of other studies in this area. Currie et al. (2012) and Loyer (2018) both wrote of the violence experienced by Indigenous students in academic settings and these findings were reiterated by our participants who spoke of their caution when searching for information as well as the negative consequences of encountering racist information. The emotional labour experienced by Indigenous students as they confront colonial untruths, challenge authority, and navigate harmful resources remains a major issue that Indigenous students are largely left to address on their own. More work is required to consider how libraries can ease the process of evaluating potentially harmful resources. Considering how we catalogue information that is falsely portrayed as Indigenous authorship may be a necessary step.

Additionally, Indigenous students recognized that Indigenous Knowledge remains peripheral when working within the limitations of settler colonial knowledge organization systems. The barriers for Indigenous students seeking information ranges from the harmful colonial texts that are often preserved on library shelves, to the lack of modalities of knowledge that are not recognized by libraries, to the uncertainty over what constitutes a reliable source. Overcoming these barriers led our participants to create pathways to information that emphasize relationality and human interaction, where information is partially evaluated based on which Indigenous scholars are

interacting with that source. Gibson et al. (2023) wrote of the cost-benefit analysis that many BIPOC students engage in when seeking information. While our participants did not describe identical behaviours and concerns particularly around a hesitancy to seek help, our participants did speak on relying on the expertise of librarians, scholars, peers, and professors. Recentring information seeking to human networks allows Indigenous students to create information networks using Google Scholar, interdisciplinary databases, and other Indigenous scholars.

That Indigenous students are able to adapt their information seeking behaviour in response to gaps in scholarly databases and library structures is not an indication that recent moves within librarianship towards 'reconciliation' are bearing fruit. Rather, the complexity of the information seeking needs of Indigenous students indicates the difficulty of forcing Indigenous Knowledge into a knowledge system that does not consistently recognize orality, materiality, and songs and dance as knowledge. These findings are in agreement with those of Lilley (2012) and Littletree et al. (2023) that the traditional focus of libraries on the written word does not facilitate access to the full array of information sources required by Indigenous students and scholars.

We would also like to emphasize that the experiences of our participants represent just that—they are not representative of their communities, Nations, or Indigenous students as a whole. How Indigenous students negotiate their Knowledge and ethics in a settler colonial space that preserves harmful knowledge is highly localized. We hope that our analysis and dissemination of the experiences shared with us by our participants will be useful for others. To that end, rather than treat our analysis as an essentializing discourse that emphasizes the dis-belonging of Indigenous Knowledge in Western institutions, we encourage readers to instead use our analysis as a starting point to observe the information needs of Indigenous students in their own institutional contexts.

Conclusion

This study offers unique insights into the information seeking behaviours of Indigenous students. Indigenous students' information seeking behaviours, especially in relation to their relationship to Western academic practices, is an understudied aspect of the field and has implications for the continued development of non-Eurowestern information systems as they interact with information and cultural heritage institutions. Due to the ongoing impacts of settler colonialism, some Indigenous students felt anxiety or trepidation when faced with the use of the library. This anxiety was related to both feeling a lack of belonging and an understanding that searching the stacks for physical resources would likely result in encountering harmful materials. Indigenous students also understood that the complexity of their information seeking needs was greater than that of other non-Indigenous students and researchers, both due to the interdisciplinary aspect and the difficulty with identifying good, trusted resources. For Indigenous students, there is an added responsibility to represent their communities and research needs in ways that are responsible to their accountabilities and obligations to their own communities. Due to these factors, students have developed a variety of techniques and strategies to complete their research. As a consequence, students have developed alternative practices and techniques to ensure safety. Some of these techniques include using alternative sources, such as preferring online research, using Google Scholar, and consulting trusted individuals, such as peers and professors. Throughout the study, the students also identified pathways forward to improve the library environment and services to help meet their needs. Some of these pathways included continuing to build relationships, increasing services through increasing offerings for workshops, as well as building relationships that can facilitate access to diverse resources. With the insights shared with us through their stories, library staff can work to make the experiences of Indigenous students safer, more comfortable, and more generative.

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Navigating subjectivity in causal context: a non-deterministic approach for information behaviour research

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Abstract

Introduction. Information behaviour research often asks causal questions with tools that describe associations. Conventional, regression-based models struggle when constructs are subjective, context-bound, and difficult to estimate. The academic setting is one example where behaviour is often self-directed, cues are fragmentary, social constructs are latent, and perceptions vary across roles and disciplines. Under these conditions, deterministic causes rarely occur and purely probabilistic models can miss how context shapes action.

Method. This paper proposes a hybrid causal procedure—the fuzzy subjective structure model—designed to handle the nuance of human perception. It integrates sufficiency paths (what usually works) from PLS-SEM, bottlenecks (what constrains action) from necessary condition analysis, and the decision-oriented visualization of combined importance–performance map analysis. To address the specific challenges of information behaviour, the model adds two adjustments: it uses entropy weighting to account for how differently people interpret survey questions, and inverse probability weighting to ensure that comparisons between groups (e.g., disciplines) are fair and balanced.

Analysis. The fuzzy subjective structure model formalizes four distinct, non-deterministic causal claims: typical sufficiency ('if *X*, then typically *Y*'), typical necessity ('if not *X*, then typically not *Y*'), probabilistic sufficiency ('if *X*, then probably *Y*'), and probabilistic necessity ('if not *X*, then probably not *Y*'). This four-claim structure addresses a noted gap in causal analysis for the social sciences by separating 'works for most cases' statements from probability-scale, counterfactual-style contrasts.

Results. The fuzzy subjective structure model reorients causal analysis in information research from behaviour-driven explanations to a perception-first assessment with visual aids. It positions latent institutional factors like culture and management as the primary drivers that shape individual behaviour through subjectively perceived affordances and constraints.

Conclusion(s). The approach supports quantitative inference by identifying conditions that usually enable behaviours and conditions whose absence makes their individual perception unlikely, while keeping latent constructs and small samples in mind.

Introduction

Causal inference has advanced many social sciences by moving beyond correlation to estimate the effects of causes (Morgan & Winship, 2014). Frameworks such as the Rubin Causal Model (Imbens & Rubin, 2015; Rubin, 1974) and Pearl's Structural Causal Models (Pearl, 2000) formalize counterfactual reasoning. Yet information behaviour research often relies on conventional regression or structural equation modelling. These methods describe associations well, but without strong—and often unrealistic—design assumptions they cannot support the causal claims that many information-behaviour questions implicitly demand (Pearl, 2010). This creates a recurring impasse: researchers estimate relationships between self-assessed variables (e.g., perceived information literacy and empowerment) but report them in causal terms, implying that improving information literacy or acceptance of information behaviour increases empowerment in a population of interest. For individuals, however, this reading is fragile. Are these perceptions causally linked, or are they joint outcomes of deeper, unobserved conditions such as institutional culture or information management? This paper argues that causal logic, already productive in social science research (Morgan, 2013), can also advance information behaviour research. The field is distinctive because information itself drives change in what people know, feel able to do, and ultimately do—yet key conditions (culture, management quality, literacy, policy) are typically measured as subjective perceptions of the culture in observational designs. That combination leaves a gap between 'context' and 'behaviour' that association models do not fully bridge. To keep the causal question concrete, consider one academic deciding whether to share data. They may have the skills but still refrain if the repository is perceived as a barrier, procedures are unclear, incentives misalign, or local norms discourage openness. The design-aware question is whether strengthening trust, clarity, and supportive information management would shift the likelihood that this person shares—rather than treating 'culture' as a downstream correlate of what they already do.

A statistical model of causal links may be useful for policymakers seeking general solutions because it estimates average effects for a population, often through latent variables derived from theory-driven measurement models. Real individuals, however, are rarely 'average'; they act in specific contexts. Regression models therefore indicate what tends to work on average, not what will work for a given person in a given setting. Understanding and influencing behaviour requires attention to upstream drivers that shape subjective interpretation—information culture, information management, and enabling technologies. In information research, this shifts attention to the inherently fuzzy perception of information need that motivates behaviour, whether observed or self-reported. Cole and Wilson's synthesis reinforce this context-first orientation (Cole & Wilson, 2024). Wilson's model treats information seeking as stimulated by needs (physiological, affective, cognitive) and filtered by social roles and performance, as well as socio-cultural, politico-economic, and physical environments (Wilson, 1981, 2022). Cole's primary-need perspective similarly treats information need as a basic human need linking external data to internal knowledge, with the individual transforming data into information in context (Cole, 2018). Taken together, these arguments imply a context-first causal direction: environments and conditions give rise to subjectively interpreted behaviours. The modelling stance therefore reverses the common regression habit of treating perceptions as explanators of other perceptions, reducible to latent constructs that merely 'explain variance'. Instead, context can be modelled as the cause of subjectively interpreted behaviour—e.g., behaviour is enabled within information management because perceived needs and available information culture support it—rather than claiming that 'acceptance' follows from behaviour and then 'explains' culture and makes practices effective.

Information is defined here in a strictly causal sense, as a change in a knowledge structure. Following Cole and Wilson (2024), a knowledge state can be represented as $K[S]$. When dynamic information ΔI is introduced, the result is a modified state $K[S + \Delta S]$. In this formulation, ΔI denotes information insofar as it produces an effect or change. Interpreted this way, organizational and

cultural conditions are not passive background factors; they function as sources of ΔI that shift knowledge states and enable action. The implication for causal modelling is that information should be treated not as a static object but as an intervention whose impact is observable as structural cognitive change.

Consequently, information need is not fixed in advance; it evolves through iterative movement between what is already known and what the environment allows (Bates, 1989; Taylor, 1968). This is exactly why causal questions belong in information behaviour research. If information is defined by the change it produces, then asking 'what causes people to seek, accept, trust, or use information' is not an optional philosophical add-on—it is the core question. For individuals, the practical implication is: which conditions make it more likely that information becomes a real input to thinking or acting (a change in understanding, confidence, or next action), rather than just random noise that gets ignored in regression model? In universities, those conditions are often institutional: the usability and legitimacy of a massive open online course systems, the clarity of rules, and the trust embedded in local culture (Deja & Wójcik, 2021).

Another issue in information research and in academic settings is that constructs like information literacy, self-efficacy, and empowerment are latent for people. They are estimated for the general population so they will be interpreted differently across roles and disciplines (Deja et al., 2021; Hatlevik et al., 2018). Behaviour in these contexts is often governed by non-compensatory constraints, or bottlenecks; without a minimal level of a certain condition, high levels of an outcome seldom occur (Dul, 2016, 2024). In such environments, universal laws of sufficiency or pure probability are rare, but patterns of typical outcomes or necessity conditions are common (Wagner, 2020).

Navigating causal context

The conceptual roots of this interpretation of cause lie in two lines of work. First, causal inference distinguishes associational regularities from the effects of hypothetical interventions (Pearl & Mackenzie, 2018). Its strength is that it makes causal questions explicit as counterfactual queries and states identification conditions for those queries, for example via the *do*-operator and backdoor reasoning (Pearl, 2010). A more traditional approach, conditional process analysis, uses related probabilistic logic but focuses on observed variables (often composites rather than latent constructs) and linear paths. It offers accessible models of mediation and moderation, yet commonly leaves latent measurement and non-compensatory constraints outside the model (Hayes et al., 2017; Hayes & Rockwood, 2020). Both approaches aim at generalisable claims, but both face limits in information behaviour settings where constructs are subjective, vary across roles and contexts, and are measured through indicators intended to capture meaning rather than direct treatments. Conventional structural equation modelling addresses latent structure but typically assumes compensatory sufficiency; without explicit design or identification arguments, it cannot resolve causal direction from association alone (Hair et al., 2022; Tarka, 2018).

Second, necessity and typicality supply an alternative logic for institutional context. Necessary condition analysis formalises 'if not X, then (typically) not Y' through non-compensatory thresholds and limited, theory-justified exceptions (Dul, 2016, 2024). Typicality refers to properties that hold for almost all cases in a set; it relies on high cardinality rather than probability mass and tolerates structured exceptions (Wagner, 2020; Wilhelm, 2022). This middle ground avoids the rigidity of deterministic claims found in set-theoretic approaches and the looseness of purely probabilistic sufficiency.

The combined importance–performance map analysis demonstrates how necessity can be embedded alongside sufficiency paths in PLS-SEM to support decision-oriented interpretation (Hauff et al., 2024). However, combined importance–performance map analysis inherits two common limitations of institutional survey research. First, it can understate how differently

respondents interpret indicators across disciplines, roles, and cultures, even when measurement quality appears acceptable. Second, it does not itself address confounding in observational comparisons: differences attributed to culture or management may partly reflect differences in who is exposed to those conditions (e.g., discipline, seniority, gender). These limitations matter because they shape how one should read familiar outputs such as path coefficients, scaled 'performance' means, or necessary condition analysis effect sizes. In information behaviour research, the same numerical result can imply different practical meanings depending on whether a factor typically enables outcomes when present or mainly constrains outcomes when missing.

To address these issues, a fuzzy subjective structure model is proposed: a hybrid, non-deterministic procedure integrating PLS-SEM and necessary condition analysis within the combined importance–performance map analysis framework, with two adjustments tailored to information behaviour. Entropy weighting treats dispersion in item responses as informative about subjective interpretation, up-weighting indicators whose response patterns carry more discriminating information (Song, 2025). Inverse probability weighting rebalances observed covariates across exposure groups, creating a pseudo-population in which comparisons more closely approximate an intervention contrast under stated assumptions (Hogan & Coote, 2014; Huber, 2014).

Within fuzzy subjective structure model, standard tools first set the quantitative baseline. PLS-SEM summarizes how conditions tend to operate 'on average' through sufficiency-type paths, whereas necessary condition analysis asks whether a minimal level of a condition functions as a practical prerequisite for high outcomes, even when other drivers are strong (Dul, 2016, 2024). Combined importance–performance map analysis then makes this dual reading easier to communicate and compare across settings by showing—within one visual paradigm—both what appears to matter and where bottlenecks may block success, while keeping inference contingent on explicit estimands and diagnostics (Hauff et al., 2024; Hair et al., 2022). The added value of fuzzy subjective structure model is interpretive: the same PLS-SEM paths, combined importance–performance map analysis 'importance/performance', and necessary condition analysis bottlenecks can all be re-read through a person-in-context necessity lens by reducing each summary back to person-by-person membership under fuzzy perception (who clears a threshold, who does not, and who becomes an exception). In this reading, coefficients stop being 'one rule for everyone' and become counts and probabilities about how often an enabling pattern holds—and how rarely high outcomes occur when a condition is missing.

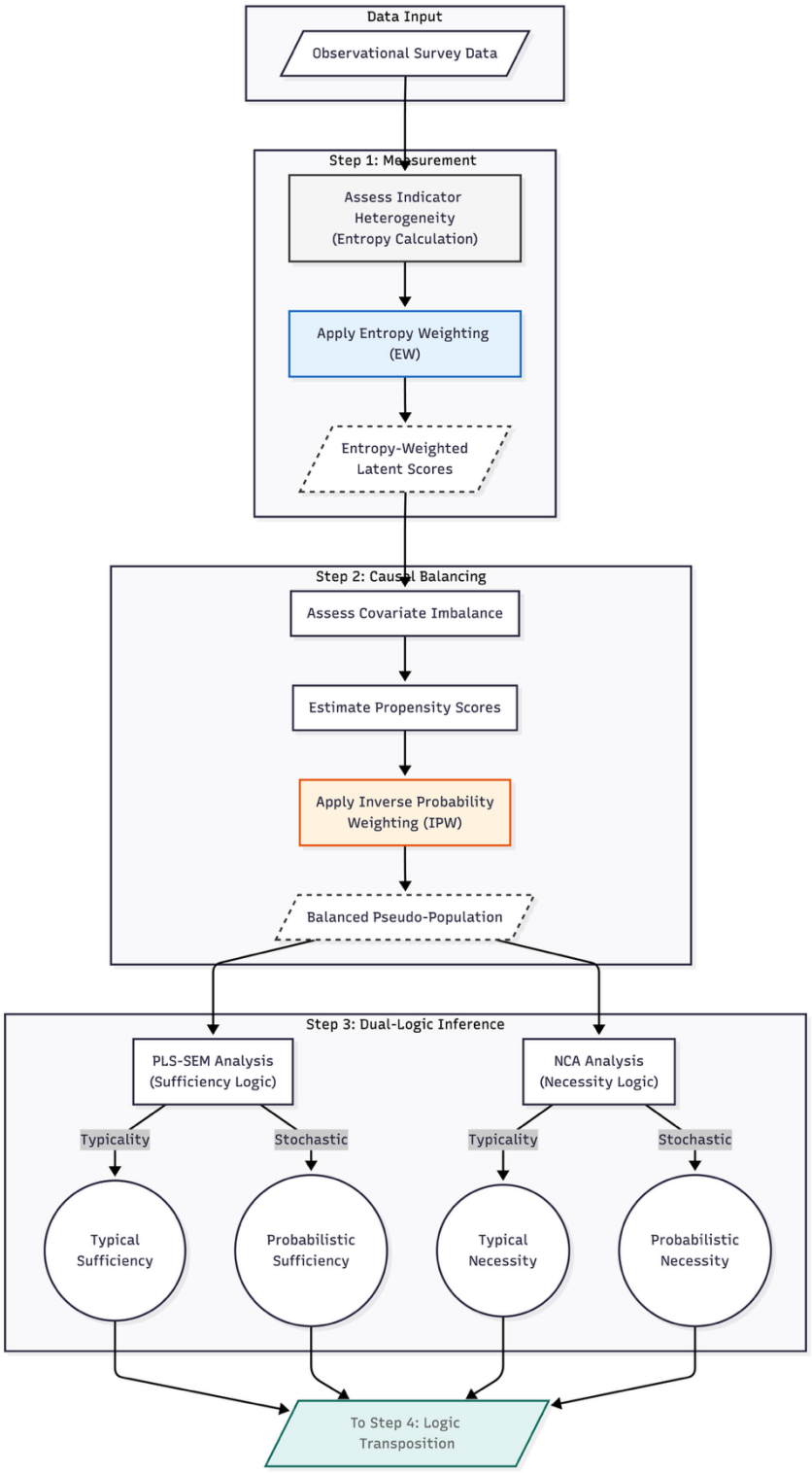


Figure 1. The fuzzy subjective structure model methodological workflow: filtering subjective perception and confounding before dual-logic inference

This combined view changes how the usual statistics are read: path coefficients and combined importance–performance map analysis 'importance' are treated as sufficiency evidence, and 'performance' is interpreted alongside necessity evidence to separate factors that mainly amplify outcomes from factors that mainly constrain them. Switching across the four fuzzy subjective

structure model claims—typical sufficiency, typical necessity, probabilistic sufficiency, and probabilistic necessity—adds a simple check: a factor that looks strong in a sufficiency model but has no bottleneck behaves like an amplifier, while a factor with a clear bottleneck but modest average effect behaves like a gatekeeper that matters most when missing (Dul, 2016, 2024). Because all claims are expressed on latent scores, results remain population-level and design-contingent, yet individual cases can still be located relative to enabling regions and bottlenecks for person-in-context interpretation without implying 'one-size-fits-all' causation (Morgan & Winship, 2014; Pearl, 2010).

Causal logic for information behaviour

Academic information work often fits a context-first logic. Policies on open access, data sharing, or digital transformation rarely produce compliance directly; what matters is whether systems feel legitimate, usable, and trustworthy in everyday work (Deja & Wójcik, 2021; Kim & Adler, 2015; Virkus & Salman, 2020). Likewise, information literacy supports action through intermediate steps—competence tends to build self-efficacy, self-efficacy supports empowerment, and empowerment supports collaboration and data stewardship (Sparks et al., 2016; Hatlevik et al., 2018; Ahmad et al., 2020). Cultural norms—openness, trust, rule clarity—often act as floors: below certain levels, strong outcomes are rare regardless of gains elsewhere (Choo, 2013; Deja & Wójcik, 2021). The task is therefore to identify what usually helps (sufficiency patterns) and what is hard to compensate for when missing (necessity constraints). Combined importance–performance map analysis supports organizational planning by showing what is important and how well it is realised; fuzzy subjective structure model keeps that visual logic but treats subjectivity and confounding as central to explaining why an action is (or is not) likely for a given person in a given context.

Theory: Probabilistic, typical, and necessary claims

David Hume's two descriptions of causality—constant conjunction and counterfactual denial—motivate why fuzzy subjective structure model treats causation in information behaviour as non-deterministic: in real information environments, causes rarely guarantee behaviour, but they can still enable it for most people or block it when missing (Dul, 2024; Hume, 1758). Applied models in the field often default to probabilistic sufficiency ('if X increases, higher Y becomes more likely'), consistent with structural equation modelling -style interpretations when identification is credible. necessary condition analysis adds a complementary constraint logic: typical necessity ('without X, very high Y is uncommon'), expressed via bottlenecks and rare exceptions (Dul, 2016; Vis & Dul, 2018). Dul (2024) argues that two further claims are often left implicit: typical sufficiency ('with meaningful X, Y occurs in most cases', allowing limited exceptions) (Wagner, 2020; Wilhelm, 2022) and probabilistic necessity ('if X is missing, Y becomes unlikely'), which turns bottlenecks into an explicitly probabilistic, counterfactual-style risk statement. fuzzy subjective structure model keeps these four meanings distinct and uses them as cross-checks, assessing sufficiency after measurement adjustment and covariate balancing, and assessing necessity both as exception patterns and as low success probabilities under sub-threshold conditions in the balanced pseudo-population (Figure 1).

Measurement under subjective fuzzy perception

Indicators of latent constructs carry different amounts of subjective perception because respondents read items through disciplinary, role-based, and cultural lenses. Entropy weighting accounts for this heterogeneity. Formally, each indicator $X_j$is assigned a weight $w_j$derived from normalized entropy. While the mathematical expression calculates dispersion, the underlying logic is intuitive. In self-reported survey data, indicators vary in how consistently and clearly they are interpreted by respondents. Entropy weighting functions as a filtering mechanism: indicators exhibiting clear, discriminating response patterns (high information content) receive greater weight, whereas indicators characterized by diffuse or random responses (noise) receive less. As a

result, the latent constructs emphasize the most meaningful components of participants' subjective perceptions.

$$w_j = \frac{1 - \left(-\frac{1}{\ln(m)} \sum_{i=1}^{m} p_{ij} \ln(p_{ij})\right)}{\sum_{j=1}^{n} \left[1 - \left(-\frac{1}{\ln(m)} \sum_{i=1}^{m} p_{ij} \ln(p_{ij})\right)\right]}, \quad \text{where } p_{ij} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}}$$

The basic idea is simple: items that show clearer, more discriminating response patterns across people carry more information and therefore receive more weight, while items that look closer to noise receive less weight (Song, 2025). Low entropy indicates more informative variation. These weights can be incorporated in how latent scores are constructed so that the inner model reflects the most informative parts of subjective measurement, rather than treating all indicators as equally interpretable (Hair Jr. et al., 2021). Low entropy indicates more informative variation. We incorporate these weights when constructing latent scores, so the inner model reflects the most informative parts of subjective measurement rather than treating all indicators as equally interpretable (Hair Jr. et al., 2021). This does not remove subjectivity; it makes it visible and accountable. Substantively, it matters because all four causal claims are evaluated on the resulting latent-score scale: who counts as 'high' or 'low' on X^* (and therefore who falls above a sufficiency cut-point or below a bottleneck) can shift once measurement is reweighted. Typical sufficiency still requires bottleneck-based reasoning to check whether 'having enough of X' is commonly associated with 'having high Y', while allowing that some cases will differ.

Counterfactual balance under observational data

Survey-based information behaviour research is observational, so group differences can reflect confounding. For example, an apparent relationship between general perception of information culture and general level of empowerment may partly reflect discipline, seniority, or other structural differences. Inverse probability weighting addresses this by constructing a pseudo-population in which exposure to a condition is statistically independent of observed covariates, simulating a randomized experiment (Hogan & Coote, 2014).

$$\mathrm{w}_i = \frac{T_i}{e(Z_i)} + \frac{1 - T_i}{1 - e(Z_i)}, \quad \text{where } e(Z_i) = P(T_i = 1 \mid Z_i)$$

To account for confounding in causal estimation, inverse probability weighting (w_i) is employed. Here, the propensity score $e(Z_i)$ denotes the estimated probability that an individual i to declare association with certain category, conditional on confounder Z_i where $T_i \in 0{,}1$ indicates whether the category is observed. These weights re-balance the sample so that the distribution of confounders like gender, experience etc. is independent of potential treatment status, simulating a pseudo-randomized condition. The practical goal is to create a pseudo-population where measured confounders are less tied to exposure, so conditional probabilities can be interpreted as approximations to intervention contrasts under stated assumptions (Morgan & Winship, 2014; Pearl, 2010). In fuzzy subjective structure model, inverse probability weighting supports the probabilistic claims, while necessary condition analysis contributes evidence about bottlenecks and the rarity of exceptions. Together, they allow necessity statements to be expressed in a probabilistic form ('when X is weak, high Y is unlikely'), while still retaining the constraint logic (Dul, 2024) that is central to institutional information behaviour.

Formalising fuzzy subjective structure model

The integration of entropy weighting for subjective measurement and inverse probability weighting for causal balance allows us to formalize four distinct, non-deterministic causal claims, addressing the gap noted by Dul (2024). These claims separate typicality (high-cardinality statements about what holds for most cases in a reference class) from probability (stochastic

statements about outcome likelihood, interpreted on a counterfactually balanced pseudo-population). The distinctive move of fuzzy subjective structure model is interpretive: the familiar numerical outputs of PLS-SEM, necessary condition analysis, and combined importance–performance map analysis are treated as a starting point, and then re-read in person-in-context terms by reducing each summary back to weighted, case-level membership on a latent-score scale (who clears a threshold, who does not, and who becomes an exception). In other words, the 'causal claim' is not the coefficient itself, but the pattern of weighted cases it implies—how often an enabling configuration holds and how rarely high outcomes appear when a condition is missing.

To operationalize these claims, we can first define our core components. Let X_i^* and Y_i^* be the entropy-weighted latent variable scores for a condition (X) and an outcome (Y) for individual i, scaled to a 0–100 range consistent with combined importance–performance map analysis 's performance metric. Also, for analytical clarity, we can define a normalized level for each case as $L_X(i) \coloneqq X_i^*/100 \in [0,1]$, which directly links the case-level score to the overall combined importance–performance map analysis performance metric via the weighted mean

$$\mathrm{Perf}_X = 100 \times \sum_{i \in \mathcal{R}} \widetilde{w_i}\, L_X(i)$$

where $\mathcal{R}$ is the analytic reference set (e.g., all non-missing cases after filtering) and $\widetilde{w_i} = w_i / \sum_{j \in \mathcal{R}} w_j$ are the weights normalized to sum to 1. The unnormalized weights w_i are case weights constructed for causal balance (inverse probability weighting) and may include survey design weights if applicable.

Let w_i be the case-level weight for individual i, derived from inverse probability weighting to ensure causal balance, i.e., used when averaging across people responses. For our analysis, these weights are normalized such that $\sum_{i \in R} w_i = 1$. The threshold for context variable being condition, T_X, is not arbitrary; it is derived directly from the necessary condition analysis bottleneck that corresponds to a meaningful target outcome level, T_Y.

From necessary condition analysis, a bottleneck (or 'ceiling-line') function $b_X(y)$ maps any outcome level y to the minimal level of X^* that is required to make y attainable without violating the ceiling. With a contextually meaningful 'high' outcome threshold T_Y(on 0–100), the necessary condition analysis-implied necessity threshold is:

$$T_X \coloneqq b_X(T_Y)$$

For typical/probabilistic sufficiency, a 'sufficient' region may be defined by theory or a practical cut-point (e.g., a high quantile), even if it is not identical to the necessary condition analysis bottleneck.

If $b_X(T_Y)$ is the minimum required level of X^* to achieve T_Y, then we can set $T_X \coloneqq b_X(T_Y)$. Also, for analytical clarity, we can define a normalized level for each case as $L_X(i) \coloneqq X_i^*/100 \in [0,1]$, which directly links the case-level score to the overall combined importance–performance map analysis performance metric via the weighted mean $\mathrm{Perf}_X = 100 \times \sum_i \widetilde{w_i}\, L_X(i)$. This setup ensures our causal tests are grounded in the same empirical scale as the combined importance–performance map analysis visualization, with all subsequent analysis performed on the pseudo-population balanced by inverse probability weights (w_i). With this foundation, we can articulate the four causal logics. Because all four estimands are computed as weighted counts over meaningful regions of $X_i^*$and Y_i^*(above/below thresholds or bottlenecks), the same latent-variable model can support both population summaries and person-in-context interpretations without implying a single deterministic rule for everyone.

Typical sufficiency

The claim 'if X, then typically Y' is a high-cardinality statement about co-occurrence in the balanced reference class. In plain terms: once we compare like with like using weights, a sufficient level of $X$is almost always accompanied by a high level of Y, with a small number of exceptions permitted. Typical sufficiency is quantified as:

$$\hat{\alpha}_X = \frac{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{Y_i^* \geq T_Y, X_i^* \geq T_X\}}{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{X_i^* \geq T_X\}}$$

The indicator $\mathbf{1}\{\cdot\}$equals 1 when the condition in braces is true and 0 otherwise. The numerator counts weighted cases with both sufficient $X$and high Y; the denominator counts all weighted cases with sufficient X. The claim is supported when $\hat{\alpha}_X$meets a high threshold, conventionally 0.85. Substantively, $\hat{\alpha}_X$answers a concrete question: among respondents who report enough of a condition—enough perceived information culture, enough literacy and self-efficacy, enough system legitimacy—how often do we also observe a high outcome such as empowerment, collaboration, or data stewardship? This resembles how survey models are commonly interpreted in information behaviour research, for instance when claiming that information literacy influences self-efficacy and empowerment (Deja et al., 2021). The difference is that the claim is now explicitly framed as a for-most-people regularity rather than an implied universal lever, and the comparison is made on a pseudo-population where observed confounders are less entangled with exposure.

Typical necessity

The claim 'if not X, then typically not Y' follows Dul's cardinal logic and focuses on the rarity of exceptions—cases that reach high Ywithout meeting the necessary condition analysis-implied requirement for Xat their observed outcome level. This is quantified as the weighted exception share:

$$\hat{\varepsilon}_X = \frac{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{Y_i^* \geq T_Y, X_i^* < b_X(Y_i^*)\}}{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{Y_i^* \geq T_Y\}}$$

An exception is a case that achieves a high outcome despite falling below the bottleneck requirement for its observed Y. The claim is supported when three conditions are jointly met: the necessary condition analysis effect size is meaningful (conventionally $d \geq 0.10$), the necessary condition analysis permutation test is significant ($p \leq 0.05$), and the weighted exception share is small ($\hat{\varepsilon}_X \leq 0.05$). Intuitively, among all high-Y cases, only a very small fraction manages this without the required X.

The estimator $\hat{\varepsilon}_X$captures what institutional information studies often describe qualitatively as non-compensatory conditions: factors that people can occasionally work around but that are difficult to bypass in practice. Information culture is positioned as a condition shaping downstream information practices and outcomes (e.g., information culture → information use). A *typical-necessity* test would treat information culture as X and information use as Y, derive T_X from the information culture bottleneck for a high information use target, and then ask: among those with very high information use, how rare are cases that fall below the information culture requirement given by $b_X(Y_i^*)$?.

Probabilistic sufficiency

The claim 'if X, then probably Y' shifts from cardinality to probability. This is the conditional probability of high Ygiven sufficient X, computed on the inverse probability weighting-balanced pseudo-population:

$$\hat{P}(Y^* \geq T_Y \mid X^* \geq T_X)$$

Uncertainty for $\hat{P}(\cdot)$ and related probability-scale summaries is obtained with a nonparametric case bootstrap (resampling respondents with replacement). In each bootstrap replicate we recompute the latent scores (including entropy weighting if used), re-estimate the propensity model and stabilized inverse probability weighting weights, and then recompute $\hat{P}(\cdot)$ under the same threshold rules. Thresholds can be held fixed (theory-anchored or necessary condition analysis-derived in the main sample) or re-estimated within each replicate as a sensitivity check. Percentile or bias-corrected and accelerated bootstrap intervals are then reported for all probability and uplift quantities.

To clarify practical meaning—especially compared to standardised path coefficients—fuzzy subjective structure model also reports a probability-scale contrast, or uplift:

$$\widehat{\Delta}_X = \hat{P}(Y^* \geq T_Y \mid X^* \geq T_X) - \hat{P}(Y^* \geq T_Y \mid X^* < T_X)$$

The uplift $\widehat{\Delta}_X$ states directly how much outcome likelihood changes across the threshold, after balancing observed covariates. This shifts attention from hypothesis-testing framing toward an estimand that states what often matters in applied research: how much does the probability of success differ when the condition is present at a meaningful level versus when it is not?

Using the structure in Deja et al. (2021) as an example, let X = high information literacy and Y =high information empowerment (IE). Then $\hat{P}(Y^* \geq T_Y \mid X^* \geq T_X)$ reads plainly as: in a covariate-balanced comparison, what is the probability of high empowerment among academics who have high literacy? The uplift $\widehat{\Delta_X}$ adds: how many percentage points higher is that probability compared to otherwise similar academics who are not in the 'high IL' region? To do so, the approach is to estimate uncertainty by repeatedly re-running the full analysis on many 'resampled' versions of the survey (drawing respondents again with replacement) and using the spread of results to form confidence intervals for the probabilities and uplift.

Probabilistic necessity

The claim 'if not X, then probably not Y' shifts from counting exceptions to estimating risk. The central question becomes: if the condition is absent, how likely is success? This is quantified as:

$$\hat{\beta}_X = \frac{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{Y_i^* \geq T_Y, X_i^* < T_X\}}{\sum_{i \in \mathcal{R}} w_i \cdot \mathbf{1}\{X_i^* < T_X\}}, \text{ with } \Pr\big(Y \geq T_Y \big| \text{do}(X < T_X)\big) \approx \hat{\beta}_X$$

Framed in interventional terms using Pearl's do-operator, this approximates $\Pr(Y \geq T_Y \mid \text{do}(X < T_X))$ under the identifying assumptions sustained by the weighting. Empirically, $\hat{\beta}_X$ is the weighted proportion of cases in the balanced pseudo-population that attain a high outcome despite being below the necessity threshold for X. The claim is supported when this proportion is small—conventionally $\hat{\beta}_X \leq 0.20$—indicating that success in the absence of the condition is a rare exception rather than a viable pathway.

For information behaviour research, $\hat{\beta}_X$ can be read as a risk-style statement: when the enabling condition falls below a workable minimum, the chance of achieving a very strong outcome is low, though not zero. If information culture is treated as the enabling condition and high information use as the outcome, then $\hat{\beta}_X$answers a plain question: after balancing by role, discipline, and similar covariates, how likely is very high information use when culture is below the bottleneck level required for that outcome? This is the 'unlikely when missing' claim expressed as a probability, not merely as a small-exceptions count.

Fuzzy subjective structure model 's probabilistic sufficiency and probabilistic necessity are effects-of-causes summaries: they describe how likely high Y is under 'high enough X' versus 'too low X' in a balanced pseudo-population. Li and Pearl's probability of sufficiency and probability of necessity

(2024), by contrast, are causes-of-effects quantities defined at the individual level conditional on what was observed—for instance, for someone who did experience Y, was X necessary for that particular person? Fuzzy subjective structure model asks 'how likely is a high outcome in comparable contexts when X is (or is not) present at a meaningful level?' while PN/PS asks 'for this person, would changing Xhave changed Y?' The concepts are aligned in spirit—both are counterfactual—but the estimands differ. In information behaviour research, fuzzy subjective structure model's version may be the more natural starting point because context conditions such as culture, management, and policy climate are measured as graded latent scores rather than as discrete treatments. The bottleneck logic then serves as a structured way to express information need as constraint: when enabling conditions fall below a workable minimum, high outcomes become unlikely even if not impossible.

Fuzzy membership

The crisp threshold formulation treats membership as binary: a case either meets the condition or does not. This discretisation, while analytically convenient, discards information about degree—how far above or below a threshold a case falls. For constructs measured on continuous latent scales, fuzzy logic provides a more faithful representation by replacing 0/1 indicators with graded membership values in [0,1]. Rather than classifying each case $i$as simply 'in' or 'out' of a category, fuzzy membership assigns each case a continuous value $\mu(i) \in [0,1]$ representing its degree of belonging. A case with $\mu(i) = 1$ fully belongs to the category; a case with $\mu(i) = 0$ fully does not belong; and intermediate values indicate partial membership. For instance, if the bottleneck requires $X^* \geq 60$ for high outcomes, a case with $X^* = 60$ has $\mu_X^S(i) = 0$ (just at the boundary), a case with $X^* = 80$ has $\mu_X^S(i) = 0.5$ (halfway to the ceiling), and a case with $X^* = 100$ has $\mu_X^S(i) = 1$ (full membership). These case-level membership values are then aggregated across the sample: rather than counting cases (as in crisp formulations), we sum weighted membership degrees to compute population-level estimands.

For sufficiency-type membership, the function $\mu_X^S(i)$ measures the degree to which case i has enough of condition X to enable a high outcome, anchored at the fixed bottleneck $b_X(T_Y)$:

$$\mu_X^S(i) = \max\left\{0, \min\left\{1, \frac{X_i^* - b_X(T_Y))}{U_X - b_X(T_Y)}\right\}\right\}$$

where $U_X$is the upper bound of the scale. Cases at or below the bottleneck have $\mu_X^S(i) = 0$; cases at the scale ceiling have $\mu_X^S(i) = 1$. The complement $\mu_X^{\neg S}(i) = 1 - \mu_X^S(i)$ measures the degree of insufficiency.

For necessity-type membership, the function $\mu_X^N(i)$measures the degree to which case $i$meets the Xrequirement for its own observed outcome level, anchored at the case-specific bottleneck $b_X(Y_i^*)$:

$$\mu_X^N(i) = \max\left\{0, \min\left\{1, \frac{X_i^* - L_X}{b_X(Y_i^*) - L_X}\right\}\right\}$$

where L_X is the lower bound of the X scale. Cases that meet or exceed their required bottleneck have $\mu_X^N(i) = 1$; cases at the scale floor have $\mu_X^N(i) = 0$.

For outcome membership, the function $\mu_Y(i)$ measures the degree to which case $i$achieves a high outcome:

$$\mu_Y(i) = \max\left\{0, \min\left\{1, \frac{Y_i^* - L_Y}{T_Y - L_Y}\right\}\right\}$$

Cases at or above T_Y have $\mu_Y(i) = 1$; cases at or below L_Y have $\mu_Y(i) = 0$.

The parallel fuzzy formulations of all four causal claims—fuzzy typical sufficiency ($\tilde{\alpha}_X$), fuzzy typical necessity ($\tilde{\eta}_X$ and $\tilde{\varepsilon}_X$), fuzzy probabilistic sufficiency ($\tilde{\Delta}_X$), and fuzzy probabilistic necessity ($\tilde{\beta}_X$)—are detailed in the supplementary materials (OSF: https://osf.io/b8maq/). This two-stage logic preserves the person-in-context interpretability of fuzzy subjective structure model: we can examine any individual case's membership profile to understand why they contribute (or fail to contribute) to a population-level pattern, while the causal claims themselves remain statements about regularities across the reference class.

Design and identification

As an example of how these causal ideas can be implemented with survey-based information behaviour data, the causal story is specified as a context-first chain in which information management (M) shapes information culture (C); culture shapes information literacy self-efficacy (S); self-efficacy supports empowerment (E); and empowerment encourages collaboration (B): M → C → S → E → B. Culture is also allowed to have direct upstream effects on S, E, and B. Each arrow is treated as its own causal question rather than as a single 'global model claim', so the estimand and the identification argument are stated for each exposure–outcome contrast. This stepwise structure matters because the meaning of 'cause' differs across the four fuzzy subjective structure model claims: some arrows are more naturally read as typical enablers (sufficiency-type) and others as constraints that block success when missing (necessity-type). Crucially, the framework does not assume that PLS-SEM paths or probability contrasts are causal by default; causal interpretation requires temporal ordering arguments, a justified adjustment set (e.g., via a Direct Acyclic Graph), overlap diagnostics, etc.

Interpreted in information-behaviour terms, these four claims answer different practical questions even when they are computed on the same weighted latent constructs: typical sufficiency means 'if the information policy is there, most people acknowledge the need and act'; typical necessity means 'if the support is missing, very strong acceptance of behaviour is rare, with only a few exceptions'; probabilistic sufficiency means 'raising the support increases the chance of information behaviour'; and probabilistic necessity means 'lacking the policy makes behaviour unlikely.' In this sense, sufficiency claims tell us what to strengthen to raise outcomes, whereas necessity claims tell you what must not fall below a workable level or the system stalls; typical claims emphasize 'for most cases', while probabilistic claims emphasize 'how likely, or how much the odds change'.

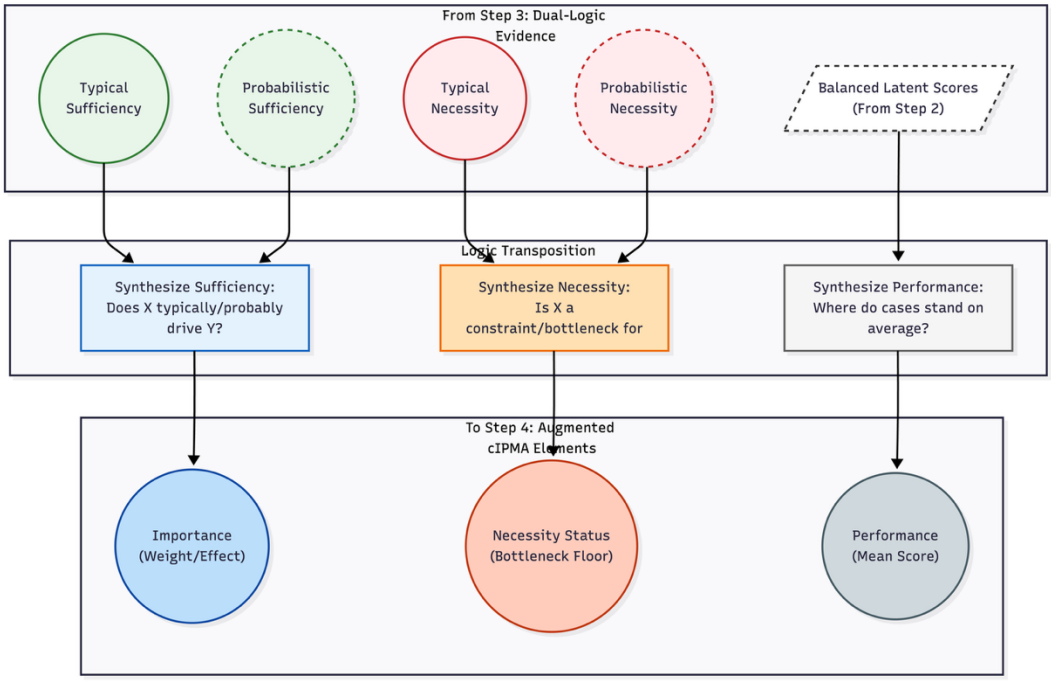


Figure 2. Mapping typical/probabilistic sufficiency and necessity to importance, necessity status, and performance

As shown in Figure 2, all four causal claims are evaluated on latent scores (Step 2) constructed from entropy-weighted measures: once $X_i^*$and Y_i^* are entropy-weighted, who counts as 'high' or 'low' on a construct can shift in a principled way. These balanced scores feed the dual-logic evidence (Step 3): typical and probabilistic sufficiency (α and the probability/uplift summaries) are synthesized as importance (effect), while typical and probabilistic necessity (ε and β) are synthesized as necessity (bottleneck) using the necessary condition analysis boundary $b_X(Y_i^*)$. In parallel, the same balanced latent scores are summarized as Performance (normalized mean score), so the combined importance–performance map analysis view (Figure 3, Step 4) reports—on one consistent scale—what tends to drive outcomes (importance), what can block outcomes when too low (necessity status), and where the context currently sits on average (performance) (Hauff et al., 2024).

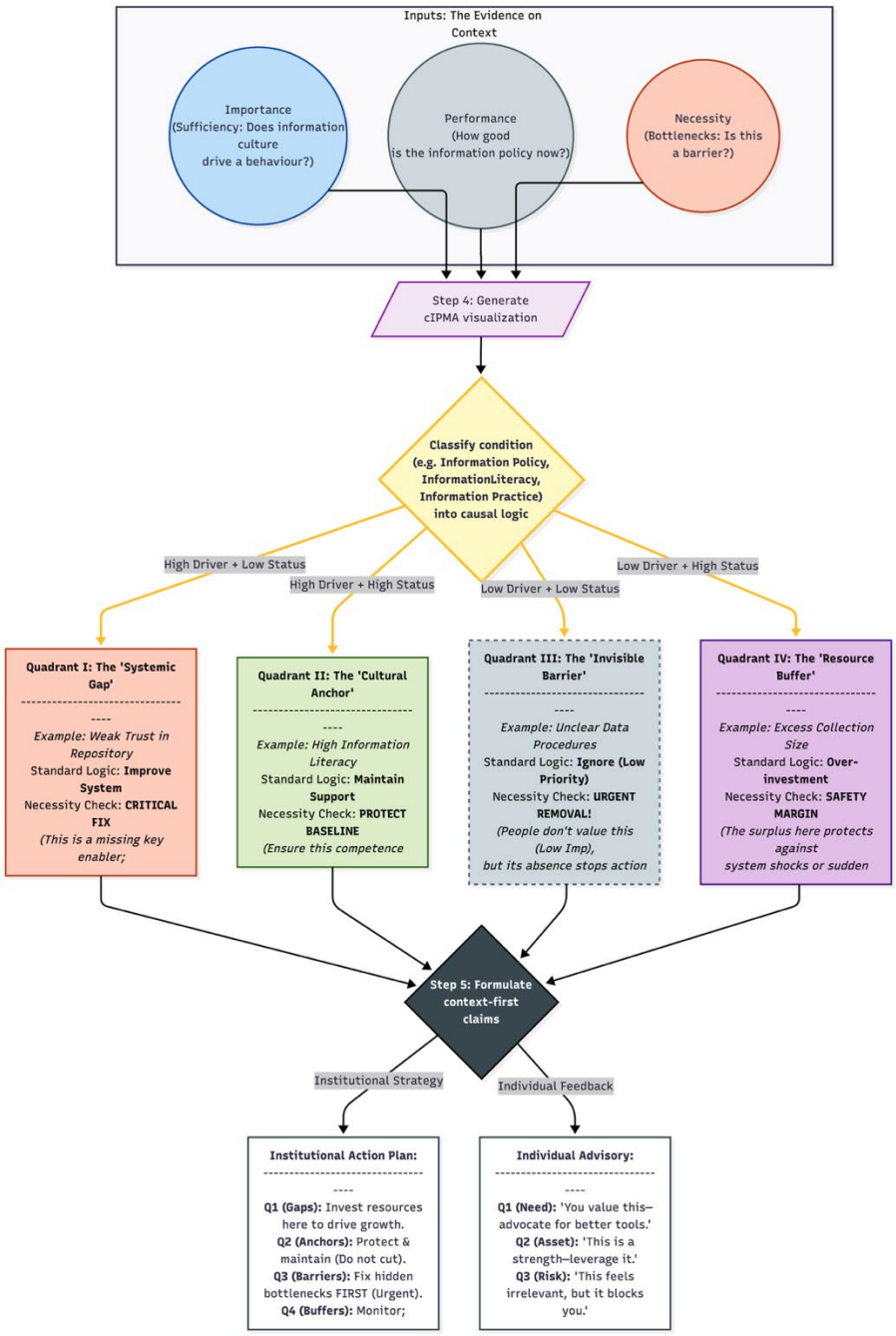


Figure 3. Augmented combined importance–performance map analysis interpretation workflow

Discussion

Many empirical models in information research put individual behaviour on the left-hand side and treat culture or management as downstream correlates. This direction is at odds with the everyday reality of universities, where perceived norms, governance, and system quality enable or constrain what people can do. Compliance with open access or data policies is not an effect of 'compliance behaviour' but a response to institutional affordances such as trust in repositories, fit with incentives, and procedural clarity (Deja, 2024; Kim & Adler, 2015). Fuzzy subjective structure model replaces the usual regression-based default by treating information culture and information management as upstream conditions and by estimating both their sufficiency paths and their necessity bottlenecks for self-efficacy, empowerment, and behaviour. In this framing, higher

literacy typically co-occurs with greater self-efficacy; higher self-efficacy typically co-occurs with greater empowerment; but without culture or management at (at least) their bottleneck levels, very high empowerment or collaboration should be rare. Figure 2 clarifies how these statements map onto distinct estimands rather than being left as implicit 'causal-sounding' interpretations of associations, while Figure 3 shows how the same evidence can support institutional planning without collapsing everything into a single coefficient narrative.

Potential areas for implementation of fuzzy subjective structure model

Information literacy remains the foundational competence for academic work, understood as the ability to locate, evaluate, and use information effectively, ethically, and reflectively (Kurbanoglu et al., 2006; Sparks et al., 2016). Because respondents read items through disciplinary and role-based lenses, subjectivity in measurement is accommodated. In the present implementation, indicator heterogeneity is treated through entropy-based reweighting as a robustness device to probe whether the main findings are sensitive to differences in response dispersion; the core structural conclusions do not rest on reweighting alone. With this measurement stance, sufficiency paths from literacy to self-efficacy tend to pass typicality criteria, consistent with prior evidence on the literacy–confidence link (Hatlevik et al., 2018; Kultawanich et al., 2015). Empowerment—understood as the capacity to shape one's information environment—typically follows from self-efficacy and supportive culture (Ahmad et al., 2020; Choo, 2007, 2013). Necessity is evaluated by asking whether high empowerment is uncommon when culture is below its necessary condition analysis-derived bottleneck T_X. When the inverse probability weighting-balanced probability of high empowerment under sub-threshold culture (β) is small (e.g., $\beta \leq 0.20$), the result supports a probabilistic-necessity reading that aligns with institutional experience: without minimal cultural support, success is unlikely even if not impossible.

Methodological implications

Fuzzy subjective structure model remains anchored in combined importance–performance map analysis as a decision-oriented way to summarise what matters and how well it is currently realised, but it changes what those summaries mean for information behaviour research. By adding indicator-level entropy weighting and case-level balancing, and by allowing the analyst to switch between sufficiency- and necessity-oriented readings depending on the substantive theory of information need, the procedure becomes usable across a wider range of information-behaviour questions than a single regression-style interpretation. It still addresses the general need–behaviour relation—how environments shape whether perceived needs translate into action—but it does so in a way that is closer to person-in-context reasoning. Instead of treating coefficients and average scores as if they imply the same mechanism for everyone, fuzzy subjective structure model asks how often enabling patterns are observed among comparable individuals (typical sufficiency), and how rarely high outcomes occur when key conditions are weak (probabilistic necessity). That shift makes the interpretation more 'causal in intent' even when the data are surveys and constructs are continuous latent estimates because the claims are expressed as counterfactual-style contrasts and cross-checked against bottlenecks and exception patterns, while remaining explicitly contingent on research design and identification assumptions.

Limits and scope conditions

No statistical procedure substitutes for research design. Identification requires a design-level account of confounding and temporal ordering, ideally formalized with a directed acyclic graph that justifies the conditioning set for each exposure–outcome contrast (Morgan & Winship, 2014; Pearl, 2010). Inverse probability weighting hinges on measured-confounder sufficiency, positivity (overlap), and correct specification of the propensity model; weights should be stabilized and diagnostics reported to guard against extreme values. Because necessary condition analysis permutation tests are implemented without design weights, unweighted necessary condition analysis evidence on bottlenecks is paired with weighted exception rates and probabilities for causal interpretation, and any discrepancy is treated as a signal for sensitivity analysis rather than

as a contradiction. To avoid circularity, necessity thresholds might be learned from training data or theory and evaluated out-of-sample; sufficiency thresholds can also be defined independently (e.g., high quantiles) rather than reusing necessity cut-points. Finally, PLS-SEM paths remain associational unless the design and identification argument license a causal reading; balancing and bottleneck checks reduce but do not eliminate ambiguity. Entropy reweighting can also shift construct meaning by emphasizing certain response patterns; therefore, reporting both weighted and unweighted results, and where possible subgroup checks, is part of responsible interpretation.

Conclusion

Within academic settings, culture and management function as upstream enabling conditions rather than mere correlates of behaviour: openness and trust tend to foster sharing, while rule-centric climates may secure compliance yet dampen initiative unless complemented by other enablers (Choo, 2002; Deja, 2024; Deja & Wójcik, 2021; Detlor, 2010). Fuzzy subjective structure model renders these expectations testable as causal hypothesis. Hence, a causal claim in information behaviour must be design-contingent. Fuzzy subjective structure model should therefore be read as a principled workflow rather than as a turnkey identifier: it combines PLS-SEM for sufficiency paths, necessary condition analysis for necessity bottlenecks and exceptions, and combined importance–performance map analysis for decision-oriented visualization, with inverse probability weighting-based balancing and measurement sensitivity checks to align statistical estimands with counterfactual questions when the assumptions required for such alignment are explicitly defended. When enabling conditions exceed their thresholds, desirable outcomes usually appear; when they remain below, success is unlikely. These claims are most credible when thresholds are theory-anchored, identification is justified with explicit design assumptions, and results are validated through out-of-sample evaluation, diagnostics, and sensitivity analysis.

About the author

Marek Deja is an Associate Professor at Jagiellonian University, Krakow, Poland. He received his Ph.D. from Jagiellonian University. His research interests include information culture in higher education as well as information behaviour and governance within the academic community. He can be contacted at marek.deja@uj.edu.pl

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The author thanks the reviewers for the motivation to refine this working theory. This logic requires further implementation; a dedicated R package is currently in development to support the field. Further development of the fuzzy subjective structure model project can be followed at: https://osf.io/b8maq/.

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Social media practices among academics: the case of Sri Lankan universities

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Abstract

Introduction. This study examines how Sri Lankan university academics engage with social media for professional purposes, focusing on demographic and job-related factors associated with platform adoption, frequency of access, and perceived satisfaction, as well as the competencies and skills required for effective use. While much prior work emphasises student use, academics' perspectives remain underexplored, especially in South Asia.

Method. A mixed-method approach was employed, comprising a survey of 432 academics from multiple Sri Lankan universities and semi-structured interviews with 22 academics. The survey captured demographic characteristics, platform adoption, frequency of access, and perceived satisfaction, while interviews explored experiences, barriers, and competencies.

Analysis. Quantitative data were analysed using descriptive statistics and cross-tabulations to examine patterns of platform engagement and satisfaction across demographic and professional characteristics. Interview data were analysed thematically to provide insights into academics' motivations, challenges, and perceived skill requirements.

Results. Patterns of professional social media engagement varied by gender, age, discipline, rank, and educational background. Younger academics and women reported higher levels of everyday professional use, and women also reported higher satisfaction with platforms including YouTube, LinkedIn, and ResearchGate, whereas senior academics reported greater engagement with more information-focused platforms such as Academia.edu and Twitter. Key competencies included digital literacy, cybersecurity awareness, research and information literacy, pedagogical integration, and time management.

Conclusions. Social media is increasingly central to Sri Lankan academics' professional work, supporting both pedagogical and professional activities. However, sustainable engagement requires not only individual skills and self-regulation but also institutional support, infrastructure, and ongoing professional development.

Introduction

Social media has an important role in academics' professional practices. It enables them to communicate with students, coordinate classes, and share learning materials, while also allowing participation in research networks and international scholarly communities (Xu et al., 2024). In Sri Lanka, as in many parts of the world, social media has become an integral part of everyday academic life, supporting teaching, research, and scholarly networking (Chandrasena & Ilankoon, 2022; Wahid & Sajiharan, 2019). Recent studies indicate that social media use in Sri Lanka is steadily increasing, with academics and students alike increasingly relying on digital tools for communication, collaboration, and knowledge dissemination (Jayasinghe et al., 2024; Senanayake & Liyanage, 2023).

There are many definitions of social media. In this study, the term is used to describe 'a web-based technological platform for online communication that enables users to connect and interact, share ideas and information, build and engage social networks, and develop online communities' (Chugh & Ruhi, 2019, p. 1). Social media, therefore, includes platforms such as Facebook, WhatsApp, YouTube, LinkedIn, ResearchGate, Twitter (X), Instagram, and TikTok, as well as individual blogs, websites, and digital repositories maintained by academic communities. These platforms play a significant role in research and teaching (Zimba & Gasparyan, 2021; Chugh & Ruhi, 2018), but challenges remain around privacy and institutional support (Alwis et al., 2018).

Academics' engagement with social media in higher education

At this point, it is necessary to examine how the literature presents both the positive and negative aspects of academics' use of social media in higher education. A growing body of research highlights the opportunities that social media provides for academics. Greenhow & Galvin (2020) mentioned that social media can improve online education by (a) expanding the context of learning beyond the classroom into wider networked communities, (b) introducing hybrid forms of expertise that include alumni and professional practitioners, (c) combining different types of resources and information, and (d) reshaping academics' roles from knowledge transmitters to facilitators of learning. Such perspectives encourage educators to engage with social media not only as a teaching aid, but also as a tool for professional growth and scholarly collaboration.

Collaborative digital content creation is one area where academics can lead by example. Encouraging students to co-create blogs, websites, podcasts, or videos through platforms such as YouTube, Twitter, or LinkedIn can foster meaningful interaction and creativity (Jordan, 2019; Manca & Ranieri, 2016b). Platforms like Google Drive and Microsoft Teams also enable synchronous and asynchronous collaboration, supporting both teaching and research initiatives. By promoting such practices, academics can help bridge the gap between formal education and the digital literacies required in contemporary society.

Institutions have also increasingly recognised the value of social media in enhancing visibility and outreach. Many universities maintain official Facebook pages and YouTube channels to share events, lectures, and promotional content (Capriotti & Zeler, 2023). These channels allow institutions and individual academics to connect directly with stakeholders, including students, alumni, and the broader public. Likewise, professional platforms such as ResearchGate and LinkedIn give academics opportunities to build scholarly networks, disseminate their work, and improve their international presence (Donelan, 2016).

Social media also supports academics' personal and professional development. It allows them to build communities of practice, exchange knowledge with colleagues globally, and stay updated with developments in their disciplines (Chugh et al. 2021; Veletsianos, 2016). For teaching, it creates opportunities to overcome classroom isolation, facilitate peer-to-peer engagement, and encourage leadership skills among students through the creation of online academic communities (Sobaih et al., 2016).

However, alongside these benefits, significant concerns emerge. Social media can blur professional and private boundaries, raising ethical questions about data privacy and online identity management (Manca & Ranieri, 2013). Time commitment and workload pressures remain barriers for academics who already balance heavy teaching and research responsibilities (Murire & Cilliers, 2017). There are also risks of information overload, misinformation, and predatory practices, which can undermine the credibility of academic engagement online (Shahbazi & Bunker, 2024). In Sri Lanka, infrastructural challenges such as unreliable internet connectivity and uneven access to devices further complicate widespread adoption (Jayasinghe et al., 2024).

Taken together, these perspectives suggest that while social media offers powerful tools for academic innovation, collaboration, and visibility, its promotion within higher education must be accompanied by careful consideration of ethical, institutional, and infrastructural challenges. Clear policies, professional development, and support systems are essential if academics are to use and promote social media in sustainable and meaningful ways.

The use of social media in universities: The case of Sri Lankan academics

Most studies on social media use in education have been conducted in developed contexts such as Australia, the United Kingdom, the United States, and Germany (Balakrishnan et al., 2017; Kapidzic, 2020; Sutherland et al., 2020). In contrast, research from South Asian countries remains comparatively limited. Within Sri Lanka, existing work has largely concentrated on student use, while studies examining academics' professional engagement are rare. One of the few investigations focusing on academic communities in Sri Lanka found that privacy concerns were a primary barrier to using social media for educational purposes (Alwis et al., 2018).

Globally, research highlights how different platforms serve distinct academic purposes. For instance, YouTube has been identified as an accessible medium for sharing educational resources and video-based learning content (Greeves & Oz, 2024), while platforms such as ResearchGate and LinkedIn are widely used to enhance scholarly visibility, promote collaboration, and facilitate international networking among academics (Donelan, 2016; Vivakaran & Neelamalar, 2018).

A growing body of evidence from other developing countries also demonstrates that social media can improve the quality of teaching and learning by offering interactive, low-cost tools that support communication among academics, students, and administrators (Jayasinghe et al., 2024; Sobaih et al., 2016). Moreover, social media groups and online communities foster professional growth by enabling participation in seminars, workshops, and collaborative research initiatives (Sutherland et al., 2020). Collectively, these findings highlight the potential of social media to support both pedagogical innovation and professional identity development. However, despite this promise, empirical research on how higher education academics use social media for professional purposes remains scarce, particularly in South Asia. To address the gaps in existing scholarship, this study is guided by two research questions:

RQ1: which demographic and job factors are associated with professional social media use and satisfaction among Sri Lankan university academics?

RQ2: what competencies and skills do Sri Lankan academics consider necessary for effective professional use of social media in higher education?

Methodology

The case study of Sri Lankan academics was designed to investigate the use of social media in higher education and to contribute to the emerging literature on academics' digital practices in developing contexts. A mixed-method approach was adopted (Creswell & Plano Clark, 2018), combining quantitative survey data with qualitative interview insights to provide a more comprehensive understanding of academics' practices, competencies, and challenges.

A structured questionnaire, aligned with the research questions, was distributed between May and June 2024 to approximately 6000 academics across 17 state universities in Sri Lanka via institutional email distribution, with targeted follow-up through departmental contacts. The survey was created and administered via Qualtrics. In some instances, it was also shared directly with academics (for example, through departmental channels) to encourage participation. The survey yielded a voluntary, self-selected, non-probability sample of 432 academics. The first author's university granted ethical approval for the study. The instrument began with an introductory consent item and demographic questions (e.g., gender, discipline, years of academic experience). It then included multiple-choice items on platform usage, frequency, and purposes (e.g., teaching, research, professional networking) alongside open-ended items that allowed respondents to elaborate on their experiences and concerns. In this study, 'professional social media use' refers to academics' self-reported platform adoption and frequency of access, and their perceived usefulness and satisfaction in relation to education, teaching, and research; the survey did not specifically measure active content creation (for example, posting or producing original content).

Interview participants were recruited from the questionnaire respondents. At the end of the questionnaire, respondents were invited to volunteer for a follow-up semi-structured interview by leaving their email address. Those who provided an email address received an invitation to participate, and 22 academics from a range of disciplinary backgrounds volunteered and were interviewed. These interviews provided deeper insights into the meanings attached to social media use, the barriers academics face (e.g., infrastructural limitations, privacy risks, and workload), and the skills they consider essential for effective integration of social media in higher education. The interviews were conducted online via Zoom or Teams and lasted 30 to 45 minutes each. The combination of surveys and interviews allowed for triangulation, enhancing both reliability and richness of the findings. The interviews guided an exploration of academics' insights regarding professional identity, pedagogical innovation, and institutional support.

This mixed-method design was chosen to capture not only broad patterns of use, but also the contextual differences of Sri Lankan higher education, aligning with practice-oriented frameworks that emphasise the interplay of cultural-discursive, material-economic, and social-political factors shaping academic practices. These dimensions collectively influence how educational technologies are integrated and enacted in institutional settings. While this contextual perspective provides an important interpretive lens, it does not constitute the central analytical focus of this paper.

Findings

Demographic and job-related factors associated with professional social media use and satisfaction among Sri Lankan university academics (RQ1)

The first research question examined which demographic and job-related factors are associated with professional social media use and satisfaction among Sri Lankan university academics. The analysis revealed patterns across gender, age, discipline, rank, experience, and educational background.

Gender

Female academics exhibited greater professional engagement on social media, with over 50% of women reporting everyday use, compared with 39.8% of men. Women demonstrated marginally more satisfaction on several platforms, specifically ResearchGate (mean satisfaction score 4.39), YouTube (4.15), LinkedIn (3.86), and WhatsApp (3.75), suggesting higher perceived usefulness in these tools for academic activities. Male participants assigned the highest ratings to YouTube (4.1) and ResearchGate (4.08). Women reported greater overall satisfaction (3.52) than men (3.35). Platform satisfaction for education, teaching and research is illustrated in Table 1.

Satisfaction with the platform	Female mean satisfaction score	Male mean satisfaction score	Mean difference of Female Vs Male	Female mean score over weighted mean	Male mean score over weighted mean
Facebook for education	3.12	3.00	0.12	-0.40	-0.35
Facebook for teaching	2.89	2.94	-0.05	-0.63	-0.41
Facebook for research	2.81	2.55	0.26	-0.71	-0.80
YouTube for education	**4.15**	4.10	0.05	**0.63**	0.75
YouTube for teaching	4.06	4.04	0.02	0.54	0.69
YouTube for research	3.60	3.48	0.12	0.08	0.13
LinkedIn for education	**3.86**	3.57	0.29	**0.34**	0.22
LinkedIn for teaching	3.49	3.25	0.24	-0.03	-0.10
LinkedIn for research	3.55	3.38	0.17	0.03	0.03
ResearchGate for education	**4.39**	4.08	0.31	**0.87**	0.73
ResearchGate for teaching	3.93	3.84	0.09	0.41	0.49
ResearchGate for research	4.07	3.79	0.28	0.55	0.44
Twitter for education	2.89	2.93	-0.04	-0.63	-0.42
Twitter for teaching	2.83	2.82	0.01	-0.69	-0.53
Twitter for research	2.75	2.75	0	-0.77	-0.60
Academia for education	3.54	3.23	0.31	0.02	-0.12
Academia for teaching	3.47	3.14	0.33	-0.05	-0.21
Academia for research	3.56	3.22	0.34	0.04	-0.13
WhatsApp for education	**3.75**	3.51	0.24	**0.23**	0.16
WhatsApp for teaching	3.63	3.35	0.28	0.11	0.00
WhatsApp for research	3.66	3.32	0.34	0.14	-0.03
Average weighted mean	3.52	3.35			

Table 1: Social media platform satisfaction

Age

Academics under 44 years of age reported higher levels of use across multiple platforms, with 65.4% utilising YouTube and 77.3% engaging with Instagram. Their interest in TikTok was the highest at 77.7%, while their interest in Academia.edu was the lowest at 54.1%. In contrast, senior academics (44 and above) reported greater use of platforms associated with professional and information-focused engagement, including Academia.edu (45.9%), Twitter (42.5%), WhatsApp (41.7%), and LinkedIn (37.1%). Younger academics reported stronger use of social media for entertainment (mean = 4.36), relaxation (4.35), skill development (4.15), and teaching and learning (4.05), while senior academics reported higher use for discovering new ideas (4.07), maintaining connections with friends (4.05), and educational purposes (3.97).

Discipline

Disciplinary differences were observed in platform use and perceived academic value. Academics in STEM disciplines reported higher use of Twitter (37.5%) and LinkedIn (36.4%) to enhance research visibility, but academics in the humanities and social sciences preferred Academia.edu (27.1%) and TikTok (22.2%) for social media engagement. Satisfaction patterns were broadly consistent: STEM academics assigned the highest academic value ratings to YouTube (4.12) and ResearchGate (4.15), while social science scholars considered Academia.edu (3.65) and WhatsApp (3.62) most beneficial for scholarly work. In addition, science-based academics formed the single

largest disciplinary subgroup of users of ResearchGate (19.90%), Facebook (18.8%), WhatsApp (17.9%), and YouTube (16.2%) relative to other disciplines.

Rank and experience

Academic rank and experience shaped patterns of social media use. Experience was measured by the number of years academics reported using social media. Among respondents who reported using social media for more than 10 years, senior lecturers formed the largest group (50.8%), followed by probationary lecturers (20.7%), with professors and senior professors combined accounting for 16.9%. Rank differences were also evident in daily professional use. Probationary lecturers reported the highest everyday professional use (59.3% within rank), followed by professors (47.5%) and senior professors (44.4%), while senior lecturers reported a lower level of everyday professional use (39.1%). Across all ranks, daily personal use was more common than daily professional use: 78.6% of academics reported using social media every day for personal purposes, compared with 45.4% who reported daily professional use.

Education

Educational background was also associated with platform engagement and satisfaction. PhD holders reported higher use of Twitter (60%), WhatsApp (46.4%), and Academia.edu (46.4%) than academics with master's degrees, who reported higher use of YouTube (36%), Instagram (36%), and Facebook (25%). Satisfaction patterns indicated that PhD holders rated ResearchGate most highly (4.11), while master's qualified academics rated YouTube most highly for educational purposes (4.20).

These characteristics collectively influenced not only the frequency of social media use but also the types of platforms preferred and the purposes for which they were employed. The findings reveal that professional engagement with social media among Sri Lankan academics is uneven, shaped by intersecting demographic and institutional factors such as gender, age, discipline, rank, and educational background. Overall, the data suggest that social media participation is not uniform but stratified by experience, academic position, and access to professional networks, potentially reflecting broader patterns of digital inequality and institutional culture within higher education.

Competencies and skills considered necessary by Sri Lankan academics for effective professional use of social media in higher education (RQ2)

The second research question explored the competencies and skills Sri Lankan academics consider essential for the effective professional use of social media in higher education. The findings suggest that such use requires a diverse mix of technical, informational, pedagogical, and personal abilities.

Digital literacy and infrastructure awareness

Participants consistently emphasised that foundational digital literacy remains an essential competency for effective professional use of social media. Many academics highlighted difficulties in navigating technological and infrastructural constraints, including weak internet connectivity, outdated devices, and limited access to reliable software. As one participant reflected, '*Recently my mobile is outdated, so I cannot log in to my Facebook account… my phone no longer supports the latest app update. Therefore, nowadays I am not using it*' (P6).

Connectivity issues were frequently cited as barriers to both teaching and learning. As P1 explained, '*We have Wi-Fi facilities in our university, so students can log in, and use social media at any time. But sometimes our internet connection is very limited*'. Similarly, P5 described how inconsistent access disrupts digital learning activities: '*Sometimes we have Wi-Fi and connection issues. Imagine asking students to take an online preposition test when some don't have proper devices*'. P8 echoed these concerns, noting that '*Internet issues, especially weak signal strength, make it difficult to log in to social media*'. These accounts illustrate how technological limitations

intersect with digital competence, shaping academics' ability to integrate social media into professional practice.

Cybersafety and privacy skills

Participants frequently referred to hacking, scams, and unwanted content, highlighting the need for cybersecurity awareness. One participant described how '*Both the Instagram and the Facebook account hacked; I lost access*' (P12), while another noted the vulnerability of students to predatory practices: '*Some student actually… got mail from American journals… but those are not real, those are kind of a spam. We have to have some awareness on that as academics*' (P3). These experiences illustrate why safeguarding personal and professional data, and guiding students toward credible sources is viewed as an essential competency.

Research and information literacy

Beyond technical skill, academics emphasised information and research literacy. They described how platforms like ResearchGate, LinkedIn, and Google Scholar are becoming indispensable for visibility and knowledge sharing. Yet, they also stressed the need to filter content reliably and engage consistently. '*I did not know what to do, what to share and how to update… Later on, when I started my academic career, I thought I should create a ResearchGate account for myself*' (P6). Others shared frustrations with poor scholarly exchange, such as P1's account: '*I'm sending two times, three times request [for articles] … but nobody is going to reply to me*'. These examples highlight both the potential and the gaps in academic networking skills.

Time management and self-regulation

Academics recognised that while social media offers value, it also risks distraction and overuse. Developing disciplined time management strategies was seen as crucial. As P1 explained, '*I have given like one hour to use social media… you need to prioritise otherwise it will have a bad impact on you*'. Similarly, P5 advised, '*Social media is wonderful… but please use them wisely with the button in your hand*'. Such reflections emphasise that self-regulation is not merely a technical skill, but also a personal competency for sustaining productivity.

Pedagogical integration

Many academics are embedding social media into their teaching practice. YouTube, WhatsApp, and Facebook Messenger were frequently used for coordination, teaching materials, and motivating students. One participant noted, '*I started a YouTube channel for my lecture recordings*' (P7) while another highlighted innovative uses: '*A student actually gave a research project where he proposed to teach English through WhatsApp*' (P4). However, these practices require both technical skill and sensitivity to personal and professional boundaries. As P16 explained, '*I have limited the things that I share in Facebook because a lot of students are in my profile as friends. I see not adding them is rude, but it's not nice either*'. This balancing act reflects the dual challenge of pedagogical creativity and boundary management.

Continuous learning and adaptability

Participants consistently acknowledged that digital tools are evolving, requiring ongoing learning. Some rely on informal resources for their learning, as P1 stated: '*I am using TikTok to get some insights about the new technology… a small tip about how to do citations, how to use the new software*'. Others reflected their growth, with P6 recalling, '*At that time, I was not much aware… Later on, I thought I should prepare… create a ResearchGate account also for myself*'. Yet, they also called for structured institutional training to reduce fear, especially among older or non-academic staff: '*Non-academic staff need to be trained a lot more, almost monthly, until that fear of technology goes*' (P4).

Institutional Support

Finally, academics emphasised that individual competencies alone are insufficient without institutional investment in infrastructure, policy, and professional development. As one participant noted, '*We have Wi-Fi facilities in our university… but sometimes our internet connection is very limited*' (P1), reflecting persistent infrastructural gaps that hinder consistent digital engagement. Another participant highlighted the importance of capacity building, stating: '*I do strongly believe that academics should have more training, and they should be taught on how they can improve*'(P22).

These findings indicate that successful engagement requires more than familiarity with platforms; it depends on a blend of technical, informational, pedagogical, and personal competencies. Participants emphasised the importance of digital literacy, cybersecurity awareness, and research skills, alongside the ability to manage time, integrate social media into teaching, and adapt to rapidly changing digital environments. These insights illustrate that professional use of social media is as much about building capacity and resilience as it is about mastering technology.

Discussion

This study demonstrates that Sri Lankan academics are integrating social media into their professional and pedagogical practices in structured and meaningful ways. The findings reveal that demographic and job-related factors, such as gender, age, discipline, rank, and educational background, shaped both usage and satisfaction. Women and younger academics, in particular, reported more frequent and diverse use, whereas senior academics reported greater engagement with information-focused platforms such as Academia.edu and Twitter, and doctoral-level academics reported stronger engagement with academically oriented platforms that support research visibility and networking. These patterns align with a global study by Manca & Ranieri (2016a), highlighting that age, rank, and discipline often determine adoption rates and platform preferences. However, a study by Mansour (2015) illustrates that there is no substantial difference in social media usage concerning participants' demographic data. In South Asia, similar demographic effects have been noted among academic populations (Alwis et al., 2018), but this study adds evidence from academics themselves, showing how institutional rank relates to professional digital practices.

Consistent with the present findings, prior research indicates that doctoral-level scholars engage more actively with academically oriented digital environments that support research collaboration and professional networking (Kang & Pak, 2024; Sakurai et al., 2012). In contrast, studies on master's students highlight a preference for interactive, multimedia-based platforms that promote applied and flexible learning experiences (Williams et al., 2018). Together, these findings suggest that educational background shapes not only the extent but also the form of online engagement, with PhD holders prioritising scholarly exchange and master's students favouring accessible, practice-oriented learning tools (Barrot & Acomular, 2022; Jordan, 2019). The Sri Lankan case, however, suggests a more integrated model in which these functions coexist, enabling academics to construct a layered digital presence that strategically balances pedagogical and professional objectives.

At the same time, the study highlights the challenges associated with increased social media use. Concerns over distraction, overuse, and the pressures of constant connectivity echo broader global debates about digital overload in academia (Tarafdar et al., 2020). Privacy and cybersecurity issues, including scams, hacking, and misuse of personal data, were prominent, echoing findings in other developing contexts where infrastructural limitations intensify digital risks (AlMudahi et al., 2022). In Sri Lanka, weak connectivity, outdated devices, and limited institutional support amplify these challenges, creating uneven access and adoption across groups of academics.

The competencies identified by participants point to the multidimensional nature of effective professional engagement with social media. Digital literacy and cybersecurity awareness are

baseline requirements, but academics also emphasised research and information literacy, echoing calls in the literature for critical evaluation skills to navigate misinformation and predatory publishing practices (Beall, 2016; Nicholas et al., 2020). Pedagogical integration emerged as equally critical, with academics using platforms like YouTube and WhatsApp to foster interactive learning. Although university academics use learning management systems, participants reported that WhatsApp remains considerably more popular. This supports findings from Manca & Ranieri (2017), who argue that pedagogical competence is necessary for turning social media into a transformative educational tool rather than a mere communication channel. The Sri Lankan case highlights how these competencies extend beyond teaching into boundary management, with academics negotiating professional presence while avoiding overexposure to students.

Adaptability and continuous learning were also emphasised, reflecting the dynamic nature of the digital landscape. Informal learning, such as using YouTube tutorials, currently fills many gaps, but participants expressed a strong demand for formalised training and clear policies. Prior studies have highlighted similar needs: without institutional investment, benefits of digital adoption tend to accrue disproportionately to younger and more digitally fluent academics, leaving senior staff marginalised (Salajan et al., 2010; Veletsianos & Kimmons, 2016). Although the study focused on academics, several participants noted that institutional capacity constraints extend beyond teaching staff. In particular, non-academic personnel were often described as lacking confidence and experiencing fear when using digital tools, highlighting the broader institutional challenges that influence how academics themselves engage with technology.

Taken together, these findings contribute to the growing body of research on social media in higher education by providing an in-depth view from the South Asia region, where empirical studies on academic staff remain scarce (Senanayake & Liyanage, 2023). They suggest that while Sri Lankan academics are embracing social media as a powerful tool for teaching, networking, and professional growth, the sustainable and equitable use of it depends on addressing infrastructural gaps, strengthening institutional policies, and investing in ongoing skill development. In this context, social media holds potential to strengthen higher education in Sri Lanka by fostering knowledge sharing, student engagement, and international collaboration. Yet, as global scholarship warns, these opportunities can only be realised if risks related to distraction, inequity, and digital vulnerability are actively managed (Kimmons et al., 2017; Manca, 2020).

Conclusion

This study provides one of the first systematic examinations of professional social media use among Sri Lankan university academics. The findings reveal that social media has become embedded in both teaching and professional development, though patterns of use are shaped by demographic and job-related factors such as gender, age, discipline, rank, and educational background. These patterns highlight the dual role of social media as both a pedagogical and scholarly tool in higher education.

At the same time, the study highlights that effective use requires a diverse set of competencies, including digital literacy, cybersecurity awareness, information evaluation, pedagogical integration, and time management. Sri Lankan academics are already developing these skills through informal learning and adaptive practices, but disparities across generations and ranks point to the need for structured institutional support. Investment in infrastructure, targeted training, and clear policies on ethical and professional use are crucial for ensuring that benefits are equitably distributed.

By situating the Sri Lankan case within global debates, the study contributes to a growing body of work that sees social media not as an optional add-on but as an essential component of contemporary academic practice. For Sri Lanka, the challenge is to leverage these platforms strategically and ethically, so they encourage dynamic knowledge sharing, inclusive student

engagement, and stronger international collaboration. Addressing issues of distraction, inequity, and digital vulnerability will be key to realising this potential.

Although this study provides valuable insights into academics' professional use of social media in Sri Lankan higher education, it has several limitations. The use of a voluntary, self-selected non-probability sample limits the extent to which the findings can be generalised to the broader academic population, and self-reported data may reflect perceptions rather than actual behaviours. In addition, the cross-sectional design captures practices at a single point in time, without accounting for changes in technology use or institutional policy. Future research employing longitudinal or comparative approaches across different contexts would provide more insight into how academic social media practices evolve.

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Foraging for instruction: A microethnography of academic librarians' information behaviours and practices in instructional planning

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Abstract

Introduction. Academic librarians regularly deliver information and digital literacy instruction. This study explores the information behaviours and practices exhibited by academic librarians in the context of instructional planning, with a focus on information foraging and information-resource use.

Method. A short-term microethnographic study was conducted of academic librarians (n=3) from a postsecondary institution in Toronto, Canada. Data gathering involved unobtrusive observations in librarians' offices, fieldnotes, photographs, and semi-structured interviews.

Analysis. A manual stepwise analysis process was conducted, involving open coding, focused coding, and the writing of integrative memos. The thematic narrative was employed to present findings, which manifested in the writing of excerpt-commentary units.

Results. Findings reveal that instructional librarians exhibit information foraging behaviours in the instructional planning process. Instructional librarians rely on a combination of documentary and social information resources to complete the task of instructional planning. Temporal pressures, experience levels and feelings of inadequacy also shape information behaviours and practices.

Conclusion. While instructional librarians take pleasure in seeking and retrieving instructional information, they often lack adequate time for planning or adequate information from faculty colleagues. Regardless, institutional repositories of instructional materials and strong relationships with fellow teaching librarians are integral to their information behaviours and practices.

Introduction

As technology rapidly evolved in the 20th century and digitally accessible information became widespread in the 21st century, the information landscape transformed, and the need for academic librarians as instructors of information and digital literacy emerged (Loesch, 2010). In training to deliver said instruction, newly hired academic librarians are often expected to consult a combination of documentary and social information resources, including the reading of pedagogical writings and shadowing their more experienced colleagues (Bewick & Corrall, 2010; Houtman, 2010; Westbrock & Fabian, 2010; Wheeler & McKinney, 2015). Seeing as librarian instruction is often requested by a disciplinary faculty member, colloquially referred to as an instructional 'one-shot' (Reitz, 2013), instructional librarians must also learn to navigate the postsecondary landscape as information professionals who work alongside disciplinary experts (Azadbakht, 2021; Becksford, 2022; Cadogan et al., 2023; Kirker, 2022; Sandy et al., 2023; Vassilakaki & Moniarou-Papaconstantinou, 2015). As a result, instructional librarians' information behaviours and practices are generally aligned with the needs of the students and faculty members they serve (Mavodza, 2011; McDonald et al., 2015). This study seeks to illuminate the information behaviours and practices exhibited by academic librarians while preparing for information and digital literacy instruction. Through observations conducted in instructional librarians' offices, this exploratory study offers a look behind the curtain of the information foraging habits (Pirolli & Card, 1995) and information-resource use that surface in the process of instructional planning. In addition to findings related to instructional librarians' information behaviours and practices, this paper makes a methodological contribution by employing the writing method of the thematic narrative with excerpt-commentary units.

Research focused on the searching skills, strategies and preferences of academic librarians continues to grow in the library and information science (LIS) literature, as evidenced later in the literature review, but little attention has been paid to the process of instructional planning and so the present study seeks to address this gap. Furthermore, questionnaires and interviews are frequently used in studies conducted on academic librarians (Nel, 2020, p. 12), so observations conducted in the offices of academic librarians present a novel approach to data collection in the field. Other studies have either observed librarians in the process of teaching (Szempruch, 2025) or non-library faculty members working in their offices (Ruth, 2015). This study also endeavours to establish the first links between theoretical understandings of information behaviour and academic librarians' practical instructional experiences, which addresses a need in the literature for increased 'integration and collaboration between theory and practice' (Nel, 2020, p. 14).

Literature review

Information behaviours and practices of academic librarians

A recent scoping review by Nel (2020) synthesized the key findings from over 120 studies on the information behaviours and practices of academic librarians, concluding that librarians generally feel 'confident' in their ability to seek and retrieve information (p. 10). The review's findings also denote information sharing as a crucial aspect of librarians' behaviours and practices, whether through in-person interactions like 'communities of practice' or through virtual encounters over 'electronic mail' or 'online discussion groups' (p. 10). To satisfy their information needs, librarians tend to prioritize 'library databases and collections', 'electronic books', and 'scholarly journals' as information resources (p. 10). Collaboration and socialisation are integral to librarians' information practices, and these practices are ultimately shaped by the 'norms and attitudes' within their specific institution and within the field of academic librarianship more broadly (Nel, 2020, p. 10).

Through semi-structured interviews and think-aloud narratives, Tucker (2014) positions academic librarians as 'expert searchers' who have developed a 'profound discernment of critical concepts of information' (p. 239). In Tucker's view, academic librarians have mastered certain threshold concepts like the 'information environment' and 'information structures' and combine their

abilities in these various domains to retrieve information effectively and efficiently, in a process referred to as 'concept fusion' (p. 245). Reference librarians were noted as possessing a 'strong willingness to explore new avenues' in the search process and an 'enthusiasm' for the pursuit of information, as well as embodying qualities like 'persistence and patience' (pp. 250-251). The strategies employed by instructional librarians were found to be shaped largely by their learning experiences as students and teaching experience as instructors, where 'each experience fuelled the other' (Tucker, 2014, p. 251).

Instructional planning as information task

In practice, the information task of instructional planning is often hindered by a lack of adequate time, with academic librarians often having to rush through the task (Gill, 2023; Julien & Genuis, 2009; Julien & Genuis, 2011; Julien & Pecoskie, 2009; Nichols Hess, 2020; Vassilakaki & Moniarou-Papaconstantinou, 2015). Instructional librarians face 'administrative and practical challenges' that involve balancing multiple portfolios on top of their instructional work (Julien & Genuis, 2011, p. 108). Julien and Genuis (2009) describe these challenges as the 'invisibility of emotional labour' (p. 935) in the work of instructional librarians, who are expected to jump from one session to the next, with little time to seek and retrieve information for the purposes of creating new or updating existing instructional materials. Despite these challenges, academic librarians still take pleasure in instructional planning thanks to the variety of topics on which their instructional responsibilities allow them to retrieve, synthesize and present information (Julien & Genuis, 2011, p. 108).

Information environments of instructional librarians

To complete the task of instructional planning, instructional librarians are dependent on social information resources, such as the information they receive from disciplinary faculty members requesting their instruction (Julien & Pecoskie, 2009). The authors' findings suggest that instructional planning is largely informed by the demands of the disciplinary faculty member, resulting in instructional planning that prioritizes 'successful faculty negotiation and relations' over 'students' learning' (p. 151). Instructional librarians also participate in communities of practice alongside other librarians and faculty members related to the scholarship of teaching and learning, allowing them to reflect on their current pedagogical practices and exposing them to new instructional strategies (Hays & Studebaker, 2019; Houtman, 2021; Mallon, 2019; Sandy et al., 2023). Apart from formal communities of practice, instructional librarians benefit from 'supportive interpersonal relationships' with fellow instructional librarians to develop their instructional repertoire (Nichols Hess, 2020, p. 345).

When not consulting social information resources, instructional librarians rely on documentary information resources, like existing instructional materials that they or their colleagues have previously used, which are usually housed on 'shared drives, learning management systems, repositories, and LibGuides' (Gill, 2023, p. 18). If they cannot make use of an existing instructional resource, then instructional librarians may turn to 'learning object repositories' like 'Project Cora and the Association of College and Research Libraries Framework for Information Literacy Sandbox' which provide them with 'open and freely accessible instruction resources' (Ford-Baxter, 2023, p. 426). For librarians engaged in digital literacy instruction, toolkits, like the one curated by the 'Digital Library Federation', otherwise known as '#DLFTeach', serve as important sources of information for instruction (Neatrour et al., 2025, p. 42).

Research questions and positionality

This study takes up the information task of instructional planning in the work of academic librarians. While academic library instruction also occurs over videoconferencing platforms, this study exclusively addresses the delivery of in-person instruction, and so academic librarians' offices served as the primary field site. Instruction also occurs in various configurations in academic libraries, including reference desk interactions, staff training or private research

appointments, but this study takes particular interest in classroom instruction that has been requested by a disciplinary faculty member. More specifically, the research questions guiding this study include:

1. While preparing to teach a class, which information behaviours and practices do academic librarians exhibit?
2. Which information resources are the most important to academic librarians' instructional planning and why?
3. Which factors, whether personal or otherwise, influence academic librarians' instructional planning and how?
4. Methodologically speaking, how might answers to these research questions be presented to scholars in a lively and relatable way that honours the research participants' realities?

On a personal note, while an ethnographer should endeavour to maintain an 'etic perspective' (Fetterman, 2010), I come to this work with some insider knowledge. Having studied pedagogy and instructed university courses, I possess first-hand experience with instructional planning. To avoid influencing the study's findings with personal biases, I heeded Spradley's (1979) warning about 'expressing ignorance' (p. 57). I did not impose my knowledge and experience of instructional planning on the participants while gathering data. Instead, I prompted them to elaborate further on their practices so that the ethnographic record could accurately represent their experiences.

Methods

Theoretical approach

With regards to terminology, 'information behaviour' and 'information practice' are both relevant terms to this study. The differences between these two concepts are debated (Wilson et al., 2009), but when appropriate, I employ these terms in the study according to Savolainen's (2007) distinction that information behaviour denotes a 'needs and motives' approach to dealing with information, while information practice refers to information-related activities 'affected and shaped by social and cultural factors' (p. 126). For instance, academic librarians may exhibit information behaviours while working alone in their offices to prepare an instructional session, but they may also exhibit information practices when they engage in strategies influenced or informed by their fellow academic librarians.

In terms of the literature on information seeking, Bates' (1989) 'berrypicking' model stands out for its relevance to this study, as an explanation of exploratory searching using the analogy of 'picking huckleberries or blueberries in the forest' (p. 410). Similarly, Pirolli and Card (1995) propose the 'information foraging' model, taking inspiration from biological and anthropological conceptions of 'food-foraging strategies' (p. 51). While the models share many similarities, Savolainen (2017) delineates key differences between the two. Berrypicking accounts for searching that may be open-ended or fluid, but information foraging envisions information seekers as animals, hunting for specific information in response to an external stimulus. In the foraging metaphor, information seekers forage through 'information patches' or information resources, which emit an 'information scent' that attracts seekers to them, and in turn, the seekers develop an 'information diet' or preference for certain sources of information (pp. 586-587). In this foraging process, the seeker is often making information-related choices based on task requirements, the nature of their information diet, and 'cost-benefit judgements' (p. 588). I chose to approach this study from the information foraging perspective, rather than berrypicking, because information foraging is predicated on 'task performance or problem-solving' (Savolainen, 2017, p. 588), and the object of this study is the execution of instructional planning as a time-sensitive work task.

Methodology

Inspired by Stebbins' (2006) writing on 'concatenated exploration' in the social sciences, this study serves as the first link in a planned chain of ethnographic explorations that will grow in complexity and size, and so, the present study is 'predominantly exploratory in scope' (p. 484). The research methodology employed in this paper is informed by the work of Pink and Morgan (2013) on 'short-term ethnography', in that it is a 'sociological microethnography' which focuses on practical activities (p. 353). While traditional ethnographies may require a researcher to spend months or years in a field site to understand the way of life of a particular social group, short-term ethnographies are better suited for the study of specific activities, like instructional planning. The approach to this ethnographic research is also influenced by Griffin's (2017) work on positivist ethnography in LIS settings, aiming to observe and describe information behaviours and practices in situ. Despite the short-term and granular approach of this study, the study still adhered to Spradley's (1979) ethnographic cycle by selecting the ethnographic project based on my personal interest in the experiences of instructional librarians, before determining the ethnographic questions that would guide the project through the data gathering process.

Data gathering and analysis

Instructional librarians (n=3) possessing between two and six years of professional experience each, served as the study's population, with varying disciplinary specializations and a combination of digital and information literacy instructional responsibilities, served as the study's population. While other participants were recruited, scheduling around teaching sessions proved difficult, limiting the number of participants who could see the data gathering process to completion. I recruited participants for the study via convenience sampling. Before proceeding with data gathering, I required participants to sign informed consent letters (Appendix A). To maintain confidentiality, I have de-identified their names as Informant A, Informant B, and Informant C.

Following Emerson et al.'s (1995) model for unobtrusive observations and fieldnotes, I passively observed each participant for one hour while they prepared for instruction in their offices, taking handwritten notes that documented the work they completed at their desks and on their computers. Inspired by the work of Prosser and Loxley (2008) on visual research methods, I also captured a photographic inventory of the participants while they worked, following a shooting guide established prior to the observations (Appendix B). While integral to data gathering in ethnographic research, these methods can be intrusive. Participants must grant the researcher access to their private spaces and risk being personally identified in photos, which further constrained the number of participants willing to participate in the project.

As a short-term ethnography, this study prioritized the 'intensity of the research encounter' (Pink & Morgan, 2013, p. 355), resulting in a rich ethnographic record that included observations, fieldnotes, photos, and interview transcripts, despite the limited pool of participants. To avoid any undue influence on the participants' behaviour during the observation process, I scheduled semi-structured interviews with the participants at least one week after the observations had concluded. Prior to the semi-structured interviews, I provided participants with an interview guide (Appendix C) that incorporated information-related questions and photographic elicitation, largely informed by Bernard's (2002) writing on grand-tour and mini-tour questions. I audio-recorded and then transcribed these hour-long interviews, before de-identifying the transcripts and permanently deleting the recordings.

Once I had gathered the complete ethnographic record, I engaged in Emerson et al.'s (1995) stepwise analysis process. First, I conducted open coding where I reviewed the fieldnotes, photos and interview transcripts in print format, to make note of any broad thematic ideas that emerged at first glance. Then, I undertook focused coding, using coloured highlighters and sticky notes to aggregate recurring themes and areas of research interest. Lastly, I crafted integrative memos

(Appendix D), which served as both a medium for self-reflection on the research experience, and as precursors to the writing-up process.

Writing-up

This study was written with the 'thematic narrative' in mind (Emerson et al., 1995; Hartel, 2020); a method of writing ethnographic research that incorporates 'several analytic themes or concepts linked by a common topic' (Emerson et al., 1995, p. 170). Later in the Findings section, I denote these common topics through subheadings. The thematic narrative is made up of 'excerpt-commentary units' consisting of an analytic point, orienting information, an excerpt, and analytic commentary (p. 182). Unlike traditional social-scientific writing, the units combine content typically found in findings and discussion sections to craft an impactful narrative. In writing these units, I endeavoured to prove my point 'economically', while also being mindful of 'length, relevance, readability' and 'comprehensibility' (Emerson et al., 1995, p. 187). To achieve this, I revisited the results of the focused coding and the integrative memos repeatedly, and this iterative approach allowed me to clarify and link the key analytic themes that emerged from the participants' contributions. While it may seem like each excerpt-commentary unit is reflective of a single participant's experience, the excerpts are intended to exemplify the commonalities shared across participants.

Excerpt-commentary units (findings and discussion)

Information foraging

Instructional librarians act like foragers, adeptly jumping from information patch to information patch in hopes of gleaning the information required for the purposes of instruction. After my observation of Informant C, I assembled these photos in a chronological order which illustrate this behaviour:

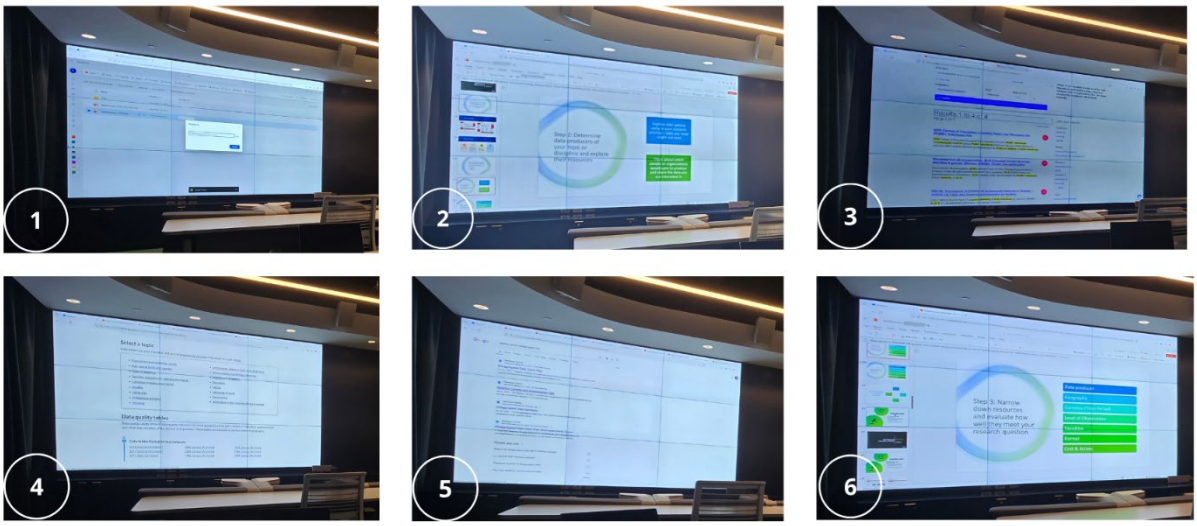


Figure 1. Informant C's resource consultation process, moving from institutional repository and discipline-specific databases (#1, #3 and #4) to Google searching (#5)

Informant C is an information forager with a well-established information diet, successfully navigating the information patches available to them to prepare their instructional content. Informant C chose to prioritize their most reliable information patches, consisting of institution- and discipline-specific resources. By consulting these trusted resources first, Informant C clarified the focus of their search, before branching out to less reliable patches. Tucker (2014) characterizes this expert searching behaviour as being 'discerning of the environment' (p. 253). The searcher must first home in on a specific informational scent before navigating to more expansive information patches. For example, if Informant C started the process with a Google search, they

likely would have to sift through an abundance of results without focus or purpose. This behaviour is apparently typical of academic librarians, who may incorporate Google into their information practices, but still tend to prioritize 'library catalogues rather than commercial or free websites' (Nel, 2020, p. 12).

Academic librarians approach instructional preparation with a combination of curiosity and determination, relishing in finding information while keeping task completion top of mind. When asked to describe their instructional preparation process, Informant B likened it to their experience conducting scholarly research:

> I always aim to be focused. Sometimes, I do get a little distracted. I think it's very similar to a research process [...]. It's like an iterative process that you do when you're researching: you start with something, and then you might refine it to something else, or you might strike upon something that's a better example or a better topic.

In this response, Informant B is expressing that while they remain task-oriented in the process of instructional preparation, they also let the search process guide them in new directions. As an expert searcher, Informant B exhibited what Tucker (2014) describes as 'enjoying the hunt' (p. 250). As an experienced instructor, Informant B could just as easily rely on their existing instructional materials, but they chose to actively embrace enthusiasm. However, in information foraging, information seeking is ultimately driven by 'task performance or problem-solving' (Savolainen, 2017, p. 588). Despite their enthusiasm, Informant B's information behaviour was tempered by the looming requirements of the work task.

When preparing or updating instructional materials, academic librarians conduct their searches based on satisficing, quickly cutting their losses when they deem an information resource inadequate. After writing up the field notes from my observation of Informant A, I noticed how promptly they moved from one information resource to the next:

> Whenever Informant A needed to update their lesson plan, they would begin an information search. Informant A would swiftly assess the value of a resource, comment out loud on the quality of the resource, and then move on. They would continue this evaluative process in rapid succession until they were satisfied with the information they retrieved.

In this process, Informant A conducted some mental math, determining if a resource was worth their time and energy based on what the resource could provide them. In some cases, instructional resources are dense and require careful parsing, and in other cases, instructional resources are concise and easily assessed. Regardless of the resources being consulted, Informant A was adept at executing 'cost–benefit judgments' (Savolainen, 2017, p. 588), a common strategy employed in information foraging. Making these judgments frequently and efficiently, Informant A demonstrated 'persistence and patience' (Tucker, 2014, p. 251), which is characteristic of the information behaviour of an expert searcher.

Information diet

Existing instructional materials, typically hosted on digital institutional repositories, are the most prized information resource in the instructional planning process of academic librarians. In my observations, all the informants consulted their existing instructional materials, as evidenced in these photos:

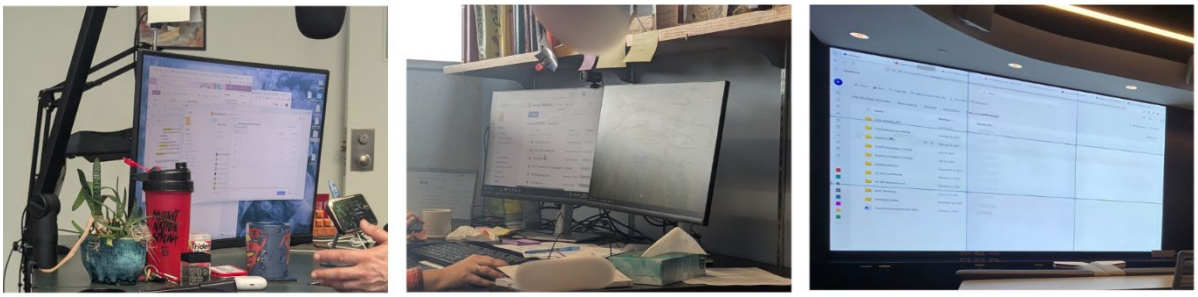


Figure 2. Informants A, B and C choosing to first consult their institutional repository

Without fail, every time I started an observation of an informant in their office, they would first open the Microsoft Teams or Microsoft OneDrive account affiliated with their institutions. It appeared that these digital databases housed a plethora of instructional content, including lesson plans, PowerPoint slides, descriptions of tools and databases, and instructions for activities. Some of the content had been generated by the informants, but a significant amount had also been prepared by their colleagues. In Gill's (2023) investigation, a lack of 'sharing and collaboration' amongst instructional librarians negatively impacted the teaching experience (p. 23). I witnessed the primacy of these shared repositories that act as time-saving tools, streamlining instructional planning. To be clear, their reliance on these existing resources should not be interpreted as a sign of laziness. Instead, this behaviour is a testament to both the reliability of these repositories as information patches and the ability of academic librarians to judiciously make cost-benefit judgements about how much time they can spend preparing for a single instructional session.

Academic librarians rely on information from their disciplinary faculty colleagues, usually contained in email communications, to feel confident in their instructional preparation. Informant B captured this sentiment in our interview when they described how a lack of information from a faculty colleague can negatively impact the preparation process:

> Having [the faculty member's] information about the research assignment helps me to really tailor the session to the students' needs. It is really important, and it makes me irritated when they don't provide me with information [...]. So, I usually ask and most are pretty good, but sometimes they don't give you the syllabus, even if you ask for it.

While the academic library might curate and offer their own set of library-led workshops, lots of academic librarian instruction relies on requests from disciplinary faculty members. According to Informant B, communicating effectively with these faculty members was critical to the success of their instruction, which the literature also supports (Vassilakaki & Moniarou-Papaconstantinou, 2015). If they failed to retrieve adequate information from the requesting faculty member about the context of the class and the learning needs of the students, then the instructional session risked being overly generic or missing the mark altogether. Informant B's experience is not an isolated case, as evidenced by Julien and Genuis' (2011) finding that a lack of 'faculty buy-in or support' is an ongoing challenge for many instructional librarians (p. 108).

At the start of their careers, fellow academic librarians are crucial information resources for teaching librarians, influencing their instructional practices and assisting them in the creation of foundational instructional materials. For instance, Informant C described the co-creation process they completed with a veteran colleague at the start of their tenure:

> [Colleague] came with more ideas than I did because I was fresh out of library school. Essentially, we put together lesson plans and developed slides. I have taught it now for three or four years, so I don't really bring up the lesson plans anymore, but I found that process crucial for me.

With little experience under their belts, greener instructional librarians can turn to their peers for inspiration and guidance. Informant C had not previously worked in teaching roles but was expected to undertake teaching responsibilities soon after completing their LIS studies. While documentary information resources can be helpful, more experienced academic librarians serve as invaluable social information resources. As a newcomer, Informant C found their footing by collaborating with a veteran colleague. According to the literature, this collaboration can be fostered in formal 'communities of practice' (Nel, 2020, p. 10) or informally through supportive colleague-to-colleague interactions (Nichols Hess, 2020).

Situational, personal, and organizational factors

The process of instructional preparation for academic librarians is governed by temporal pressures, both in terms of in-office preparation time and time allocated for instruction. As I wrote down notes while observing Informant A, they spoke out loud to themselves about their concerns related to time:

> While they worked, Informant A would make comments about not wanting to waste their precious preparation time on menial tasks. They expressed their discontent with having to prepare for the session an hour before teaching it. Informant A would also frequently check their emails to confirm they were respecting the time limit established by their faculty colleague.

Instructional librarians find themselves between a rock and a hard place, yearning for more time to search for and work on instructional materials, but having to defer to their faculty colleagues to determine the duration of their instruction. Informant A felt like they never had enough time for instructional planning, which is echoed in Vassilakaki and Moniarou-Papaconstantinou's (2015) review of the literature. Simultaneously, librarians rely on the faculty members who request their instructional expertise to provide them with the 'gift of time' (Julien & Pecoskie, 2009, p. 151). If the faculty member can only offer a short period of instructional time to the librarian, then the instructional librarian must limit the content of their lessons, resulting in less time spent seeking and retrieving information related to instruction.

The more time librarians spend in their teaching roles, the less laborious, time-intensive, and stressful the information task of instructional planning becomes. Reflecting on their life as a novice instructor, Informant B described how their instructional preparation process became more seamless, calm, and playful:

> I am spending less time on preparation now than I used to, because I have at least 25 or 30 different presentations in my folder that I can refer back to [...]. I feel a lot more relaxed about preparation [...]. I used to get really nervous before every class that I taught, but now it's less [...]. Also, having all that experience gives me more time to branch out and try new things.

The work of instructional preparation for newcomers is complicated, having to create content from scratch and ruminating excessively on the preparation process. Nichols Hess (2020) attributes this hardship to a lack of working relationships and professional development. Generally, newcomers have a limited repertoire of instructional resources and skills from which to pull. As Informant B attests, the confidence in their current preparation process stems from their existing documentation and years of teaching experience. The literature also indicates a direct correlation between a librarian's time spent in a role and their confidence in their ability to prepare and deliver instruction (Julien & Genuis, 2011).

During instructional planning, academic librarians experience feelings of self-doubt and inadequacy related to being perceived as legitimate in the eyes of their students and faculty colleagues. While in conversation with Informant C, they spoke about how these concerns manifest in their attitude toward using open educational resources:

> I try to see what's out there, but it's half my fear and half my pride. I think I should be creating [instructional materials] on my own [...]. In general, it just doesn't feel right. For some reason, there's something within me that doesn't want to crib off something else. [...] I feel like I owe it to whomever I'm teaching to not use that content or not use a lot of that content.

Despite not being directly represented in the content of their instruction, academic librarians expend time and energy in the instructional planning process to ensure they are perceived as competent. This manifests in various ways, including updating their materials with contemporary references, preparing printed handouts for students, and making alternative plans if technological issues arise. In Informant C's case, they believed that referring to open educational resources would denigrate their credibility, as if they were taking an undeserved shortcut in their completion of the information task. Julien and Genuis (2009) attribute this preoccupation with reputation to the disregard academic librarians often experience at the hands of both learners and faculty colleagues.

Conclusion

In line with the literature on time being a limited resource in instructional planning (Gill, 2023; Julien & Genuis, 2009; Julien & Genuis, 2011; Julien & Pecoskie, 2009; Nichols Hess, 2020; Vassilakaki & Moniarou-Papaconstantinou, 2015), the study's participants all expressed concern about lacking time in their work schedules for instruction-related searching, causing them to make cost-benefit judgements on an expedited timeline. Personal feelings of self-doubt or inadequacy also obfuscated the participants' instructional planning, which has been documented in the literature (Julien & Genuis, 2009). However, years of job experience and teaching practice can alleviate some of these pressures (Julien & Genuis, 2011) and such was the case for the participants. In terms of information resources, existing instructional materials found on institutional repositories, like Microsoft Teams and OneDrive, were the most trusted and commonly used amongst this study's participants, which aligns with Gill's (2023) findings on the importance of sharing instructional materials between librarians. Instructional librarians' information practices are also influenced by both disciplinary faculty members and fellow librarians. As Julien and Pecoskie (2009) assert, academic librarians rely on the information provided to them by the faculty members requesting their instruction, and the study's participants would often refer to this information to ensure they were following the ideal information scent in the instructional planning process. The study's participants also benefitted from supportive relationships with more experienced colleagues to guide their information seeking and retrieval while planning for instruction, hearkening to Nichols Hess' (2020) findings on the subject.

Speaking to information science more broadly, the present study begins to address a gap in the literature. While academic librarian's information behaviours and practices in the context of work tasks have been studied at length (Nel, 2020; Tucker, 2014), little attention has been paid to the behind-the-scenes work of instructional planning. With regards to information foraging, previous studies have explored the information foraging habits of undergraduate students in the context of curiosity-driven learning (Kedrick et al., 2023), gaming (Avvisati & Borgonovi, 2023), and digital library environments (Lin & Zhang, 2025). Information foraging research has been dominated by publications from the field of computer science, resulting in limited social science writing on the topic (Nwagwu, 2024, p. 139), and so academic librarians' ability to forage for instructional information in digital spaces represents a novel frontier in information foraging. Based on the study's findings, academic librarians exhibit similar information behaviours in their instructional

preparation tasks as they do in their non-instructional search tasks. Following the information foraging metaphor, academic librarians carry baskets with them, like their lesson plans or PowerPoint slides, to berry patches, which represent their trusted information resources. The information scents that they follow are generally informed by their faculty colleagues and fellow instructional librarians. They then judiciously pick berries to fill their baskets based on their dietary needs, which represent the requirements of the information task. In order of priority, they will first pick through existing instructional materials housed on institutional repositories, then library databases, before moving on to broader Internet searches. Instructional librarians are information foragers who take pleasure in the information retrieval process and assess instructional resources based on cost-benefit analyses, all while prioritizing completion of the instructional preparation task.

From a methodological standpoint, the thematic narrative proved to be a useful tool for both storytelling and research analysis purposes. In traditional social scientific writing, the writing-up process can feel formulaic, in the sense that each original data point must be connected to as much existing research as possible, resulting in a product that reads less like a *story*, and more like a *show and tell*. However, in writing the thematic narrative, original research findings and the existing literature must coalesce into impactful, yet economically written, units. This writing style forces the author to engage deeply with both their own research data and the existing literature. In the coding process, the author must sift through their data with a fine-toothed comb in hopes of identifying throughlines which bring together the individual accounts of their research participants. Each component of the excerpt-commentary unit must then be judiciously considered, crafted, and placed to develop a compelling story that is academically sound, flows coherently and accurately represents the worlds of its participants. The writing-up process requires the researcher to build an intimate relationship with the ethnographic record, but in doing so, the researcher invites the reader into the lives of the ethnographic study's participants thanks to the 'creative tension' that emerges 'between excerpts and analysis' in the writing (Emerson et al., 1995, p. 186).

This study is exploratory and limited in its sample pool of participants (n=3), and as such, its findings should not be used to make sweeping generalizations about the instructional planning process of all academic librarians. Furthermore, none of the librarians in this study were complete newcomers to the profession or crafting entirely new instructional content. Based on the study's findings, the instructional planning process of newly hired librarians generating content for the first time likely differs from that of the study's more seasoned participants. Despite these limitations, the research methodology of short-term ethnography employed in this study offers some professional implications and potential avenues for future research. Instead of a multi-year ethnographic study where the researcher embeds themselves into the social fabric of an institution, short-term ethnography enabled this study to drill down directly to the machinations of this everyday work-related activity. According to the findings, existing instructional materials and institutional repositories are pivotal to facilitating the preparation process. To complement Gill's (2023) investigation where a lack of resource sharing stifled instruction, a future study could investigate contexts where sharing and collaboration have prospered and how this culture of collaboration has positively impacted the instructional preparation experience. Future studies conducted on more participants from a variety of institutions will further concatenate the chain of exploratory studies, allowing 'grounded theory' to emerge from the 'detail, breadth and validity' of the growing body of available research data (Stebbins, 2006, p. 486).

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Appendix items

Appendix A. Informed consent letter

Consent Letter for Research

[primary investigator's name]
[institution], [specific faculty]
[institution's address]

Dear [participant],

This consent letter is your invitation to consider participating in research that I am conducting at the [specific faculty], [institution]. This study explores instructional planning process of academic librarians, with a focus on information behaviours and practices.

I will conduct an observation and interview with you concerning the topic above. Combined, both the observation and interview should not take longer than 2 hours. During the observation, notes and photographs will be taken. The interview will be audio-recorded and then transcribed. There is no compensation.

Upon completion of both the observation and the interview, all identifiable information that links you or your employer to the study will be removed. The data will be kept indefinitely. Your name will not appear (a pseudonym will be used) in the final paper. The final paper may be shared for the benefit of the information studies discipline and profession.

I will leave you with a copy of this consent letter and retain one copy for my own records. The only people with access to this consent letter (in addition to you) are representatives from the [institution's research ethics office].

There are no known or anticipated risks to you as a participant in this study, in fact, there may be benefits of enjoying the process and learning more about yourself and information.

Participation in this study is voluntary, and you may refuse to participate in any portion of the research, at any time and without penalty. You may decide to withdraw entirely, without any negative impact, within one week of today. In the event that you wish to withdraw, any information collected about you will be immediately destroyed and not used in the study.

If you have any questions regarding this study, you can contact me by email at [email]. You may also contact the [institution's research ethics office] at [email] or [phone number], [research protocol #] for reference.

Thank you in advance for considering participation in this research project.

Sincerely,
[primary investigator's name]

Participant Name (Please Print): _____

Participant Signature:_____

Appendix B. Shooting guide for photographic inventory

Photographic Inventory Shooting Guide

- 5-15 photos per field site
- Focused on your instructional planning process
- Degrees of resolution: the office/workspace > the desk > documents (both virtual and physical)
- Initiated by the observer or invited by the informant, for example:
    - Observer: “May I take a photo of (object/item/space)?”
    - Informant: “Would you like to take a photo of (object/item/space)?”
- Photographic elicitation: Informants may be asked to describe or explain photos taken during the observation in further detail, later during the semistructured interview

Appendix C. Semi structured interview guide with photographic elicitation

Semi structured Interview Guide

Grand-tour question

- In general, how do you experience (i.e., thoughts, feelings, behaviours, etc.) the instructional preparation process?

Mini-tour question

- More specifically, how did you experience preparing for the instructional session that I observed?

Questions about information

- You may consult various information resources (i.e., email communications, lesson plans, PowerPoint slides, web searches, etc.) in the instructional preparation process. Which of these resources are the most important to you and why?
- Let's say you are preparing for an instructional session; you have all your tabs open on your computer. How would you characterize/describe your behaviour when consulting these various information resources?
- Photographic elicitation: Looking at this photo/these photos (taken during the observation), what ideas, thoughts or emotions come to mind for you?

Appendix D. Titles of integrative memos

Integrative Memo Index

1. (Berry)Picking Participants
2. Lesson Plans, Printouts and Staplers, oh my!
3. Tabs on Tabs on Tabs
4. Slides on Slides on Slides
5. “Am I Good Enough?” and Other Questions
6. No Need to Reinvent the Wheel
7. Gleaning for Instruction

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Floating libraries and Bible rolling papers: Accessing books and information while incarcerated

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Abstract

Introduction. Prisons are environments of restriction, including what and how inmates access books and information. As federal prisons in Canada do not allow internet access, physical books and prison libraries are of particular importance. This research, part of a larger project looking at inmate reading, explores how inmates access books and information.

Method. Interviews were conducted with 9 current inmates who were incarcerated in a men's minimum-security institution. A researcher and a research assistant conducted the interviews; the research assistant was a former inmate of that facility. Participants had been incarcerated from a few months to over 20 years and had come from a range of higher-security prisons.

Analysis. Preliminary analysis of the interviews was conducted using qualitative content analysis and categories and themes were developed through iterative discussions between authors.

Results. Throughout the interviews, participants discussed the variability of experiences accessing books and information between prisons, highlighting the importance of understanding the context. Two themes were developed. The first covered the creative ways inmates access physical-only materials and the numerous barriers that exist. The second covered the need for inmates to navigate official prison policies and unofficial prison culture in order to access materials.

Conclusion. While some of the barriers to access were anticipated, participants also discussed the unique ways that inmates develop to increase their access to materials. Individuals (prison staff and inmates) can make a significant difference to access, and dedicated resources are required. Learning the specific institutional culture is key.

Introduction

Both society and individual inmates benefit when they engage positively within prisons and then successfully reintegrate into society. Access to libraries and books in prisons is foundational to an array of prosocial activities. As inmates in Canadian Federal Institutions are not generally allowed any internet access while incarcerated, physical books become a central source of information and as means—both formal and informal—to use the time in prison to meet a variety of personal and institutional goals.

Part of the central mandate of Correctional Service Canada is 'actively encouraging and assisting offenders to become law-abiding citizens' and thus education, self-improvement, job preparation, and civic-mindedness are all part of a rehabilitative mission. The National Guide for Institutional Libraries directs that Canadian federal prison libraries are to meet the needs of inmates, providing service that 'emulates the public library model' (Correctional Service Canada, 2012, p. 3) and should 'provide inmates with the opportunity to pursue recreational, cultural, and spiritual interest' (p. 3). However, the guide also recognises there are limitations to the service due to legislation, policy, and security considerations.

Information science researchers have long been interested in prison libraries (e.g., Austin, 2022; Curry et al., 2003; De Agostini, 2022; Garner, 2020; Ings & Joslin, 2011; Mostek, 2024), exploring topics such as reading habits, prison library policies and practices, and censorship and access. Censorship is common in prison libraries, often taking the form of content bans, such as restricting access to violent or sexual content (Mostek, 2024). Studies about access have looked at the ways prison restrict access to information, including restricting the internet (e.g., Canning, 2022) and using access to information to control inmate behaviour (Austin et al., 2020). While there is interest in prison libraries, there have been relatively few studies that have spoken directly to inmates about their own experiences. The notable exceptions to this are the work of Chatman (1999), Canning (2022), and Virgo (2024, 2025).

Chatman (1999) conducted a ground-breaking study of women in a maximum-security American prison, from which came her theory of 'Life in the Round'. Chatman's study builds on her previous work on small worlds (1991), stating that inmates reshape their own views to align with the norms within the small world of the prison. In this situation, insider information is important; contextual information is used to fit into the 'everyday reality of prison life' (Chatman, 1999, p. 208). Part of her theory of 'Life in the Round' was that those living in the round will only seek information from those who are inside their world unless there are exceptional circumstances.

Canning's (2022) doctoral work was a study of inmates' information needs and seeking in a maximum-security Scottish prison. Inmates' information needs were varied; the most common were identified as 'mental health, relationships, the prison regime, education, rehabilitation, reintegration, physical health, law, and recreational interests' (p. 141). Barriers to meeting information needs were both physical and security-related; however, cognitive, affective, and coping issues were also found. Inmates demonstrated a clear preference for interpersonal sources who were judged trustworthy, and particularly those who had lived experience of incarceration.

Virgo's (2025) study of the information behaviour of incarcerated university students who are released on temporary license during the week to attend university in the UK. In this study, inmates expressed experiencing information overload when transitioning from full incarceration to attending classes on campus, overwhelmed by the many things that they needed to know, and emphasising self-identified gaps in their knowledge. During that transition, inmates expressed feelings of isolation and having 'nobody to ask' (p. 570) when they had questions, highlighting barriers to filling information needs.

This paper –part of a larger project that seeks to understand inmate experiences of libraries, books, and reading while incarcerated – focuses on inmates' access to books and information.

Context

When accessing books and information in prisons, context is key. In this study, all participants were currently at a minimum-security federal prison and had spent time in other federal prisons. In this prison, library resources were limited to a small collection of donated books on shelves in a common area that functions without a librarian. A single computer is available to use to access electronic documents and locally available resources; however, inmates have no internet access, increasing the importance of accessing prison libraries and books through other means. Inmates engaged in schooling can type papers on the computer, but there is no private file storage, so documents can be accessed by others or even erased. There is an educational officer who works part time in the prison and provides extra reading materials, largely from the instructor's own personal collection. In addition, the local public library sends staff into the prison every two weeks. Inmates can request titles or topics from the library staff, which are brought on the subsequent visit, but significantly, there is no catalogue access. Aside from borrowing books, inmates can order books to purchase; however, there are limits on what they can own. When entering prison, inmates are allowed a 'pen pack' (i.e., a package of essential personal items sent to the newly incarcerated individual), which includes all clothing, personal care items, and entertainment items. It can cost no more than $1500 CAD total, and this amount remains the maximum amount allowed. Books are allowed in pen packs but are part of the total dollar value; however, books that are deemed for religious or educational purposes are not included in the total. Funds for purchases are also often limited. Inmates can earn up to a maximum of $6.90 CAD per day and items they purchase are not discounted. This would mean, for example, that the purchase of a new hardcover book would be nearly a week's wages. Purchased items are also subject to intense scrutiny and it can take weeks for this review to take place.

Research aim and questions

The larger research project explores inmates' book collecting and reading habits during their incarceration. In this paper we explore inmates' access to books and information, focusing primarily on prison libraries.

The research questions include:

1. How do inmates access books and information?
2. What barriers and facilitators do inmates experience?

Methods

Participants

Participants were inmates at a men's urban, minimum-security prison in Western Canada. The institution is small and intended for inmates who have been at higher-security institutions but have earned their way into a lower security placement.

The research assistant (RA) for this project is a former inmate of this institution (and other institutions). The RA made a valuable contribution to the project because of his understanding of the context and experience with being incarcerated. This insider information would not have been otherwise available to the researchers. The contributions included planning how the interviews should be carried out, suggesting some of the questions that should be asked, and helping to collect data. The RA and the lead researcher, with the facilitation of the Warden of the institution, attended in-person recruitment sessions to explain the project and solicit participants. Special precautions were taken to ensure participants felt comfortable in taking part in the

research. Research ethics approval was obtained from both The King's University Ethics Board and multiple research ethics boards of Correctional Service Canada.

Nine inmates agreed to take part in the research. Participants ranged in age from their early twenties to early seventies and had been incarcerated from a few months to over 20 years. Participants chose their own pseudonyms.

Data collection and analysis

Data collection consisted of individual audio-recorded interviews, lasting approximately one hour, conducted by the lead researcher and the research assistant. The interviews were designed and co-conducted with the research assistant as he had insights and personal experience to help put current inmates at ease. The RA suggested two key adjustments to the interview protocol. The RA suggested undertaking the interviews in dyads. The team had debated who should do the interviews, wondering if incarcerated people would be more comfortable talking to a former inmate. However, the RA expressed that while his presence was important to help put the participants at ease, having a researcher there as well would give the process credibility. The RA also advocated for recording the interviews. The team also debated whether to record the interviews or not, having concerns about making participants feel surveilled. However, the RA articulated that many inmates have had experiences of feeling their words had been misrepresented and that recording interviews would help them to feel more comfortable that their words would be accurately represented.

The original plan was to do data analysis as a team, with both researchers and the RA. However, this was not possible, so the analysis was carried out by the researchers. Qualitative content analysis was used for the preliminary data analysis, which categorises data by means of patterns, conceptual categories, and themes (Julien, 2008). This analysis enables meaningful interpretation of the data as well as relationships between data. Both authors read the interviews iteratively and reviewed categories and themes, refining the themes through analysis and discussion.

Findings

Preliminary findings demonstrate the importance of books and prison libraries, as inmates have significant amounts of unoccupied time and restrictions on most activities. Reading books was frequently mentioned as a good use of time—entertainment with vocabulary or wellness benefits—and/or a way to better oneself by gaining new information, self-help strategies, or spiritual insights. Over the course of the interviews, participants discussed a wide array of ways to access books and information—both official and unofficial. Access varied widely across institutions with differing facilities, resources, and protocols, but the variations were also due to the influence of key individuals (especially librarians, but also educators, chaplains, and correctional officers) and changed according to inmate social networks.

In looking at these varied experiences, two themes developed. The first centred around the unique situation and challenges created by restricting inmates to only physical media. The second centred around needing to navigate official and unofficial aspects of prison life.

The unique access and barriers of paper books

As prisons provide no internet access, the access to the prison library and the quality of its contents became especially important. However, access to libraries is not always guaranteed. Rocky (an inmate in his 20s. incarcerated for 1.5 years) talked about being at a maximum/medium-security prison, Prison C, that when he arrived,

> ... was all locked down for some reason. I just kind of got there at a bad time. It was just unlucky. So I never actually went to the library there. But yeah, at [Prison C], there's a huge library there.

During lockdowns, inmates could get books brought around on a trolley, typically once a week.

Many higher-security prisons limited library access to specific days. Jeff (an inmate in his 30s who had been incarcerated for 3 months) mentioned having to request going to the library on specific days by putting a note in his cell window, which did not guarantee being able to go. It depended on whether correctional officers 'actually read the note'. Limits were also placed on the number of books borrowed, typically 3-5, depending on the institution. Several inmates found these numbers insufficient.

The minimum-security prison where the interviews took place, Prison A, was exceptional in that inmates could access books in the informal library at any time, and the local public library would come in every two weeks to bring requested titles or books on a particular topic. However, inmates had no access to the public library's catalogue, making book selection challenging. The public library visits were important as Prison A's 'library' consisted of shelves of books that were largely unorganised donations and library castoffs. Edwards (an inmate in his 70s, incarcerated for 1.5 years) noted, 'our library [at Prison A] isn't organized, right? Just kind of all over the place. So it could use some help. Even if you alphabeticalized [sic] them or something'. The lack of organization hampering access was mentioned by multiple inmates.

While some prison libraries were well-stocked, well-staffed, and well-organised, others had few books, damaged books, and were unorganised. Most inmates agreed that Prison B – a medium/minimum security prison –had a library almost as good as a public library. Part of this was due to the librarian, who worked hard to provide content and programming for inmates. Specific librarians and their contributions were mentioned by several inmates. The experience of Prison D differed significantly, though it was another medium/minimum security prison. Kirby (an inmate in his 40s, incarcerated for 2 years) stated,

> At [Prison D], there was a library. It was accessible, but the selection wasn't the best. And the library times were limited to when you could go in. And a lot of the books were kicked in, wrecked, covers missing, pages missing, all that kind of stuff.

Physical books often showed signs of wear and damage. Some books had blood or other bodily fluids, some were torn, and some even had remnants of pepper spray on their pages. Missing sections of books were also a problem. Perry (an inmate in his 70s, incarcerated for 2.5 years) mentioned that 'many of the Bibles were missing a lot of the New Testament and Revelation because it made good paper roll' for cigarettes. Some reported the most frequently referenced sections of legal books being torn out, creating challenges accessing legal information.

Besides the library, books could be accessed through educational endeavours, through classes taken, from a small 'school library' (the educational officer has books that can be lent out), through religious organizations (chaplains have books that can be loaned), or through purchase. However, as mentioned previously, there is a monetary limitation for inmates. Rocky mentioned an officer who undervalued his books. 'With the books, like [the officer] could have charged me for what they were actually worth, but he charged me, I think it was 2 bucks for each book or something'. Not all books count towards your monetary limit. There are two exceptions—books that are religious, and books that are explicitly for educational purposes—but in both cases, someone must officially deem the books to belong to these categories. However books are obtained in these ways, inmates are dependent on others to facilitate this access.

Access depends on navigating official policies and unofficial culture of prisons

Some institutions went further in their official policies than those previously discussed. Prison B, with the excellent library, developed a library culture of respect for books. Kirby discussed how that library's policies affect access:

> Now, with that system that they have in place in [Prison B], you have to earn the right to take a book out. So you can't just go in off the first day and take a book out. So you have to kind of build a bit of a rapport with them. So you go in there, maybe you get some books, you sit down in there, you read them, check them out, return them in mint condition. Then they'll start you off with one book and you've got two weeks with that book.

Kirby also mentioned serious consequences in Prison B for damaged books, which was an 'institutional charge' (formal disciplinary action taken for rule violation), as well as 'being responsible for the price of the book. So it did keep books in good condition for sure'.

While official policies govern so much of inmates' lives, inmates also develop their own culture around books. Unofficial collections of books are important resources. As Jeff (an inmate in his 30s, incarcerated for 3 months) discussed, 'some of the books that weren't labelled from their library that floated around on the ranges [corridors with multiple cells] and in the buildings. So, that's another thing, people were hoarding them …' When he ran out of books, Jeff would look at communal shelves, which normally hold microwaves or coffee pots, or in the laundry room, to find these floating collections.

Some collections floated, but others belonged to inmates. Books are an important object of exchange between inmates but typically were only lent to those that were friends or deemed trustworthy. Kirby discussed lending as including a 'level of respect' because inmates have so few possessions. In some prisons, particularly maximum-security, inmates had their own protocols for book circulation. Jones (an inmate in his 30s, incarcerated for 10 years) related,

> oddly enough, a lot of the tough guys would monitor the books because otherwise no one would get through the stuff. We were there when *Game of Thrones*, [was] just like coming out, for example. So it was like, 'OK, everybody's going to go through it, if you're not going to read it, you get put to the back of the line.

Evidenced by Jeff's and Jones' quotes, many inmates deeply valued their access to books. The interviews affirmed that books in particular were an important means not only to pass the time in a positive way, but also as a part of self-improvement, mental wellness, and in some cases, spiritual development. Multiple inmates expressed their desire to develop their reading skills and to acquire knowledge for personal, social, or employment reasons through books. As Kirby said, 'I think when it comes to when it comes to prison, it's just accessibility. That's really the biggest thing'.

Discussion and conclusions

In answering RQ1 (How do inmates access books and information?), participants described the very prison-dependent ways they access books, including the official policies to visit prison libraries and check out books. Unsurprisingly, the highly rules-based approach to life in a prison also applies to prison libraries. However, even following rules and regulations, books and information were not always accessible and information needs (entertainment, legal, educational, and other types of information about incarcerated life and life on the outside) were not always being met. With complicated and sometimes fractured systems, inmates had to get creative to access materials and work around the barriers they experienced. That said, participants did not express experiencing information overload – unlike Virgo's (2025) participants who were transitioning from full-time incarceration; they needed to know the formal and informal rules and social norms within their prison. As with previous research, participants noted that access to prison library books and

information was used as a form of 'behavioural control' (Austin et al., 2020, p. 175), including Prison B's policy of earning the right to borrow books and the possibility of an 'institutional charge' if books were damaged. While our interview questions focused on formal library policies, inmates also described accessing books and information informally through floating libraries, personal collections, and inmate lending. In this case, behaviour control was also asserted about borrowing books; however, in this case it was inmates who set the boundaries for behaviour about how books circulate and how long anyone had with the new *Game of Thrones*. Not following the established rules risked sanctions or exclusion, highlighting the importance of learning how things are done between inmates. In Chatman's (1999) terms, these are 'insiders' setting social norms and asserting social control. The argument can be made that participants in this study occupy a 'small world' (Chatman, 1991). And while a those in a small world focus on 'practical dimensions of life' (p. 445), it does not follow that information behaviour in a small world is simplistic. The complexity of understanding official policies, social norms, and ways to work around barriers demonstrate the complexities involved in accessing books and information within a prison.

In answering RQ2 (What barriers and facilitators do inmates experience?), participants noted ways that prison staff could act as both barriers or facilitators to access. Participants described how some individuals went above and beyond to ensure that any inmate interested in materials had access, including librarians, educators, chaplains, and public library staff who visit the prison. While policies are there to ensure a certain level of access, it is often individuals in the prison system that make a significant difference to the level of access. Participants also discussed the power staff had in making monetary decisions that could also influence access. With having a limit to the total cost of possessions, if staff choose to count books at their full retail price or not, or count books as educational or religious or not (these books do not count towards the possessions total), this could have a significant impact on what possessions inmates could have, particularly as inmates have limited means of making money while incarcerated. They also described instances of officers not bringing inmates down to the library, due to lockdowns or staff shortages. A basic barrier described was the lack of internet access, an issue found in other studies (Bajić et al., 2021; Canning, 2022). Interestingly, there were no explicit discussions of prison staff censoring materials beyond the limitation of sexual content and children's materials; this topic is frequently mentioned as an issue in prison libraries (Austin et al., 2020; Mostek, 2024). Participants also described barriers as limitations to when libraries can be accessed, libraries with poor collections and/or in poor condition, and libraries that are unorganised and/or have no catalogue. De Agostini (2022) critiques poorly resourced Canadian prison libraries as 'making it impossible for prison librarians to meet the minimum human rights requirements of the people they serve' (p. 1). Conversely, participants described some prison libraries as welcoming, well-stocked, and with staff that work to ensure a variety of books are available to meet inmates' needs. Canning (2022) found that librarians were positively perceived and recognised by some inmates as a source of information. What we found was that when accessing books and information there were an array of libraries – floating, personal, chaplain, educational, and official libraries – each that required specialised, context-specific knowledge about how to access them.

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Situated storywalks: A participant-led elicitation method

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Abstract

Introduction. Information behaviour research has traditionally relied on researcher-led methods such as interviews, surveys, or experiments. While these approaches provide control and comparability, they often limit the potential to observe unexpected or situated information behaviour.

Method. This paper introduces situated storywalks, a participant-led method developed by the authors, integrating elements of guided tours, observations, participatory research, and touchstone tours. In situated storywalks, storytellers guide researchers through physical or virtual spaces while narrating their experiences, expectations and interactions.

Analysis. The approach was developed and applied in a case study at a large German library, where storytellers with diverse accessibility needs were invited to share their experiences through storywalks. The collected data, including audio recordings, field notes, and photographs, were analyzed qualitatively, identifying emergent patterns in spatial and affective engagement.

Results. Findings demonstrate that situated storywalks help uncover dimensions and nuances of information behaviour that may remain hidden in more traditional, researcher-controlled methods.

Conclusion. Situated storywalks expand the methodological repertoire of information behaviour research, enabling richer, context-sensitive, and co-constructed understandings of how people interact with information in everyday-life environments.

Introduction

Information behaviour research has a history of employing diverse methods including interviews, focus groups, observations and surveys, guided tours, think-aloud-protocols, and experimental designs. Several studies examine the most prevalent methods, revealing interviews and surveys as the most widely used (Lund, 2022; Greifeneder, 2014; Julien et al., 2011), reiterating methods guided and controlled by the researcher, and further reinforcing power imbalances (e.g., an interviewer asking questions and steering the conversation or a structured survey with predefined questions, both resulting in more control on the researcher's end). Even less formalised approaches, such as think-aloud protocols and other researcher-led techniques, designate predefined tasks for participants, limiting their natural and organic tendencies.

Researcher-led methodological approaches have clear advantages. First, circumstances are comparable because participants complete the same tasks or answer the same guided questions. Second, elicitations are clearly directed towards answering a research question and the chances of deviations from the topic under study are minimal. These approaches also have disadvantages such as failing to encourage unexpected information behaviours and yield unforeseen results, further highlighting the importance of a carefully planned research design. While analytic methods such as abductive analysis (Tavory & Timmermans, 2014) endorse the discovery of the unexpected, if the research design does not support and encourage unanticipated information use situations, data analysis may also not emanate surprising results. Therefore, this paper introduces a method, created by the authors, addressing the limitations and highlighting strengths of several of the aforementioned methods used in information behaviour research, supporting a more open-minded approach.

Developed by the authors, this paper introduces a new method called situated storywalks, a participant-led method highlighting the significance of participants' environments and settings (e.g., spatial aspects), based on an amalgamation of guided tours, observations, storytelling, participatory approaches, and touchstone tours. The paper begins by defining and discussing related methods before situated storywalks are delineated and defined. Next, the authors introduce an exemplary information behaviour study at a large library in Germany before delving into the research design of the situated storywalk, and selected study results are presented.

Background

This section positions situated storywalks within a broader methodological context by examining related approaches. Various methods, including observations, think-aloud protocols, guided tours, participatory approaches, and touchstone tours, are employed to explore situated and experiential forms of engagement. Each method offers distinct perspectives on how participants interact with their environment and construct meaning through experience. Lastly, abductive analysis is introduced as an alternative analytical framework complementing these methods.

Observations

Observational studies focus on the present status of the phenomenon as it occurs, using observations—or watching attentively—rather than asking (Connaway & Radford, 2021). In information behaviour research, observation is seldom used as an independent method, with only a few studies adopting it as their sole means of data collection. Oestreich (2017), for example, used observations to examine patrons' reaction to sound masking in libraries as an acoustic compromise for conflicting usage requirements. Greifeneder & Gäde (2020) conducted 99 non-participatory observations of information seeking in a local bookstore. In interactive information retrieval studies, however, observations have been applied as main data collection approaches when working with special user groups (e.g., Bircanin et al., 2020).

More commonly, observations are integrated with interviews, wherein the observational phase explores *what* takes place within a given context, and the interview phase follows to investigate *why* these events, or behaviours, occur (e.g., Kampen, 2025). In other words, what people say and what people do are not always the same (Jerolmack & Khan, 2014); interviews and observations are often used as means of triangulation. In a recent German library study, Wildermuth et al. (2025) and Menzel et al. (2025) conducted nearly 15,000 campus observations combined with 1,068 interviews, exploring why students study outside university libraries. While observations showed extensive learning activity across hallways, cafeterias, and classrooms, the methodological combination with interviews revealed that 78% of these students also use the library.

Think-aloud protocols

Think-aloud protocols are a foundational method in user experience research, allowing researchers to capture users' cognitive processes, usability challenges, and decision-making strategies while interacting with library systems, interfaces, and services (Wildemuth & Freund, 2012; Komlodi et al., 2007). The method is grounded in theories of system usability and user interaction, aiming to identify both effective design elements and pain points in use. Think-aloud protocols typically involve two key components: first, participants perform a predefined set of tasks while researchers observe their ability to complete them efficiently and effectively; second, participants verbalise their thoughts and actions throughout the process, providing insight into their reasoning and experiences. Within information behaviour research, think-aloud protocols are mostly used in libraries or digital tool accessibility. However, Al-Moteri's (2023) examination of nurses' information seeking behaviours and Cole et al.'s (2022) study of dyslexic undergraduates' information behaviours are recent indicators that think-aloud protocols are gaining ground in information behaviour research.

Think-aloud protocols are similar to observations because researchers observe human information behaviours. Instead of complementing the observations with follow-up interview questions guided by the researcher, think-aloud protocol observations are supplemented with participant-led observations. Participants decide what they want to explain. At least, in theory, the researcher is tasked to continuously probe throughout the process as the participant takes the lead.

Despite its strengths, think-aloud protocols have limitations. Participants may alter their natural behaviours when verbalising their thoughts, leading to reactivity effects that can influence task performance or information seeking strategies (Komlodi et al., 2007; Wildemuth & Freund, 2012). Additionally, not all cognitive processes are easily verbalised, such as tacit actions, resulting in incomplete or biased data (Branch, 2000).

Guided tours

Space and environment are becoming increasingly more important to holistically understand information behaviour (Cox & Fulton, 2021). As such, Thomson (2018) articulates the guided tour as a participant-led, spatially grounded qualitative method in which researchers accompany participants as they move through meaningful settings (physical, digital, or hybrid) and think aloud about how they interact, interpret, and navigate that environment (Thomson 2018). At the same time, researchers are asked to guide the tour with direct but open-ended requests. The guided tour hybridises aspects of observation and less-structured interviews which involves a co-creation between the researcher, in conjunction with the participant, of important details and aspects of daily life (Thomson, 2018). The guided tour is especially beneficial for exploring and uncovering embodied, material, and spatial dimensions of information behaviour that would remain hidden in static interviews (see Hartel, 2006; Solhjoo, 2022).

Ferguson et al. (2025) conducted guided tours to posit a revised model of transition theory including reframing personal information management as an information behaviour helping people navigate life changes while Hellmich and Dinneen (2023) utilised guided tours about the personal

information management of visual artists. Virtual guided tours were used to document and analyse faculty members' organisational activities by exploring participants' digital workspaces (Jacques et al., 2021). Physical spaces (i.e. participants' vehicles) were also explored through virtual guided tours via Zoom to understand vehicle residents' information practices (Montague, 2023), and later, in-person guided tours were used in a larger study of vehicle residents' information practices (Montague, 2025). Information behaviour studies also used guided tours in domestic and everyday settings such as culinary hobbyists and undergraduate students. Across these contexts, the guided tour method surfaces tacit, embodied, and spatially embedded practices often missed in interviews or surveys, making it an effective tool for illuminating the lived, situated dimensions of information behaviour research.

While guided tours are theoretically conceptualised to embrace participant-led tours, most guided tour studies follow a researcher-led approach. For example, Ferguson et al. (2025) used predefined prompts and tasks that guided participants, creating more of a think-aloud study setting than a guided-by-the-participant design. Similarly, Alon (2025) used guided tours as part of the interview process, as the guiding element served as a modification of the interview. Similarly, participants were given clear tasks to complete.

While guided tours are valuable for uncovering embodied and spatial aspects of information behaviour, they can be limited by their performative nature, as participants may selectively present spaces or practices they consider appropriate or meaningful for the researcher, potentially leading to curated, rather than more natural, accounts (Thomson, 2018; Hartel, 2010). The method also requires the participant to have a previous or expert knowledge of the space through which the tour is taking place. Additionally, guided tours rely heavily on participants' ability to articulate their actions and interpretations in real time, which may result in uneven data quality depending on participants' communicative skills and comfort levels (Mizrachi, 2011; Kwasnik, 1991).

Touchstone tours

Touchstone tours originate from user experience research and represent qualitative research, inviting participants to take the researcher on a tour of a physical item or physical space, during which they perform a series of tasks and are prompted to reflect aloud on their experiences and thought processes as they proceed with the aim of evaluating and improving the item or space (Garg, 2022). Unlike think-aloud protocols, where researchers guide the participants, touchstone tours reverse roles: the user leads the exploration. The researchers gently guide conversation but remain flexible, allowing participants to highlight elements of personal relevance while the researcher observes attentively and follows emerging themes (Priestner, 2019). Touchstone tours serve as a contextual method immersing researchers in their participants' environment. This immersion facilitates an understanding of how individuals organise information, systems, and spatial arrangements through their use of cognitive and physical artifacts (Hanington & Martin, 2019). Touchstone tours are employed primarily within professional or practitioner-oriented contexts—for instance, in a library user experience study conducted at the University of Guelph (McLaughlin & Rayment, 2019)—rather than within formal academic research settings.

Conceptually, touchstone tours are a participant-led method. Although observations can make inferences about participants' environments and allow insights into behaviours, touchstone tours extend these insights through the element of a tour, offering additional insights into thought processes. However, touchstone tours possess a highly evaluative element, conflicting with the more neutral attitude of information behaviour research.

Participatory design

Moving further into participant-led methods, participatory approaches give participants a more active voice. Participatory design is a collaborative research and design methodology actively involving users and community members in shaping technologies, services, and spaces (Bødker et

al., 2022). Emerging from Scandinavian design traditions, participatory design emphasises democratic participation and shared decision-making between researchers, practitioners, and users (Bødker, 1996). Within Library and Information Science (LIS), participatory design has evolved beyond user consultation toward meaningful involvement of participants as co-researchers, recognizing their situated expertise and lived experiences (Foster, 2012; Senteio et al., 2021). Participants contribute to defining research problems, co-creating design ideas, and evaluating outcomes through workshops, prototyping sessions, and iterative feedback cycles (Dalsgaard & Halskov, 2010). This shift reframes users not merely as data sources but as active collaborators whose insights shape both the research process and its outputs, aligning with LIS commitments to inclusivity, community engagement, and user-centered service design (Pettigrew et al., 2001).

Participatory design has been employed in diverse LIS contexts to co-develop digital tools, physical spaces, and information services. For example, Dalsgaard and Halskov (2010) applied participatory design methods to reimagine public library spaces, incorporating iterative prototyping and user feedback to create more participatory, flexible environments. Similarly, Starostka et al. (2023) employed participatory design to develop community-based library services, positioning participants as co-creators in service planning and delivery. More recently, Lu et al. (2024), drew on participatory speculative design to explore how communities negotiate in shared design spaces.

While fostering inclusivity and collaboration, participatory design can be limited by power imbalances between researchers and participants, influencing which voices are prioritised and shaping the design outcomes in subtle ways (Bødker et al., 2022). Additionally, participatory design projects often require significant time, resources, and sustained engagement, making them challenging to implement in institutional contexts with limited capacity or where long-term participant involvement is difficult to maintain (Dalsgaard & Halskov, 2010).

Storytelling

Storytelling has increasingly been recognised as a valuable qualitative method in LIS for exploring how individuals make sense of their information landscapes (Lloyd et al., 2013). Rather than focusing solely on discrete behaviours or system interactions, storytelling foregrounds narrative as a mode through which people structure experience, convey values, and articulate relationships with information (Savolainen, 1995). Methodologically, storytelling allows participants to shape the research encounter, producing richer, more nuanced accounts than structured interviews (Frandsen et al., 2021). LIS scholars have employed narrative and storytelling approaches to examine phenomena such as everyday life seeking, professional identity formation, and community memory work (Hartel & Savolainen, 2016; Olsson, 2013). Olsson's (2013) work with performing artists demonstrated how personal stories reveal networks of trust and informal information flows that remain invisible in formal communication channels. More recently, storytelling has been integrated with participatory and decolonizing methodologies, emphasizing the co-creation of knowledge and community agency (McDowell, 2021). Storytelling not only functions as a data collection tool, but as an epistemological stance honoring participants' meaning-making processes and highlighting the narrative nature of information practices.

While storytelling offers rich, situated insights into information practices, it can be limited by participants' selective memory and self-presentation, leading to narratives emphasizing coherence or idealised versions of experience rather than capturing messy or contradictory practices (Savolainen, 2014).

Abductive analysis

Abductive analysis is a qualitative reasoning strategy beginning with *surprising* observations and moves iteratively between data and theory to develop the most plausible explanations (Tavory & Timmermans, 2014). Unlike deduction, testing existing theories, or induction, building

generalisations from the ground up, abduction focuses on anomalies—treating them as analytical leverage points for new theorizing (Timmermans & Tavory, 2014). Tavory and Timmermans (2014) define abductive analysis as a back-and-forth process between the research evidence and considerations of theory. It is a 'reciprocal coming-in-close and backing-off-to-a-distance' in terms of researcher exploration of situations and evidence (Earl Rinehart, 2021, p. 305). The approach emphasises maintaining theoretical sensitivity, moving between multiple casings of the data, and actively cultivating surprise rather than smoothing it away (Thompson, 2022). This makes abductive analysis particularly useful in LIS, where researchers often encounter complex, situated practices that defy neat categorisation.

Within LIS, abductive analysis has been employed to reveal unexpected patterns in information practices. Ekström (2022) used an abductive approach in studies of biodiversity and citizen science, showing how contributors developed heterogeneous niches of practice and locally specific credibility strategies—challenging prevailing assumptions that volunteer information behaviour is uniform or error-prone. In a companion piece, Ekström (2022) highlighted how credibility and authority were negotiated through situated, informal practices rather than formal scientific validation. Montague (2025) used abductive analysis to explain how information practices are organised around human needs; surprising findings shifted focus away from purely technological access issues. Collectively, these studies illustrate how abductive analysis enables LIS researchers to treat anomalies in the field as clues, leading to richer and more situated explanations of human information behaviour.

Although abductive analysis is valuable for generating novel theoretical insights, it can be limited by its interpretive ambiguity, making it challenging to determine which interpretations are most compelling (Timmermans & Tavory, 2014). Abductive approaches also demand a high level of theoretical sensitivity and reflexivity, which can be unsustainable and difficult to navigate, particularly when unexpected findings emerge in complex settings (Ekström, 2022).

Research questions

Drawing from both the strengths and limitations of the aforementioned methods, the following research questions guided this method's design and implementation:

W*hat are situated storywalks and what are their benefits for information behaviour studies*?

Situated storywalks

This paper introduces *situated storywalks* as a novel methodological approach designed to address several of the limitations identified in the previous sections. Situated storywalks are participant-led guided tours in which storytellers lead researchers through a particular situation, thereby positioning storytellers as primary knowledge bearers. Throughout this process, participants illuminate place-based practices, interpretations, and perspectives.

Conceptualising situated storywalks as *situated* builds on information behaviour scholarship, understanding information practices as inherently embodied and spatially embedded, where information practices encompass a range of activities including and exceeding seeking, evaluation, and sharing information (Bonner & Lloyd, 2011). From this perspective, information behaviour is not limited to cognitive decision-making but is enacted through bodies moving through time and space while interacting with material objects and responding to environmental affordances and constraints (Lloyd, 2010; Cox & Fulton, 2021). For instance, information seeking and sense-making unfold in place and are shaped by how individuals orient themselves physically, inhabiting different environments, while negotiating spatial arrangements that both enable or limit access to information (Savolainen, 2008; Thomson, 2018). Including embodiment foregrounds sensory perspective and understanding, and physical movement and action, as integral to meaning-making, while attention to space and time emphasises how information practices are produced

through relationships between people, places, and objects (Lloyd, 2017). By explicitly centring embodiment and space, situated storywalks capture information behaviour as it is lived and enacted within real-world environments.

The following sections define storytellers and provide a detailed account of the methodological procedures of situated storywalks.

Storytellers as participants

In situated storywalks, we describe the people who guide researchers through spaces as storytellers. Information behaviour studies employ a variety of terms to refer to the humans involved in research. The most common designation is *participants*, followed by *human subjects* or *users*. In some cases, individuals are identified according to the social or demographic groups to which they belong, such as students, older adults, unemployed individuals, or immigrants. In these examples, the participant/researcher relationship is a one-directional exchange where humans serve as input providers to researchers.

Situated storywalks deliberately avoid referring to storytellers as *participants* or *human subjects*. Unlike traditional research settings, storytellers are not engaging in pre-designed tasks or responding to researcher-imposed questions; rather, it is the researchers who participate in the storytellers' situated experiences. Moreover, the detached stance implied by the term *human subject* is fundamentally at odds with the relational and immersive nature of storytelling. Since the professional term is participant-led research, this term is nevertheless used to describe the relationship between researcher and storytellers within situated storywalks.

In participatory research, the collaborative ethos of the approach is reflected in the terminology used to describe those involved, with terms such as *co-researcher*, *peer researcher*, and *citizen scientist* being common. Co-researchers work in partnership with academic researchers, actively contributing to the formulation of research questions, as well as to data collection, analysis, and coding. The aim of this approach is to promote genuine collaboration and shared ownership of the research process, rather than tokenistic involvement.

While this participatory approach aligns more closely with the role of storytellers in situated storywalks, storytellers provide a singular, situated insight into their thoughts and experiences rather than engaging in an ongoing collaboration with researchers. Situated storywalks are therefore not designed as a tool for sustained co-creation. In this respect, storytellers resemble participants or human subjects in offering one-directional input; however, the key distinction lies in the storytellers' agency—they determine the nature and scope of the insights they choose to share.

The design of situated storywalks

Situated storywalks constitute a participant-led qualitative elicitation method designed to generate in-depth insights into storytellers' information behaviours within a given situation. The approach comprises two main components: a brief preliminary interview and a subsequent, more extensive (walking) tour.

The short pre-interview aims to establish a trustful relationship between the storyteller and the researchers and to provide an understanding of the storyteller's context, which shapes their information experiences. It is not intended as a primary means of data collection for information behaviour; rather, it seeks to minimise researcher influence and avoid directing storytellers toward specific topics. Nevertheless, as in other qualitative interviews, if storytellers spontaneously begin to discuss lived experiences, such accounts may also be considered relevant data, even when they emerge outside the formal tour. The guiding principle is that, as long as storytellers retain agency over their narratives and decide which stories to share, the integrity of the method is maintained. The short interview is an inherent part of the situated storywalks.

The central component of a situated storywalk is the joint tour. In the present case study, this tour was conducted within a physical environment; however, situated storywalks are not inherently restricted to physical spaces. Unlike guided tours, situated storywalks do not require storytellers to have a prior relationship with the setting or object of the tour. The primary objective is to accompany storytellers as they engage in their information experiences and interactions. Such tours may take place in environments that storytellers are intimately familiar with—where their specific information practices have evolved—or in spaces they are encountering for the first time.

At the beginning of the storywalk, researchers explain to storytellers that there are no right or wrong actions or statements—similar to the approach used in think-aloud protocol studies—and that, from this point onward, they are free to decide where to go and what to share with the researchers. When storytellers encounter a setting or service for the first time, they are encouraged to act as they would in the absence of researchers. As in guided tours or think-aloud protocol studies, storytellers are invited to comment on their observations and feelings. However, unlike think-aloud protocols, they are not expected to verbalise every single action, in order to avoid creating the impression that they must continuously report back.

Throughout the process, storytellers retain full agency over what they choose to share. For some storytellers, this situation may initially feel unfamiliar, as it positions them as the primary speaker. In such cases, researchers may engage in gentle conversational prompts—not to probe for explanations or justifications, but rather to maintain a natural, comfortable exchange and to express empathy.

It is recommended to define a clear end point for the tour. Approximately five minutes before the scheduled conclusion, researchers should inform storytellers that the agreed-upon time commitment is approaching its end and that the session will soon be concluded.

As in guided tours, observation studies, or touchstone tours, multiple forms of data are collected during situated storywalks. Researchers are advised to take brief field notes during the storywalk and expand these into detailed, structured memos immediately afterward, consistent with qualitative research best practices. Permission to make audio recordings should be obtained prior to the session. When feasible, photographs can further enrich the data. Photographs may serve both to document elements discussed by the storyteller (e.g., barriers or spatial features) and to facilitate gentle follow-up questions that confirm whether the captured images accurately reflect the storyteller's descriptions or perceptions.

Each situated storywalk involves one storyteller and at least one researcher, who conducts the pre-interview and who explains the tour at the beginning. However, it is advisable for two researchers to accompany the storyteller, as managing interview interactions, active listening, timekeeping, note-taking, photography, and audio recording simultaneously can be demanding for a single individual.

The analysis and interpretation of situated storywalks follow procedures common to qualitative research, with abductive analysis being particularly well suited to this approach. Data interpretation can be challenging due to the inherent openness of situated storywalks, which may result in less distinct thematic patterns compared to more structured methods. Furthermore, the analytic process may reveal emergent themes that shift the focus of the original research question toward previously unanticipated areas of inquiry. While such developments are not uncommon in qualitative research, they may occur more prominently in situated storywalks because of the method's participant-led nature.

By granting storytellers a high degree of agency, situated storywalks enable the uncovering of previously hidden or unarticulated information experiences, contributing novel insights to the field of information behaviour.

Case study: visible and invisible barriers in a library

This section introduces a case study that both motivated the development and tested implementation of situated storywalks. Investigating how people with disabilities experience the library space, we conducted a situated storywalk at the Berlin State Library during a two-week period in 2025. The aim was to identify visible and invisible barriers to participation and to develop recommendations for a more inclusive library environment. The study design consisted of short interviews directly prior to situated storywalks in the library.

The library's objective was to investigate the perceived low use of the Berlin State Library by individuals with disabilities. Although general barriers were already documented by our local collaborator responsible for inclusion, the study aimed to identify previously unrecognized or anticipated barriers that may have deterred current or potential users.

We recruited 10 storytellers by using snowball sampling and by engaging gatekeepers within disability networks, inclusion representatives from Berlin universities, social media channels, and at special events for inclusion. The storytellers came with very diverse and complex backgrounds including ADHD, autism, blindness, hearing impairment, emotional regulation, hyperactivity disorder, hypersensitivity, social anxiety, difficulty understanding complex language, as well as combinations of the above. All storytellers were offered an incentive of 30 EUR, which many of them chose to donate to an association for supporting inclusion.

We initially designed touchstone tours alongside separate qualitative interviews, but quickly recognised that the evaluative focus of touchstone tours was not well-suited to our storytellers, as our goal was explicitly not to judge how they did or did not use the library. We also began our research design planning in a researcher-led mode of a guided tour by assigning specific rooms for storytellers to visit during the tour, but realised prior to the first session that, given the diversity of disabilities, each participant would naturally gravitate toward different spaces. For instance, a person with visual impairments might prioritise the special reading area for the blind, whereas someone with social anxiety might prefer quiet study spaces. Imposing a predetermined route based on our assumptions about relevance risked undermining the richness of the data. Ultimately, we decided to define only a single joint starting point and a fixed end time, leaving the remainder of the tour entirely under the storyteller's control.

We initially planned to conduct qualitative interviews prior to the tour, either onsite or online, structured as guided interviews in which barriers and experiences would be discussed. Each interview was originally scheduled to last approximately 60 minutes. This approach would have allowed us to tailor the subsequent tour based on participants' input and to design tasks suited to each storyteller. In practice, all participants preferred onsite interviews immediately preceding the tour, eliminating the opportunity to prepare individualised tasks. For some, this timing was more convenient, while others were limited to a maximum of 90 minutes for participation as the study was conducted during their work hours. Consequently, we conducted shorter interviews immediately before the situated storywalks. These interviews gathered background information on each storyteller's self-perceived and labeled limitations, previous library use, experiences, expectations, and needs. They also allowed participants and researchers to become acquainted and provided an opportunity to identify any necessary assistance or special requirements for the upcoming tour. The interviews lasted an average of 20 minutes.

The core component of the study was an individual tour of the library, guided by the storyteller. Each situated storywalk began outside the library, where participants received instructions emphasising that they could freely decide what to show and where to lead the tour. There was one formal limitation to this openness: in accordance with library policy, jackets and umbrellas had to be stored in the wardrobe lockers before entering. All tours passed through the locker area and the security checkpoint prior to entry.

The maximum duration of a tour was set to one hour, although we did not limit storytellers if they were still experiencing new things. Therefore, the different tours lasted from 20 minutes to almost 1.5 hours in total. The tour group included three student researchers with distinct roles: one served as walking-partner and asked clarifying questions if needed, one documented the experience through photographs and field notes, and one created an audio recording to capture the storyteller's comments and interactions. In one situated storywalk, the storyteller was accompanied by a support person who did not lead the tour but contributed to the discussion. This arrangement was permitted to preserve a natural and comfortable environment for the storyteller.

During the walk, we recorded both verbal accounts and nonverbal aspects of how storytellers engaged with the library space, including their movement, pauses, and interactions with the environment and library staff. All groups used a tour protocol and the same templates for notes and photo documentation. In order to be able to contextualise the photos later on, the protocol included information about the photo number, place, reason/observation impulse, and relation to the observation. For notes, the storyteller ID, place, situation or room, comments or quotes from the storyteller and necessary contextual information were written down. All audio recordings were transcribed using a secure-server version of Whisper and subsequently manually proofread for accuracy. The interview and tour data were both analysed with MAXQDA using an open thematic coding scheme that was agreed on within the group of researchers. This multi-layered design enabled us to combine pre-interviews and in-situ observations, creating a holistic, situated understanding of library use from the perspective of people with disabilities.

This article reports only selected findings from the study. Many of the barriers identified would likely have been detected using alternative methods. For instance, storytellers reported broken or concealed elevators, inaccessible assistive workstations, and unreliable booking information. Physical barriers included architectural and functional challenges such as insufficient lighting on stairways, unmarked edges, incomplete handrails, and the absence of touch-free sensors in accessible restrooms. Equipment such as rolling stools also posed safety risks for users with visual or motor impairments.

Some barriers were only identified due to the use of situated storytelling, such as those mentioned above. Even among barriers that may appear straightforward to identify, some only became visible throughout the situated storywalks due to the storytellers' control over what they chose to show and discuss. For example, one storyteller guided us to the braille and tactile information display and remarked: 'Touch it. Do you feel how dirty that is?' She needed the information on the display but did not want to touch it. This demonstrates how situated storywalks support elicitation of embodied information.

Researcher-led methods may reinforce stereotypes by focusing on what is already known or expected. For instance, it is commonly assumed that neurodivergent patrons prefer quiet areas for work. While this was true for our storytellers, they also emphasised the importance of sitting near a window to allow their gaze to wander, linking this to enhanced creativity. A standard silent reading room may be quiet, but they perceived its cramped environment as limiting creativity, and, over time, concentration.

Situated storywalks proved particularly effective at uncovering invisible or unspoken barriers. For example, storytellers frequently described difficulties upon entering the library due to missing or unclear orientation information, such as maps, signage, or explanations of registration procedures. One blind storyteller needed a key to access the workspace for visually impaired users and approached the reference desk. The librarian stepped away during the conversation, seemingly unaware that the storyteller could not see her departure. The storyteller later described how this interaction made her feel marginalised in the conversation.

The most unexpected findings concerned indirect or non-visible psychological barriers reported by storytellers—barriers that likely would not have been identified without the open, participant-led nature of the situated storywalks method. For instance, access to the Berlin State Library is monitored by security personnel. This entrance was frequently described as intimidating, and the lack of clear social cues or rules generated a sense of uncertainty. In the original guided tour design, we had planned to begin inside the library, starting at the lockers and using a special pass to bypass security. This approach would have overlooked one of the study's most significant insights. Nearly all storytellers paused outside the security checkpoint. Some attempted to discern the entry procedures and behavioural expectations. Because the situated storywalks were not evaluative, the goal was not whether participants succeeded in entering, but rather how they experienced the situation. Several storytellers stood silently for a time, observing other patrons to infer the rules for entry. They later explained that, despite watching multiple people enter, each following different behaviours and all being admitted, they could not determine the correct protocol. Some noted that, under normal circumstances, they would likely have chosen not to enter the library at all, given the ambiguity and discomfort associated with the entry process.

Despite these obstacles, most storytellers also expressed appreciation for several aspects of the library: helpful staff, informative pictograms indicating noise levels in different areas, generous spatial layout, and a calm, welcoming atmosphere. By leaving control with the storyteller, they felt less forced to evaluate and criticize as much as possible and opened the conversation for more positive stories.

Conclusion

This paper introduced situated storywalks as a novel method for research on information behaviour. The approach draws on elements from several established methods, including touchstone tours, guided tours, observational studies, participatory design, storytelling, and think-aloud protocols. What distinguishes situated storywalks as a distinct method—rather than merely a variation or technique within existing approaches (see Pickard, 2009; Greifeneder & Bressel, 2022)—is its strong participant-led orientation, granting storytellers substantial agency over which aspects of their information behaviour they choose to share and the absence of any evaluative character. The method consists of two core components: a brief pre-interview and the storywalk itself. Following the tradition of storytelling, participants are called storytellers.

The method is relatively easy to implement and does not require extensive training. What is essential is a respectful attitude toward the storytellers, openness to the directions the storywalks may take, and the researcher's ability to relinquish control, step back, and allow storytellers' voices to take precedence.

The situated storywalks method was developed and empirically validated through a case study at the Berlin State Library. The case study demonstrates the value of participant-led, situated approaches in information behaviour research. Traditional researcher-driven methods often fail to capture the nuances of spatial experience and affective response. In contrast, the situated storywalks allow participants to narrate their interactions while moving through the environment, revealing aspects that might remain unnoticed in classical observations or researcher-led guided tours. The study also illustrates how participant-led methods can yield unexpected insights that challenge researcher assumptions. For instance, while the research team anticipated physical barriers as the dominant theme, many storytellers emphasised psychological and communicative aspects, shifting the analytical focus toward emotional and symbolic dimensions of access.

The openness of the situated storywalks approach and the strong agency granted to storytellers may, however, result in outcomes that do not directly align with the researchers' original research questions. Additionally, identifying consistent patterns can be challenging, as storytellers determine what aspects of their experiences they choose to share. Despite these challenges, the

situated storywalk sets itself apart by granting storytellers a high degree of agency as the method is especially well-suited to enable the deeper exploration of previously hidden or implicit information experiences, contributing innovative insights to the field of information behaviour.

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Information practices are environmental

Isto Huvila

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Abstract

Introduction. Existing research into information practices has largely neglected their fundamental environmental dimension. Despite earlier research into information environments, ecosystems, and environmental information, a sustained investigation into the reciprocal relationship between information practices and the physical, more-than-human environment – termed 'environmentality' – has been surprisingly sparse. This paper aims to address this gap, arguing for a broadened conceptualisation of information practices.

Method. This conceptual paper reviews earlier literature focusing on the influence of the environment on information practices, and conversely, how information practices shape the environment. Two empirical vignettes are used to illustrate key themes emerging from this review.

Results. The key argument of this paper is to expand the conceptualisation of information practices beyond traditional cognitive, sociomaterial, and sociocultural approaches. Specifically, the concept of *environmentality* highlights a mutual, unfolding co-construction between information practices and the environment. This includes an acknowledgement of the embodiedness, materialities, environmental underpinnings and impact inherent in these practices, as well as opening possibilities for further investigation into the reciprocal relationships between diverse more-than-human actors, including robots and animals, engaged in these practices.

Conclusion. This paper concludes that a more comprehensive understanding of information practices necessitates acknowledging that information practices *are* environmental. By recognising information practices as fundamentally embedded within a more-than-human habitat, and engaging with their reciprocal influence, it is possible to move beyond fragmented conceptualisations and better account for their intricate complexity. Furthermore, this perspective opens avenues for critical inquiry into the embeddedness, accountability, and agency of these practices within a wider ecological framework.

Introduction

As the original name of the ISIC conference 'Information Seeking in Context' suggests, one of the key questions of information behaviour research has been related to its whereabouts and what exactly constitutes the locus and context for diverse information activities. Different branches of information behaviour research have positioned it as focally cognitive and individual, others as social, cultural, material, or practice-focused undertaking. Different spatial and ecological metaphors including landscape (Lloyd, 2010), world (Chatman, 1992), grounds (Fisher et al., 2004) and ecosystem (Cortada, 2016; Introne et al., 2024) have been popular (Savolainen, 2021) even if other types of conceptualisations for what essentially describes the context of information practices have been proposed (Dervin, 1997; Huvila, 2019b; Tabak, 2014; Talja et al., 1999). Perhaps somewhat unexpectedly, one of the apparent perspectives to situate information behaviour as an environmental – as per *natural* environment – endeavour has received surprisingly sporadic attention in the literature (Norris & Suomela, 2017). Surely there is a considerable corpus of research focusing on information environments (Taylor, 1991) and ecosystems (Norris & Suomela, 2017) that captures some aspects of the natural environment and in a more specific sense to the biological underpinnings of information practices (e.g., Bates, 2005; Spink, 2010) and their relations to environment, but, as a whole, the environmentality of how humans and non-humans deal with information has not been discussed extensively. The significance of this research gap and the theoretical and practical opportunities stemming from a more comprehensive understanding of information practices as environmental is obvious if we try to redefine information practices as a concept completely disconnected from the natural environment. As you probably see, such a concept does not make much sense.

The aim of this paper is to interrogate into the environmentality of information behaviour by tracing out in what terms information practices are environmental in addition to how they are also, to various extent, productively characterisable as cognitive, sociomaterial, sociocultural, or for example, spatial. This exploration selectively reviews earlier literature focusing on outlining how environment influences information practices and vice versa, and how they are contextual to environment. Two empirical vignettes are used to exemplify the themes emerging from the review. As a terminological note, this paper refers to information behaviour when discussing the research field that investigates diverse human and non-human engagements with information (see e.g., Given et al., 2023; Huvila & Gorichanaz, 2025), and information practices when referring to such engagements. Environment is understood in this text as 'physical surroundings or conditions in which a person or other organism lives, develops, etc., or in which a thing exists' (Oxford English Dictionary, 2025) with a focus on broader material (in neo-material sense, see e.g., Dolphijn and van der Tuin, 2012), natural, or more-than-human (Varutti, 2025), rather than an unspecific or merely human backdrop within which practices are enacted.

Information and environment

Even if the engagements of information behaviour research with its own environmentality might have been limited, spatial and ecological language has been popular in describing information practices, their localities and contextualities (Savolainen, 2021). Understandings of space and place are also central to the information experience of those engaged in information practices (Cox & Fulton, 2022). In parallel, the interest in environment-related information practices has been growing steadily in information behaviour research (e.g., Chowdhury, 2014; Gilbert et al., 2021; Haider, 2016).

Many of the references to environment in information behaviour research use the word in the sense of referring to the surroundings within which actors act and information practices take place. Typically, environmental concepts describe what in broad terms can also be described as context and/or situation of information practices (Given et al., 2023, p. 75). Incidentally, the use of these related notions has also been criticised for lack of consistency (e.g., Courtright, 2007; de

Fremery & Buckland, 2022). Taylor's notion of information use environments (Taylor, 1991) and, for example, the notion of environmental scanning (Choo & Auster, 1993), both imply that information practices unfold in an 'environment' that is their setting and at the same time a key source of information and a factor that influences how information is enacted. Later studies have underlined, for example, the sensory aspects (Ocepek, 2018) and materiality (Veinot & Pierce, 2019) of information environments. The references to ecological or ecosystemic nature of information practices and infrastructures (Huvila, 2009; Nardi & O'Day, 1999; Steinerova, 2012; Williamson, 1998) emphasise to varying degrees the co-evolution and interplay of actors and (their) environment.

Much of environmental and ecological discourse in information behaviour research has tended to focus on social human environment even when acknowledging the presence of physical or material environment. There has been little exchange between biology and environmental science and information practices research that would shed light on the biological underpinnings of information activities (Norris & Suomela, 2017). Some theorists like Bates (2005), Spink (2010), Budd (2024) and Pirolli (2007) make this connection but generally it has remained undertheorised. The environment-related theoretical discourse is predominantly metaphorical applying, for example, to the use of Gibson's popular notions of affordances and constraints (Gibson, 1977) that have gained leverage in information research for explaining the use and non-use of information related artefacts and infrastructures (e.g., Huvila, 2009, 2019a; A. J. Nelson & Irwin, 2014; S. B. Nelson et al., 2017; Pilerot & Limberg, 2011; Zhao et al., 2021). This is also apparent in many of the references to Bateson's definition of 'elementary unit' or 'bit of information' as 'a difference which makes a difference' (Bateson, 1972, p. 315, 453) that information behaviour research seldom expands on its roots in cybernetics and ecological anthropology beyond stating that information is a stimulus that is supposed to make sense to a human actor (as formulated e.g. in Given et al., 2023). More recently, multi-species and more-than-human perspectives to information and document practices have started to broaden the scope of who acts with information and how, challenging the idea of (non-human) environment as a passive backdrop of (human) information practices (Kosciejew, 2020; Solhjoo, 2025).

A parallel line of research has engaged with environment-related information and information practices. Investigations into diverse engagements with environment-related information from spatial, geographical, and climate data to information on sustainable everyday practices, research on specific environment-related information practices, and studies of the environmental impact of all informational engagements all evince of how information practices are in diverse ways environmental. Information about environment is crucial for many activities. Geographical information plays a central role in many of the contemporary information services that are increasingly location-based (Huvila et al., 2025). Many researchers and professionals, including environmental scientists (Murillo, 2019), urban planners (Suorsa et al., 2024), disaster management specialists (Lekic-Savatic et al., 2025; Lopatovska & Smiley, 2014), and land developers (Huvila, 2017) work continuously with spatial information similarly to environmental activists (Savolainen, 2007) and hobbyists like bird watchers (e.g., Chaitov, 2023; Mansourian, 2021) and hikers (e.g., Innocenti et al., 2022). People seek and work with information on environment that impacts their life choices (e.g., Graminius & Haider, 2018) even if, as Haider (2011) shows, being informed and knowing of environmental issues does not necessarily have an obvious link with people's everyday life practices. The environmental impact of especially digital information practices is increasingly underlined as a major societal challenge even if information science has been criticised for being slow to engage with sustainability in its research agenda (Nolin, 2024). The information field in general and information behaviour research in particular has plentiful opportunities to engage in understanding present practices and envisioning future practices of informing and getting informed about sustainability-related conundrums (Graminius, 2022; Nolin, 2024; Spink, 1999) and

developing sustainable information systems, technologies (Agha & Akhtar, 1992) and practices (Nathan, 2012).

The literature in neighbouring disciplines provides additional examples of how information and environment converge, however, at the same time, evincing what seems a much greater commitment to explicating the mechanisms of their entanglements. Science and technology studies literature contains plentiful examples of how physical and natural environment inform a parallel with comparable work in information science (e.g., Olsson, 2016). Keller (1983) describes how Nobel Prize winner Barbara McClintock developed intimate knowledge on biological specimens that helped her to develop new genetic theories. Her studies of genetics also point to how much information is generated indirectly, not by manipulating entities themselves but their environment (Keller, 1996). Research on (information) practices in field sciences (e.g., Kohler, 2019; Kuklick & Kohler, 1996; O'Reilly, 2016) evince the same. Information is sociomaterial, but it is also environmental in how the environment 'pushes back', much like how Pickering (1995) describes the influence of material agency on scientific knowledge production.

Theorising environmentality

A key takeaway from the earlier literature is that there are apparent tendencies to view environment either in broad and unspecific, or in varyingly narrow terms both in theoretical accounts and empirical investigations. From a processual theoretical perspective, ecological theories' tendency to think in terms of firm boundaries is a fundamental problem (e.g., Abbott, 2016) with an elemental complication being the assumption of their *a priori* fixity. Boundaries are necessary for making sense of the world (Zerubavel, 1991), but when essentialised, they easily turn into a problem. Similarly, broad and unspecific references to environment can be criticised for failing to be helpful in making sense of its influence and role in informational undertakings. It is necessary to be attentive to both of these apparent risks and keep the proposed ecological-environmental theorising in its customary half-way position between case-based particularism and formal causalism (e.g., Abbott, 2016). Therefore, I am inclined to direct attention to the environmentality in information practices as their key infrastructural underpinning, however, without focusing a particular set of aspects of environment (e.g., the impact of information practices on climate or how weather affects information practices) as determinants but rather on the different ways the environment acts out when the practices are enacted (e.g., that environment influences practices and what is considered as information and vice versa) in different situations.

Such an approach to the environmentality of information practices comes close to how Pritchard (2011) uses the term *envirotechnical* to refer to 'the historically and culturally specific configurations of intertwined *ecological* and *technological* systems, which may be composed of artifacts, practices, people, institutions, and ecologies' (p. 19). She emphasises that the notion refers to environment beyond 'natural' non-human nature and to techniques beyond artefact-centred understanding of technologies incorporating technical knowledge, practices, and objects. She continues further by proposing that technologies are natural i.e. 'technological artifacts and systems are thoroughly implicated in/by/with ecologies' (p. 22) and nature is technological in how 'humans can, have, and do appropriate nonhuman nature' (p. 22). In this respect, a turn to environmentality should not be considered as a step away from humans but rather as a way to acknowledge that humans – though not only humans – wield what Hansen and Schulze (2025) describe using Bennett's term thing-power, the 'strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness' (Bennett, 2010, p. xvi) through their agency in and to the environment.

I agree with Pritchard's (2011) basic proposition of rejecting the nature/technology dichotomy and her challenging of 'the argument that technology is what nature is not' (p. 22). In contrast to Pritchard's human-centric view, however, I argue that humans are not the only creatures to appropriate nature. Beavers are an obvious example but there are many other, more subtle ones.

In a fundamental sense, I see positing that information practices are environmental as a more-than-human argument that can help to engage with their environmental aspects in a manner that traverses the dichotomies of how they are often either related to or underpinned by their environmentality rather than being the both at the same time. While the present paper focuses on the reciprocal environmentality of human information practices because I am inclined to consider that there is enough ground to cover for a short paper, more importantly, the exploration into environmentality also opens an inquiry into what extent more-than-human entities engage in activities that are fruitful to conceptualise as information practices (cf. Ferraris, 2014; Solhjoo, 2025). Like Soper (1996) emphasised the importance of untangling oppositions relating to contemporary theories of 'nature' for being able to distinguish human nature and human impact on nature, a similar move is needed to approach information and information practices both as environmental and relating to environment. Following Pritchard's (2011) framing of techniques as being cultural in more-than-human sense, also information and information practices should not be treated as what nature is not, but rather, if not artefacts, as entities that 'are thoroughly implicated in/by/with ecologies' (p. 22) where environment becomes an actant by its own right.

A parallel benefit of inquiring into the environmentality of information practices is the opportunity to draw from environmental theorising to explicate their changing (eco)systemic entanglements rather than contenting oneself to describe their present relations to particular environment-related contexts, situations, things, species, or forms of matter. Similarly to how Bennett (2010) describes matter, the most pertinent aspect of environment is perhaps not that it merely is there but rather, that it is vibrant – it is alive and animate in a very literal sense. From this outset, my theoretical standpoint to environmentality of information practices in this paper can be summarised as that of environment being 'thoroughly implicated in/by/with' (Pritchard, 2011, p. 22) the ecology of human and more-than-human information practices and their infrastructures (cf. Huvila, 2009, 2018).

Vignettes

Instead of turning to actual empirical cases, I am using the following two vignettes to outline the different ways that information practices are environmental. The first one concerns archaeological information practices that are epitomised by multi-modality (Huvila, 2018; Olsson, 2016) and contemporary everyday life digital information practices whose environmental impacts and dependencies have only recently begun to be seriously acknowledged (e.g., Nathan, 2012; Nolin, 2024).

Archaeological information practices

Archaeologists seeking information by feeling, listening, and even tasting physical objects and the stratum has turned to something of an exemplification of how information practices can be embodied and associated with physical objects (Olsson, 2016). Archaeology is also, however, to a significant extent, environmental and driven by factors beyond the classical trope of an archaeologist carefully unearthing an artefact. Archaeological work and its tools are enmeshed in environment. This applies to natural and synthetic materials used to produce notebooks, measurement devices and trowels, their availability and durability, but also to how perhaps the most critical problem in digitalising archaeological fieldwork in remote areas has been the lack of electricity and connectivity, and the price and availability of sturdy enough devices suited to fieldwork (Huvila, 2019a).

As per evidence, beyond individual objects, archaeology is interested in their broader distribution in the landscape, and larger structures and features in the stratum, including remains of buildings and roads. Contemporary archaeological inquiry relies heavily on analysis of geophysical, chemical, biological and environmental data and knowledge of animal and plant remains (Pollard et al., 2023). Knowing the environment is critical for an archaeologist to also understand how to piece together

the evidence, to understand when a certain feature is human-made and when it is a result of natural processes, or to know when coarser digging methods are acceptable, and when it is necessary to proceed very cautiously.

Historical and contemporary geological and biological processes are also influencing the preservation of physical evidence from the past and whether an archaeologist notices individual, often tiny pieces of potential evidence in field (Perreault, 2020). When it is raining, too dark, or when direct sunlight dries the stratum, flattening its colours, it is easy to miss details. When soil is too hard or too moist it is difficult to dig (Huvila, 2019a). The archaeological physical record is fundamentally a result of how the different facets of environment work in concert, with, together, and against each other.

Digital information practices

Even if a prominent trope of the digital way of life is a virtual reality disconnected from the physical *real* life, recent global and local crises are making it increasingly evident how the digital cannot escape its environmentality. Every internet search, social media post, and especially the use of artificial intelligence, has a significant environmental impact (Nolin, 2024). Digital information management can save paper and videoconferencing can reduce the environmental impact of travelling but both have an environmental impact that is not negligible. If non-digital tools and commodities are manufactured of physical materials, the amount and complexity of resources required to produce digital devices and the complex infrastructure of digital information practices is massive. Data centres and location-based media are dependent on the functioning of a complex geographically distributed infrastructure of earth mineral and energy sources and base stations that is clearly not as robust as we may think. Electricity supply and telecommunication cables are vulnerable to both human and environmental interference, including storms, floods and drought. Even if satellites make connectivity seemingly ubiquitous, they depend on the environment in orbits that are increasingly congested, at a time when it is increasingly difficult to disconnect and pursue a life without using any digital technologies.

While helping to overcome the constraints of the physical environment, the expansion of digital information practices has started revealing its downsides, as well as highlighting the advantages of non-digital interactions. Remote work can be an opportunity but also an impediment to, for example, serendipity, information exchange, individual and collective trust and well-being (Paavola et al., 2025). Digital information practices do not make the physical environment disappear, either. Mobile workers do not necessarily need to commute to a specific office but they still need a physical place to work (Jarrahi & Thomson, 2017). Even if new digital screens are much better than older ones, they are still hard to use in direct sunlight.

In the end, digital information practices are not only about distancing from the environment (Cox & Fulton, 2022). Diverse location-based services have made many information practices increasingly environmental in how it is possible to seek information relative to the specific place and, for example, local weather. Environmental practices have also become informational, for example, in how mobile applications help to crowdsource information on the state of the environment and help to recognise plants and birds, pointing to how the contemporary digital informational way of life is as environmental as ever.

Discussion

The two vignettes direct our attention to a handful of modalities of how information practices are environmental and in Pritchard's sense, envirotechnical in how they condition and are conditioned by environment and a plethora of environment-related practices, objects, and knowledge. In addition to making the broad connection between information practices and environment, the vignettes also help to discern specific modalities for how environmentality is enacted in information practices.

First, *information practices are conditioned by the environment within which they are enacted.* This environmental impact can be conceptualised in terms of general and specific footprints of individual artefacts, natural objects, or particular assemblages of environmental processes and matter. However, as the two vignettes evince, information practices are not conditioned by one of them alone but rather by the very specific environment as a whole within which they unfold. Understanding the information practice of a field archaeologist requires a thorough understanding of the particularities of the environment of a specific excavation site and its critical aspects to interact with information. Similarly, a meticulous account of digital information practices could be suggested to require a much more careful rendition of their digital and non-digital environment.

Second, *information practices condition the environment both directly and indirectly*. While information science seems to have a tendency to conceptualise information as a medium or means to an end, the vignettes show how information practices have very specific implicit and explicit impacts on the environment. Designating an excavated feature in the archaeological stratum as archaeological has multiple consequences to how it is treated in the future as a material feature and a source of information. Similarly, digital information practices designate objects, turn environments navigable or non-navigable in addition to how the development of digital technologies have changed geography. We now have nearly ubiquitous means of interacting, sharing information, and collaborating remotely, though in some cases, physical presence is still required or preferred. Interplay between people and environment has also changed. The technologies themselves mean that certain places in the environment have turned particularly valuable due to rare earth mineral deposits required for producing digital equipment and sites that are particularly suitable for digital infrastructures like telecommunication cables or data centres.

Following Pritchard (2011), the reciprocal conditioning of and by environment can be conceptualised in terms of techniques enacted by human and non-human entities being part of the environment that incorporate knowledge, practices and objects brought into play in diverse situations. Such techniques might be best understood, as Pritchard suggests, in the sense of the word *technique* in French, that in her view is less focused on technological objects than the English one. Another concept that can help to understand the use of technique is the notion of cultural technique (Ger. kulturtechnik) discussed in German media theory (Siegert, 2015). Similarly to Winthrop-Young (2014) who emphasises that in the contemporary understanding, culture does not necessarily need to focus on humans or 'high culture' only; in environmental or envirotechnical sense cultural techniques are naturecultural (as for Haraway, 2003) i.e. inclusive of the environment in its entirety.

Third, *information practices are environmental both directly and indirectly*. Direct forms of environmentality in, for example, how archaeologists get informed by hands-on interactions with the archaeological stratum, are often easier to discern than indirect ones even if information science has a pre-history of focusing on particular information artefacts and being a less specific or less formal means of informing and getting informed. Indirect forms, like the impact of geography on mobile coverage, how certain types of urban spaces invite people to talk and spend time with each other, and how origins of some archaeological investigation methods in archaeologically rich areas mean that they are ill-suited for research on areas where traces of past occupation are more subtle and different.

Fourth, *environmentality of information practices is often invisible*. Indirect infrastructural forms of environmentality can be especially difficult to discern. They are taken for granted without reflecting upon them, but even direct forms of environmentality might remain obscured by the fact they are too self-evident. It is common knowledge that notebooks and archaeological documentation forms are printed on paper that are produced from wood, or, that the most of the plastic in circulation and used in manufacturing diverse digital devices has its origins in fossil oil. Darkness or bad weather obscure what we can see and report, but even largely unremarkable

weather conditions like thin overcast, too bright sunlight, or haze affect what we can see. If taken literally, the proverb that it is difficult to see forest for the trees reminds us how environment can influence how we direct attention to certain things while ignoring others.

Fifth, *imaginaries of the environmentalities of information practices can differ from how the environmentalities are enacted in practice*. The portrayals and discourse on the environmentalities of information practices can be selective, but as Pritchard (2011) reminds us, entities like nations that are – inspired by Anderson (1991) – frequently argued to be imagined, such things nonetheless take place in the environment with environmental underpinnings and consequences. This applies obviously to information practices as well. In theory, archaeological fieldwork is a systematic and meticulous undertaking of documenting the entire stratum under investigation – which it is – even if the inquiry is at the same time limited by many practical and environmental constraints from hard or too moist soil to bad weather and remote location of the site. Particular information practices like videoconferencing are also varyingly ascribed as diametrically opposed environmental impacts and they are portrayed as either green or environmentally questionable. With digital information practices, one of the key arguments for information digitisation has been the possibility to reduce environmental impact of travelling and paper handling. All but recently, this discourse has omitted the environmental footprint of manufacturing, running, and disposing digital devices and their critical infrastructures.

Sixth and finally, *environment is informational and information itself involved in information practices is environmental in diverse and to the practices in specific ways*. The vignettes provide plentiful examples of the how diverse things appropriated as information both in archaeological fieldwork and everyday digital practices are relative to the environment in multiple ways. As Araújo (2024) puts it, 'information is imbricated in a context; it is in the order of a contingency… it produces effects, it is a way of acting in the world' (p. 18). In an environmental sense, acting with information is not only a human condition (Arendt, 2018; Huvila, 2008a) but a condition of the environment itself. Even if manipulated by humans, archaeological finds are often typical to the environment where they are found. Local production of artefacts and transportation of goods farther off both depend on environment. While digitalisation has overcome physical and geographical boundaries, even digital information can be in diverse ways environmental, either being sourced from the local or distant environment, conditioned by it, or by having an impact on environment, for example, to what roads and travelling options we choose, and what choices we make as consumers of diverse goods and services.

In addition to how a closer look at the environmentality of information practices provides means to articulate their reciprocal impact, in a conceptual sense, a closer consideration of what environmentality implies in the context of information behaviour research can help to open some of the persisting conceptual black boxes in the field. It is common to note in passing that information practices are, for example, social, cultural, material, embodied, affective, more-than-human, or cognitive, and having an environmental impact, often without necessarily specifying the corresponding concepts and, perhaps even more often, their mutual differences and linkages. To be fair, corresponding conceptual unclarity and tendencies to bundle together such elementary categories as social and cultural has been observed and criticised throughout social sciences (e.g., Lahire, 2023; Latour, 2005). A parallel, equally problematic approach typical to many information behaviour models is to propose an assumably complete list of factors that together explain, for example, the social or environmental impacts and underpinnings of information practices. Environmentality of information practices implies that environment is no more merely a context in a generalising container-like sense or a factor reducible to a handful of facets. Context, whenever using the word makes sense anymore, to refer to diverse particulars underpinning information practices, and situation – as a particular set of circumstances with specific kinds of internal-external dynamics arising in a particular moment of time – are not surrounding or

containing information practices but rather patterns, meshworks or centred sets (Huvila, 2019b) of everything that not only connects (as for Bateson, 1978) but participates in a practice. While I am not opposing the use of the terms environment or context to describe what should be obvious after 30 years of ISIC and related research, that information practices are not happening in a vacuum, I believe that it is the time to seriously shift focus on explicating and analysing the constituents, including environmental ones, of such centred sets, however, rejecting the idea that the context we describe would be nothing more than a result of an analytical choice to focus on factors that appear as particularly interesting and pertinent to reaching specific analytical or practical ends in a given situation.

The environmentality of information practices means also that rather than being merely ancillary to other practices with direct environmental impact, the information practices themselves have diverse impacts. While it still can be useful to make analytical distinctions between primary and secondary practices framing information work as a form of sub-work (Huvila, 2008b cf. computing work for Gasser 1986) to other activities, such analytical hierarchies or prioritisations of particular perspectives or activities should not be assumed to imply that they would be subordinate undertakings when it comes to their complexity or environmental embeddings.

A key risk in inquiring into the environmentality of information practices is to meander towards some form of environmental determinism and claiming that the environment should be marked out as a new particularity of how information practices should be understood. Rather than de-emphasising other dimensions of and perspectives to information practices, my purpose for inquiring into the environmentality of information practices is to contribute to embracing their complexity. They are more-than-human, and, perhaps even more succinctly, more-than-anything-particular – at the same time cognitive, social, cultural, material, multi-species, environmental and so forth. Paying particular analytical attention to their environmental aspects helps to pinpoint certain particularities about their more-than-human nature that might otherwise remain undisclosed if the focus of inquiry would attempt to cover all-more-than-human at once. I am inclined to posit that inquiring into the environmentality helps to disclose a consequential aspect of information practices that easily remains invisible as a part of their context when they are, in passing, acknowledged to be contextual. Pritchard (2011) emphasises the risks of such generalisations in her critique of how non-reflective use of the notion of hybridity risks to flatten or even conceal significant differences among hybrids (p. 246). Similarly to how all information practices are sociocultural, sociomaterial and sociotechnical, more-than-human, and, as discussed in this paper, environmental, each practice is all of them in very particular ways. A key question is thus how a specific practice is environmental and how different, even very similar practices differ from each other in their environmentality.

Conclusions

My key argument in this paper is that information practices *are* environmental and our understanding of them broadens if they are approached as environmental in an envirotechnical sense. Rather than a container or scene like a backdrop of how information takes place, environmentality of information practices mean that they are unfolding as a part of, rather than within, their more-than-human habitat. A parallel benefit of approaching information practices through their environmentality, it can help to assemble a broad range of what is typically seen as their contextualities in relation to each other, including their embodiedness, materiality, environmental impact, and more-than-human character to a whole that facilitates sensitising vibrant change and the mutual, very tangible co-construction of information practices and physical environment. Acknowledging the environmentality of information practices implies that (physical) environment is not a container of but a participant in information practices, and context is a set of factors that is analytically and functionally central to them in a situation, a moment in time-space, when they are studied or enacted rather than static or given containers or scenes for

informational undertakings. It also opens up the question of whose practices the information practices are and to what extent it is fruitful to conceptualise the information-related interactions enacted by, for instance, (some species of) animals, robots, and artificial intelligence as information practices. However, even if environmentality is a substantial aspect of information practices rather than a mere analytical perspective, I am not suggesting that it should replace other perspectives. Rather, as with other aspects of their contextualities, acknowledging and inquiring into the environmentality of information practices is complementary to approaching them as social, cultural, cognitive, and more-than-human undertakings – of which none is comprehensive enough to address their intricate complexity.

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‘Helping people with literally everything under the sun’: Exploring the work and information behaviours of constituency caseworkers

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Abstract

Introduction. This study explores the work conducted by constituency caseworkers in Scotland with a focus on their information behaviours. Caseworkers act as information intermediaries, finding and sharing information with constituents on behalf of elected political representatives. As yet, they have not received much examination in information science.

Method. 20 constituency caseworkers across Scotland were interviewed. In semi-structured interviews, participants discussed their role and responsibilities, revealing a variety of different information behaviours.

Analysis. Interviews were transcribed then subjected to thematic analysis, identifying and categorizing recurring phenomena.

Results. Findings showcase caseworkers’ role as information intermediaries with a wide range of information behaviours. These include information elicitation, information tailoring, and information signposting. Networking was also found to be crucial to the role to keep informed and find critical information for clients.

Conclusion. Gaining a deeper understanding of unexplored information intermediaries contributes to the information behaviour field as well as providing practical implications for governments to motivate greater support for caseworkers, who are given little training for their critical role.

Introduction

While the roles and responsibilities of politicians have moved to the forefront of the public's mind in recent years, staff behind the scenes and the information work they undertake has garnered little attention. In the UK, constituency caseworkers act as a point of contact for the public with their elected representatives. Acting as information intermediaries, caseworkers advocate for, signpost, and seek information for constituents who may be unable to find information for themselves (Womack, 2002).

This paper introduces the information work and behaviours of constituency caseworkers who work for Members of the Scottish Parliament (MSPs), examining their job role and responsibilities, discussing distinctive information behaviours such as information elicitation (Ashikuzzaman, 2024; Cassell, 2023; Ross, 2003) and information tailoring (Colineau & Paris, 2009; Smets et al., 2024; Tara, 2015). Casework can cover a staggering range of topics, from homelessness to refuse collections, requiring caseworkers to have excellent information seeking and sharing abilities.

Information intermediaries are defined as those who act as information agents, undertaking information work on behalf of others (Buchanan & Jardine, 2020; Nicol et al., 2022). Often associated with archivists, librarians and teachers (Vitak et al., 2018), the human role of the information intermediary has been expanded to encompass other professionals, for example, family nurses, chaplains, and social workers, who assist in the collection and distribution of crucial information (Abrahamson & Fisher, 2007; Buchanan et al., 2019; Robson et al., 2024).

Although examination of information intermediaries is gaining traction, and they are regarded as a 'a vital component in information behaviour' (Case & Given, 2016, p. 362), the focus on intermediaries within information science has chiefly been on those whom they serve, examining concepts such as information poverty (Chatman, 1996), information marginalisation (Gibson & Martin III, 2019) and information needs (Buchanan & Jardine, 2020; Hasler, 2014) among those populations. This study adds to the literature by focusing on an unexplored category of information intermediary, in a study of how they meet their clients' ('constituents') information needs.

In the UK, elected representatives such as Members of Parliament (MPs) and Members of the Scottish Parliament (MSPs) are individual employers in sole command of staffing their offices, with roles such as parliamentary researchers, policy assistants, social media creators, and constituency caseworkers (IPSA, 2023; UK Parliament, 2023). Roles and responsibilities often overlap, but constituency casework specifically refers to the issues (cases) that members of the public (constituents) bring to their elected MP or MSP (representing a specific geographical area or 'constituency') (McKee, 2023; UK Parliament, 2023). The current work focuses on caseworkers in Scotland supporting MSPs.

Casework is the day-to-day support available to constituents, who can contact their MSP for assistance, for information, conflict resolution, or advocacy. While constituents can and do contact MSPs for other matters, e.g., policy queries, casework is defined as that which requires problem-solving and active engagement from staff at the behest of individual constituents (Gill, 2020; Koop, 2012; McKenna, 2022).

Crucially, casework is not a legal requirement of the MSP role and is rarely overseen by any higher authority. Occasionally, a constituent's individual problem will prove to be part of a broader issue, such as a medical scandal (e.g., Derbyshire, 2017), and might be referenced by the MSP in a parliamentary speech or taken to social media or journalists, sometimes to enhance the public image of the politician or, more often, to further the case. Casework is however largely hidden from public view.

Most casework is treated as discrete work tasks distinct from the MSP's legislative duties and tends to be performed by staff acting as sole operators of cases, with various levels of oversight by the

MSP (Gill, 2020; McKenna, 2022). A key characteristic of casework is unpredictability, with cases ranging from the mundane to the horrific (Gill, 2020; Nicol et al., 2022). Cases can cover multiple issues, entailing highly detailed information tasks reflecting the complex information needs of constituents (Gill, 2020). MSPs are sought out to assist with such matters for a number of reasons, including the public perception of MSPs as independent arbitrators, a belief that an MSP has influence that could resolve cases, or, indeed, as a last resort when other channels have failed (Blidook & Koop, 2024; Gill, 2020).

The constituency caseworker role is not unique to the UK, with similar roles in Ireland, New Zealand, Australia and Canada (Blidook & Koop, 2024; McKee, 2023). Globally, staff of elected representatives operate in the shadows, their jobs ill-defined and often misunderstood by the public and even by the politicians who employ them (Tiernan, 2007). There is a lack of formal mandates for members in regard to casework (which is rarely even stated on official government sources) (Commonwealth of Australia, 2025; New Zealand Parliament, 2025; Oireachtas, 2025; Privy Council Office, 2015) and gaps in knowledge regarding the role performed and the information sought, shared and collected.

Constituency caseworkers have attracted little scholarship, with existing literature limited to parliamentary-funded studies and newspaper articles on the psychological stresses of the role (Chappell, 2020; Courea & Halliday, 2024; Cox, 2018; Halliday, 2024; Weinberg et al., 2024; White, 2019). There are however a few studies exploring constituency casework. Hofstetter examined constituent and MP interactions including casework and signposting (Hofstetter & Alexander, 2021; Hofstetter & Stokoe, 2015, 2018a, 2018b). Gill's study on MSPs and casework included constituency caseworkers as participants, though they were not at the forefront of the research (Gill, 2020). Nicol et al. explored the changing information work of support staff, including constituency caseworkers during the Covid-19 pandemic (Nicol et al., 2022).

Research questions

There is little research into constituency caseworkers, neither regarding their remit nor their information behaviours, despite their important role as information intermediaries. To shed more light on their work, the following research questions were posed:

RQ1. What information work do constituency caseworkers engage in?

RQ2. How do constituency caseworkers act as information intermediaries?

RQ3. What information behaviours do constituency caseworkers engage in when acting as information intermediaries?

Methodology

An interview study (n=20) was conducted to provide novel insights into the work and information behaviours of Scottish constituency caseworkers. The study received ethical approval from the University of Strathclyde.

Questions covered five categories, deliberately broad to allow participants the range to speak about what they found to be important aspects of the role:

1. Demographics – Age, sex, schooling, time in role.
2. Experience – Description of role, motivations, challenges,
3. Training – What was provided, what was missing.
4. Networks – Connections and contacts made or available to them
5. Other – anything else to discuss

Semi-structured interviews were chosen for their combination of flexibility and structure, allowing the conversation leeway, while also permitting questions to be guided and interviews to be conducted quickly if necessary (Luo & Wildemuth, 2009). As caseworkers were either giving up free time or participating during working hours, careful consideration was given to interview length. Piloting with colleagues resulted in questions that could be covered in 30 mins.

Participants were offered in-person or online interviews to fit work schedules. Two opted for in-person. While scheduled for 30-60 minutes, interviews ranged from 26 minutes to 2h 26 minutes, averaging 1h 10 minutes. Interviews were audio recorded resulting in 23 hours of data.

Participant selection and profile

Caseworkers were recruited by first sending emails to the 128 publicly available MSP email addresses (Miles et al., 2020; Pickard, 2018). Some MSPs then forwarded the email to the private email addresses of caseworkers, of which 25 responded. Three responders declined, and two dropped out before interview. Interviews took place March to April 2025.

Analysis

Thematic analysis was utilised by the lead author to find codes, with themes developed and refined iteratively by discussion among all authors (Braun & Clarke, 2012). This involved finding commonalities in the data by following a six-phase process, beginning with familiarisation with the data, achieved via transcription and multiple readings of the data. Transcription of audio recordings was performed manually, allowing immersion with the data which formed a deeper, richer understanding of the information (Strauss & Corbin, 2015). Intelligent verbatim transcription was applied, with stutters, filler words and false starts removed to make transcripts more readable and digestible while maintaining nuances of participants' responses, which is ideal for identifying recurring themes and concepts (Point & Baruch, 2023). Participants were offered the option of reading transcripts to confirm their original statements and, if necessary, suggest redactions (Carlson, 2010).

The next phases involved identifying initial codes and illustrative quotations, then placing them into overarching themes. Several codes and themes were merged, separated, or discarded as time passed to be more cohesive before contextualising the themes within current literature (Braun & Clarke, 2012; Hamad, 2023). This data analysis was sequential but also recursive, as at many points it was necessary to go back a phase with a new perspective and re-build, examining the codes in relation to the research questions to ensure relevance (Miles et al., 2020).

Findings

This section details study findings, exploring the work of caseworkers, focusing on information tasks, as well as their information behaviours.

Themes are discussed using illustrative quotes, though quotes can reveal several different aspects of information work taking place simultaneously and have thus been sorted as logically as possible.

Casework characteristics

This section addresses RQ1, conceptualizing the role of a constituency caseworker, exploring its parameters, and types of information work they engaged in.

Variation

Participants were asked to give a brief description of their work. All believed the role to be vastly different to written descriptions such as job advertisements, with a wider range of duties and responsibilities '*do you want the job description or the reality*?' (P1).

Participants found cases too varied to properly describe, though housing, the National Health Service (NHS) and education concerns dominated day-to-day tasks. All argued that '*anything and*

everything' (P16) could feasibly land on their desk, with Table 1 demonstrating the range, from the commonplace to the heart-breaking.

Health	Legal	Transport	Housing	Financial	Environmental
ADHD and schooling	Child sexual abuse	Ferry delays	Land ownership	Council tax overpayment	Council roadworks disrupting the growth of plants
Adult caring responsibilities	Domestic abuse	Anti-pavement parking	Homelessness	Decreasing child maintenance payment	Garden centre recycling scheme
Suicide	Help with arrest warrants	Bus schedules, shelters and gates	Overcrowding	Food parcels	Food recycling scheme
Medical scandals	Help prison inmates	Community centre parking	School catchment areas	HMRC (tax) concerns	Abandoned boats in harbour
Cancer misdiagnosis	Shop facial recognition software	Disabled parking spaces	Wheelchair access to third floor flat	Rent concerns	Overgrown Japanese knotweed
Hospital at home services	Solicitors' offices closing	Driving license revoked	Black mould	Community funds	Rubbish dumps
NHS waiting times	Leaving the Taliban	Train refunds	Waiting lists	Heating bills	Sewage in garden
Hospital trips with plus 1	Paedophile ring	Private taxi for narcolepsy	Ground floor access after operation	Windfarm land payments	SEPA water monitoring

Table 1: A list of individual cases that participants spoke about in interview. Many examples given cross over categories (such as health and housing) but have been placed to showcase range of daily cases.

This variability was seen as a positive aspect of the role, with multiple participants citing it as a factor in their remaining in the role, enjoying the chance to learn and adapt to the constant workflow:

> *It's a different job every single day. I never know what's going to phone, write, email, walk in. I can guess… our bread-and-butter work. But the other stuff, you cannot guess, and that's quite interesting.* (P4)

> *You never know what is going to be on the end of the phone. You know, from the weird to the unbelievable to… the so sad.* (P14)

> *It's helping people, but it's helping people with literally everything under the sun.* (P7)

Multiple participants expanded on this theme of variability, noting that constituency offices and caseworkers themselves could differ hugely, and that casework would accordingly be conducted in very different ways (P2, P3, P13, P15). Time taken on cases was also highly variable: some lasting minutes, others many weeks, or even years.

> *...last week I had nothing in my for-action tab. And now I've got ...13. In total, I have how many non-closed cases? 28... all of a sudden you get like five in a day. And they vary obviously in intensity.* (P15)

Participants noted that constituents did not always fully comprehend the assortment of issues they were facing, often involving many interconnected problems, which meant having to interact with multiple external services and sources of information '*when you're dealing with a case and somebody will tell you, X is a problem. And then you have a chat with them, and you go, yes, but A and B is also a problem and F*' (P9). Interview analysis revealed that the three most frequent categories of case brought to caseworkers were housing, healthcare, and education. Figure 1 illustrates some of the potential overlaps that could be present within cases, with the concept of 'waiting times' a common issue across the board, and issues such as black mould causing concern with not just housing, but also with health, as highlighted by recent tragic cases (Brown & Booth, 2022).

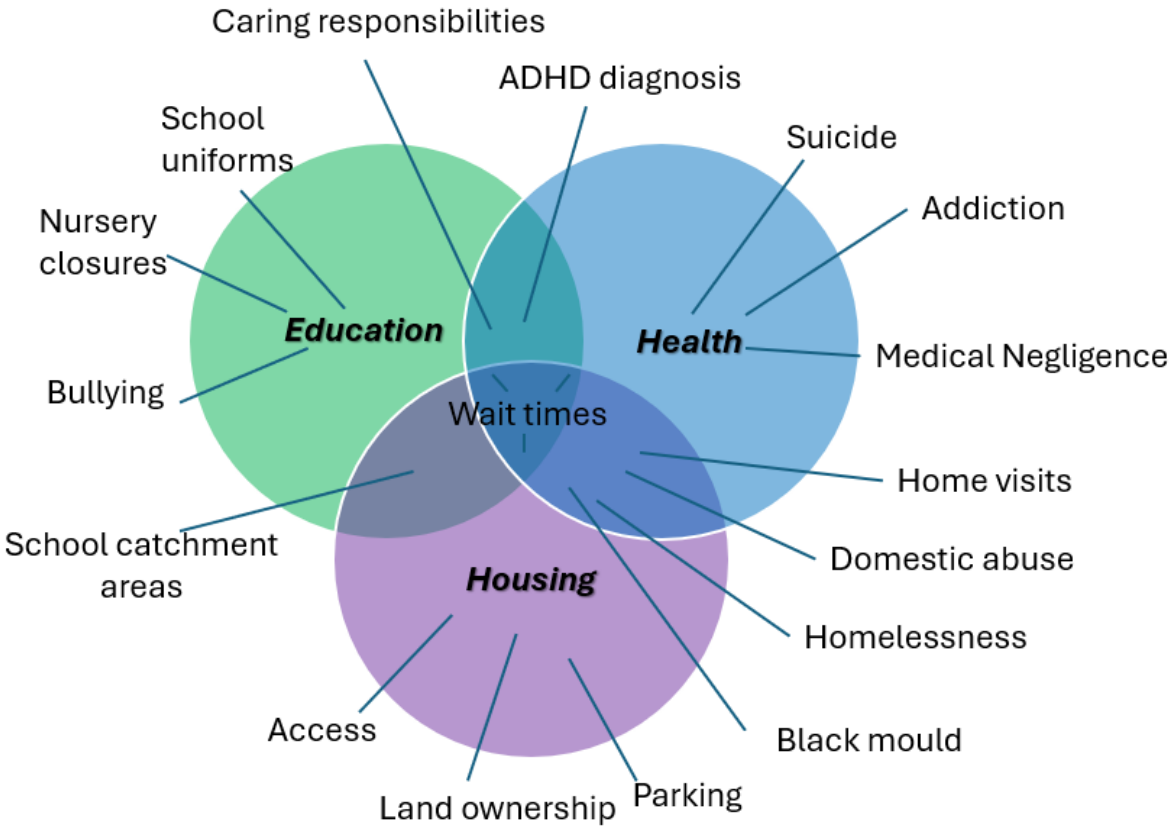


Figure 2 Venn Diagram showcasing three major types of casework, demonstrating how problems often intersect.

Political aspects

Participants were divided over the extent to which personal politics influenced their work, from the hiring process to the job itself. Three stressed that they were not political at all in their personal lives (P2, P7, and P20) and did not believe that active engagement in politics was required to perform their role, while two had been employed following periods of political activism (P3, P9). Two argued that their political beliefs had to align with those of their MSP when conducting

casework '*I don't think I could write an email that I didn't believe*' (P18), though three others said that while they were not supporters of the party with which their MSP was affiliated, they were supportive of the MSP in themselves. A minority (6) had a degree qualification in politics (P2, P6, P11, P12, P17, P18), though none believed it had prepared them for the role's realities.

Participants were clear that casework was removed from politics when advocating for constituents, [Participant and colleagues are] '*very careful to say… we are not asking for special treatment*' (P3), '*we always remain neutral*' (P18). However, they conceded that in working for a political representative, any of their work *could* become political, be it '*to win hearts and minds*' (P1) And by being responsive or doing tasks well, they may maintain or enhance the MSP's popularity and assist their re-election: '*how well I do my job can directly influence electoral outcomes*' (P15). Additionally, casework could be used by MSPs to increase awareness of big or divisive issues and cases could be raised among other elected representatives, including in parliamentary debates (P13), demonstrating how casework can have far reaching effects and consequences.

Training and lack thereof

The scarcity of casework-specific training identified in the literature was confirmed by participants' responses. While professions such as social work or nursing have strict training protocols and qualifications, there is no accredited training for caseworkers – '*for us it's on a wing and a prayer*' (P16).

Participants discussed some available training, but this was often parliament centric, in setting (having to travel long distances to the parliament in Edinburgh to take part) or in content, e.g., fire evacuation training in the context of the parliament building, rather than constituency offices (P2). When asked if there was specific training, P3 responded: 'No. *Has anyone said yes to that*!?' P4, P10, P17, and P19 all called commencing their role a '*baptism of fire*', with no official handover procedures:

> *one of my questions in the interview was, what kind of training do you provide? And it was a blank look on their face like, what do you mean? And I was so confused… [they said to me] you're more than welcome to organize it.* (P7)

Thus, the onus was on caseworkers to learn the role and skills of casework 'on the job'. A majority of participants concluded that experiences outside the role had been essential training, notably, experience in customer service roles. Some noted their luck in having supportive, experienced colleagues who could train them, while being acutely aware this was not a universal experience:

> *…you might find that you come into a new office, and you've not done casework before, and that caseworker who was in there before has left…without giving any instruction. Panic stations!* (P16)

Training improved post-Covid, with greater availability of online resources. This included a caseworker forum, regularly hosting training delivered by caseworkers and other organisations, both by internal organizations, such as the Scottish Parliament Information Centre (SPICe), or external providers. While sometimes useful, participants expressed frustration with these services, citing lack of visibility, '*I didn't know that SPICe existed for a year, nobody told me. I got no information*' (P16), '*resources that are there, that you don't* ***know*** *are there*' (P2).

Communication

This section focuses on RQ2, exploring how caseworkers' act as information intermediaries.

Networks

Participants found building networks to be necessary to constituency casework for gaining relevant, critical information for constituents and for the MSPs for who employ caseworkers.

Again, participants struggled to detail how they forged and maintained networks, but all were clear that connections were crucial. '*You need to create good connections in the community to be a good caseworker*' (P1).

Building and maintaining networks and resources was mentioned by all, though the manner varied. Some preferred to rely on parliamentary resources such as telephone hotlines or parliamentary groups (e.g., SPICe or other cross-party groups) which could be contacted for advice and assistance. Additionally, each constituency office has software, called 'Caseworker', accessible by all staff. This is used to log cases, with old and current cases and general contact lists visible. However, most participants found these resources to be too general or out of date and needed to supplement them with their own personally sourced knowledge bases.

Caseworker networks such as WhatsApp or Facebook groups were mentioned by several participants and though only used occasionally, they appreciated this option (P2, P6, P8, P11). Similarly, individual or groups of caseworkers could be contacted using parliamentary email. This was again seen as a rarity (P2, P3, P4, P14).

Arranging meetings with public service providers, businesses, or community groups were common ways to build up networks and to follow up on cases (P2, P7, P8). Some had contacts pre-dating their caseworker employment that they used in office, such as local authority, charity, or business contacts, as well as using associations via their political party membership. Others created their own '*online black book*' (P10), noting useful contacts when seeking information. Contacts formed the fundamental blocks of information work, as while a caseworker might not know much about a topic, they knew who to go to for an answer:

> *.... initially, I found it very, very stressful because I was like, I'm 17. What the hell do I know about tax? But now the way I see it is more, I don't need to know about tax. I need to know who knows about tax.* (P15)

> *Honestly, it's talking to other people and it's getting it wrong sometimes. So, like phoning the wrong number...eventually someone will direct you to the person to help you.* (P17)

When questioned further on the formation and maintenance of networks, many referred to their '*experience*' in the role as how they knew what to do and who to contact: '*You tend to just learn who the best people...are.... that's an experience thing*' (P1). Maintaining strong relationships and staying professional and polite under pressure was also key to networks: '*we don't want to go too strong and just break that chain of communication at all, because absolutely we might need them tomorrow to bend over backwards for us*' (P19).

Trust building

Another essential practice for effective casework was building trust with clients and sources. Part of this was about empathy, with 19/20 participants noting its crucial role: '*you need empathy and compassion before anything else*' (P17). Trust allowed for greater information sharing, which facilitated accurate and efficient information seeking: '*...it also allows you to build a better rapport...to display a bit of empathy*' (P10).

Participants stressed the fundamental role of active listening in building trust and how it aided information work by helping them to fully understand a constituent's needs:

> *...first thing is trying to get the information. And that actually can be very difficult.... Sometimes somebody's situation is very complicated. And for them just to suddenly... tell you everything that's been going on for...however many years, ... it takes quite some time.* (P14)

Active listening also played a role in understanding constituents' perceptions of task success. Constituents could be as varied as the casework, if not even more so, thus checking in and listening to needs rather than assuming the direction or degree of effort expected was necessary:

> *I'll ask: ...What does success look like for you now? How would you like us to step in? I don't tend to do anything without having quite clear instruction, because everyone's different.* (P13)

Keeping clients informed and actively listening meant that they would be more open to changes of direction if a caseworker felt that doing so would be the best way to close the case, even if the client had originally desired a singular direction: '*I think most people are quite agreeable to you changing tack*' P19.

Building trust with sources was also crucial. Being upfront about the information needed and its priority, '*We never say [to sources] it's urgent, if it isn't*' (P4), enabled caseworkers to engage with sources '*off the record*' (P4) or '*under the radar*' (P4) and to obtain information that might not normally be revealed, as sources could trust caseworkers' sincerity, confidentiality, and discretion:

> *We built very good relationships where we can go under the radar on stuff where you have very straight conversations and just say, really, what's going on here? And where you may get other piece of information... they trust us.* (P4)

Setting expectations

Another part of building trust with constituents centred on managing expectations. Participants noted that many constituents had unrealistic expectations or a false understanding of what MSPs and/or caseworkers were capable of: '*We don't have like superpowers, and we can't force other services to do certain things*' (P7). Participants noted that many constituents perceived the MSP as the one who would do the casework, believing that the MSP had far-reaching powers to solve cases: '*no-one understands who we are or what we do...Like the expectation people have is that* [MSP] *is doing it all, and I'm like: Yeah. I like to see him try!*' (P2). Thus, the first step in any constituent interaction was to set expectations of what could realistically be achieved:

> *The frustrating thing is that people think that we can wave a wand and have things happen for them. And I'm always at pains to tell people I cannot compel anybody to do anything, but I can and will fight your case.* (P3)

Information engagement

This section explores RQ3, examining prevalent information behaviours revealed by participants.

Information elicitation

Participants described extremely high levels of engagement with information and discussed numerous approaches to information work. Using information elicitation to establish a rich picture of constituents' information needs was common, with caseworkers often needing to draw out additional information that clients did not realise was connected to the case: '*something that for them was a throwaway comment, but you can kind of latch on to it*' (P3).

This approach enabled caseworkers to guide constituents towards the correct information, as what a constituent might name as the problem, might not be the full picture of their need and was '*not necessarily just what single issue they've come to you with*' (P3). Participants noted that constituents often fixated on facets of the main issue, overshared, or provided '*fluff*' not useful to the case, which they recognised as the constituent's attempt to control an overwhelming situation.

By talking further and digging deeper into clients' stories, caseworkers could find additional problems and uncover the '*whole rammy* [mess] *of stuff underneath*' (P9), build a clearer overview and '*then trying to put all those various pieces together to see if you can resolve it*' (P11).

Information tailoring

Participants discussed information tailoring, wherein they made information more digestible for constituents and contacts. Caseworkers tailored information from and to constituents to ensure clear, effective communication. An important information practice involved '*deconstructing what comes in*' (P8), to make information requests from constituents more factual or more streamlined and, importantly, less aggressive, '*remove some of the petrol*' (P4).

Participants further noted the need to tailor information requests to be polite and inquisitive, as demanding or aggressive tactics could destroy existing or nascent relationships with information sources, who were often service providers. Such tailoring also occurred when providing information to constituents, to guarantee that information was '*as relatable and understandable to them as possible*' (P8) while simultaneously ensuring constituents felt '*heard without being patronizing*' (P15).

Information tailoring was often needed due to literacy issues. Caseworkers recognised the role of literacy in the difficulties constituents experienced in expressing needs:

> *I never failed to be astonished at how poor people can be at articulating clearly the problem and the need. And therefore, go for months without help because they have been unable to do that. And I that is a responsible duty for a caseworker, to take it and [help].* (P9)

Information signposting

Signposting constituents to other services was a key information behaviour described. Caseworkers would also signpost in cases where they thought specialist expertise was needed e.g., connecting abuse survivors with refuges (P14). They stressed it was neither lack of ability nor reluctance that stopped them helping directly, but that signposting was a necessity of the role, as otherwise caseworkers could be overwhelmed with information requests: '*If there was nobody else around [to signpost a constituent to], I would do what I could*' (P4). For example, they might signpost a constituent to specific service provision if the case related to their representative's statutory responsibility in the Scottish parliament, while for cases within the remit of the UK parliament they would signpost constituents to the local MP's office. Participants made it clear that signposting was done to maximise efficiency, as well as to expand the constituent's support network: '*signpost… to dedicated organisations that can give them much more detailed professional and key experience in that field*' (P8).

Discussion

RQ1 addressed the role of constituency caseworkers and the types of work undertaken. A large variation in the type of information work, from addressing mundane, neighbourhood concerns, to potentially life-threatening situations was revealed. As well as requiring keen information-seeking skills, constituency casework, as described by participants, is knowledge-intensive, requiring an understanding of a variety of overlapping yet distinct sectors such as health, education, and housing (see Figure 1). That such varied, complex, and unpredictable information work is undertaken by individuals with no formal training nor established professional infrastructure to draw on is striking. Whereas information intermediaries such as family nurses (Buchanan et al., 2019) or librarians (Vitak et al., 2018) may have standard information practices learned from their professional training, alongside routine access to dedicated knowledge bases and formal professional networks, constituency caseworkers enjoy little such formal guidance or support. The types of challenges described by caseworkers, of navigating new, complex information environments, locating resources and establishing sources in the absence of written procedures and guidelines have also been recognised by Willson and Given in their studies of new academics (Willson & Given, 2020). Authors such as Gill (2020) and McKenna (2022) have pointed to potential political ramifications, such as threats to a politician's re-election resulting from casework done

poorly or not at all. This aspect of constituency casework, which multiple participants acknowledged, particularly distinguishes it from other types of information work.

RQ2 examined how caseworkers act as information intermediaries for constituents with complex information needs. Interviews revealed the sophisticated interactions needed to build networks and, crucially, to gain trust and build rapport with constituents and sources. Other authors (e.g., Buchanan et al., 2019; Robson et al., 2024) have noted the important role of trust in clients' acceptance of information, combatting factors such as information overload, low literacy and misinformation, all of which were cited by participants in this study as challenges when engaging with constituents. Participants were careful not to damage relationships with entities or individuals who may be the only ones able to help with future cases, echoing Duncombe & Heeks (2002), Sabelli (2012), and Schilderman (2002) regarding the need for information workers to act as bridges between clients and sources. Additionally, caseworkers recognised the need to set expectations with constituents but found this challenging due to false perceptions of the power of elected representatives. While professionals such as doctors and lawyers are supported by frameworks and knowledge bases (Bikin, 2003; Meyer, 2003; Roper, 2010) to set expectations with patients and clients, there are no such frameworks for constituency caseworkers.

RQ3 explored the information behaviours of constituency caseworkers when acting as information intermediaries, shedding light on how they elicit information from clients, tailor information to specific needs, or signpost to specialists. Findings showed that constituents often have complex information needs, prefaced by information uncertainty or dissatisfaction e.g., (Taylor, 1968; Wilson, 2018). This uncertainty is often accompanied by anxiety, frustration, and discomfort, affecting articulation of problems (Heinstrom, 2010; Kuhlthau, 1991; Nahl & Bilal, 2007; Wilson, 2018). Therefore, caseworkers require methods such as active listening to elicit the full picture from constituents, whilst being sensitive to their clients' personal context, particularly in cases that may be potentially traumatic to discuss (e.g., domestic abuse) (Kimbley et al., 2023). Caseworkers also play a key role in the breaking down of information, so that clients not only possess the correct and relevant information but can also comprehend and apply it as in Buchanan et al. (2019).

As information intermediaries, constituency caseworkers go much further than simply seeking and sharing information from pre-ascribed resources; not simply acting as mediators they actively engage with the information to tailor it to unique client needs, supporting both Tara and Colineau and Paris' findings that for information provision to be effective and improve client understanding it has to be tailored (Colineau & Paris, 2009, Tara, 2015). Factual and relevant information is essential for both clients and sources; as information needs and literacy levels vary, the information tailoring enables information to be more readily understood and acted upon (Smets et al., 2024). Constituents' emotional needs often actively affect information work, with information tailoring also being used to contain or de-escalate potentially heated or intense interactions.

Building trust and having empathy for constituents were components stressed repeatedly by participants, who found that without these, constituents would be less likely to divulge all pertinent information. As cases could vary widely, from the mundanity of overgrown grass and underfilled potholes, to suicidal crises, caseworkers need efficient strategies such as active listening and information tailoring to respond to each case (Gill, 2020). Akin to the medical field, the information gathered for constituents may need to be made digestible dependent on information literacy levels, be made to be sensitive to client's unique emotional states and needs, or need to be escalated and/or signposted to the relevant bodies (e.g. charities or food banks) for more specialised assistance (Smets et al., 2024).

Much like Willson and Given's study of early-stage academics, caseworkers found themselves facing 'baptisms of fire', relying upon life experience to guide them in the beginning stages of the

job (Willson & Given, 2020). Once established in the role, the forming of networks and cultivation of select useful resources was necessary to survival in the fast-paced workplace, with both prior experiences in other roles (such as hospitality or healthcare), combined with experience as a caseworker, being a concrete factor that participants were able to pinpoint as crucial to surviving the emotionally taxing work. This experience helped to build stability and belonging, increasing caseworkers' confidence and ability to assist clients with their information requirements (Willson & Given, 2020). Conversely, and unlike other intermediaries such as academics (Robson et al., 2024; Willson & Given, 2020) or chaplains (Robson et al., 2024), participants (from newbies to those with decades in the role) struggled to fully articulate other information behaviours and practices, and even when pushed still used the word 'experience' to explain the motivations behind their responses to clients.

Limitations, future directions, and conclusion

This study investigated the information work of constituency caseworkers of elected politicians in Scotland. While previous studies have focused on political representatives (Auel & Umit, 2018; Counts, 2017; Gill, 2020; Hofstetter & Stokoe, 2018a), political (Koop, 2012) or psychological aspects of casework (Kelly, 2024; White, 2019), this is among the first to focus on the casework of politicians and those undertaking it on their behalf. The study reveals the varied and highly complex information work and behaviours of a group of information intermediaries undertaking such tasks in the service of often highly vulnerable constituents, despite little training or formal guidance. The potential political ramifications of caseworkers failing in their information work is unique to this group and has yet to be given attention in information science.

While the research approach adopted was successful in eliciting rich data regarding the caseworker role and elements of their information behaviours, there were limits to the interview method for capturing nuances of the behaviour. Though participants recognised the high complexity of the information tasks they undertook, they nonetheless struggled to articulate their approaches to seeking information, the steps involved, and how they achieved resolutions. The generalisability of the findings is also limited by the sample size, possible sampling bias, and non-involvement of those who have left the role.

Future work could expand on this study to capture the information behaviours that participants struggled to articulate. This could be achieved via established ethnographic approaches for information science research such as observations or information horizon interviews (Savolainen, 2007; Sonnenwald, 2005), with the caveat that constituency caseworkers operate in often highly sensitive informational and political contexts where securing access might be difficult. How participants' information behaviour changes over time might also be examined further, e.g., via a longitudinal study on caseworker transition from newcomer to experienced intermediary.

This research contributes to the limited body of knowledge on information intermediaries operating outside classic information professional roles and contributes to theoretical understandings of people who deal with complex information tasks on behalf of others. New insights into how information work is conducted when training and guidance is not explicitly provided is explored, with a focus on how individuals form and keep their information networks. The research has implications for policy and standards to better support constituency caseworkers and the communities they serve.

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Cultural community as an information ground of Middle Eastern women refugees in Sweden: a road to better integration into society

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Abstract

Introduction. Integration into a host society is often complex and challenging for refugees, requiring access to relevant information sources. This study explores the role of *place* as an informal information source that supports the integration of Middle Eastern women refugees in Sweden.

Method. Twenty Middle Eastern women refugees, residing in Sweden for three to five years, were interviewed. The qualitative data were analysed using the concept of *information grounds* to understand how cultural communities facilitate information sharing.

Analysis. Interview data were coded thematically to identify key factors shaping cultural communities and patterns of information sharing. The analysis focused on the influence of gender, collectivism, and cultural similarities (language, values, religion) in fostering trust and participation.

Results. Two main categories of information sharing emerged: 1) information about life in Sweden, and 2) information about participants' own culture and traditions. Techniques such as storytelling, sharing experiences, humour, and social media use were commonly employed.

Introduction

Sweden received a total of 34,2243 asylum seekers during the years 2014-2019, 113,649 of which were women and girls. Almost 41% of them (46,523) came from Iraq, Palestine, and Syria (Migrationsverket, 2021). By looking at the sizable and growing group of women refugees in Swedish society, it is important to understand the integration perspectives of women refugees in particular. So far, we know less about women's integration process, their challenges, and how they navigate through the integration process, apart from a few studies (Albrecht et al., 2021; Liebig & Tronstad, 2018) where they discussed that women refugees' integration challenges are generally different from those of the male counterparts and need special attention.

Forced migration has raised the challenge of better integration of refugees into Swedish society. In this study context, refugees are those who arrive in Sweden with the status of a refugee, based on conflicting situations in their home countries, who have received residence rights in Sweden and are part of the integration plan (United Nations High Commissioner for Refugees, 2015). The Swedish integration policy introduced an introduction program for newcomers aimed at enabling them to obtain housing, gain command of the Swedish language, employment, and social benefits in Sweden (Wiesbrock, 2011). Generally, the integration system is complex and difficult for newcomers to navigate (Oduntan & Ruthven, 2019). This drives an information aspect into the integration process. Newcomers need access to different information sources in order to navigate through the integration system. It was observed hat the Swedish integration policy makers have not focused on an information aspect explicitly in its policies, besides highlighting the role of some public and private actors (such as the unemployment office, language schools, Non-Government Organizations (NGOs), case workers, and volunteers) as primary formal information sources for newcomers (Wiesbrock, 2011). However, newcomers' interaction with informal information sources is also an important aspect in the integration process. For instance, it is noticed that particularly Middle Eastern women refugees face difficulties in understanding a new communication culture and lack of appropriate information sources and connections in Sweden, resulting in integration problems (Kainat et al., 2021; Liebig & Tronstad, 2018). Therefore, this study particularly highlights the role of informal information sources for women refugees during their integration process and suggests that policy makers consider the informal information aspect when drafting future policies, in order to improve navigation for newcomers. Informal information source is defined in this study as a source of information which comes from informal meetings, informal chatting and discussions with people in an informal environment such as, events, festivals or celebrations.

Despite the central role that information plays in refugees' integration into a new society (Caidi & Allard, 2005; Lloyd & Wilkinson, 2016; Mansour, 2018; Oduntan & Ruthven, 2021), very limited empirical research exists that examines the importance of *places* as information sources for newcomers (Bronstein, 2017; Oduntan & Ruthven, 2021). Refugees need connections with different people and places upon their arrival in a new country to meet their various information needs for better integration into society. To better understand the role of places as informal information sources, Fisher's theory of *information ground* (Fisher, 2006; Pettigrew, 1999) is used in this study. The theory proposes information grounds as 'synergistic environment(s) temporarily created when people come together for a singular purpose but from whose behaviour emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information' (Pettigrew, 1999, p. 811). This paper presents the idea of a cultural community of Middle Eastern women refugees as a place where they primarily gather for cultural celebrations, festivals, and parties, and end up sharing and exchanging useful information about everyday life in Sweden. The cultural community serves as an information ground as per the definition of Pettigrew (1999, p. 811). And Kelder and Lueg (2011) assert that the first issue with information grounds 'is whether the information sharing activities observed are 'incidental' to the main event' (p. 5). The cultural

community of Middle Eastern women refugees fits these characteristics well. Hence, this study presents the idea of better understanding the role of place as an informal information source for better integration. This study addresses the following research questions:

1. How and why are the cultural communities shaped among women refugees?
2. What is the role of the cultural community for information sharing that supports women refugees' integration into the society?

To answer these research questions, literature related to cultural community, information ground, and information sharing of newcomers and refugees was reviewed and 20 semi-structured interviews with women refugees living in Sweden were conducted in 2019-2020.

Literature review

Cultural communities of refugees

The British sociologist Gerard Delanty (2003, p. 3) refers to community as a concept that means 'both an idea about belonging and a particular social phenomenon, such as expressions of longing for community, the search for meaning and support, and collective identities'. He argues that communities provide social integration rooted in associative principles of collective practices (p. 192). This study focuses on cultural communities of refugees in particular. In migration studies, a cultural community is often referred to with different labels such as ethnic community, community of networks, and community of informal networks (De Smet et al., 2019; Fang et al., 2018; Innocenti, 2016), which means a group of people who come together based on some kinds of cultural similarities such as language, gender, cultural values, and religious beliefs. However, Middle Eastern culture is not practised or understood in a uniform way by individuals in all Middle Eastern regions (Pooremamali et al., 2015).

Beyond their social and cultural significance, refugee communities play an important role in supporting refugees' information practices during integration. Previous research in library and information science (LIS) highlights that integration into a host society is highly information-intensive and requires newcomers to access information related to employment, education, health care, housing, language learning, and legal and bureaucratic systems (Caidi & Allard, 2005; Lloyd et al., 2013; Oduntan & Ruthven, 2019). However, these systems are often complex, fragmented, and difficult for refugees to navigate, particularly in the early stages of settlement.

Studies have shown that refugees frequently rely on informal information sources such as family members, friends, co-ethnic communities, and social networks to compensate for gaps in formal information provision (Bronstein, 2017; Caidi, 2008; Mansour, 2018). These informal sources are often perceived as more accessible, trustworthy, and culturally sensitive, especially when language barriers or unfamiliar institutional practices limit access to formal channels. For women refugees in particular, gendered roles, caregiving responsibilities, and socio-cultural norms can further shape their information needs and constrain their access to information and social networks (Hynie et al., 2011; Kainat et al., 2021; Shuva, 2020).

While migration and integration research has extensively examined refugee communities as sources of social support and belonging (Akullo & Odong, 2017; Sundvall et al., 2021), fewer empirical studies have focused explicitly on how such communities function as sites of information sharing. This gap highlights the need to examine cultural communities not only as social or cultural entities, but also as information environments that shape how refugees access, share, and use information during integration.

Information grounds and information sharing

Fisher's theory of information grounds is based on research conducted in foot clinics (Pettigrew, 1999) and involves situations and places where people may gather for one purpose and end up sharing and exchanging information while they are there. Fisher's idea of information grounds refers to social settings that arise when people gather for a specific purpose, but in the process, they naturally create an environment where information is shared spontaneously and unexpectedly through their interactions (Fisher, 2005; Pettigrew, 1999). Fisher and Naumer (2006) expanded the concept of information ground by including seven characteristics to it: 1) Information grounds can occur anywhere, in any type of temporal setting and are predicated on the presence of individuals; 2) People gather at information grounds for a primary, instrumental purpose other than information sharing; 3) Information grounds are attended by different social types; 4) Social interaction is a primary activity at information grounds such that information flow is a by-product; 5) People engage in formal and informal information sharing, and information flow occurs in many directions; 6) People use information obtained at information grounds in alternative ways, and benefit along physical, social, affective, and cognitive dimensions; and 7) Many subcontexts exist within an information ground and are based on people's perspectives and physical factors.

Information grounds can occur at any place where free and easy social interactions can occur that foster information sharing and use (Khoir et al., 2015). As Fisher et al. (2004) observed, 'As people 'visit' and engage in social interaction in the information ground setting, their conversation about life in general and about specific situations leads to the formal and informal sharing of information on a range of topics and in a multitude of directions' (p. 757). The concept has been used extensively worldwide for understanding the role of informal social settings in information flow (An et al., 2019; Rohman & Pang, 2015). In a very early study, Pettigrew (1999) outlined the concept based on the physical environment of a foot clinic which promotes activities at the clinic, nurses as information sources, and communication between patients. The concept has been studied and explained in numerous contexts leading to the theoretical development of it. In Kelder and Lueg's (2011) study, breast cancer stalls play the role of information grounds where information about community health education is shared. In Fisher et al. (2007), information ground is revealed as a significant information source for everyday life matters among college students. Similarly, Khoir et al. (2015) described the importance of information grounds for Asian immigrants in Australia, where these led to strong social relationships and fostered the sharing of information because of the strong preference for face-to-face interactions to build trust and allow spontaneous information sharing. Counts and Fisher (2010) investigated mobile social networking as an information ground where formal and informal information sharing occurred as a by-product of the communication process. In another study by Fisher et al. (2004), the public library is outlined as an information ground for information sharing about everyday life that helped immigrants improve literacy skills and develop coping skills to meet psychological and practical needs. These studies highlight the importance of information grounds as places for informal information sharing and that the concept is suitable for this particular study because it focuses on the aspect of place and people who gather for purposes other than information sharing.

Places as information grounds can include 'informal social settings where people experience information, where they create, remix, curate, and share everyday information, all while attending to another activity: at cafés and pubs, on the metro, at casinos, at hair and tattoo salons, in bus queues, at the grocery store, at football games, in waiting rooms, at parks, at libraries and bookstores, by luggage carousels, while flying, while waiting for a class, and at the beach, and in online settings too, including World of Warcraft, Etsy, Instagram, OKCupid, Facebook, and more' (Fisher & Bishop, 2015, p. 24).

Oduntan and Ruthven (2021), highlighted the importance of places (e.g. mosques, schools, charities) as information grounds by drawing upon Fisher's theory and distributing refugees' information grounds into designated and undesignated grounds. Designated grounds are refugee-specific places created by host societies to support integration such as refugee councils, the Red Cross or community centres, whereas undesignated grounds are non-refugee-specific places refugees attend for other purposes including leisure, fun, socialisation and emotional support, such as playgrounds, religious centres, refugee camps and detention centres.

The information ground theory has been applied to different social groups, such as students, migrant workers and other immigrants (Fisher, 2005), and refugees (Bronstein, 2017; Oduntan & Ruthven, 2021). The aim of this study is to explore how cultural communities function as informal information grounds that facilitate information sharing and support the integration of Middle Eastern women refugees in Sweden. It also addresses a gap in existing literature by examining the role of place as an informal information source, an aspect that has received limited empirical attention in refugee integration and information behaviour research.

Methodology

Data collection

This study used a qualitative research method of semi-structured in-depth interviews in order to get the most information about the participants' experiences (Kvale, 1996). This technique is considered useful for conducting research with vulnerable groups such as refugees (Fisher, 2018; Shuva, 2020; Valentine, 2013). The study used convenience sampling to recruit participants at cultural events where women refugees generally get together because it was an efficient and simple way to access the participants. The first author participated in some cultural events such as Eid and Ramadan in the Middle Eastern community in Sweden to get access to volunteers for interviews. Shared gender and cultural similarities helped to establish contact with the participants. She acknowledges that her personal position has a potential influence on the research, but self-reflection has helped her to manage her positionality as an outsider.

Before the interviews, all the necessary information about the study, data collection, and details about data privacy was provided to the participants. Interviews were conducted in English and were audio recorded. A translator was not used because of privacy concerns. All participants agreed. The interviews were conducted in English because the participants had good English language skills. In the first round, 20 face-to-face interviews were conducted from May to October 2019 (duration 60 minutes) in Sweden. The interviews were conducted in the places most convenient for the participants such as, home, office, and cafes. In the second round, some follow-up interviews (duration 40 minutes) were conducted with nine participants on Zoom from January to June 2020. In the second round, the main author approached participants in order to find more detailed answers for some questions which were lacking from the first round, such as integration challenges and information sharing in the cultural community.

The interviews were conducted in English because all participants demonstrated a good command of the language and expressed a preference for being interviewed without an interpreter. Conducting interviews in English also helped address privacy concerns and allowed participants to speak openly about personal experiences without the presence of a third party. While everyday information sharing within the cultural community often occurred in Arabic, English functioned as a shared interview language that enabled participants to reflect on their experiences across multiple information settings. This methodological choice shaped the scope of the study and is acknowledged as influencing which voices could be included.

The interview guide was designed with inspiration from studies on immigrants and refugees by Caidi (2008) and Bronstein (2017). The questions were about experiences in the Middle Eastern cultural community in Sweden, everyday life challenges such as those related to family, job, and language, why the participants choose to stay in this community and how it helped them to share information for everyday life matters. Some follow-up questions asked more concretely about information sharing within this community.

Participants of the study

Twenty participants from Middle Eastern countries, mainly from Syria (11 participants), Iraq (3 participants) and Palestine (6 participants), who are women refugees, aged 23 - 32 years, who have lived in Sweden for a minimum of three to five years, have received resident permits and are going through the integration process in Sweden were interviewed. They are considered refugees as per the definition of the United Nations High Commissioner for Refugees (2015) because they came to Sweden to seek protection from the political threats from their home countries. Among all the participants, 16 were working in different professions such as, doctors, nurses, dentists, psychologists, teachers, and accountants. Two were full-time housewives and another two were part-time housewives and freelancers in their home countries before moving to Sweden. All of the participants have good command of the English language. We acknowledge that the participants belong to highly educated backgrounds and have a good command of the English language in this particular study, while the refugees with limited English or host country language may face more challenges in integration. Some of the women arrived with their spouses and children, and some as single mothers. Most of them are attending Swedish language school, looking for jobs, doing placement jobs and training as part of an integration program.

Data analysis

Following the outline of Braun and Clarke (2006), this study conducted four stages of data analysis: 1) familiarisation with data and making notes; 2) generating initial codes to identify themes such as codes related to the role of cultural community in integration process and information sharing techniques in the community, and; 3) combining the codes into the potential themes. For example, gender aspects, cultural similarities, and collectivism were collected under the factors influencing cultural community theme. Similarly, all experiences related to *what* information participants share such as, information about health, jobs, education, banking, children-related, driving courses, and immigration were collected under the theme *information sharing about life in Sweden*, whereas Arabic language, Quran and Prophets' stories were collected under the theme *information sharing about their own culture and traditions*. Furthermore, the experiences related to *how* they share information in cultural communities such as past experiences, storytelling, jokes, informal conversations, old experienced refugees, social media, and cultural festivals were collected under the theme *information sharing techniques*. The fourth stage involved reviewing the themes carefully in relation to the entire data set and finalised themes. After reviewing these themes carefully in the final stage, all themes were presented for the findings by using Nvivo12.

There are three main themes in the findings section of the study: 1) the cultural community of Middle Eastern women refugees in Sweden; 2) factors that influence making a cultural community; and 3) information sharing in the cultural community, that is, what information they share and how they share it, and how this cultural community helps in better integration into the society.

The cultural community of Middle Eastern women refugees in Sweden

This section answers the first part of the research question: 'How are the cultural communities shaped among women refugees?' The findings show that participants have formed a cultural

community of Middle Eastern women who share Arabic language and Muslim culture. They engage in various activities such as cultural and religious celebrations, language learning, meetings, and social gatherings held in private homes, public community halls, and virtual spaces like WhatsApp and Facebook groups. These spaces connect both new and long-settled refugees across Sweden, creating networks that also include immigrant women beyond refugee backgrounds.

Factors influencing in making cultural community

This section addresses the second part of the first research question: 'Why are the cultural communities shaped among women refugees?' Participants explained that language barriers, cultural differences, and limited interaction with locals made it difficult to build new connections, leading them to form communities with those sharing similar language, religion, and values. Rooted in Middle Eastern collectivism, which emphasises family and community ties (Baldwin et al., 2014), these communities foster togetherness through shared activities such as language learning, cooking, celebrations, and mutual support during events like Ramadan and Eid (Ramadan is the Islamic holy month marked by fasting from dawn to sunset, increased prayer, and communal gatherings and Eid refers to major Islamic festivals celebrated with communal prayers, social gatherings, and shared meals, marking the end of Ramadan (Eid al-Fitr) or the completion of the pilgrimage season (Eid al-Adha)). Women expressed that such spaces allow them to maintain their culture while feeling accepted and free in Swedish society. The cultural community helps them to learn about Swedish culture through co-activities.

A statement by Zara revealed how she feels happy in speaking Arabic with other women in the community:

> I belong to Arab community for enjoying speaking my own language [Arabic] freely and making close friends with whom I can practise Swedish language, go shopping and spend my free time. (Zara)

From the participants' statements, it was concluded that similarity in terms of gender is an important factor that makes them feel they belong to this cultural community. Laila mentioned that they can freely discuss women-related issues such as health and beauty concerns, love lives, and cooking ideas in this community:

> [.....] I am glad that we have the community for women only [.....] We have special activities such as drawing henna occasionally and waxing and massaging the body once a month. which we freely do in women groups. We have a small WhatsApp group for talking about our hygiene health care. (Laila)

Information sharing in the cultural community

This section answers the second research question of the study: 'what is the role of the cultural community for information sharing that supports women refugees' integration into the society?' It was observed that information sharing occurs in a very informal way in the cultural community. This study found two main categories of information sharing: information sharing about life in Sweden and information sharing about one's own culture and traditions in the cultural community. Under each category, it is explained how the participants share information by looking at some information sharing techniques of the participants, such as sharing past experiences, storytelling and jokes, informal daily random conversations, consulting old and experienced refugees, posting photos and stories on social media, arranging Arabic lessons and Quran classes, gathering at Friday prayers every week and organising celebrations and festivals.

Information sharing about life in Sweden

In this category, it was observed that refugees share information about practical matters in everyday life in Sweden such as health, job, education, opening a bank account, cooking ideas, children's matters, immigration matters, digital tools, and similar issues which are important for integration into Swedish society.

The communication takes place in a very informal way such as, 'How was your week?', 'How are your Swedish classes going?', or 'How is your child doing?'. In these conversations, the issues and problems related to language learning, children, or jobs emerge. Other women participate in the interaction and exchange information as well. For example, there was an occasion when one of the participants (Hamna) mentioned her struggle with job seeking without sufficient local language skills and other women also joined the conversation and shared their stories of struggles about job seeking in Sweden in the beginning of the integration process. Listening to other women's stories was comforting for Hamna and she also learned how to find some basic jobs (such as, cleaning, food delivery, postal services) without sufficient language skills in Swedish. The job searching theme came up on numerous occasions in the conversations during cultural festivals (Eid and Ramadan) and other celebrations like birthday parties in the cultural community.

During the interviews, it was mentioned by most of the participants that Eid is the biggest cultural festival for women to celebrate in this cultural community once a year. Participants were excited to talk about their various experiences of the Eid festival during the interviews, but the most interesting experience was how they come together and meet with other families with whom they have not met for the last whole year. Usually, on Eid, the cultural community members dress up, cook traditional food, and gather in one physical place, that is, the community hall. This cultural activity provides an opportunity for women and children to share information on several challenges and problems related to new integration policies, the job market, and Swedish culture in general. They also share good news or anything new that happened during the last year in their lives. For example, Hamna and Amina mentioned:

> We started talking about a very important matter at the Eid party this year. We discussed changes in immigration policies about newcomers in Sweden such as compulsory language test for applying for citizenship application and a certain amount of income is required for new applicants. This information was useful particularly for those women whose relatives were trying to apply for citizenship lately (Hamna)

> I am so happy to see Sara after one year. I met her on Eid last year in this community hall. And I am happy to hear that she is expecting a baby soon. And her husband got a good job. (Amina)

Several participants indicate that the cultural community is a place for information sharing among new and old refugee women. Participants consult on health issues, children's matters and cooking ideas with the experienced refugees in the community. The participants feel more comfortable and easy to approach experienced Middle Eastern refugee women for information because of language and other cultural similarities in terms of values and religion. Experienced refugee women who have lived in Sweden for longer are frequently consulted about information on children's matters. As Hamna says:

> Samina has been living in Sweden for nine years and even her children were born in Sweden. She knows many things about children and guided me when I came to Sweden. She told me about the best school, nearby *dagis* [kindergarten], playing

> parks and specialist doctor for kids. Once she helped me in applying for the social benefits for children's sick leave from the government. She showed me her application form which she filled for her children in the past. She also informed me about some volunteer women in our cultural community teaching Arabic language to children for a small fee. [...] I trust her as my elder sister. She even helped drive my children to and from school.

Furthermore, information sharing through social media (Instagram, WhatsApp and Facebook) is a useful practice for the participants. Participants generally share information about any new learnings, for example, how she applied for a library card, where to find student lunches, the best coffee in town, etc. on social media accounts in the form of photos, stories, talks and jokes.

Information sharing about own culture and traditions

It was observed that this cultural community is not only a place to share information about practical matters in everyday life, but also information about participants' own cultures and traditions. In this study, the participants belong to Muslim Middle Eastern culture. The findings reveal how women care about reinforcing traditional Middle Eastern culture among their children— especially the Arabic language, Quranic education, close interactions, maintaining extended family relations and respecting elders, keeping traditions, and awareness of religious limitations. The community makes efforts to reinforce the symbols that are meaningful to the Middle Eastern cultural system while trying to learn the mainstream culture. As well, this cultural community is a place to share information about their own culture and traditions. Zara explained the situation:

> I fear that my children will forget our cultural roots and become too Swedish. I want them to know basic Arabic to be able to speak with their parents and grandparents. I want them to read the Quran and know its meaning. The Quran is basic compulsory education in Arab culture. I also want my children to eat Halal and not drink alcohol. I am happy that when I bring them in cultural events in the community, they get to learn about our food, traditions and festivals. Two volunteer ladies teach the Arabic language and the Quran to some children in the community hall once a week and I send my children to those sessions. (Zara)

They have Arabic language classes and Quran classes for their children and young girls twice a month, usually on Fridays after Friday prayers in the community hall. A few volunteer teachers take part in these activities. They also read the Prophets' stories from the Quran and draw and share some important lessons from those. For example, Sara mentioned 'I learned from one of the Prophets' stories how he struggled and survived through different battles when he migrated to a new country in the past. I resembled my life with His story. I am motivated that I will find a good job and a good life in Sweden soon'. She shared this story with other women in the group on Facebook also.

The knowledge about Middle Eastern cultural heritage, its values, and traditions is also shared in this cultural community in the form of celebrations and festivals. For example, Eid and Ramadan festivals and parties (birthdays, baby showers, bridal showers, etc.) are some of the events that allow participants to learn something from their own culture and share with others.

Discussion

Factors influencing the cultural community

In this study, factors such as gender, collectivism, and shared cultural traits like language, values, and religion foster trust and influence information sharing within the cultural community.

Collectivism, common in the Middle East, emphasises family and group support over individualism (Baldwin et al., 2014). Understanding these factors helps explain why certain groups join specific information grounds. Prior studies also show that newcomers often form communities with those sharing similar culture, language, and values to reduce cultural shock (Kainat et al., 2021; Akullo & Odong, 2017), and that women refugees in particular build networks around shared gender, culture, religion, and social circumstances (Degni, 2004; Innocenti, 2016; Shuva, 2020).

Cultural community as an information ground

In this section, we discuss the second research question of the study: the role of cultural community for information sharing that supports women refugees' integration into the society. We explore how cultural community can be an information ground with the help of Fisher's concept (2005) and Bronstein's (2017) figure of information ground (Figure 1).

Findings from this study extend the literature on information grounds by highlighting the role of cultural communities as places for informal information sharing that support refugee integration. Drawing on Fisher et al.'s (2004) concept of information ground, the study shows that the cultural community functions as a meaningful site for information exchange among Middle Eastern women refugees. In line with Fisher and Naumer's (2006) characteristics, women primarily gather for cultural and social purposes rather than information seeking, with information sharing emerging as a by-product of social interaction. Participants engage mainly in informal information sharing during cultural and religious events, placing high value and trust in information received from more experienced refugees, while also participating in formal information activities such as Quran readings and Arabic language lessons. Information flows multidirectionally between experienced and newly arrived refugees, as well as through connections extending beyond the cultural community. Together, these findings demonstrate how cultural communities operate as dynamic information grounds embedded within refugees' broader information worlds.

Inspired by the Bronstein's (2017) study, Figure 1 is drawn from the findings of this study. This figure shows how women refugees perceive the cultural community as an information ground for information sharing by explaining five main elements: physical and virtual environment; information sharing about life in Sweden; information sharing about own culture and traditions; information sharing techniques; and cultural activities.

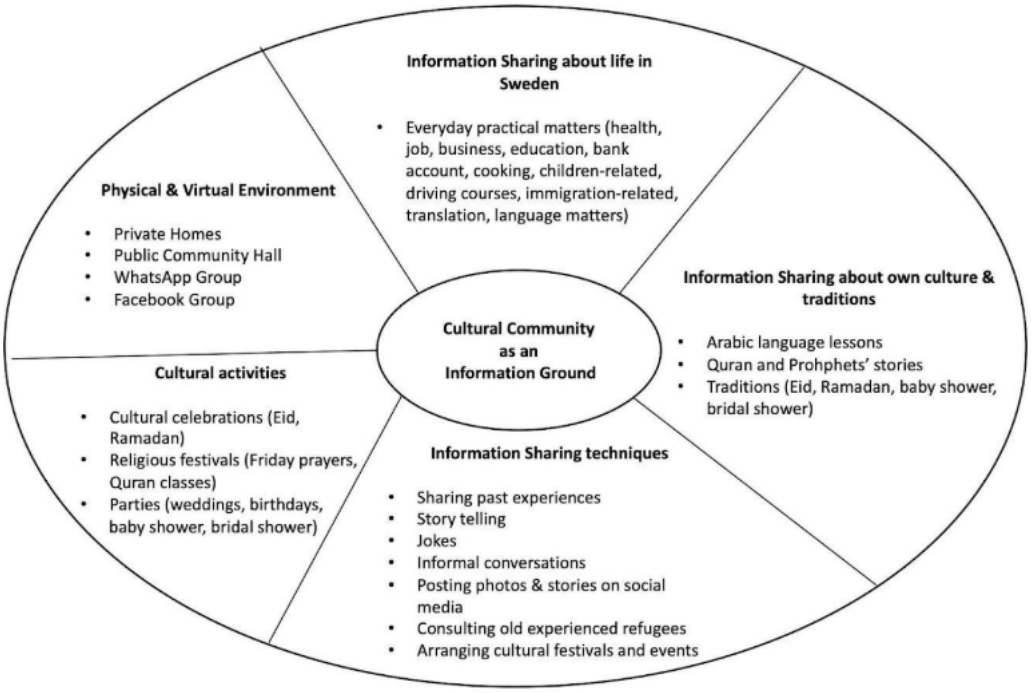


Figure 1. Cultural community as an information ground.

At the same time, the cultural community examined in this study does not represent the entirety of women refugees' information behaviour or information worlds. Refugees navigate complex and layered information environments across multiple places, relationships, and information sources (Fisher, 2018). The cultural community should therefore be understood as one significant information ground among several others, rather than as a comprehensive space that fulfils all information needs.

Some participants described receiving practical support, such as help with filling in official forms or navigating bureaucratic procedures, through close personal relationships with friends or 'sisters' outside organised community gatherings. In addition, while cultural and religious events such as Eid and Ramadan offer meaningful opportunities for information exchange, their periodic nature limits their capacity to address ongoing information needs. Instead, these gatherings function as episodic yet socially dense moments that reinforce trust and enable information sharing that continues across other contexts.

By situating the cultural community within refugees' broader information worlds, this study highlights how place-based information grounds intersect with personal networks and everyday information practices, complementing other informal and formal sources that support integration into society.

Physical and virtual environment

As shown in Figure 1, the cultural community exists in both physical and virtual settings. Women refugees mainly gather in a rented community hall for cultural activities, sometimes also meeting in private homes. This reflects earlier findings on physical information grounds such as libraries, cafés, salons, and schools (Fisher & Bishop, 2015; Fisher et al., 2007; Khoir et al., 2015;; Lilley, 2010; Oduntan & Ruthven, 2021). They also connect online through Facebook and WhatsApp groups, but virtual information grounds remain underexplored and present an avenue for future research.

Cultural activities

In this study, the primary purpose of the cultural community is to organise cultural and religious events (Eid, Ramadan, Friday prayers, Quran classes) and social gatherings (weddings, birthdays, baby and bridal showers) for Middle Eastern women refugees to strengthen their cultural identity (Figure 1). Following Oduntan and Ruthven's (2021) concept of undesignated information grounds, the community serves as a place where women primarily meet for cultural or social reasons but also engage in 'spontaneous and serendipitous sharing of information' (Fisher, 2005) about daily life in Sweden and their own traditions.

Information sharing about life in Sweden

From Figure 1, we can see that a cultural community is an information ground where participants share information about life in Sweden, such as everyday life practical matters regarding health, jobs, business, education, banking, cooking, children-related, translation, and language matters. From previous studies, it is obvious that these everyday life matters are the primary needs of most newcomers (Bronstein, 2017; Oduntan & Ruthven, 2021).

Information sharing about own culture and tradition

Figure 1 depicts that participants also share information about their own culture and traditions besides life in Sweden. The information concerns Arabic language lessons, Quran and Prophets' stories and traditions of Eid and Ramadan, baby showers, and bridal showers. In this information ground, refugees' own culture and tradition are considered an asset. In a study by Lightfoot et al. (2016), a cultural asset is described as an asset that is related to the distinct ways that members of a culture live, which includes cultural heritage (e.g., stories, myths, fables), cultural traditions (e.g., festivals, sports, holidays), arts and music, food, values, religious and philosophical beliefs, family and community norms, work methods (e.g., agricultural methods, tools), community organisation, leadership practices, language, among others.

Information sharing techniques

Most of the previous studies do not focus explicitly on 'how' the newcomers share information in information grounds (Kelder & Lueg, 2011; Khoir et al., 2015), while this study points out the 'how' aspect in this section. It was observed that the participants share information through past experiences, storytelling, jokes, information conversations, interactions with experienced refugees and by posting stories and posts on social media. Experienced refugees who have been living in Sweden for more than five years are also considered an important and trustworthy source of information. They also share information by arranging cultural festivals and celebrations. By understanding all the information sharing techniques the participants used in this particular information ground, the information ground concept can be enriched further.

Theoretical and practical contributions of the study

Previous LIS research shows that women refugees face distinct integration challenges, including limited social networks and restricted access to information due to socio-cultural barriers and gendered roles (Hynie et al., 2011; Kainat et al., 2021; Le Louvier, 2019; Mansour, 2018; Shuva, 2020). Cultural communities are known to support women refugees by fostering social ties, belonging, and cultural continuity that facilitate integration (Akullo & Odong, 2017; Sundvall et al., 2021). However, less is known about how these communities function as sources of informal information. This study addresses this gap by conceptualising cultural communities as information grounds that support information sharing about both everyday life in Sweden and refugees' own culture and traditions, thereby extending the information ground concept through the lens of refugees' cultural values and practices.

Beyond its empirical contribution, the study offers broader insights into refugee information behaviour by highlighting information sharing as a collective and relational practice shaped by

trust, belonging, and shared cultural meaning, rather than solely by access to information sources. While the empirical material is rich, the study focuses on key patterns of information sharing to demonstrate how place-based and culturally situated interactions shape refugees' everyday information practices and to encourage future research to examine information grounds as dynamic elements within refugees' broader information worlds.

The findings also have practical implications for integration policymakers, community organisations, and information professionals. Middle Eastern women refugees often feel more comfortable engaging in spaces where language, values, and religion are shared (Albrecht et al., 2021; Liebig & Tronstad, 2018), suggesting that cultural communities should be recognised as supportive resources rather than barriers to integration (Klarenbeek, 2021).

Finally, the study highlights implications for public libraries and other information institutions. Although libraries are often positioned as inclusive information grounds (EBLIDA, 2024), cultural communities may be perceived as more accessible and trustworthy due to shared language, gender, and cultural norms. Collaboration with existing community networks may therefore be more effective than expecting independent engagement with library services. However, such engagement involves challenges related to language barriers, literacy, awareness of services, and culturally specific expectations around gender and privacy. Addressing these challenges can support the development of more culturally responsive and community-oriented library practices.

Limitations and future research directions

This study focuses on the benefits of cultural communities without examining possible drawbacks identified by Shuva (2020), such as small-world effects, misinformation, competition, and jealousy among participants. Not all Middle Eastern women prefer joining these communities; some rely on personal networks of family and local friends. The study includes only women refugees who have lived in Sweden for 3–5 years, so future research could examine more experienced refugees to see whether their information-seeking and sharing differ. It also assumes a shared understanding of gender and cultural similarities (language, values, religion), and the use of convenience sampling limits the representativeness of participants. Future studies could build a stronger conceptual framework for cultural communities, explore links between gendered roles and culture, and examine both physical and virtual information grounds among refugees, including men (Shuva, 2020).

Another limitation of this study is its focus on a single type of information ground within women refugees' broader information worlds. While the cultural community plays an important role in facilitating informal information sharing, participants also rely on a range of other information sources and settings, including close personal relationships, digital platforms, and formal institutions. These interconnected information environments were not examined in depth in this study. Future research could adopt a more holistic or longitudinal approach to explore how different information grounds interact over time and how information obtained in one setting is carried into others.

In addition, some of the cultural and religious events discussed in this study occur infrequently, which limits their capacity to address continuous information needs. Future studies could investigate how episodic gatherings contribute to sustained information practices and how relationships established in these settings continue to function beyond the events themselves.

Conclusion

We can conclude that the cultural community is an information ground, which is shaped by Middle Eastern women refugees, based on some factors such as gender, collectivism, and other cultural similarities (language, values, religion). This information ground helps them to share information regarding the practical matters about life in Sweden and also the information hidden in their own culture and traditions. The primary purpose of this information ground is to get together with people from the same culture and celebrate traditional festivals and events, but information sharing occurs as a by-product. The cultural community is considered as an information ground for sharing information in informal conversations, through storytelling, jokes, past experiences, and from more experienced refugees. This emphasises the importance of considering places and informal information sources such as communities when it comes to designing integration policies and services for newcomers.

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'I know a place': the informational value and loss of queer spaces

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Abstract

Introduction. This study examines the informational functions of queer spaces (physical and digital) and the consequences of their loss for identity formation, community support, and information circulation.

Method. We conducted fifteen semi-structured Zoom interviews with US queer adults who had lost access to a queer space. Participants were recruited via convenience and snowball sampling and received a small honorarium.

Analysis. Interviews (mean 53 minutes) were audio-recorded, transcribed, and analysed using a six-step thematic analysis with an abductive coding approach. Iterative analysis generated three primary, interrelated themes that structure the findings.

Results. Queer spaces operate as information hubs that enable embodied information encountering, localised circulation, and grassroots information activism (e.g., archiving, resource curation, community networks). Loss of these spaces disrupted localised knowledge flows, hindered identity work, and forced redistribution of labour to digital and decentralised networks. Participants described strategies to sustain legacies, including social media archiving, community organising, and do-it-yourself resource sharing, yet noted challenges of fragmentation, gentrification, and threats of violence.

Conclusions. Findings highlight the need for localised, community-driven information provision and suggest roles for libraries, archives, and policymakers in preserving queer spaces and the information practices they sustain.

Introduction

'They will try to make you unhappy; don't let them. They will try to tell you you're not free, don't listen. I know a place where you don't need protection, even if it's only in my imagination' (MUNA, 2017).

These lyrics, written by the queer band MUNA, capture the imagined and material refuge queer spaces provide; sites where connection, safety, and freedom coexist, even if temporarily. Spaces of connection and safety are integral to building queer identity and community, as well as facilitating information flow. Examples of information-rich physical queer spaces include queer bars (Mattson, 2023), gay-straight student alliances (Lee, 2002), and performance art/activist groups (Wilcox, 2018). Digital parallels include bulletin board systems for those impacted by the HIV/AIDS epidemic (Brewster & Ruberg, 2020), queer-affirming microblogging platforms (Haimson et al., 2021), communities of practice centred around coming out (Ridder & Dhaenens, 2019), and amateur queer history accounts on social media (Wagner, 2024). While each space has unique subcultural practices, they provide integral reference points for queer inquiry, serving as central, if not singular, sites of information provision. We contend that spatial, social, and informational factors are intertwined; we cannot understand informational phenomena without understanding spatial and social characteristics (Cox & Fulton, 2021; Gray, 2009; Hardy, 2021; Savolainen, 2008). Distinguishing between abstract space and socially meaningful place allows information research to move beyond treating geography as a neutral container and instead recognise how meanings, identities, and information behaviours are co-constructed through place-based practice. As such, there are informational consequences when queer people acquire culture and knowledge in spaces that change or disappear.

Our study employs an information practices approach (Savolainen, 2008) to understand how queer spaces facilitate activities such as embodied information-seeking, circulation, and information activism, and what is lost when these spaces change or disappear. Rather than functioning merely as background settings, places actively shape and are shaped by information practices, producing distinct informational affordances whose loss carries material consequences for how people locate, share, and sustain knowledge (Cox & Fulton, 2021). The study reports on findings from 15 semi-structured interviews with queer adults across the US about their experiences of losing queer spaces. Findings extend advocacy and policy-based initiatives calling for the importance of queer spaces by contextualising their informational functions and considering how information institutions, including libraries and archives, can contribute to locating, preserving, and recreating queer spaces.

Literature review

Despite their multifaceted values, queer spaces are '*hard won*' and '*limited*' (Taylor, 2008, p. 526). Their ephemerality manifests in various forms, including closure, discontinuation, and transformation (Ketchum, 2020; Ketchum, 2022; Mattson, 2023). Physical queer spaces such as bars are on the decline, with US queer bar listings decreasing by almost 37% between 2007 and 2019, resulting in marked losses of half or more of lesbian bars, cruisy men's bars, and bars serving BIPOC queer people (Mattson, 2019, 2022). In parallel fashion, online queer spaces hosted on corporate platforms like America Online shut down as companies closed (Dame-Griff, 2023) or because of regulations disproportionately harming queer people. For instance, the US Fight Online Sex Trafficking Act (FOSTA)/Stop Enabling Sex Traffickers Act (SESTA) regulations stymied many trans BIPOC, especially from engaging in conversations about sex education and sex work (Fuentes et al., 2025).

A significant factor contributing to these losses is advancing gentrification, which decentres queer people and spaces by pushing them outside of urban, trendy areas (Doan & Higgins, 2011; Gieseking, 2016). Gentrification uplifts specific queer spaces deemed '*respectable*', rendering less commercialised spaces '*physically and economically marginal to and distant from the scene*' (Taylor,

2008, p. 532). Historical and contemporary divisions of queerness at the intersections of class, race, and gender, among other categories, also shape who can authentically embody specific queer identities in spaces (Forstie, 2020; Taylor, 2008). These divisions result in exclusions of working-class queers through classed expectations, including cover fees and drink prices (Binnie, 2018; Ketchum, 2021; Taylor, 2008); BIPOC due to a history of structural racism within queer spaces (Held, 2009; Hunter & Winder, 2019; Lane, 2016); and exclusion of femme and trans people due to patriarchal and homonormative structures (Binnie & Valentine, 1999; Castells, 1983; Hartless, 2018; Valentine, 2013). Such exclusion can also lead to greater effort on the part of these people to locate queer spaces and relevant information sources, such as increased travel time (Gibson & Kaplan, 2017).

Gentrification also operates in online spaces vis-à-vis algorithmic exclusion, commercialisation and commodification, and platform fragmentation, among other factors. Algorithmic exclusion can both affirm and marginalise queer identities, such as location-based dating app Grindr facilitating connections among certain users while excluding others due to vitriolic dating norms (e.g., 'no fats, no femmes, no Asians') and being in rural, remote locales (Aunspach, 2020; Conte, 2017). Surveillance capitalism turns queer people into consumers in online spaces. Platforms like Grindr profit from users' data (and their networks') to decide which ads to show them and to shape their behaviour, making them more predictable and easier to influence with those ads (Aunspach, 2020; Zuboff, 2019). Finally, platform fragmentation can cause digital gentrification by driving certain queer users off a platform. An example is Facebook's '*real names*' policy, which restricted the expression of drag and Indigenous names, potentially causing these groups to leave the platform (Haimson & Hoffmann, 2016). Such digital redlining enforces class and racial boundaries through technological policies, practices, investment, and pedagogy (Gilliard, 2017).

A final critical factor is the chronic threat of and experiences with violence, including shootings occurring in queer bars, spaces located in areas that police queer BIPOC people (Hanhardt, 2020; Reynolds, 2009), and online hate, harassment, and abuse (Hubbard & Keighley, 2023). According to the Gay and Lesbian Alliance Against Defamation (GLAAD's) 2025 ALERT Desk report, 2.5 anti-LGBTQ+ recorded incidents occurred per day, with over half targeting transgender and gender non-conforming people (GLAAD, 2025a). The report also notes a sharp rise in anti-LGBTQ+ rhetoric and online disinformation and malinformation, including doxxing and coordinated harassment campaigns. Finally, according to GLAAD's 2025 Accelerating Acceptance Report, 84% of Gen Z LGBTQ+ adults believe violence or threats will increase in the coming year (GLAAD, 2025b). The spectre of this violence can deter queer people from locating support, including within queer spaces, ultimately contributing to a lack of social safety (Diamond & Alley, 2022).

Our work extends examinations of queerness, loss, and space into the information practices area by expanding spatial understandings of context (Chatman, 1991, 1999; Fisher & Naumer, 2006; Pettigrew, 1999; Savolainen, 2008). We pay particular attention here to Lloyd's (2007) fractured information landscapes, which describe not only abrupt informational disruption but also the ongoing labour required to reconcile prior ways of knowing with environments marked by instability, exclusion, or loss. Thus, we seek to understand how marginalised communities archive their histories, including barriers and facilitators to these practices. In response to these objectives, our study asks the following questions: 1) What are the informational functions of queer spaces? and 2) How do queer people sustain queer spaces and uphold the legacies of those lost?

Materials and methods

Our institutional ethics boards approved this research at the University of Illinois [IRB Number: IRB23-0317] and the University of South Carolina [IRB Number: Pro00133762] for exempt review. We recruited 15 US queer adults using convenience and snowball sampling. We shared a digital recruitment flier that linked to a pre-screening survey with people in our networks and asked them to forward it to others who might qualify. Participants were selected based on the following

criteria: they could name a queer space to which they had lost access, were 18 or older, and had identities within the queer umbrella.

We conducted virtual Zoom interviews averaging 53 minutes (range 42–82 minutes). We provided participants with letters of invitation describing the study and obtained verbal assent before data collection. Interviews followed a semi-structured protocol organised around the following topics: participant background; ways the space served as an information hub; experience with losing the space; information practices in response to loss; and a debrief. Data collection and analysis were iterative, and we used theoretical sampling as the study continued to ensure we purposefully incorporated new perspectives. We concluded recruitment after we reached conceptual saturation; in other words, when we heard similar responses to our interview questions (Glaser & Strauss, 1967). We gave participants a $30 digital gift card for their participation.

We audio-recorded the interviews and used Otter.ai to generate an initial transcript. Otter.ai transcription services follow best practices for data security and privacy laws, including the General Data Protection Regulation, the California Consumer Privacy Act, and the Voluntary Product Accessibility Template for accessibility requirements compliance (Herdiyanti, 2024). We disclosed to participants that we were using Otter.ai to generate an initial transcription and obtained their consent. We then double-checked the transcripts, redacting any identifying information, and sent them to participants for member checking. We registered both our Zoom and Otter.ai subscriptions under our institutional addresses, and we used local files downloaded to our machines rather than those uploaded to the cloud. Due to privacy concerns about Otter's 'Pilot Feature', we uploaded Zoom audio to Otter.ai for transcription rather than using the Zoom integration (Allyn, 2025).

We then analysed transcripts using a six-step thematic analysis (Braun & Clarke, 2006) that included becoming familiar with the data, redacting identifying information, creating and refining initial codes using an abductive approach that combined deductive and inductive coding (Timmermans & Tavory, 2012), writing analytic memos, and finalising a detailed codebook. Through abductive coding, three interrelated categories—embodied information encounters, localised information, and acts of information activism—emerged as central to participants' descriptions of queer information spaces and loss.

Figure 1 shows a word cloud of labels participants used to describe their sexualities and gender identities. We also asked participants to provide information about their race/ethnicity. Twelve participants identified as White, one participant identified as Afro-Indigenous Latine, one as Asian/Mixed Race, and one as Hispanic/Latino. We did not ask for any additional identifying information; however, four participants disclosed that they were in their 40s, four in their 30s, one in their 20s, and one who had just turned 18. Regions and locations discussed included the Midwest, the South, the West Coast, New England, and the Northeast (US), as well as Central America, Europe, and the UK. Participants also disclosed other significant identity intersections, such as having various types of disability, being sober, and being multiple types of students or academics.



Figure 1. Word cloud of participant gender and sexuality identity labels.

We approach this study as two queer White academics in our 30s with expertise in information practices and archives. We have both experienced losses of queer space due to community-based (first author) and institutional (second author) exclusion, as well as moves between rural and suburban conservative areas and urban progressive ones. We found that the participants we recruited and who agreed to interviews often reflected, rather than differed from, our own identities. Consequently, our study underrepresents individuals with different intersectional identities, non-white-collar occupations, and queer subcultures. Future research could focus more deliberately on these groups to better understand the sociocultural dynamics that influence access to, and the eventual loss of, queer information spaces and resources.

Additionally, while our study addressed information loss across various physical and digital spaces and resources, the emphasis on '*information*' rather than '*community*' or '*culture*' may have discouraged some from participating, especially those who had lost access to queer spaces like bars and community centres. Several participants questioned whether spaces such as queer bars or restaurants qualified as information spaces. Though we reassured them that they did, the recruitment language and potential academic jargon in the field of information science likely deterred participation. Future studies could adopt a broader recruitment approach, focusing on the loss of space and resources, and introduce the concept of information during interviews rather than beforehand.

Results

Findings identified three interrelated categories central to understanding queer information spaces: 1) embodied information encounters, 2) localised information, and 3) acts of information activism to sustain spaces over time. We illustrate each theme with lightly edited quotes from participants. All participant names are pseudonyms. When we first introduce participants, we refer to them by their self-selected labels for sexual orientation, gender identity, and race/ethnicity. This information is essential, as it describes how their intersectional orientations toward space shape the meanings they assign to that space (Cox & Fulton, 2021) and how that space may shape their information source preferences and access (Gibson & Kaplan, 2017).

Embodied information encounters

Queer spaces played a critical role in supporting people's embodied information encountering and assessment. Per Ahmed (2006), queer is not solely an identity but also a subject position that represents a reorientation away from cis-heteronormative social structures and information, and towards other ways of inhabiting the world. This reorientation also occurs informationally, as queer people turn away from normative ways of engaging with information, such as what sources are authoritative, like doctors, parents, and teachers (Floegel & Costello, 2019). A related concept in the information science literature is Lloyd's (2017) fractured information landscapes, which signify a disruption between one's previously familiar environment and an unknown one, in which one is supposed to establish a new knowledge base, within the context of forced migration (see also Montague, 2025). In these instances, queer people must 'reconcile established ways of knowing', in this case from normative society, with new ways of knowing drawn from lived experiences, which provide them with new forms of information. Celia (cisgender lesbian/queer White woman), who resided in a rural conservative county in the US Southeast, addressed how she encountered new information about her queerness and to whom she was attracted by visiting a queer bar when she was 18:

> *My biggest influence growing up … was my pastor's wife. She would always talk about what it was like … to serve through her marriage, and she would serve her husband, and I never could get with that. It never felt right. I didn't learn anything about myself in that timeframe. The first night that I went to the gay bar, I was like, holy crap. This is what attraction feels like. I can't stop looking at that girl because she looks like Eminem. What is this all about? I learned a whole lot about myself. People naturally learn about themselves by exposure to things that cause a response.*

Celia describes inhabiting a cis-heteronormative and patriarchal social system in which her key information source growing up is her pastor's wife. However, Celia relied on her body, specifically her emotional response to the information she was learning, to assess it as irrelevant to her identity. When she finally visited a queer bar, she had her first embodied encounter with information relevant to learning about herself: people who '*cause[d] a response*' within her of attraction.

Queer spaces facilitated participants' exposure to new ways of existing within the world, which they both experienced in their own bodies and witnessed in others. Brian (nonbinary, pansexual/queer white person) recounted how a do-it-yourself music and social space run by an informal collective of socialist punks in a US Northeastern town, the majority of whom were queer, facilitated '*the first time I ever watched someone inject testosterone*'. They also were exposed to '*people openly practicing polyamorous relationships*' and '*just existing openly and without fear*'. These embodied moments laid the groundwork for more situated, place-based forms of information exchange, which participants described as essential to sustaining queer connection. Being in spaces that facilitated encounters with different forms of embodiment illustrates the indispensable role of localised information within queer information spaces.

Localised information

Participants emphasised the importance of localised information, which comprises knowledge and resources geographically, culturally, and relationally situated within queer communities. One argument made in the face of the closure of local queer spaces has been post-gay assimilationist narratives that, due to a growing cultural acceptance of queer people, they do not require spaces of their own, which Gieseking (2020, p. 24) recognises as a privilege of '*the white and wealthy who can choose to assimilate as such*'. Informationally, such a narrative might argue that queer people's needs are being met on a national scale, whether by dating apps, social media spaces, and national information resources.

However, participants like Izzy (pansexual White cis-woman) emphasised the importance of local queer spaces in addressing the scarcity of information and resources that often results from their absence. Specifically, Izzy discussed her efforts with other queer psychology graduate students to create a space promoting the exchange of information for their specific needs in response to losing another local queer space:

> *There are unique issues for queer psych graduate students in terms of finding therapy care where they don't know the person professionally and [who] is also culturally competent and can work with a queer individual … And through this loss of physical space … our reaction was so desperate to cling to one another to create this community.*

There is a need for Izzy and her community of queer psychology graduate students to access local therapy care for several reasons. First, if they wish to see a therapist in person, they must be able to travel. Even if they were flexible to meet a therapist online, the provider would still need to be local to have the visit covered by student health insurance. Furthermore, Izzy and her community are familiar with many therapists through coursework that often includes field placements and internships. These characteristics combine to produce a need unique to Izzy and her community. As a result, Izzy has created a new community space where she and her fellow graduate students can circulate information related to their local problems, such as where to find a culturally competent, queer-friendly therapist who is (presumably) in-network and does not know them professionally.

This new space, created by Izzy and her community, promotes circulation, which encompasses actions that facilitate participants' '*access to information related to diverse LGBTQ experiences*' (Hardy, 2021, p. 105). Gray (2009) originally described circulation practices as introducing queer people to queer spaces, specifically boundary publics, as spaces created by queer people in response to the absence of more stable queer spaces, such as community centres, coffee shops, or bars. Such publics are temporary and occur both at the margins and within the public sphere. Examples of boundary publics include digital spaces, such as Trans Tumblr, and in-person pop-up queer events. Due to their impermanence and strategic visibility, boundary publics rely on circulation as a critical practice among queer people who communicate about these spaces. Hyacinth (queer transsexual White person) discussed visiting a warehouse space where he met '*somebody who is going to be opening a [queer] bookstore in the area*'. They expressed excitement in having a space to access queer books since:

> *I can't access the YA fiction or a good majority of the books [in my public library] because there is no lift to that second floor. And while I'm technically able to, it isn't often, and frequently not safe or incredibly painful for me to go up a flight of stairs.*

Here, circulation occurred when Hyacinth engaged in a serendipitous conversation with someone opening a queer bookstore, which gave them an alternative space to access queer books. Further, this encounter underscored how access to queer information was not only bodily but also infrastructural, dependent on local accessibility and the physical design of community institutions. Greg (cisgender White gay man) described how public libraries could facilitate queer circulation by highlighting '*local smaller library branches*' that feature '*on racks inside the door*' a queer circular documenting local queer culture.

Adrien (non-binary queer White person) illustrates how circulation depends on local embeddedness across digital networks. They described their move from '*lesbianville, USA*' where they had a relatively '*untraumatic upbringing*', to an area where '*I have no idea where to get information*'. When Adrien moved, they experienced a sense of disorientation (Ahmed, 2006) because the digital resource they relied on for circulation in their prior home, Queer Exchange, was not present in their new location. Queer Exchanges are online private Facebook groups for

queer people who reside mainly in urban and progressive areas to share and exchange information, such as '*to find dog walkers, house sitters, barbers, just everything*', as well as to locate community, connect with jobs and mutual aid initiatives, and more. This example further underscores the critical connections between physical and digital spaces, as Queer Exchange's function is circulation and, therefore, it depends on geography. Adrien addressed the importance of their social networks in facilitating circulation: '*Finding resources in [US STATE] has been hard. I mostly use word of mouth once I started to make more friends here*'. Adrien's observation highlights a challenge in circulation: participation requires being networked or having awareness of the spaces that facilitate network access (Hardy, 2021). Or, as Adrien puts it, '*you have to have some access to information to get more information*'. This account also illustrates Montague's (2025) concept of dynamic information layers, which are closely tied to place and must be relearned or rebuilt after movement. These layers are opposed to the foundational layer, which represents information resources that travel with an individual across places and remain usable despite geographic change, such as Adrien's lived experiences as a queer person.

While Adrien's narrative highlighted the challenges of re-establishing networks after relocation, others focused on the erosion of existing local ties. During their interview, DJ (queer/non-binary pansexual/bisexual White person) also spoke about the importance of local space: '*One of the challenges we're running into as a society is that we've become so international and global that we're losing touch with the people in our community. And I think that hurts for personal support and personal bonds*'. This personal support and bonds foster circulation. As stated above, depending on one's location, identifying queer spaces and resources can be challenging, as such identification often depends on circulation and networks, which may be more limited in certain areas. As DJ elaborated:

> *It's one thing where everybody is accepting and affirming, for the most part. I know, you can step out the door in, say, San Francisco, and go somewhere and not worry about it. But here, we have to make sure that we know about these spaces, and I think there needs to be more communication. And I wish there were more resources for that.*

However, Greg, who resides in a progressive urban area, provides a counterexample to the idea that even places that are '*accepting and affirming*' require local queer spaces. Greg discussed his experiences with several queer bars, which, while some are still standing, he can no longer inhabit. The first bar was a regular haunt for Greg. '*There's still a cruisiness about it, where it's like, the single people space*', he described. Now that Greg is in a monogamous marriage, he does not necessarily feel like the space is for him anymore: '*If I go in with my husband, I'll have people that will hit on me. I'm like, "Oh, this is my husband", and there's almost a "Well, what are you doing here then?"*' Another bar used to be a space for queer people to watch drag performances and learn about '*contributions made by drag performers in drag culture*'. However, over time, the neighbourhood composition surrounding this bar started to shift from a historical *gaybourhood*, in which queer bars were '*part of the tapestry*', to gentrified spaces with more straight couples. As a result, Greg said that he and his friends have been '*spaced out*' of the bar. Greg described a final bar closing due to gentrification and reopening as an inclusive, but not specifically queer, bar.

These queer spaces have historically served as critical nodes within a gaybourhood, facilitating the circulation of information about local queer culture. For a time, Greg hosted karaoke at the queer bar that closed, recounting conversations with '*younger men who would be exploring the scene and their sort of interaction with it, their place in it*'. These spaces also facilitated the circulation of information about queer events and spaces: '*There was information around town*'. For instance, Greg stated that it was '*known*' in the gaybourhood that on Wednesday nights at a coffee bar, '*there would be a huge LGBTQ meeting*'. However, as gentrification changed the composition of the neighbourhood, these bars either closed, opened to '*outsiders*', or seemed to tighten around an

'*LGBTQ bubble*' with specific norms in place that keep certain queer people away. Ultimately, the importance of local queer spaces has increased for Greg, despite living in an affirming place. He noted, '*If you're looking for specifically LGBTQ places, those no longer exist. They are now, they're mainstream*'.

Information activism

Circulation is an essential activity within an umbrella of information-related activities and skills that queer people engage in, both within and outside queer spaces, to address information scarcity in a heteronormative society. McKinney (2020, p. 2) describes this larger umbrella of activities and skills as information activism, '*a range of materials and processes constituting the collective, often unspectacular labour that sustains social movements*'. Information activism '*brings together people, their visions of justice, and the media they use to organize, store, and provide access to information*'. This activism and justice encompass grassroots organising, but at its core, it includes any activity that makes life as a queer person possible. Information activism, therefore, represents a broader concept in which circulation plays a critical role, which also characterises queer spaces, including their creation, maintenance, and sustenance over time.

M (nonbinary ace White person) described their extensive effort to create and maintain digital queer spaces when discussing their declining use of Twitter/X to circulate information about '*disability LGBT experiences, especially trans and nonbinary ones*'. M's value as an information source gained them '*a large enough platform that I ended up on the front page of several social media sites a few times*'. Twitter's '*takeover*' by Elon Musk rendered it an unsafe digital space for M and their followers. M had to contend with the loss of circulating information on this more widely known and visible platform. They had already established a more extensive network on a variety of 'distributed channels, which they used to recreate aspects of this space. As a result, '*there are [queer online] spaces, but nothing interconnected at this point*'. An advantage to this lack of interconnection is that '*not having everything in one place means that some random person like Elon Musk can't come in and just screw everything up immediately*'. However, one disadvantage is that it's '*hard to go from one [space] to the other*', which leads to '*accidental redundancies*' of information. Specifically, '*the lack of communication between different projects ends up meaning that you do have a lot of people working in places that [are] trying to do something good, but it's something that's already been done*'. M's quote highlights a critical challenge in circulation within ephemeral queer spaces, such as boundary publics, which involves the sustainability and persistence of information.

M later described the extensive effort required to maintain a Discord server specifically for trans people in their local geographical area. This work included '*handling our backend server management*', engaging in '*basic verification on someone before they get access*' to the Discord to ensure they are not there '*with any ill intent*', '*keeping a list of [trans friendly] providers, advantages, disadvantages, strong competencies, weak areas in their care*', and '*mak[ing] a channel for specific resources [and] pin[ning] resources*'. Therefore, queer spaces can perform only informational functions, such as facilitating embodied information encountering and circulation, if those inhabiting them engage in information activism over time to sustain the space.

Information activism also occurred when participants discussed their actions to preserve lost spaces. For instance, Greg stayed connected to people who used to frequent queer spaces he lost access to through social media: '*We still have that shared connection digitally through that physical space years ago*'. This account connects to participant Brian, who discussed reconnecting with people from a do-it-yourself punk space they used to inhabit via social media and suggests the blurring of on/offline in terms of spaces, and especially the potential for queer people to leverage on/offline networks to keep a space that has disappeared alive by fostering community connections and exchange of stories. Specifically, they are working on archiving an oral history of the do-it-yourself space on Instagram: '*I would archive it on Instagram, which is what I'm doing*

right now'. In addition, Brian is documenting the stories of older queer people and serving as an information source in emergent queer spaces:

> *I've seen statistics that seven out of ten gay people died of AIDS. I go out now to shows. I used to feel uncomfortable because I was like, 'All these kids don't want me in their space'. But I've had people tell me they like seeing someone who's like them but older because they have no image of what they could be as older. I think by documenting, I'm providing validity for myself and for people whose stories we're sharing.*

Brian's narrative illustrates how information activism is not limited to just codifying information, such as creating a pamphlet or resource, but extends to '*upholding a legacy*' by fostering '*us-led spaces that aren't commercial. Because there's a need for community beyond what capitalism will ever provide for us*'. Brian envisions the information activism inherent in fostering these spaces as a historical duty to communal care that queer people have. Therefore, information activism shows that information is not an end in and of itself but rather encompasses the work that goes into '*upholding a legacy*' of queer activism by fostering queer-led spaces that connect people to queer community and culture. Conversations about fostering and preserving queer space must maintain the physical aspects of the space and the information that circulated within it, support the work that occurred there, and understand how this work connects to the local community, history, and larger queer culture and politics.

Discussion and conclusion

As evidenced by the findings, which spanned embodied encounters, localised information, and acts of information activism, queer spaces serve as pivotal nodes within an information network, disseminating various forms of queer information and knowledge. These spaces are essential because queer people often lack access to information in traditional venues, such as schools, homes, and libraries. Findings support scholarship on queer identity-making, suggesting that community spaces offer affirming and inclusive information, which is often lacking in hegemonic locales (Floegel & Costello, 2019; Kitzie et al., 2019). In response to these realities, practitioners and scholars must reorient informational outreach and provision to prioritise and affirm queer knowledge, as well as the spaces where queer people can learn about themselves, their histories, and their communities (Delmonaco et al., 2023; Hawkins et al., 2017; Vera et al., 2020).

Taken together, these three categories suggest that libraries and archives can use this work to develop more inclusive and supportive environments for queer individuals—spaces that, as the MUNA lyrics that open this paper suggest, provide connection and safety even when queer spaces are under threat. Several participants noted that increased access to digital information enabled them to acquire general knowledge more efficiently. Absent in this shift were more localised and identity-specific resources. We argue for a bespoke approach to information provision within these spaces, designed from the ground up rather than from the top down. As Kitzie (2019) observed, a top-down approach proves irrelevant to most queer users of libraries and information hubs, rendering invisible localised information resources and support. In turn, a local information institution might work with its queer communities to identify an information need or space that is currently lacking a presence elsewhere and create a hyper-focused resource. For instance, libraries could create dedicated queer resource sections that include books, zines, and digital archives of local queer history. They could also host regular events, such as queer book clubs, film screenings, and workshops on queer history and activism. Archives could partner with local queer organisations to document and preserve the histories of queer spaces and communities, ensuring these stories are accessible to future generations. Beyond preservation, archives can act as active partners in information activism by equipping communities to document and disseminate their own stories. Ideas such as guided tours of former queer neighbourhoods and community centres,

community-curated collections like flier archives from do-it-yourself spaces, and oral history projects can give queer people autonomy over how their narratives are recorded and shared.

Another layer of queer information spaces and their loss concerns how information circulates within them. While traditional conceptualisations of library and information provision imagine the librarian's role as an information curator and distributor, in many queer spaces, information circulates throughout the entire communal space rather than through a central point of reference. Within queer information spaces, there rarely exists a reference or circulation desk. Instead, many of the space's members share in the communal and affective distribution of knowledge. One of the most significant ways a library can support the growth and thriving of queer information spaces, particularly during times of loss, is by allowing its space to facilitate, even if informally, such knowledge distribution. For example, does a public library have a community bulletin board? If so, what types of vetting process does the bulletin board have, and how might such vetting practices result in curatorial practices that support or negate the needs of queer individuals? As our findings suggest, queer communities will circulate information within spaces regardless of visible support for such circulation. So, what might it mean to invite these individuals into a more communal, visible act in which librarians and their spaces offer assistance and sustainability to such work rather than directing the flow of that information unilaterally?

Extending these implications beyond libraries and archives, community organisations can likewise draw on these findings to create and sustain queer spaces that address the unique needs of their members. A community space focused on queer communal connection might aid participants like L (Afro-Indigenous Latine queer/non-binary person), who left their queer college student group after realising that many members were unwilling to acknowledge their white privilege and its impact on the group's inclusivity. As a person who was not old enough to drink, L could not access community information spaces in a queer bar, and the provision of such a space within a community centre, even if only for informal discussion, might provide a considerable informational boon to L following their loss of space.

Finally, policymakers can use these insights to advocate for the protection and funding of queer spaces, recognising their importance for the well-being and identity formation of queer individuals. For instance, local governments could provide grants to support the establishment and maintenance of queer community centres and safe spaces. They could implement policies to protect these spaces from gentrification and ensure they remain accessible to the community. Robust policy must move beyond protection of queer spaces to actively resource the information activism that sustains them through grants, legal safeguards, and institutional recognition of community archiving as vital civic labour. Ultimately, queer spaces, whether physical, digital, or imagined, function as critical infrastructures of information and care. Even when such spaces disappear, the embodied, localised, and activist practices of circulation, archiving, and mutual support they foster endure. In this way, the '*place*' MUNA evokes is both metaphor and method: a collective imagining that sustains queer freedom through information, memory, and connection. Protecting these informational spaces and the people who build them is, therefore, not only an archival act but also a declaration of continued queer existence.

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Viewing leisure as experience

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Abstract

Introduction. Serious leisure is a well-established concept in leisure studies and combined with the everyday information seeking model, has led to an increased study of leisure activities in library and information science. Considering the limitations of the serious leisure perspective, this conceptual paper makes the case for viewing leisure as experience.

Method. A theory adaptation and conceptual synthesis approach is adopted based on analysis of relevant literature and the use of two studies as cases.

Analysis. Analysis of serious leisure as well as information and document experience literature is used in conceptualising leisure as experience and to make the case for adopting an experience-oriented approach to studying leisure pursuits in LIS.

Results. Leisure is conceptualised as experience rooted in everyday, and falling in a continuum of intentionality based on personal circumstances.

Conclusion. Viewing leisure as an experience will enable the identification and study of holistic experiences of information along with the social context to such experiences.

Introduction

A simple definition of leisure is time spent away from work and other duties, exercising one's freewill in choice of pursuits. Coined by Stebbins (2020), serious leisure is a well-established concept in leisure studies and refers to a 'broad range of leisure pursuits, such as hobbies, voluntary activities and amateurism, which are sufficiently challenging but adequately rewarding' (Mansourian, 2024, p. 1). As Veal (2021) notes, serious leisure perspective has presented an 'accessible and attractively labelled framework' (p. 575) for studying leisure activities. Gallant (2017) views serious leisure as a foundational concept in leisure studies, which provides a new way of examining leisure undertaken in a systematic and committed manner resulting in significant benefits.

In library and information science (LIS), the influence of Stebbins's (2020) serious leisure perspective combined with Savolainen's (1995) everyday life information seeking framework has resulted in an increase in information behaviour studies looking into non-work contexts including leisure (Given, Case & Willson, 2023). One could add Kari & Hartel's (2007) call for studying the pleasurable and profound as contributing towards this increase in attention to leisure-related contexts. In a similar vein, Ocepek (2018) called for greater focus on the everyday, while Gorichanaz (2019) made the case for studying freely-chosen, personally meaningful activities. Mansourian (2024) put forward 'passionate pastime' as an experience-oriented perspective towards leisure and a complementary concept to go with serious leisure perspective, helping to capture the affective dimensions of leisure.

Even though serious leisure perspective has remained unchallenged and unchanged pointing to its popularity and durability, it has faced criticism and debate, with certain aspects facing more critique like its lack of growth as a concept, its status as a theory, and absence of attention paid to political and social contexts of serious leisure among others (Gallant, 2017). In a similar vein, Gallant et al. (2013) also raised certain limitations to Stebbins conceptualisation of serious leisure perspective and called for an expanded view of serious leisure. Veal (2021) termed serious leisure perspective a typology of activities and suggested that one could attain an optimal lifestyle without participating in serious leisure. In LIS, serious leisure has been viewed as more attractive due to the notion that such activities are information rich, leading to much of everyday life being viewed as information poor.

Considering the critique and limitations raised against serious leisure, the aim of this conceptual paper is to propose the viewing of leisure as an experience. Adopting a theory adaptation and conceptual synthesis approach, the argument is developed for viewing leisure as experience, moving away from dichotomies like serious/casual, and situating it in the everyday. Jaakkola (2020) states that theory adaptation starts with the 'problematization of a particular theory or concept' (p. 23). Here the critique against serious leisure perspective is treated as the point of departure for problematisation of serious leisure and draws on the work of Gallant et al., (2013), Gallant (2017), and Veal (2017, 2021, 2023) for providing an alternative frame of reference in developing the conceptual approach of viewing leisure as experience. Further, the paper draws on information and document experience related literature for conceptual synthesis to advance the argument that viewing leisure as experience for information behaviour studies will enable the capture of holistic experiences of information along with the social context of such experiences. Two empirical studies from LIS literature are analysed to support the conceptual synthesis.

Serious leisure

The serious leisure perspective developed by Stebbins (2020) categorises leisure activities into three forms: casual, project based and serious; each of these categories have several distinguishing qualities, costs, rewards and benefits. Activities that are carried out for fun and pure pleasure and which do not call for any specific skillset or commitment have been termed casual leisure, whereas

project-based leisure requires some amount of basic skills while not requiring any long-term commitment. It covers activities that are occasional, or which happen only once, like organising a cultural event or completing a do-it-yourself project. The third category, serious leisure, has two further subcategories: serious leisure and devotee work. It calls for knowledge, skills, and long-term commitment on the part of the person participating in it. As such it is termed as generating durable benefits and exhibits the potential for turning into a career (Mansourian, 2024). It has been used to study wide ranging activities like sports, hobbies, tourism and volunteering, and varied populations, including disabled individuals and older adults Stebbins (2020) states that the serious leisure perspective takes its name from serious leisure as it was the first form to be studied. He also states that serious leisure has often been the point of reference for analyses of casual and project-based leisure activities, and as such, naming serious leisure perspective after serious leisure 'facilitates intellectual recognition' (p. 2).

In its earlier iterations, serious leisure was perceived as activities that are 'particularly intense and enduring' (Hartel, 2003, p. 230). It was also categorised into three general forms: hobbies, volunteering, and amateurism. Hartel (2003) made a case for adopting serious leisure in LIS noting that participants must make 'significant personal effort based on specially acquired knowledge, training, or skill' (p. 230), and as such, information seeking and use is central to it. Stebbins (2009) himself noted that the serious leisure perspective could bridge the critical gap separating both disciplines, adding that due to its complexity compared to casual and project-based leisure, serious leisure is particularly suitable to be used by LIS scholars. Empirical research into serious leisure in LIS has mostly been limited to activity-based contexts starting with Hartel's (2003) study of gourmet cooking hobbyists as serious leisure. There have been other studies ranging from knitting groups (Prigoda & Mckenzie, 2007), motorsport (Joseph, 2016), food blogging (Cox and Blake, 2011), hobbyist collectors (Lee and Trace, 2009), quilting (Gainor, 2013), music record collectors (Margree, MacFarlane & Prie, 2014), urban exploration (Fulton, 2017), and fandom (Hill & Pecoskie, 2017) among others. Mansourian (2021) looked at the joy of information associated with participation in serious leisure.

Challenges to serious leisure

Serious leisure has been a significant concept withstanding the test of time by shaping leisure research over many decades, through the many empirical studies which have used it as a theoretical lens to look at various leisure activities, especially hobbies, volunteerism or activities engaged in by amateurs. Some of these studies have started from the assumption that engagement in a particular activity means serious leisure is present in it. On the other hand, researchers have chosen certain activities for study and then looked for evidence of the presence of serious leisure in them. Over time there was a shift in focus to an exploration of the six distinct qualities of serious leisure. The concept has remained largely unchallenged and unchanged pointing to its durability, while also being reflective of its 'somewhat intractable links to its past and the intellectual context from which the theory emerged' (Gallant et al., 2013, p. 92). The following aspects of serious leisure has faced most critique.

1. its lack of growth as a concept as well as its status as a theory;
2. the assumption often made that certain activities are serious leisure, rather than defining serious leisure based on the attributes of the experience;
3. a lack of clarity on how serious leisure is connected to casual leisure;
4. focus on benefits, ignoring costs which could have resulted in a more balanced conceptualisation; and
5. lack of attention paid to the political and social context of serious leisure, especially in its research and conceptual development (Gallant, 2017).

Scholarly attention to leisure emerged at a time when it was viewed as a sphere of life capable of contributing meaningfully toward fulfilment of individuals. It was typically examined together with and in opposition to work. In North America, by the 1970s, theoretical focus turned towards the instrumental function that leisure could play. Based on the notion that our feelings of accomplishment, success, and rewards emanate from work, leisure was viewed as providing similar outcomes. The formative years of leisure studies during the latter half of the 20th century were focused on examining how leisure could be used effectively to attain benefits from it. This had the result of imbuing leisure with traits similar to work for the purpose of justifying its importance. Gallant et al. (2013) suggests that this viewpoint has led to the utilitarian, instrumental, and functionalist approach to leisure and its commodification. They argue that Stebbins early work on serious leisure emerged during this time frame.

Calling for the re-envisioning of serious leisure, Gallant et al. (2013) puts forward three limitations to the concept of serious leisure which demand an increased attention to the 'sociopolitical context and the adoption of a critical lens' (p. 91). These limitations arise from an activity-based view of serious leisure in empirical studies and the conceptualisation of serious leisure 'as embedded in a series of dualisms such as positive–negative, work–leisure and serious–casual' (p. 91). The first limitation arises from the fact that assumptions are often made that participation in a particular activity implies that a person has engaged in serious leisure, and as such, is in receipt of the positive benefits accruing from such activity. This, in essence, reflects a normative tone on the types of activities considered as serious leisure and the inevitable benefits accruing from them. Further, there is an absence of attention to the costs associated with such activities. These assumptions have been challenged by studies of normatively marginal activities in recent times. Secondly, it fails to fully consider the psychological aspects of participation in serious leisure pursuits. Thirdly, the social context to leisure activities is often not fully acknowledged or studied, with the results, its potential to help build identity and foster social ties, disregarded.

Keeping these limitations in mind, Gallant et al. (2013) call for viewing leisure as an experience, thereby moving it beyond activity and dichotomy. Shen and Yarnal (2010) noted that we could approach any leisure activity with different styles, and most activities offer the potential for varying levels of skill and behavioural involvement to participants. In other words, 'serious and casual leisure pursuits can be found in practically any activity' (p. 165). They also raised the question that neither forms of activities nor the distinguishing qualities associated with serious and casual leisure are reliable as criteria to evaluate whether a particular leisure pursuit is casual or serious. This dichotomy fails to consider the wide range of leisure pursuits which might represent the 'typical experiences of the majority of individuals' (p. 167) and could fall in a casual-serious continuum. Veal (2017) also made a case for viewing seriousness as a continuum and not as distinct categories, while noting that most leisure activities can be carried out with varying levels of seriousness. Similar to Mansourian (2024), an experience perspective is also proposed by Veal (2017) 'which consolidates features of the serious leisure perspective and other research traditions and theoretical perspectives' (p. 205).

Viewing leisure as experience

According to Fox (2008), 'experience is a multilayered phenomenon; individuals make sense of experience through cultural, cognitive, subconscious, and personal interpretive layers' (p. 41). It also involves the negotiation of norms and dominant values, managing immediate relationships with others and the personal context within 'larger societal and historical positioning' (p. 41). As Savolainen (2020) notes, defining experience in detail is difficult as an 'all pervasive quality of human life' (p. 672). In a similar vein, Lloyd (2014) argues that similar to difficulties in defining information, defining experience comes with its own set of challenges. For this paper, experience is understood as a 'complex interaction between body, sensory input, and neurological processing

—a relationship with the world as humans encounter, interpret, and shape messages' (Fox, 2008, p. 41).

Calling for viewing leisure as an experience, Gallant et al. (2013) offer a definition of serious leisure as

> the committed pursuit of a core leisure experience that is substantial, interesting, and fulfilling, and where engagement is characterized by unique identities and leads to a variety of outcomes for the person, social world, and communities within which the person is immersed. (p. 104)

The 'committed pursuit' contrasts with Stebbins's (2007) 'systematic pursuit' which implies a rigid, structured interaction. Viewing serious leisure as a committed pursuit allows for the possibility of interruptions from various personal circumstances. This stance implies that 'serious leisure is associated with strong personal interest, nurturing highly engaging social worlds and identities' (p.104). It also removes the activity-based focus of serious leisure and views it as a core leisure experience, removing it from the dichotomies like work/leisure and casual/serious. Gallant et al. (2013) calls for viewing serious leisure as an 'experience embedded in social and community processes rather than as an activity with individual outcomes' (p. 104). This could also be seen to be in line with Mansourian's (2024) idea of a passionate pastime, with passionate standing in place of the committed. Yet this also raises the question, if the idea is to move away from the dichotomy of casual/serious, then why should we refer to it as serious leisure? The idea of committed pursuit could be seen to continue the dichotomy even though the stated intention is to move away from it.

Within LIS, information experience is a new construct where 'analysis of human experience is taken as a point of departure' (Savolainen, 2020, p. 671). Bruce et al. (2014) defined information experience as a 'complex, multi-dimensional engagement with information' (p. 4) in real world contexts, that 'integrates all information related-actions, thoughts, feelings and has social and cultural dimensions' (p. 34). According to Davis (2015), the three dimensions to information experience are individuals with their backgrounds, world views, emotions, thoughts and feelings; the myriad forms of information, or information as experienced; and physical or virtual context in which the experience takes place. Hoyte (2019) argued that the concept of information experience is holistic as it unites 'perceptual, cognitive, and embodied experience' (p. 413). Pollak (2015) looked at experience in general, in a small rural context, across the life, work, and leisure spectrum to come to an understanding of experiential information.

Introduced by Latham (2014), information experience from a document perspective is termed as document experience. She drew on the work of Dewey and Rosenblatt, and holds that document experience in the form of a transaction falls in a continuum between aesthetic and efferent, with the stance taken by a person having an impact on it. Dewey (1934) viewed experience as transactional. Latham (2014) observes that Dewey defined experience as the 'undivided continuous transaction between human beings and their environment' (p. 549). Rosenblatt (1981), who herself drew on Dewey, states that the term transaction is used to 'designate a two-way relationship in which one shapes and is shaped by the other' (p. 18). A person and their environment are seen to be parts of an entire event or system. A transaction is not fixed or stable, and 'involves both the past and the future, and is always historically situated; it includes not only thought, but also feeling, doing, perceiving, suffering and other aspects of living in the world' (Latham, 2014, p. 549). The stance taken by Rosenblatt's reader is reflective of their purpose, unconscious or conscious. Similarly, Csikszentmihalyi and Rochberg-Halton (1981) as cited in Latham (2014), also employed Dewey's concept of transaction in viewing the relationship between people and household objects. The transactional outcome in this case depends on 'intention, a direction or purpose that is an

essential feature of the meaning of the activity' (Latham, 2014, p. 549) and is similar to the stance in Rosenblatt's work.

Taking Gallant et al.'s (2013) repositioning of 'serious leisure as *experience in social context*' (p. 104-105) as a springboard and drawing on information experience and document experience literature, as well as following an approach previously put forward by Pollak (2015), this paper calls for *viewing leisure as an experience rooted in the everyday*. This paper also proposes that leisure be viewed as an experience falling in a continuum. Figure 1 presents a mapping of concepts used in the conceptualisation of leisure as experience.

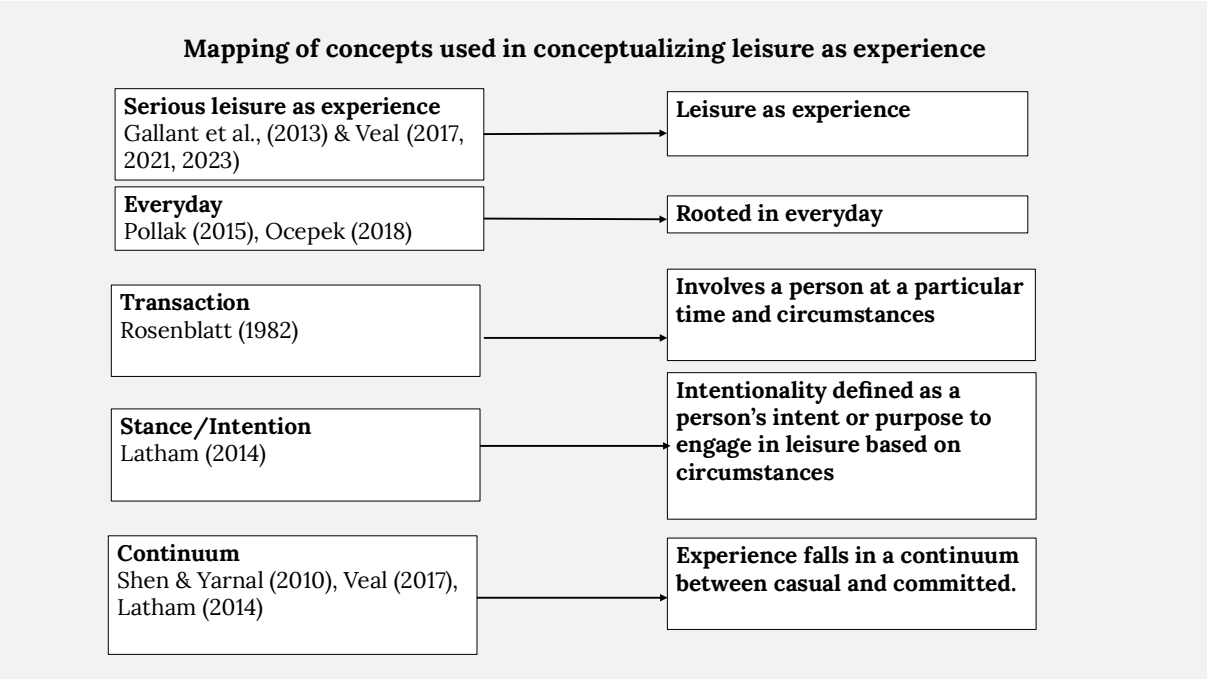


Figure 1. Mapping of concepts used in the conceptualisation.

In her transactional theory, Rosenblatt (1982) states that 'reading is a transaction, a two-way process, involving a reader and a text at a particular time under particular circumstances' (p. 268). Drawing on this, I would like to argue that the experience of leisure involves a person at a particular time and in a particular circumstance, with these circumstances falling in a continuum of intentionality. Here intentionality is defined as a person's intent or purpose for engaging in leisure. Various aspects of life could potentially play a part in the circumstances surrounding leisure experience, like availability of time for leisure pursuits, which could have an impact on one's ability and intention to engage in such activities. In document experience, the stance towards the document is crucial and the 'experiencer's purpose, focus and goals determine the kind of encounter, efferent or aesthetic' (p. 558). Adapting this, the intentionality based on circumstances will determine whether an instance of leisure experience is casual or committed, with most falling in the continuum. The term committed is adopted from Gallant et al.'s (2013) work, as it recognises interruptions from personal circumstances. Figure 2 presents the leisure experience continuum.

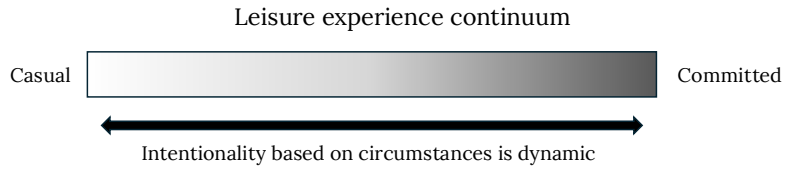


Figure 2. Leisure experience continuum.

Using terms from serious leisure literature we could say that the interest and motivation to engage could fall in a continuum between casual and committed, by situating the leisure experience in the everyday. Table 1 lays out the major differences between serious leisure perspective and viewing leisure as experience.

Serious leisure Perspective	Leisure as experience
Categorisation of activities into serious, casual and project based, on the basis of certain inherent characteristics	Leisure experiences are fluid, emergent and are contextually situated
Primary focus is on classifying leisure activities into types	Primary focus is on understanding lived experiences and the meaning making processes therein
Serious leisure is privileged based on required perseverance, effort and potential for career trajectory	Experiences are not privileged but are seen to fall in a continuum based on circumstances
Often perceived as linear	Nonlinear, based on circumstances, experiences will shift and transform
Associated information practices are seen as goal oriented to support serious leisure activities.	Information practices span the spectrum from seeking, sharing, browsing and as constitutive of experience. Includes affective dimensions of information too

Table 1. Serious leisure perspective versus leisure as experience.

Implications for LIS

Highlighting the lack of interest in everyday as information poor, Ocepek (2018) noted that even in studies of leisure, the focus has been on information richness. In making her observation, she points to the exhortation made by Hartel (2003) for information behaviour studies of leisure, that 'the most fruitful starting point [for leisure research] is serious, not casual leisure, because it is information-rich' (p. 230). She argues that the traditional understanding of information and information richness in information behaviour literature 'makes much of everyday life appear to be information poor and thus not a worthy focus of research' (p. 404). In calling for an expanded view of what constitutes information richness, Ocepek (2018) noted that future work should move beyond serious leisure and explore other activities including those defined as casual. In a study of casual leisure, Elsweiler et al. (2011) found that many of the behaviours identified in the study did not 'fit with existing models of information behaviour in the literature' (p. 237). An understanding

of and usage of the 'transformative power of the everyday' can enable us to expand our research to 'new domains and new forms of information' (Ocepek, 2018, 405). According to Case and Given (2016), in information behaviour studies, information and entertainment have been treated as if they had nothing to do with each other. But it could be said that these concepts exist on a continuum, 'with some sensory input being 'purely' enjoyable, other input being 'purely' informative and much of what we encounter in everyday life falling somewhere between the two extremes' (p. 127).

In a similar vein, Pollak (2014) argued that socially constructed and unacknowledged dichotomies have the potential to stifle the study and interpretation of leisure activities. The results of Elsweiler et al.'s (2011) study of casual leisure can be said to support this. The limitations highlighted by Gallant et al. (2013) also apply to information behaviour studies of leisure. One could argue that viewing activities as pleasurable and profound is also dichotomous, as is the idea of lower and higher things. Along with Ocepek's (2018) observation of the perceived lack of information richness in the everyday, Pollak (2015) observed that very little is known about non-documentary and experience-based information that is found in informal contexts. Viewing leisure as experience, rooted in everyday and falling in a continuum of intentionality, can provide a lens to study information experiences in leisure contexts, moving us away from the work/leisure and casual/serious dichotomies amongst others. Using two studies as cases, this paper demonstrates that such an approach would enable the identification of holistic information experiences in a more holistic way, placing the emphasis on the 'relationship between the various types of information and the individual interacting with that information' (Ocepek, 2018, 405). This is also aligned to Gallant et al.'s (2013) call for an 'expanded view of experiences of leisure in general, and serious leisure more specifically, particularly the gendered and commodified nature of these experiences, as well as the potential for diversity and innovation' (p. 94).

Case one: Rural context

Pollak (2014, 2015) looked at the nature of experience across work, leisure, and everyday life in a remote, rural village in Canada. She views it as a small world, in terms of both the geographic location as well as in terms of the dynamic present within it. The study is positioned as an initial attempt at bringing together the disciplines of information behaviour studies and leisure studies, 'in a way that privileges the experiential nature of information behaviours in everyday life' (Pollak, 2015, p.33). She notes that viewing experience as an information source across the spectrum of work, leisure, and everyday, we can gain a finer and minute understanding of leisure related information experiences, in contrast to what can be understood through the examination of individual activities in isolation. The results of her study supported Gallant et al.'s (2013) claim that serious leisure is 'more textured and complex than often acknowledged' (p. 94). The boundaries between the various domains of life and the various social worlds one occupies were seen to be considerably more fluid, highlighting that various dichotomies could stifle our understanding of leisure. She offers a working definition of experiential information as 'sensation, emotion, fact, skill, knowledge, or understanding acquired or otherwise derived from interactive participation in a social or solitary context, or occurring at some point thereafter as a result of contemplation and reflection' (Pollak, 2015, p. 255-256). Here the process of experiencing information occurs in physical or cognitive contexts, in work or non-work contexts as well as in formal or informal contexts.

Case two: Virtual context

Kizhakkethil (2020a, 2021) studied an online community from a gender, diaspora, and leisure perspective, adopting the theoretical lens afforded by information and document experience literature, to understand the experiences of information within that context. Viewing leisure as an experience, the population studied consisted of Indian women belonging to the diaspora and who were also fans of an Indian television show. Fanfiction associated with the show is extremely

popular within the community and the blogs where the stories are hosted function as *Addas* or hangouts, providing the social context to study information experiences within it. The participants in the study consisted of both writers and readers. To capture the social context, a model of a small world was used, defined as having a primary activity and sites of activity, supported by mediated practices and characterised by the presence of social ties and a sense of community. A key takeaway from the study is the importance of social ties for the participants, playing a part in their experience of reading and writing. Participants also described their experience as an enriching or learning one. Based on the results, information was experienced as everyday, as social ties in the form of interaction and motivation, as awareness, and as memories resulting in a broad conceptualisation of information as meaningful experience. Table 2 provides a comparison of the two cases.

Feature	Rural context (Pollak, 2015)	Virtual context (Kizhakkethil, 2021)
Context/Setting	Rural village in remote Canada	Online community, blogs functioning as spaces
Population	Rural residents	Women belonging to the Indian diaspora
Theoretical approach	Everyday life information seeking, experiential information, serious leisure, small world rural context	Small world model; Information and document experience, leisure as experience
Key findings	Boundaries between domains of life (everyday, work, leisure) are fluid. Leisure is complex and textured	Role of social context in information and document experience. Experience seen as learning or enriching.
Definition of information	Experiential information: Emotion, fact, knowledge, sensation, skill and understanding derived through participation either socially or solitarily or through reflection.	Meaningful experience: Informaiton as everyday, social ties (interaction & motivation), awareness and memories.
Nature of experience	Occurring in cognitive/physical, formal/informal and work/everyday	Socially mediated, by way of social ties and a sense of community. Also cognitive, perceptual and embodied

Table 2. Comparison of the two cases, representing rural and virtual contexts.

Discussion

The two cases discussed above show that viewing leisure as an experience result in the identification of more holistic forms of information experiences. It enables the capturing of non-documentary forms of information highlighted by Pollak (2014). In the remote rural context of Pollak's (2015) study, information experiences occurred across the 'work-play-everyday life spectrum' (p. 260), whereas in Kizhakkethil's (2021) study, the social context to the leisure experience was seen to play an important role in experiences of information. Pollak (2015) noted that 'examining leisure information behaviours from the perspective of experience—broadly defined and across the work–maintenance–leisure spectrum—can potentially reveal macro-level detail and connections between activities that might otherwise remain hidden' (pp. 34-35). Her participants did not differentiate between the foisted boundaries between work, everyday life—and drawing on leisure and information behaviour literature—casual project-based, and serious leisure. Activities were undertaken which spanned the different domains, like female participants foraging for berries as a fun activity to do, as well as a way to earn money. Though Kizhakkethil's (2021) study looked at a leisure context, it afforded the opportunity to examine how 'individual experiences of leisure are socially constructed within ideologies and discourses of gender, sexuality, race, and class that are present within institutions and structures of society' (Gallant et al., 2013, p. 96). The participants of her study experienced leisure within the larger context of

migration and questions of identity that stem from it. The small world of similar others played a role in their information and document experience, whether in the form of motivation for writers, an awareness of self in contrast to others, or a more critical way of engaging in other activities borne out of the social nature of their leisure experience.

Gallant et al. (2013), drawing on the work of Dilley and Scraton (2010), note that the values associated with the acquisition of skills in serious leisure are gendered. It is described as closely aligning with 'traditional male values such as action and challenge rather than feminine values related to building interpersonal relationships' (p. 99). The emphasis on social ties and the benefits that accrued from it like motivation and support in Kizhakkethil's (2021) study shows that there can be gendered differences in experiences of leisure. Participants who were writers spoke of the motivation they received from their social ties as instrumental in them becoming writers, thereby discovering a side to themselves. Similarly, Pollak (2014) notes that the results of her study support the examination of leisure social worlds in terms of 'fluid plurality that embraces difference' (Gallant et al., 2013, p. 103). In her study, hunting as an activity was seen to be enjoyed by both individuals and small groups. There is not only a sharing of labour, but also the proceeds of hunting even with people outside of the groups. Membership is seen to persist in the hunting communities across generations and can play a part in who is invited to hunt. She argues that this can be seen to support Gallant et al.'s (2013) suggestion that leisure experiences are 'influenced by the socio-political context in which they occur' (p. 96).

According to Gallant et al. (2013), the serious leisure conceptualisations display a 'functional, gendered and westernized view of leisure' (p. 98), which Pollak (2014) notes does not capture differences in leisure experiences in other cultures. Her study also suggests that it is possible to find unique leisure-related cultures within one large socio-cultural context. This not only shows that studies of such contexts and cultures are warranted, but it may also afford us the opportunity to have a more nuanced understanding of leisure experiences, along with associated activities, practices and behaviours. Kizhakkethil's (2021) study highlights the role technology can play in leisure experiences, especially in engendering spaces which support the development of social ties and a sense of community. For immigrant and diaspora communities this could play an important role in how leisure is experienced. The results of both studies show that the 'social experiences of information and leisure are particularly important to how and why people participate in various leisure activities and how they affect individuals and groups' (Pollak, 2015, p. 265). Both studies show the value in viewing leisure as an experience, moving away from ideas of the need for perseverance and commitment. Gallant et al. (2013) states that 'perseverance as a means of acquiring high levels of skill and knowledge is a privilege available primarily to those with sufficient material and temporal resources' (p. 101). This would mean differences not only in terms of access but also in terms of gender and class. Viewed as an experience rooted in the everyday, this can mean viewing leisure as 'nurturing both individual identities and social ties' (p. 101).

The approach put forward in this paper also supports Ocepek's (2018) call for a more holistic approach to information behaviour studies, and the need to 'research the quotidian aspects of the everyday world, a fruitful and underdeveloped domain' (p. 409) by discarding dichotomies that have been a feature of both information behaviour and leisure studies. This would enable the exploration of methods that highlight forms of information that may be hidden and present in lived experiences, and which may not be revealed by 'customary methods and concepts of information' (p. 408). Both Pollak (2015) and Kizhakkethil (2021) adopted a qualitative approach to their studies, with Pollak (2015) adopting an ethnographic approach, while Kizhakkethil (2021) adopted an institutional ethnographic approach. Much of the literature drawn on for this paper is rooted in phenomenology, and as such, the approach adopted by Kizhakkethil (2020b) of viewing phenomenology as meta-theory, that is philosophy behind theory, could be valuable not just for studies of leisure but studies of information experiences in general. As Gorichanaz et al. (2018) highlights, even if not 'self-evidently phenomenological in nature' (p. 886), the concept of life world

was a finding in Pollak's (2015) study also. This approach is supported by Suorsa (2024), who calls for the 'conceptualization of information starting from a holistic concept of human being, which combines the understanding and thinking human being to the perceiving and experiencing human being' (p. 1470). She highlights the phenomenological threads in LIS, by pointing out its usage as a broad approach, 'both as a way to understand the premises of the discipline and as a way to introduce methods for examining phenomena related to information' (p. 1468).

The definitions of information presented by Pollak (2015) and Kizhakkethil (2021), show a nuanced view of information, which also highlights the relationship between an individual's interaction with new information and the use of their existing knowledge in the meaning making process. In Pollak's definition, it is the varying contexts to the information experience, like social or cognitive, and in Kizhakkethil's definition, in information viewed in the form of social ties, awareness and memory. In both studies, experiential learning plays a part in the information experience. Pollak (2015) states that while 'experiential learning is an iterative process of engagement, growth, practice, feedback, and reflection, it is always in response to a dynamic set of context–related information variables' (p. 253). In Kizhakkethil's (2021) study, participants pointed to things like developing a positive attitude towards life, the discovery or nurturing of a talent or skill as a learning or enriching experience emanating from their information and document experience. This is reflected in the definitions of information put forth by the two authors.

Elsweiler et al., (2011) noted that casual leisure is marked by a wide variety of motivating factors for engagement, such as desire to change mood or to gain knowledge generally or for social interaction. Similarly, information encountered could play a role in evoking a physical or emotional response to the experience. The importance placed on the leisure experience can also vary with an emphasis on personal wellbeing. Viewing leisure as an experience, falling in a continuum of intentionality can help to capture these nuanced experiences of information rooted in the everyday. Viewed this way information can be seen to constitute the leisure experience, whether in the form of emotion, or a cognitive process, or a fact. It also helps to capture the social context in which the experiences take place, resulting in a more holistic conception of information. This is also in line with Davis's (2015) conception of the three dimensions of information experience, which includes individuals and their thoughts, feelings, and emotions. Adopting Rosenblatt's work as utilised by Latham (2014) in her model of document experience, I argue that viewing leisure as an experience falling in a continuum would enable the identification of information that also falls in a continuum between efferent and aesthetic, similar to the argument made by Case and Given (2016), of information and entertainment falling in a continuum. This captures the holistic view of information present in the definitions from both Pollak (2015) and Kizhakkethil (2021). The efferent side would be a person looking to take away information like, say, a fact from reading a book, while aesthetic side would feature the meaning making process involving one's emotions, prior knowledge, and memories. The social context to the leisure experience would also enable the experience of information through interactions which can also fall in a continuum between efferent and aesthetic. Using Kizhakkethil's (2021) definition, efferent would be information sharing (everyday) and aesthetic where information is experienced as motivation or awareness.

Limitations

This paper is an initial attempt at conceptualising leisure as experience for information behaviour studies. The review may have failed to consider relevant literature which could have improved the conceptualisation. It also needs empirical support apart from the two cases considered for the paper, in order to show the validity and usefulness of the conceptualisation, especially in identifying holistic forms of information.

Conclusion

Making the case for viewing fiction as informative, Broussard and Doty (2017) argued that doing so would help to better address problems in information science theory, like the 'frustrated attempts to define *information*, the (generally hidden) gendered character of information science and information behaviour research, the misguided conduit metaphor and an overemphasis on cognition at the expense of practice, documents and materiality' (p. 61). This aligns with Gallant et al.'s (2013) argument for viewing serious leisure as experience, which may be gendered, commodified, and stratified requiring an 'increased attention to the sociopolitical context and the adoption of a critical lens' (p. 91). It goes without saying that serious leisure has a rich history of application in research in various areas, including in information behaviour studies. The durability of the concept has been established by its widespread adoption. At the same time, it has certain limitations which can be overcome through conceptual approaches like viewing leisure as an experience. Various dichotomies have been a feature of both serious leisure and information behaviour studies, and this paper offers a more nuanced way than such dichotomous approaches. Pollak's (2015) study was an attempt to bridge these two disciplines by offering a fresh perspective of viewing leisure as an experience. This paper attempts to take it further by proposing that leisure be viewed as an experience, rooted in everyday and falling in a continuum of intentionality, enabling a holistic understanding of information experiences in various social contexts.

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'I'd rather not have known this': A study of information regret

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Abstract

Introduction. This article introduces the concept of 'information regret', which refers to the phenomenon where people regret having received certain information, challenging the typical information science view that obtaining information is always positive. This concept broadens the perspective of information behaviour research by focusing on the negative consequences experienced after information exposure, contrasting with related concepts that focus on avoidance or anxiety before seeking.

Methods. The paper provides a theoretical discussion of information regret, an emotion that arises after information has been acquired. It is contrasted with related concepts (such as information avoidance, denial, and ignorance) that occur at the pre-acquisition stage. Additionally, an exploratory, questionnaire-based study was conducted with 141 participants from the United States and United Kingdom to gain initial insight into the nature, types, and severity of information regret. The questionnaire aimed to determine the situations, time elapsed since the incident, current severity of regret, and the perceived impact of the received information.

Analysis. The analysis categorized the reported incidents by topic, source of information, and whether the information was obtained through active seeking or accidental encounter. These findings, combined with theoretical considerations, were used to derive a comprehensive model that describes how information regret arises from various information acquisition processes.

Results. The reported incidents ranged from trivial to severe life-changing events, typically revolving around infidelity, financial problems, and health, and involved both active seeking and passive encountering from personal and electronic sources. The data showed that the severity of regret is highly personal and has no correlation with the amount of time that has passed since the information was learned. Results from the empirical study inform the information regret model.

Conclusion. Information regret is a unique concept that shifts the focus of information behaviour research to the negative consequences experienced after information acquisition, demonstrating the profound and lasting impact a single piece of information can have. Future research should utilize in-depth interviews and explore the categorization of regret incidents.

Introduction

In information behaviour research, there is increasing interest in life-changing events. This line of research is particularly addressed in Ian Ruthven's latest book, which presents a theory on how people cope with life changes through what he terms 'information sculpting' (Ruthven, 2022). Furthermore, Ruthven discusses areas such as relationships, health issues, and surviving crime, where information plays a crucial role in coping with life-changing events.

Ruthven's book—and many other research studies—start by arguing that life-changing events trigger information behaviour, and information seeking in particular. In this article, I take the opposite position: namely, that information behaviour and the resulting information that a person searches for or encounters can trigger a life-changing event. While this may seem obvious, and we are aware of many examples in which people discovered some piece of information that positively changed their lives, the focus of this work is on how information can negatively impact a person's future. As Ruthven (2022 notes, 'information may reveal a situation that is more challenging than first appeared leading to a negative reappraisal' (p. 10).

This article introduces the concept of 'information regret', which refers to the phenomenon where people regret having received certain information. Information seeking or encountering, and the subsequent use of that information, can result in information regret, i.e., a person regretting having received that information. It is striking that, although information use has been explored in many contexts (Kari, 2010) and pre-acquisition phenomena like information avoidance and ignorance have been explored, the negative effects of received information have not yet been integrated into information behaviour frameworks.

Examples of having received information and regretting having gained knowledge of it range from the trivial to potentially life-changing events. Obviously, when someone watching a TV series but not having concluded it and learns of the fate of a character from that series, this falls in the former category. On the other hand, finding out about one's spouse leading a double life falls in the latter category. An example widely discussed in Germany is the effects of someone accessing their Stasi Files. These files were collected by the 'Staatssicherheit' (short: Stasi, the Ministry for State Security) in the former German Democratic Republic, which spied upon its citizens. Oftentimes, friends and family of someone of interest to the Stasi were recruited as collaborators. As the Stasi Files are open for inspection by any person for whom a file exists (and the relatives of deceased persons), people affected must decide whether they want to read their file or not. This is a classic example of potential information avoidance: Some people prefer not to know if some of their friends, family, or neighbours provided the Stasi with information about them. However, there are also cases where people have accessed their Stasi files and later regretted it. For instance, there are reports of a person regretting having seen their mother's file, where her suicide was documented in text and photographs (Gunkel, 2021).

In general, the problem is that what is known cannot be revoked. Of course, one can forget a piece of information, but that is not a deliberate choice. For instance, information that a person knows about another person cannot be not considered when evaluating that person. This problem arises in some court cases where jurors have seen news coverage that portrays the defendant in a negative light. The jury members, however, must disregard information that is inadmissible in the trial (Bruschke & Loges, 1999).

For a person to regret having received a piece of information, it does not matter whether they actively sought it or came across it in another way. However, this holds only as long as we consider information regret to refer only to the information itself, not to the process through which it was received. One can easily imagine that a person who has actively sought information they now regret having received may not only regret knowing the information but also regret having sought it in the first place. Furthermore, it is of no importance whether the information in question was

mediated through technical systems, directly revealed by another person, or found in the physical world. Again, this holds only if we consider the information itself. It is also possible that the recipient of the information blames the person who delivered it for doing so. In this article, I will solely focus on the person receiving the information. Questions related to a person revealing information to someone else, such as why people keep or reveal a secret, and their feelings about hiding information from others, are outside the scope of this research and have been discussed elsewhere (e.g., Fulton, 2019; Slepian et al., 2016).

Information regret is a notable blind spot in information behaviour research. Typically, information science views obtaining information as something positive. While the notion 'more information is always better' obviously does not hold and has even been declared a myth (Given et al., 2023, p. 10), research generally still assumes that people would be better off having information than not. At the same time, it is widely acknowledged that people avoid or even deny information (e.g., Case et al., 2005; Foust & Taber, 2023; Link, 2022). This is often illustrated with examples of severe illness, where people frequently choose not to get information that could potentially be emotionally harmful. Still, the assumption is usually that it would have been better for that person to have received the information in question, as they would then have been able to treat their illness properly and plan their life accordingly. Of course, this is not the case with information overload (Bawden & Robinson, 2009; Belabbes et al., 2023; Hołyst et al., 2024), where the sheer amount of information is overwhelming to a person and may lead to avoidance or shallow approaches to information seeking (Ford, 2015, p. 127). However, in the case of information regret, we can assume that a single piece of information can lead the person who receives it to regret having gained knowledge of it.

This article will show how information regret relates to central concepts of information behaviour research and how a focus on information regret can enrich this research field. To provide a first impression of how information regret is a phenomenon relevant to people and to identify avenues for further research, results from an exploratory questionnaire-based study on the phenomenon are presented and discussed. From the theoretical and empirical results, a model of information regrets is derived. The article closes with suggestions for further research.

Situating information regret in information behaviour research

It is evident and astonishing that information regret (or a similar concept) has not been considered in information behaviour research so far. One reason for this can be seen in the generally limited interest of the field in information use (Given et al., 2023, pp. 78-79), which is often regarded simply as the outcome of an information-acquisition process that is not further considered. A review of the relevant textbooks by Ford (2015), Wilson (2021), Bawden and Robinson (2022), and Given et al. (2023), as well as newer integrative models (Greifeneder & Schlebbe, 2022), confirm the absence of information regret or similar concepts. Therefore, one goal of this article is to bring the – in our case, negative – consequences of information into the focus of information behaviour research, adding a post-acquisition phenomenon to the extensive discussion of mostly pre-acquisition phenomena. Information regret is just one possible consequence of receiving information. Prior research has considered non-seeking behaviour and when such behaviour is unhealthy vs healthy (Manheim, 2014). Examples of when information non-seeking can be healthy include avoiding health information that would increase a person's worry, satisficing to avoid information overload, or avoiding low-quality information.

Negative effects of information and information anxiety

It is evident that one could regret having received information, even if its impact is low. Reasons for regret could be, for instance, that one wasted time reading something that was not relevant. However, we are interested in the more substantial regrets, which often are related to life-

changing events. Therefore, the question is whether and how people regret having received information that had a substantial influence on their lives.

The negative outcomes of information behaviour have been increasingly recognized as a crucial area of study, with scholars identifying various 'information pathologies' that arise from the complexities of information engagement. Bawden & Robinson (2009) discuss the 'dark side of information', encompassing cognitive and emotional burdens such as information overload and anxiety. A key question here is whether 'information regret' constitutes a distinct pathology within this framework. While much of the health information literature emphasizes positive outcomes, some studies address negative consequences on various levels (Zimmerman & Shaw, 2020). Additionally, studies such as those by Kuhlthau (2003) highlight that information seeking can lead to confusion and distress rather than clarity and reassurance, even when the final outcome ultimately leads to satisfaction. Furthermore, research on information grounds (Fisher, 2005) highlights the social dimensions of information behaviour, where the communal exchange of information may either mitigate or exacerbate negative experiences. These insights suggest that the consequences of information behaviour are multifaceted, requiring a nuanced understanding of both its beneficial and detrimental effects.

Information anxiety is about people's negative feelings towards unknown information. Research on information avoidance suggests that people experience anxiety not only when encountering undesirable information but even before they begin seeking it. Wurman (1991) introduced the concept of information anxiety, highlighting the distress individuals feel when faced with an overwhelming amount of information or uncertainty about how to access and interpret it. When individuals anticipate that acquiring specific knowledge—such as learning about a health condition—may lead to distress or negative consequences, they may choose to forgo information-seeking altogether, not out of apathy, but out of a protective instinct to avoid emotional discomfort.

Information avoidance, deliberate ignorance, and information denial

This section is about people's activities and strategies towards not receiving information. Avoiding, ignoring, or denying information can be seen as mechanisms of self-deception (Von Hippel & Trivers, 2011). However, it should be stressed that these mechanisms can also be regarded as self-protecting mechanisms, and, therefore, be perfectly reasonable: 'some information may be more harmful than the adverse consequences of any deception' (Echarte et al., 2016).

Information avoidance

Information avoidance is closely related to information anxiety, where anxiety is on the affective level, while information avoidance is on the psychomotor level (i.e., focusing on actions to avoid information). Information avoidance has been defined as 'any behaviour intended to prevent or delay the acquisition of available but potentially unwanted information' (Sweeny et al., 2010, p. 341). However, such narrow definitions focusing on negative outcomes have been challenged, most notably by Hicks et al. (2025), who offer a more nuanced definition of the concept: 'practices that moderate interaction with information by (1) reducing the intensity (amount and/or flow) across multiple levels of granularity; (2) restricting engagement with or control over information, whether actively, passively, or receptively, and/or (3) excluding information based on relevance, quality, and timeliness criteria' (p. 339).

People are motivated to avoid information because 'we do not wish to, or cannot, deal with the consequences of that information' (Ruthven, 2022, p. 56). This points to the – sometimes unforeseeable – consequences of information seeking, or more broadly, receiving information. In that sense, information avoidance is an active choice to prevent oneself from unpleasant or harmful information. This has been extensively shown in the context of health information, where many people with life-threatening illnesses prefer to avoid information about their health

condition (e.g., Baker, 1998; Mills & Davidson, 2002; Wong et al., 2000). Put more generally, a major reason for avoiding information is that people cannot oversee the consequences the knowledge would have (e.g., Mischel, 2014). It has been noted that the information avoided can be either undesirable or desirable (Foust & Taber, 2023). A classic example of undesirable information is the revelation that one has a high risk of contracting a particular disease. An example of desirable information is the ending of a television series, where the information itself is desired but not at the particular point in time.

In summary, the concept of information avoidance focuses on a person being aware that there is (or might be) some information that one prefers not to know. Therefore, information avoidance is strategic, whereas information anxiety is a negative feeling. Information regret, in contrast, deals with information that one either did not want to receive but received anyway, or information that one wanted to receive but later regretted knowing.

Deliberate ignorance

This section is about people *deciding to ignore information*, mainly because they consider it negative. Deliberate ignorance is a choice people make not to be confronted with information they know exists. The concept is closely related to information avoidance. However, a person avoiding information may not even be aware of or presume there is information on the matter at hand. In contrast, deliberate ignorance refers to often concrete information, such as the results from a medical test a person took but chooses to ignore the results of, and thereby avoids learning regrettable information (Sharot & Sunstein, 2019). Deliberate ignorance is based on at least the assumption that a piece of information one does not want to learn about exists. In contrast, information avoidance is not necessarily an active decision to avoid a piece of information. Deliberate ignorance is, among other things, an 'emotion-regulation and regret-avoiding device' (Hertwig & Engel, 2016). When one does not ignore potentially harmful information soon enough, the problem is that once acquired, the information cannot be forgotten.

In summary, information regret could 'destroy' deliberate ignorance when people receive information they intended to ignore without asking for it. On the other hand, when they actively search for that information, they give up their deliberate ignorance, even if only in a moment of weakness, and may regret their decision after receiving it.

Information denial

Information denial is about people *actively denying* known information, that is, information they have already received. Information denial is also related to the fact that it is not actively possible to forget information once it has been received. Denial is a coping strategy used to deal with information one cannot accept, and it can therefore serve to avoid information regret.

Keeping secrets

This section examines people *actively hiding information* from others, indicating that information avoidance can be socially collaborative (Brashers et al., 2004). It may be that people do not pass on information because it might upset the person who would receive it (see Ruthven, 2022). Information relevant to a person can be known to others but not to the person themselves (cf. the concept of the 'Johari Window', see Ford (2015, p. 38)). People keeping a secret from the 'target person' act as gatekeepers of that information. Keeping a secret is hard (for the 'owner' of the information). A person may disclose information because they can no longer bear the pressure of keeping it. However, the act of keeping secrets focuses on the sender's perspective, not on the recipient's. Nonetheless, a person who receives the information may feel information regret about having received it.

Summary of related concepts

In summary, the review of related concepts reveals that the research field is predominantly interested in problems with information *before* people seek or receive it, focusing on individuals

who do *not* seek information due to their anxiety about the outcome of that seeking. A notable exception is research on information overload, where seeking took place, but the amount of information found or available is too large to cope with. However, in the case of information overload, people are often overwhelmed by the sheer *volume* of information, rather than by the information they actually absorb. Information regret, situated after information seeking or some other form of information exposure has occurred, recognizes the fact that a recipient has already received the information and regards it as negatively impacting them. Therefore, information regret is a unique concept that broadens the perspective of information behaviour research.

How do people receive information that they later potentially regret having received?

People may receive information that they will later potentially regret having received in multiple ways. In fact, this type of information can be acquired in all ways described as the 'information acquisition space' by Erdelez & Makri (2020): 1. Undirected seeking, 2. Directed seeking (search/browse), active monitoring, 3. Passive awareness, 4. Passive monitoring. However, information passed on from person to person (i.e., not mediated through an information system) may also reach a person who is not even passively aware but receives the information from a sender without having the chance to avoid it. In all these cases, people can receive information that they later regret having received. This shows that information regrets can result from any type of information acquisition. However, when we consider that people who regret having received information may later blame someone for disclosing it, active seeking and disclosure by another person seem particularly important. The person with the information regret may either blame themselves or another person for having disclosed the now undesirable information. Because in our case, we need to also include information as something that is passed on directly from one person to another (other people as sources), we leave the focus of information science on recorded or manifested information (Buckland, 1991; Petras, 2023) and also consider volatile spoken communication, more a topic of communication research.

Empirical study

In this section, I report the results of a first exploratory questionnaire-based study on information regrets. It aims to provide an initial insight into people's information regrets, their types, and their severity. Given the convenience sample and other limitations of the approach described below, the data do not allow for any generalisations beyond the sample investigated. Accordingly, the reported incidents should not be mistaken for providing information on how often particular incidents lead to information regret.

Methods

To get a first impression of the phenomenon of information regrets, I designed a questionnaire and collected answers from 141 participants. The aim was to determine in which situations people receive information that they later regret having learned about, whether they regret more current or past incidents, how much they still regret having received that information, and how much they believe the received information has changed their lives.

The questionnaire contained the following four questions:

Q1: *Please describe a concrete situation in which you found a piece of information or obtained it by any other means, but afterwards regretted having learned about it. Hint: Please write three to four sentences.*

This question prompts participants to briefly describe a situation in which they received information that they later regretted having obtained. The question is formulated to capture both instances in which the information was actively sought and instances in which people encountered it in other ways.

Q2: *In which year did you receive the information?*

The answer to this question was used to see how much time had passed since the reported incident.

Q3: *How much do you still regret knowing this information today?*

To gauge the severity of the participants' regret for having received the information in question, we asked them to rate their regret on a scale from 1 to 10, with the endpoints labelled as 'I don't regret it anymore' and 'I regret this very much.'

Q4: *Would your life have been different if you hadn't had this piece of information? If so, how? Hint: Please write one or two sentences.*

To determine whether the information regret indicates a life-changing event, I asked participants whether they think their lives would have been different if they had not received that information.

The questionnaire was intentionally kept short. The intention was to collect a sufficiently large number of responses without requiring too much effort from the participants. As this research is exploratory in nature and the questionnaire results are intended only to provide a preliminary understanding of the investigated phenomenon, I decided against using more in-depth methods, such as interviews.

Participants and data collection

Data were collected on January 5, 2024. The questionnaire was administered on Prolific, a platform that facilitates the easy recruitment of participants through panels. I collected responses from 142 participants, 50% of whom were male and 50% female. I restricted the sample to participants from the UK and the US, who were required to be native English speakers. I did not aim for a representative sample, as this research is exploratory. However, I aimed for a balanced gender distribution. Prolific allows only for a binary gender distinction, so, for lack of better options, we stuck with that. Only individuals who had experienced information regret were invited to participate in the survey. Because of the convenience sample, the data do not allow for statements about the frequency of information regrets (and this was not the intention of this study, anyway).

Results

Topics and situations

The topics of information people regret having received cover a broad spectrum. Recurring themes in the data are finding out about someone cheating, financial problems, crimes, and health conditions. Apart from the person themselves, people affected are often close friends, relatives, co-workers, or romantic partners.

The incidents reported range from the trivial to the severe. For instance, respondent 72 reports that, '*It may seem trivial, but I bought a TV on black friday in 2022, then saw that it had gotten even cheaper in the weeks afterwards*'. In contrast, the data reveal many high-impact incidents. The following examples from the data illustrate this:

> *I was looking for a new contact at a client that I have worked with for many years. The person I was speaking to previously had always replied almost instantly. But then started to ignore calls and all other correspondence. I couldn't get any concrete information from their office and it turns out that they had been fired for a crime that really changed my opinion of them.* (Respondent 25)
>
> *Discovered a partner had cheated on me. It was a long time previous to finding out and we were happy together. It destroyed my trust and ended the relationship after a brief*

> *time of trying to make it work. If I hadn't found out, we would probably still be together.* (Respondent 88)

Regarding the people involved with the information found, many respondents report regretting having encountered information on close friends or relatives:

> *My Dad bought me a small set of desk drawers from Ikea when I was young, like 8 or 9, and I poorly decorated it. It ended up on his study desk at some point and, when I was about 12, I was curious as to what he was using it for. I ended up pulling open all the drawers and found escort cards, condoms and lubricant. It provoked me to search for more evidence of infidelity towards my mother and found a fair bit; I didn't keep any of it and have no physical proof now, as such, I really regret ever learning about it.* (Respondent 30)

Information seeking and information encountering

Information regret can be triggered by active information seeking or by – often accidental – information encountering. In the latter case, the person encountering the information is unaware that this information or information related to a topic in their life (e.g., adultery) exists.

Some people search for information out of curiosity and later regret having done so. These instances can be divided into two categories: cases where a person searches for information in publicly available sources (most notably, search engines and social media), and cases where the information is private (for instance, in a file on a personal computer or pictures on a smartphone). In the latter case, the person searching for the information is usually aware that they are doing something they should not:

> *I found out that a partner was attempting to cheat on me by reading their messages without their consent. I deeply regret it. I regret knowing the information as it didn't help my mental health or self esteem. I also regret that I read their messages without their consent, as that isn't a right thing to do.* (Respondent 81)

Additionally, in some instances, people searched for something but found something else, which they later regretted having learned. Some respondents also reported encountering information they were not actively seeking:

> *I was working as a personal assistant at the time and I had access to my bosses emails. I accidentally clicked into an email when looking for something and read about a member of staff in our department being made redundant at the end of the week.* (Respondent 120)

This suggests that people can find themselves in an unpleasant situation where they regret having received information without actively participating in disclosing it.

Sources

The information that people later regret having received can come from a variety of sources. The most notable distinction is between information received through electronic sources (e.g., search engines, social media, websites), information obtained from other people, and information found or encountered in the physical world (e.g., by looking into someone else's drawer). Some examples of the sources where respondents got the information in question from are other people directly offering the information, overhearing a conversation, actively searching on the Internet, seeing information on social media, reading another person's diary, an accidental meeting, watching someone without them knowing, and searching the physical space for something but then finding something else.

Time and impact

Most incidents the respondents reported occurred within the last couple of years. However, some incidents happened many years ago, dating back to the 1960s. As expected, there were incidents that did not leave a lasting impact and are no longer much regretted. For instance, respondent 16 reported,

> *I can only think of instances where I found out information about someone, which made me disappointed in that person. It would normally be someone famous, thus tainting my enjoyment of their output. I don't think I'd regret any other kind of information, as long as it's truthful.* (Respondent 16)

and stated that they did not much regret knowing this information now (rated lowest on the scale from 1 to 10). Further, they said that knowing this information did not have any severe consequences: '*my enjoyment of certain things would have been stronger. but other than that there's been no particular effect*'.

However, the data also reveals incidents where people's information regret is (still) very high. One example of an incident still rated 10 on the scale is respondent 83's story of how they discovered a family secret, '*Discovering a family secret. I accidently discovered a piece of information about a close member of my family. It concerned my sister-in-law*'. Asked about how their life would have been different without knowing this information, they wrote, '*It changed my relationship with her and forced me to keep a secret from my brother. I am not sure that this was the best thing to do*'. The consequences of having received information can be severe, e.g., someone cut off communication with a friend after learning that a piece of gossip they received through social media was true (Respondent 6).

There is no statistical correlation between the amount of time that has passed since the information was learned and the severity of the information regret. The data shows all combinations of time passed and severity: some cases have been rated high, while others have been rated low, regardless of the time that has passed. In some cases, people still regret heavily (10 out of 10) even when the reported incident seems minor, such as having heard about a surprise birthday party beforehand (Respondent 39). Here, the person affected said that the information changed their life '*not at all*'.

Information regret model

From theoretical considerations outlined above and the questionnaire answers, I derived a model describing how information regrets can result from either active information seeking or information encountering, considering that having received information can be regretted immediately or after some time has passed. The model is depicted in Fig. 1, the details are described in the following paragraphs.

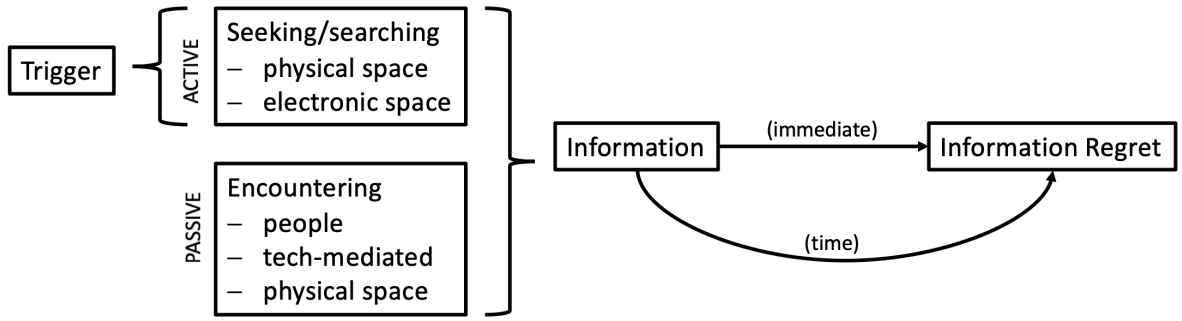


Fig. 1: Information regret model.

Triggers

Firstly, there can be a trigger (or 'activating mechanism' in Wilson and Walsh's (1996) terms) that leads a person to actively search for information. Examples of triggers include reading about a person or event or experiencing a health symptom.

Active information seeking

A trigger can lead to active information seeking, whether in physical or electronic spaces. Examples of searching physical spaces include searching through drawers in a person's study (Respondent 30) or reading a person's diary (Respondent 22). The most common form of searching the electronic space mentioned is unsurprisingly looking up something on Google, but also active search on social media.

Information encountering

In many cases, people stumble upon information they later regret having received through information encountering, without a trigger. They receive information either directly from people or through technology. In the former case, other people sometimes reveal information to a person, and sometimes a person overhears a conversation where the information was not intended for them. For information transmitted through electronic media, participants most commonly mentioned seeing information on social media, but also encountered it by chance when using someone else's device. For instance, Respondent 108 mentioned that they saw an incoming text message while repairing someone else's mobile phone.

Immediate vs later information regret

Sometimes, people immediately regret having seen a piece of information. For instance, one participant said they '*googled a medical issue that my friend told me about and due to the pictures and the description of it immediately regretted looking for it as I'm very squeamish*!' (Respondent 4). In other cases, information regret only comes after some time has passed.

Discussion and conclusion

From the questionnaire answers, we see that there are various situations in which people receive information they later regret having received. Information that later results in an information regret can come from many sources, including people, the internet, social media, physical documents such as diaries, or messages on mobile phones. Information relevant to information regrets can be related to work or private life. At work, information may concern colleagues or the person receiving the information themselves; in private life, the information often concerns the receiver's partner, friends, or family members. Topics vary widely, ranging from a person cheating on their partner to finding out that a co-worker had committed a crime. In some instances, people still regret having received a piece of information even after many years have passed since they first learned of it. This highlights the profound impact a piece of information can have on people's lives, demonstrating that it can be lifechanging.

In the empirical data, we found both desirable and undesirable information, which confirms Sweeny et al.'s (2010) findings: the information can be either undesirable (e.g., information that one is at high risk of a serious disease) or desirable (e.g., the ending of a sports game one has not yet watched). The data revealed that people sometimes not only regret having obtained some information but also having searched for it in the first place. These cases are not considered in the information regret model, and this type of regret is an interesting phenomenon in its own right. Information regret may stem from knowledge that others have already possessed about a person, possibly for a very long time. Future research, categorising information regret incidents into the Johari Window (Luft & Ingham, 1955, cited in Ford, 2015, p. 38), could further explore and differentiate information regret incidents.

It should be noted that information regret can be closely related to information anxiety. Sometimes, people overcome their information anxiety to explore something unpleasant (like in the Stasi case mentioned in the introduction), finding harmful information and later regretting it. Information regret is also related to the concept of serendipity (Edward Foster & Ellis, 2014; Erdelez & Makri, 2020). However, while serendipity is by definition a lucky surprise, encountering information one later regrets to have learned often can be seen as 'negative serendipity': a person is looking for something, but then finds something else, which is, in the case of information regret, something unpleasant.

In terms of the impact of information regret incidents, the survey data clearly indicates that this impact is highly personal. The results indicate that personal relevance plays a significant role in determining how much people regret having received a piece of information. This aligns with psychological research on the impact of a topic or issue on an individual (Foust & Taber, 2023). Further research on information regret can also benefit from psychological research on actively forgetting unwanted memories (Costanzi et al., 2021).

As this is a first exploratory study of information regret, it can only provide a preliminary glimpse into the phenomenon. The sample is not representative of any population and, therefore, the data obtained can only serve as illustrations of information regret incidents. Furthermore, we only asked a limited number of questions. The results may be seen as superficial compared to in-depth interviews, which would be a logical next step in researching information regret.

Acknowledgements and data availability

Research data is available at https://doi.org/10.17605/OSF.IO/627WK.

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Exploring emerging knowledge landscapes through preprints: A DIKW-based computational framework for transforming data into actionable scholarly insights

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Abstract

Introduction. Preprints offer a critical vantage point for tracing emerging knowledge trajectories but remain underexamined. Within the data–information–knowledge–wisdom (DIKW) framework, preprints are positioned as raw data requiring computational transformation into interpretable knowledge.

Method. Using explainable artificial intelligence (XAI) preprints as a case domain, this study applied a computational knowledge transformation framework. After a two-stage quality filter ensuring preprints' metadata completeness and institutional validity, latent Dirichlet allocation (LDA) extracted thematic structures, Word2Vec analysed semantic relations, and content analysis refined interpretive coherence.

Analysis. The framework operationalised the DIKW hierarchy by tracing how unstructured preprint texts evolved into structured information and interconnected knowledge. LDA identified thematic clusters, while Word2Vec and content analysis revealed semantic proximity and conceptual cohesion, forming an interpretable knowledge network.

Results. Two thematic trajectories were identified: (1) algorithmic development and model optimisation, highlighting methodological innovation; and (2) user-centred evaluation and performance assessment, emphasising interpretability and user interaction.

Conclusion. With appropriate quality control and computational modelling, preprints can serve as an early-warning system for emerging knowledge and technologies, offering valuable insights for scholars and data scientists.

Introduction

In contemporary research environments characterised by rapid evolution and intense competition, the ability to access, interpret, and utilise up-to-date information has become a decisive factor in generating new insights and maintaining scholarly relevance. This demand is particularly salient for researchers seeking to detect and interpret emerging intellectual trends (Pontis et al., 2017). While the traditional peer-reviewed publication system remains fundamental for ensuring academic rigor and reliability, its protracted review and publication cycles frequently impede timely dissemination at the research frontier (Alfonso & Crea, 2023). In fast-developing domains, such as explainable artificial intelligence (XAI)—which has rapidly emerged to address the opacity of artificial intelligence models (Arrieta et al., 2020; Castelvecchi, 2016; Jacovi, 2023)—research topics are expanding both in diversity and in pace. Within such contexts, the academic community increasingly relies on preprints as critical platforms for rapid scholarly communication. Preprints enable the dissemination of research outputs prior to formal publication, providing scholars with the opportunity to engage with cutting-edge developments at the earliest stage of knowledge production (Aviv-Reuven et al., 2024; Wang et al., 2020).

However, despite these advantages, preprints also present substantial challenges: they often lack peer review, exhibit structural inconsistencies, and vary considerably in quality (Kaiser, 2017; Kodvanj et al., 2022). Although prior studies indicate that the textual content of preprints frequently remains stable through to final publication (Kaiser, 2017; Klein et al., 2016), inconsistencies in formatting and metadata presentation continue to undermine their utility as reliable scholarly resources.

Problem statement

Within the framework of the data–information–knowledge–wisdom (DIKW) hierarchy (Baskarada & Koronios, 2013; Peters et al., 2024; Rowley, 2007), preprints are more appropriately conceptualised as raw data—fragmented, insufficiently validated, and structurally inconsistent—rather than as processed information capable of directly supporting information seeking or knowledge construction (Kaiser, 2017; Kodvanj et al., 2022). While data possesses latent value, its utility depends on analytical transformation, reflecting the epistemic shift from ‘data as the new oil’ to ‘analysis as the new oil’ (Dhande, 2021; Peters et al., 2024).

From an analytical standpoint, preprints constitute a vast corpus of unstructured textual material whose usefulness depends on their conversion into coherent and interpretable informational representations—a process enabled through computational and data-driven methodologies (Assaf & Srour, 2021; Hussain et al., 2021; Yoon, 2023). Despite their widespread adoption across disciplines—particularly during the COVID-19 pandemic—as accelerators of scholarly communication and innovation (Berg et al., 2016; Fraser et al., 2020; Sarabipour et al., 2019), empirical studies rarely approach preprints as big data resources. Few investigations have examined how they can function as analytical datasets for detecting emerging research trajectories and generating usable insights through computational processing (Langnickel et al., 2021).

Research purpose

Building on the identified research gap, this study seeks to establish an analytical framework for transforming preprints from unstructured textual data into structured and interpretable information. By integrating topic modelling, semantic analysis, and content analysis, the framework systematically identifies salient themes and core concepts, enhances interpretive depth through semantic association mapping, and contextualises findings via qualitative synthesis. Using XAI preprints as an empirical case, this study demonstrates how the convergence of computational and interpretive methodologies can operationalise the transition from data to actionable information within the DIKW paradigm.

Literature review

The data–information–knowledge–wisdom (DIKW) hierarchy: From data to actionable knowledge

The data–information–knowledge–wisdom (DIKW) hierarchy delineates the epistemological transformation of data into information, knowledge, and ultimately wisdom. In this model, data represents discrete observations; information embodies structured and contextualised data; and knowledge arises through interpretation and synthesis (Baskarada & Koronios, 2013; Peters et al., 2024; Rowley, 2007).

Although the model has been critiqued for its linearity and technocentric orientation (Frické, 2009; Peters et al., 2024), the DIKW framework remains salient in articulating the instrumental role of computational mediation in the data-to-knowledge transformation. Specifically, it foregrounds the necessity of algorithmic, analytical, and visualisation techniques to extract meaning and operational value from unstructured or semi-structured data.

Preprints as research data in the scholarly knowledge ecosystem: Opportunities and limitations

Preprints provide an efficient channel for researchers to disseminate their findings prior to formal peer review, supporting principles of transparency, openness, and early-stage scholarly communication (Aviv-Reuven et al., 2024; Fraser et al., 2021; Suart et al., 2020). The COVID-19 pandemic further accelerated their adoption, positioning preprints as vital infrastructures for the rapid exchange of scientific knowledge (Cohen et al., 2020; Fraser et al., 2021).

Nevertheless, preprints often exhibit incomplete metadata and inconsistent quality due to the lack of rigorous peer-review mechanisms (Kaiser, 2017; Kodvanj et al., 2022). Within the DIKW framework, such characteristics position preprints predominantly at the data layer—unrefined, fragmented, and lacking contextual integrity. Their scholarly potential resides not in their immediate form but in their capacity for analytical transformation.

Preprints provide timely access to emerging scientific developments and serve as early indicators of innovation trajectories (Fraser et al., 2021). From a data-centric perspective, they can be viewed as data-rich artefacts of scientific discourse, whose informational potential can be systematically extracted through computational techniques such as topic modelling, semantic analysis, and text mining (Benkassioui et al., 2022; Larsen et al., 2008; Zadgaonkar & Agrawal, 2024).

Furthermore, the analytical utility of preprints depends heavily on the implementation of appropriate quality control and filtering mechanisms (Alfonso & Crea, 2023; Chaleplioglou & Koulouris, 2023). Given their heterogeneous quality and inconsistent metadata, establishing robust curation processes is essential to ensure data integrity (Alfonso & Crea, 2023). When properly curated and computationally processed, preprints can be transformed from unstructured text into semantically enriched information, enhancing their role in facilitating analytical insight and accelerating scientific discovery.

Uncovering semantic structures of textual data through topic modelling

Topic modelling has emerged as a powerful unsupervised technique for uncovering latent semantic structures within large collections of unstructured text. Among various topic modelling approaches, latent Dirichlet allocation (LDA) remains the most widely adopted and influential model (Celard et al., 2020; Di Gennaro et al., 2021; Rieger et al., 2024). By analysing word co-occurrence patterns across documents, LDA enables the identification of coherent topics, providing valuable insights for computational social science, digital humanities, and bibliometric research.

Latent Dirichlet allocation (LDA): Applications, strengths, and limitations

Proposed by Blei et al. (2003), LDA is a generative probabilistic model that represents documents as mixtures of latent topics, each defined by word distributions. It has been widely applied in various domains, including research abstracts (Fang et al., 2018) and scientific papers (Bo & Gang, 2017) to extract meaningful thematic structures from textual data (Lei et al., 2023).

Despite its interpretability, LDA's reliance on statistical word distributions limits its capacity to capture deeper semantic relations among conceptually related terms, often reducing topic coherence (Rieger et al., 2024; Roberts et al., 2013).

Extending LDA through word embeddings: Toward semantically rich topic models

With advances in neural language modelling, hybrid approaches integrating LDA and word embeddings have gained prominence for enhancing topic coherence and semantic depth (Dieng et al., 2020; Mikolov et al., 2013; Rieger et al., 2024). Word embeddings represent words in continuous vector spaces, effectively capturing syntactic and semantic relations beyond co-occurrence patterns (Dos Santos & Gatti, 2014; Peng et al., 2017). For instance, Zhang et al. (2019) employed sentence-LDA to extract topic vectors from news titles and used *FastText* to learn word representations. Limwattana and Prom-on (2021) developed a neural topic model guided by pre-trained embeddings, while Mu et al. (2022) proposed ClusTop, which applies community detection for topic discovery. Recently, many Word2Vec-based approaches have emerged in natural language processing. Applications include technology forecasting using patent data (Kwon et al., 2022), enhance recommendation systems based on user's historical data (Lei et al., 2020), topic evolution modelling (Hu et al., 2019), and life-cycle analysis of thematic development in mental models fields (Ma et al., 2023).

These studies demonstrate the potential of combining LDA with Word2Vec to improve semantic depth. However, few have applied such integrated models to preprints, which offer rich, time-sensitive data for identifying emerging research trends. Exploring this integration may provide an effective strategy for analysing innovation frontiers in fast-evolving domains.

Methodology

This study aims to develop a computational framework for transforming unstructured preprint texts into structured and interpretable knowledge. As illustrated in Figure 1, the framework integrates topic modelling, semantic similarity analysis, and content analysis to operationalise the process through which raw textual data are organised, semantically linked, and contextually interpreted. This integrated approach enables the systematic exploration of emerging thematic and conceptual structures within dynamic research domains such as XAI.

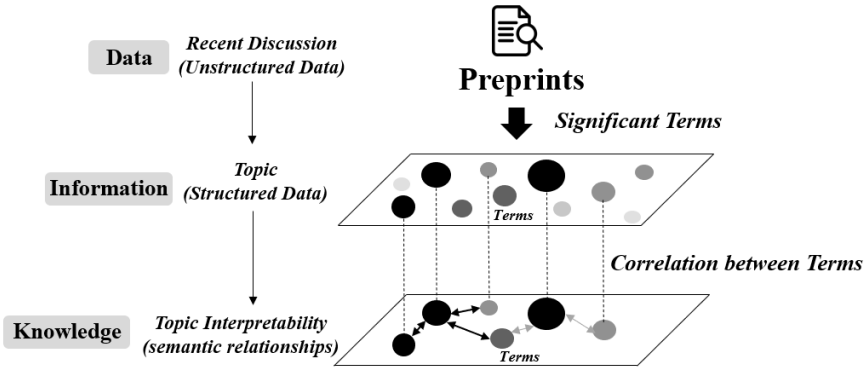


Figure 1. Research framework.

The research process, as Figure 2 shown, consists of four main stages: (1) preprints collection, (2) data preprocessing, and (3) topic modelling, and (4) semantic and content analysis.

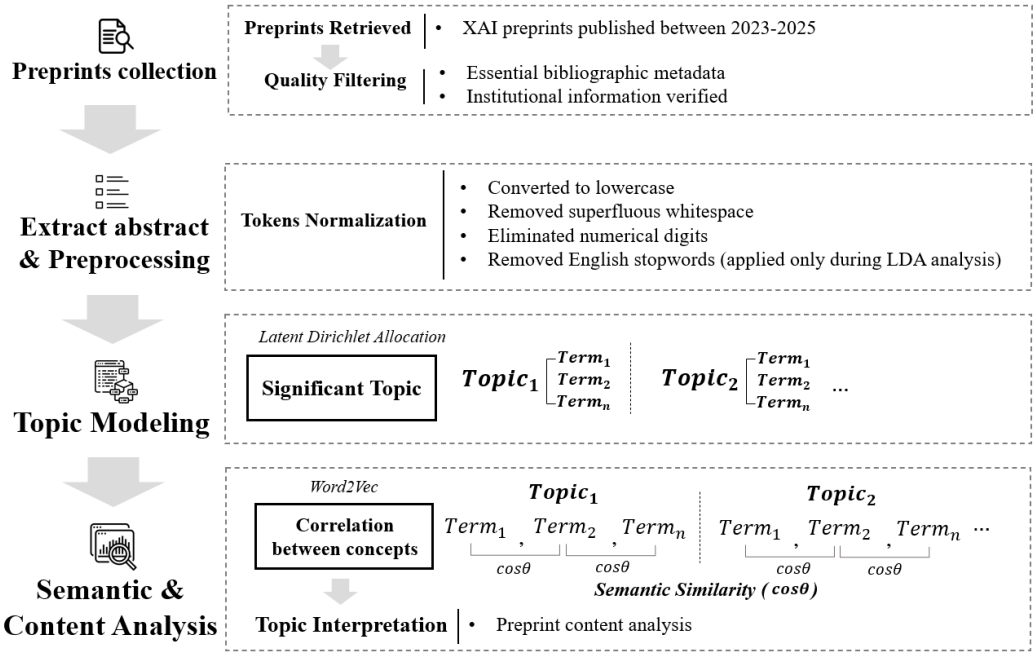


Figure 2. Research process.

Preprints collection

To ensure the currency and relevance of the dataset, preprints pertaining to XAI published between 2023 and 2025 were retrieved from the *Web of Science Preprint Citation Index*, an integrated platform aggregating preprints from leading repositories with standardised metadata.

Given the conceptual and terminological diversity of XAI, a keyword-based retrieval strategy was employed following Jacovi (2023). A refined list of domain-relevant terms was iteratively developed and applied to both titles and abstracts. To enhance precision, only records containing at least two keywords were retained, achieving a 99% precision rate in a random validation of 100 samples. The retrieve query was constructed as follows:

TS=("*xai*" OR "*hcxai*" OR "*explainability*" OR "*interpretability*" OR "*explainable ai*" OR "*explainable artificial intelligence*" OR "*interpretable ml*" OR "*interpretable machine learning*" OR "*interpretable model*" OR "*feature attribution*" OR "*feature importance*" OR "*global explanation*" OR "*local explanation*" OR "*local interpretation*" OR "*global interpretation*" OR "*model explanation*" OR "*model interpretation*" OR "*saliency*" OR "*counterfactual explanation*")

Although most preprints undergo basic screening prior to publication, the collected records still exhibited issues of incomplete or inconsistent bibliographic metadata. To address these deficiencies, a two-stage quality filtering protocol was implemented.

(1) Preprints lacking essential bibliographic information—such as title, abstract, or institutional affiliation—were excluded.

(2) Institutional identities were manually verified through authoritative directories. Records associated with unverifiable or fictitious institutions were subsequently removed to ensure the overall reliability and integrity of the corpus.

Applying these strategies, a total of 7,394 preprint records were identified and collected for analysis. The abstract of each preprint was then extracted as the primary text unit for subsequent processing.

Data preprocessing

To mitigate noise, the raw corpus—comprising abstract texts—was subjected to a rigorous normalisation process. All tokens were lowercased and numerical digits and cleansed of superfluous whitespace. Additionally, stopwords from the standard English lexicon were removed to eliminate high-frequency, low-informational content. These preprocessing operations were implemented using the *tm* and *stringr* packages in R. The resulting cleaned corpus served as the input for both topic modelling and word embedding procedures.

Topic modelling

To identify central themes inherent in unstructured textual data, LDA was applied as the primary topic modelling technique. LDA assumes a predefined number of topics (K) and models each document as a mixture of topics, with each topic represented by a distribution over words.

To determine an appropriate K-value, we evaluated model performance using perplexity, a standard metric for topic coherence. Based on this evaluation and interpretability considerations, as Figure 3 illustrated, the number of topics was set to K = 2. For each topic, the model identified the top 50 terms with the highest posterior probabilities, serving as representative indicators of thematic significance.

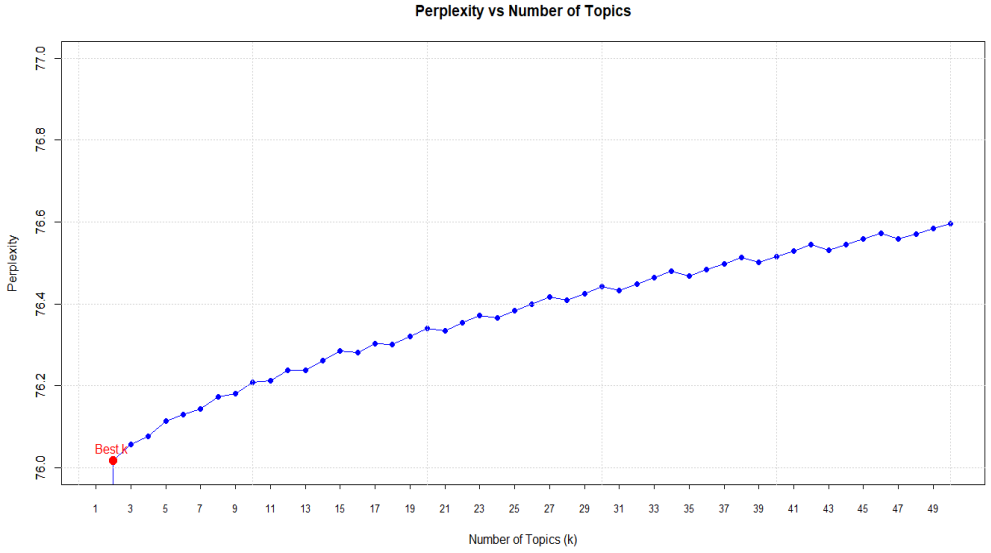


Figure 3. Evaluation of model perplexity across topic counts (K).

Semantic and content analysis

To quantify semantic associations among key terms, this study employed Word2Vec, a neural embedding model that maps words into a continuous multi-dimensional vector space. Within this representation, the spatial proximity of vectors reflects contextual and semantic similarity, forming the computational basis for calculating pairwise correlations among significant terms.

Based on the Word2Vec embedding model, each term was projected into a continuous multi-dimensional vector space to capture its semantic context. To enhance the interpretability of the identified topics and uncover the relationships among key concepts within each thematic cluster, a pairwise similarity analysis was conducted using the top 30 high-probability terms obtained from the topic modelling results.

Semantic proximity between term vectors was quantified using *cosine similarity*, a standard metric that measures the angular closeness between two n-dimensional vectors (Lai et al., 2016). A similarity threshold of 0.5 was applied to define edges in the semantic network, indicating moderate to strong conceptual associations among topic-relevant terms. The cosine similarity formula is as follows:

$$similarity = cos\theta = \frac{\bar{x} \cdot \bar{y}}{\|\bar{x}\|\|\bar{y}\|} \quad \text{Equation (1)}$$

where:

$\bar{x} \cdot \bar{y}$: *Vector dot product from x and y.* $\sum_{k=1}^{n} x_i y_k$

$\|\bar{x}\|$: *Long vector x.* $\sum_{k=1}^{n} x_k^2$

$\|\bar{y}\|$: *Long vector y.* $\sum_{k=1}^{n} y_k^2$

Subsequently, content analysis was conducted to reinforce the interpretive validity of the computational findings. Preprints corresponding to each topic were revisited to contextualise and substantiate the semantic relationships identified through modelling, ensuring that algorithmically derived themes align with the substantive contours of emerging XAI scholarship.

This multi-stage process illustrates how computational techniques can systematically transform preprints—from raw, unstructured textual data into structured informational entities and ultimately into interpretable knowledge—thereby advancing the understanding of knowledge emergence and scholarly communication within fast-evolving research domains.

Results

The proposed computational-epistemic framework yielded a dual-layered analytical outcome: (1) Topic modelling results revealed the informational architecture of preprint discourse; (2) Semantic similarity mapping and content analysis elucidated the relational structures that constitute knowledge-level understanding.

Together, these findings empirically demonstrate how the DIKW model can be operationalised through natural language processing to convert unstructured academic text into structured, interpretable knowledge.

Topic modelling results: The informational structure of XAI preprints

As shown in Table 1, the LDA analysis identified two major thematic structures, each characterised by the fifty most probable terms. The probability values represent each term's relative importance within a topic. Collectively, these topics outline the conceptual landscape of XAI preprint research.

A comparative examination of the thematic compositions indicates that *model*, *method*, and *interpretability* emerge as shared core terms, underscoring the centrality of methodological innovation aimed at enhancing model interpretability across the XAI research landscape. Nonetheless, the two topics diverge in both epistemological focus and research orientation.

Topic 1 – Algorithmic development and model optimisation in XAI

Topic 1 is characterized by high-frequency terms such as *learn*, *method*, *feature*, *dataset*, and *approach*. These terms converge around discussions of model construction, algorithmic learning, feature extraction, and data processing. This thematic cluster represents a technology-driven research trajectory, emphasising methodological innovation, model optimisation, and performance improvement.

Topic 2 – user-centered evaluation and model performance assessment

In contrast, Topic 2 encompasses high-frequency terms such as *datum*, *network*, *explanation*, *performance*, *accuracy*, *evaluation*, and *user*. This topic foregrounds evaluation-oriented and user-

centric approaches in XAI, focusing on how models can deliver transparent, accurate, and understandable outputs for end-users.

Topic 1			Topic 2		
Rank	**Terms**	**Probability**	**Rank**	**Terms**	**Probability**
1	model	0.036	1	model	0.016
2	learn	0.020	2	datum	0.011
3	method	0.015	3	network	0.009
4	use	0.014	4	much	0.009
5	feature	0.014	5	ai	0.008
6	base	0.011	6	image	0.008
7	approach	0.009	7	interpretability	0.008
8	dataset	0.009	8	method	0.007
9	datum	0.008	9	framework	0.007
10	demonstrate	0.008	10	explanation	0.007
11	task	0.007	11	performance	0.007
12	can	0.007	12	can	0.007
13	propose	0.007	13	prediction	0.007
14	high	0.007	14	propose	0.006
15	train	0.006	15	good	0.006
16	improve	0.005	16	accuracy	0.006
17	neural	0.005	17	base	0.006
18	result	0.005	18	show	0.005
19	work	0.005	19	provide	0.005
20	machine	0.005	20	result	0.005
21	identify	0.005	21	enhance	0.005
22	study	0.005	22	system	0.005
23	deep	0.005	23	also	0.004
24	interpretability	0.005	24	different	0.004
25	paper	0.005	25	use	0.004
26	provide	0.004	26	explainability	0.004
27	novel	0.004	27	study	0.004
28	analysis	0.004	28	state	0.004
29	human	0.004	29	knowledge	0.004
30	time	0.004	30	challenge	0.004
31	performance	0.004	31	graph	0.004
32	process	0.004	32	evaluation	0.004
33	however	0.004	33	language	0.004
34	challenge	0.004	34	interpretable	0.004
35	representation	0.004	35	process	0.004
36	classification	0.003	36	train	0.004
37	develop	0.003	37	information	0.004
38	system	0.003	38	make	0.004
39	prediction	0.003	39	analysis	0.004
40	explainable	0.003	40	xai	0.004
41	technique	0.003	41	however	0.004
42	decision	0.003	42	approach	0.004
43	application	0.003	43	large	0.003
44	design	0.003	44	achieve	0.003
45	score	0.003	45	decision	0.003
46	make	0.003	46	significant	0.003
47	apply	0.003	47	understand	0.003
48	present	0.003	48	structure	0.003

49	exist	0.003	49	address	0.003
50	due	0.003	50	user	0.003

Table 1. Extracted informational elements representing latent topics in XAI preprints.

Conceptual–semantic relationships within thematic structures in emerging XAI research identified from preprints

To extend the informational structures identified through topic modelling, this phase integrates semantic similarity analysis with content analysis to uncover the conceptual relationships underlying XAI preprints. Word2Vec quantitatively models lexical proximities, while content analysis interprets these associations within their discursive context.

Topic 1 — Algorithmic foundations and model optimization in XAI: Integrating the technical core and applied dimension

Semantic similarity analysis revealed that emerging research in algorithmic development and model optimization within XAI exhibits two primary regions of semantic concentration (see Figure 4). The upper-left cluster represents the theme of enhancing model reliability through data-driven and deep learning techniques, whereas the lower-right cluster reflects the semantic domain of model deployment and performance validation. Together, these regions delineate the dual orientation of XAI research—bridging methodological innovation with applied model optimisation.

The upper-left semantic cluster demonstrates a pronounced technical and methodological orientation. High inter-term semantic similarity values—such as *approach–model* (*similarity*=0.587), *technique–method* (*similarity*=0.836), *dataset–datum* (*similarity*=0.518), *dataset–task* (*similarity*=0.360), and *deep–machine* (*similarity*=0.783)—indicate a tight coupling between methodological innovation and computational implementation. Content analysis of preprints corroborates this finding, showing that these terms frequently co-occur in discussions on algorithmic pipelines (Liao et al., 2023), neural architecture refinement (Cao et al., 2023; Li et al., 2024; Tokmak et al., 2024), and the strategic deployment of task-oriented datasets (Cheng et al., 2023; Guo et al., 2024).

The use of domain-specific data is shown to facilitate precise model calibration, improve contextual relevance, and enhance interpretability within distinct analytical settings (Carrion et al., 2023; Talukdar & Biswas, 2024). This alignment between algorithmic innovation and task-adaptive data design underscores the epistemic foundation of this cluster, which represents the technical knowledge nucleus of XAI preprints—where methodological rigor, data specificity, and computational precision collectively drive explainable model advancement.

Conversely, the lower-right semantic cluster is centred on model implementation and performance validation. The observed associations—*propose–introduce* (*similarity*=0.879), *apply–use*, *propose–novel* (*similarity*=0.339), *novel–explainable* (*similarity*=0.327), and *result–performance* (*similarity*=0.431)—suggest that researchers focus on the translation of methodological innovation into empirical application. Content analysis reinforces this interpretation, revealing that authors in this group often describe the adaptation of existing models, the validation of proposed frameworks (Hu et al., 2024), and the extension of prior techniques to new problem domains (Hsiao et al., 2024; Y. Li et al., 2023; Liu et al., 2024).

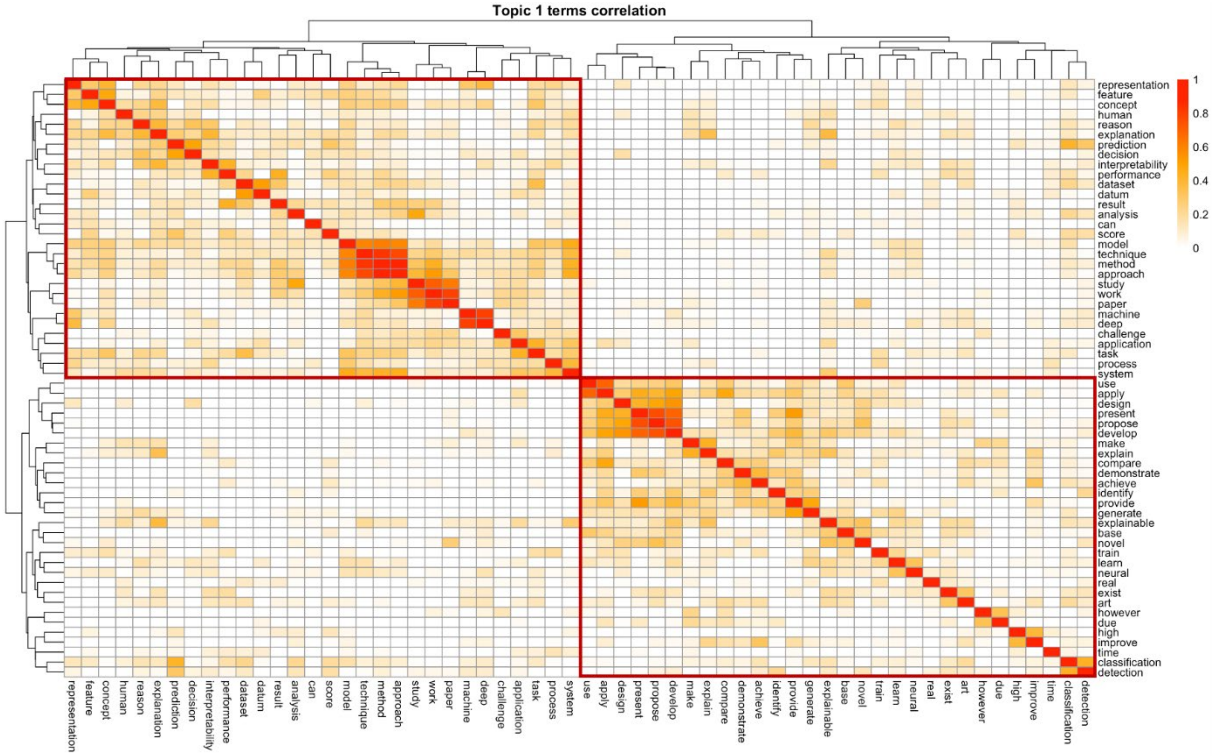


Figure 4. Semantic similarity heatmap of key terms in algorithmic development and model optimization in XAI

Topic 2 — User-centred evaluation and model performance assessment: Integrating constructive actions, interpretability, and human–artificial intelligence interaction

In contrast to the technically grounded orientation of Topic 1, Topic 2 encapsulates a distinct research trajectory centred on user-centred evaluation and performance assessment. The semantic heatmap (Figure 5) reveals two areas of concentrated meaning: the upper-left cluster, which corresponds to procedural and operational activities in model construction, and the lower-right cluster, which centres on interpretability, performance metrics, and human–artificial intelligence interaction—together constituting a semantic progression from technical implementation to user-centred understanding.

The upper-left cluster represents procedural actions underpinning model development. Although these verbs carry lower internal similarity values, their frequent co-occurrence in preprints signals the operational phase preceding interpretive evaluation. Content analysis shows that these terms typically appear in methodological sections, where authors outline model-building steps or data augmentation processes—forming the pragmatic groundwork for subsequent evaluative discourse.

The lower-right cluster, by contrast, constitutes the semantic nucleus of Topic 2. The inter-term associations—*framework–algorithm* (*similarity*=0.599), *performance–accuracy* (*similarity*=0.820), *evaluation–result* (*similarity*=0.372), *information- knowledge* (*similarity*=0.485), *user–ai* (*similarity*=0.354), *user–explanation* (*similarity*=0.347), and *explainability–interpretability* (*similarity*=0.422)—demonstrate the integration of computational precision with human-centred interpretation. Content analysis of this cluster reveals that many preprints explicitly connect model interpretability to evaluation frameworks (Chen et al., 2024), trustworthiness metrics (Cunnington et al., 2022; Geng et al., 2025), and user-oriented design principles (Bhargava et al., 2023; J. Li et al., 2023; Lichtenberg et al., 2024).

Notably, a substantial portion of these studies involve industry participation, reflecting active collaboration between academia and enterprise in developing human-centric evaluation systems. This cluster thus situates interpretability as both a technical metric and a human-centered communicative process within applied XAI contexts.

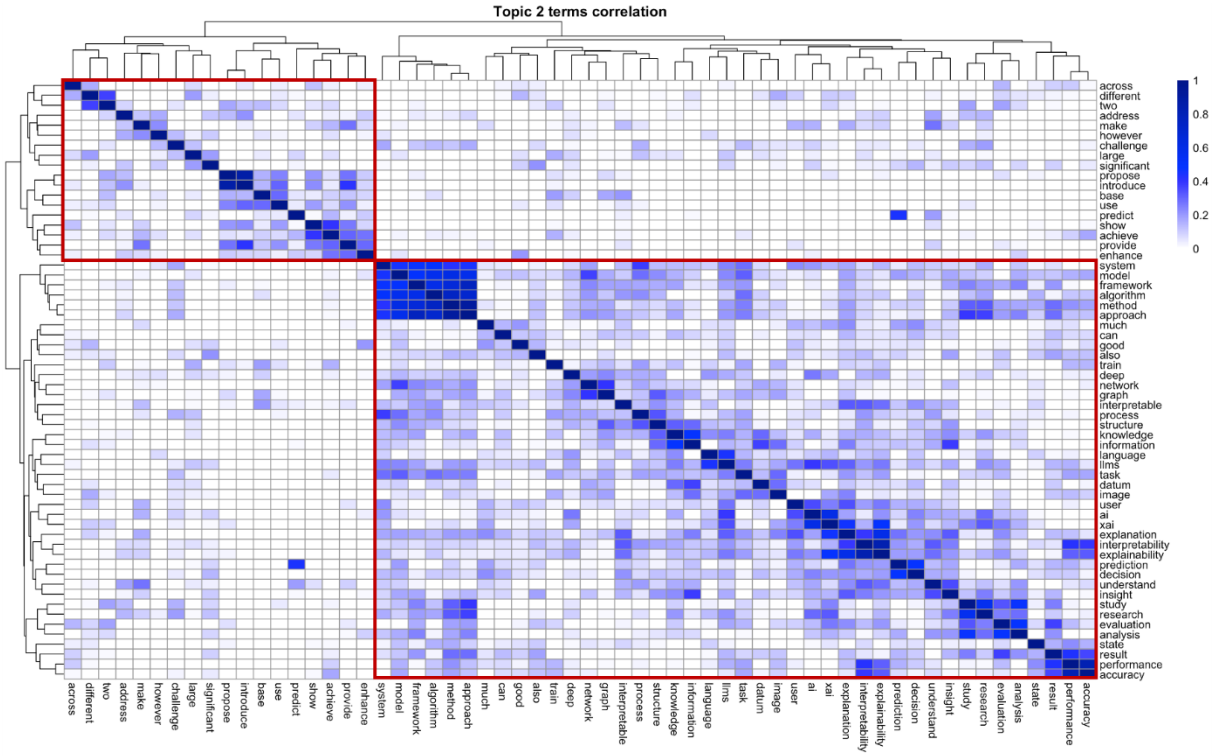


Figure 5. Semantic similarity heatmap of key terms in user-centred evaluation and model performance assessment in XAI

From semantic association to knowledge formation

The integration of semantic association and content analysis represents the epistemic culmination of the DIKW transformation process. Topic modelling delineated the informational scaffolding of preprint discourse, while this phase advances toward semantic coherence and interpretive synthesis. By aligning computationally derived clusters with contextual textual evidence, the analysis constructs a semantic knowledge structure in which conceptual relationships become explicit and epistemically meaningful.

This synthesis illustrates how unstructured textual data evolve into semantically coherent knowledge representations, reflecting how the XAI research community conceptualises algorithmic innovation, interpretability, and human trust in the broader context of emerging scientific knowledge.

Discussion and conclusion

Research findings and practical insights

Grounded in the DIKW theoretical framework, this study examined how preprints can be conceptualised as early-stage information objects and systematically transformed into actionable scholarly insights. From an information science perspective, the study positions preprints within an information creation–transformation–use continuum, demonstrating their value for sense-making and early assessment of emerging research directions. Recognising the heterogeneity and uneven quality of preprint repositories, a two-stage quality filtering mechanism was implemented

to ensure a baseline level of scholarly validity and informational integrity, rather than treating preprints as undifferentiated textual data.

The proposed computational knowledge transformation framework—integrating latent Dirichlet allocation (LDA), Word2Vec semantic modelling, and content analysis—illustrates how unstructured textual data can be progressively organised into structured information and synthesised into meaningful knowledge through a mixed-methods approach. Applied to explainable artificial intelligence (XAI) preprints, the framework identified two dominant thematic trajectories: algorithmic development and model optimisation and user-centred evaluation and performance assessment. These trajectories reflect not only patterns of technical innovation but also differences in how information is interpreted, evaluated, and used across scholarly and applied contexts, highlighting the dual emphasis in XAI on methodological advancement and human-centred interpretation.

Collectively, the findings advance both methodological and epistemological insights. Methodologically, the study demonstrates the value of integrating quantitative modeling with interpretive analysis to support large-scale knowledge transformation. Epistemologically, it shows that when subjected to systematic filtering and semantic computation, preprints can function as real-time observatories of knowledge emergence rather than merely preliminary communications. By operationalising DIKW transformations computationally, this research underscores the role of preprints as early indicators of research frontiers and as data infrastructures for understanding the diffusion, interpretation, and use of scientific information.

Limitations and future work

While this study demonstrates the feasibility of using preprints for computational knowledge transformation and technological trend monitoring, several limitations should be acknowledged. First, the dataset was limited to English-language XAI preprints published between 2023 and 2025, which may constrain the cross-disciplinary and cross-linguistic generalisability of the findings. Second, although the two-stage quality filtering mechanism enhanced data reliability, elements of manual verification inevitably involved subjective judgment. Finally, while Word2Vec enabled the identification of quantitative semantic associations, the subsequent interpretive synthesis relied primarily on researcher interpretation, which may introduce epistemic and interpretive bias.

Future research may extend this framework in several directions. Applying it across multiple disciplines and languages would allow for systematic evaluation of its robustness and scalability. Incorporating institutional- and author-level indicators could further refine quality assurance in preprint-based analytics. Importantly, future work may integrate expert validation mechanisms—such as Delphi-based or panel-based approaches—to complement computational modelling. Such integration would enrich semantic interpretation, strengthen epistemic validity, and provide a structured form of human–machine collaboration in large-scale knowledge analysis.

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iSchool students' mental models of GenAI

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Abstract

Introduction. Knowledge of users' mental models (an understanding of a system and its functions) helps align system behaviour with user expectations and identify user concerns that influence adoption. We examined graduate students' mental models of generative artificial intelligence (GenAI) as part of a larger study of GenAI adoption for academic purposes at the Pratt Institute iSchool.

Method. The data about mental models of GenAI were collected through drawings and conversations with participants during focus groups.

Analysis. The qualitative visual and textual data were analysed using thematic analysis.

Results. Students' mental models reflect a high-level understanding of the technical complexity of the GenAI system, with occasional acknowledgments of end-users and collection creators, as well as ethical, environmental, and quality concerns. mental models often reflect knowledge of prior information technology and use human analogies to explain the GenAI.

Conclusions. Even a technologically literate group of information science graduate students exhibits limitations in understanding GenAI systems. iSchool students are not only avid users of GenAI—whose deeper understanding of this technology could enhance usage efficiency and satisfaction—but also future designers of GenAI systems. Technology features, additional experiences with technology, educational resources/curricula, and critical media coverage could improve their understanding of GenAI's technological and social dimensions.

Introduction

Generative artificial intelligence, or GenAI, is a multimodal and multifunctional system that creates content, including text, images, audio, and code, by learning patterns in existing data through advanced techniques like deep learning and neural networks (Ronge et al., 2025). These systems are probabilistic, trained on large amounts of data to learn patterns and complex statistical relationships (Bandi et al., 2023), with outputs generated in small sections, or tokens, each being the most likely continuation based on statistical patterns formed from its training. GenAI outputs are non-deterministic, meaning the same input will not generate the same output twice (Bandi et al., 2023; Tankelevitch et al., 2024).

Since GenAI's introduction three years ago, it has seen widespread adoption, including by university students. Studies have shown that students use GenAI appropriately and inappropriately for academic tasks (Johnston et al., 2024; Digital Education Council, 2024; Kumar & Raman, 2022; Jin et al., 2025; McDonald et al., 2025; Reiter et al., 2025). While more studies examined GenAI uses by undergraduates, or younger (K-12) students' mental models of GenAI, fewer studies looked into university students' perceptions and mental models of GenAI. We focused on the graduate students' mental models of GenAI, and by engaging a sample of information science students, explored how technology-literate GenAI consumers and future designers understand this tool. Knowledge of students' mental models has the potential to align system behaviour with user expectations and identify user concerns that influence usage.

Literature Review

GenAI adoption by students

Research highlights the diversity of GenAI platforms used by students for various academic tasks, including brainstorming, writing, and programming (Digital Education Council, 2024). Recent reports suggest that students prefer general-purpose platforms like ChatGPT, and their usage depends on their academic needs. The majority of students view GenAI as a helpful tool for completing routine tasks and creating personalised educational approaches (Kumar & Raman, 2022; Maita et al., 2024). Students have been found to perceive GenAI as helpful (Amoozadeh, 2024) and easy to use (Daher and Hussein, 2024), though not always accurate or trustworthy. Wang and Li (2024) found that positive emotions, digital efficacy, and perceived usefulness affect students' willingness to adopt artificial intelligence (AI) tools for learning. However, when GenAI does not meet expectations, these attitudes can change (Amoozadeh, 2024) and/or lead to lower satisfaction and decreased intent to use (Daher & Hussein, 2024).

Studies illustrate that concerns about the fairness, ownership, accessibility, autonomy, privacy, security, societal impact, and sustainability affect GenAI usage (Baek et al., 2024; Hagendorff, 2020; Huang et al., 2023; Perkins, 2023; Maita et al., 2024; Siau & Wang, 2020; Zhang et al., 2021). Regardless of the levels of understanding of ethical issues, Hsiao and Tang (2024) demonstrated that it has an insignificant effect on GenAI usage.

Students' demographic characteristics, academic majors, exposure to, and awareness of GenAI have also been found to play an important role in the adoption process (Baek et al., 2024; Kelly et al., 2024; Johnston et al., 2024). Baek et al. (2024) found that age, gender, academic major, and institution type are significant factors influencing the use of GenAI. For example, students in their 30s and 40s, as well as male students, reported higher usage than participants in other age and gender groups. Daher and Hussein (2024) found that while male students perceived GenAI more positively than female students in terms of efficiency, affect, and intention to use, both groups reported similar levels of interaction.

Mental models of GenAI

Mental model (MM), defined as one's understanding of a system's functionality, is a well-established concept in cognitive science (Gero et al., 2020; Cannon-Bowers et al., 1993; Carroll & Reitman, 1988). Users of information systems rely on mental models to understand the system and its practical use, draw inferences, make predictions about its behaviour, and devise ways to interact with it.

Recent research focused on clarifying the characteristics of users' mental models of AI systems and identifying factors that influence the development of such models. Gero et al. (2020) have found that people's mental models include features related to a) global behaviour, AI performance across many turns (e.g., biases, typical mistakes); b) local behaviour, AI behaviour in a particular interaction; and c) knowledge distribution, what information the AI *knows* or can deduce and what it does not. The authors suggest that the accuracy of the MM depends not only on the understanding of the technical aspects of AI, but also on observations and interpretations of AI behaviour. AI's anthropomorphism has also been shown to affect mental models. For example, Doyle et al. (2021) discuss how interactions with conversational AI lead to the perceptions of AI as partners; Wang (2024) relies on the theory of mind, attribution of beliefs, desires, intentions, and emotions to oneself and others, to explain how the style of AI behaviour and its humanlike qualities influence people's mental models. DeVito (2021) applied the concept of folk theories, informal socially shared beliefs about systems' inner workings, to explain how users construct mental models about the invisible parts of GenAI (algorithms, ranking, moderation), drawing from experience, observation, community discussion, and platform changes. The study suggests that understanding of the system complexity and users' expectations leads to more detailed or sophisticated folk theories of AI. Additional factors that have been found to influence mental models include frequency of interactions and limitations of human cognition (Bansal et al., 2019), cognitive biases (DeVito, 2021; Nourani et al., 2021), individual differences in technological literacy (Druga et al., 2022; Long & Magerko, 2020), media coverage (Chen et al., 2025; Banks, 2020) and the degree of AI explainability (Ehsan et al., 2022; Chiyah Garcia et al., 2018; Liao et al., 2020; Rutjes et al., 2019). Development of accurate mental models of GenAI is hindered by systems' often unpredictable behaviours and outputs, and its performance adjustments based on the user-generated information and the system's 'mental models' of users (Wang et al., 2021; Ashktorab et al., 2019).

Students' mental models of GenAI

While the research on the university students' mental models of GenAI is scarce, several studies examined the mental models of K-12 students. Marx et al. (2023) reviewed 18 studies related to the secondary school students' (grades 6-12) attitudes and MM of AI. The authors found several common themes across the studies, including: a) the tendency to understand AI simplistically, as robots, intelligent computers, or automation, and conflate AI with general computing or data processing; b) frequent incorrect assumptions about the AI, for example, as unbiased and universally accurate; c) mental models that often emphasise anthropomorphic, rather than algorithmic features. Students' mental models are shaped by technology curricula (exposure to AI and programming), media presentations, social and cultural environments (including discussions with family and peers), and children's developmental stages. Marrone et al. (2025) also investigated secondary school students and their perceptions of AI as a collaborative teammate. Students generally found the AI tool to be 'cool' and engaging, even when it made errors, but preferred it in supportive, not equal, social roles. Students' mental models were frequently shaped by media portrayals, science fiction, documentaries, and marketing, often resulting in unrealistic expectations of AI. Students' perceptions of GenAI as a collaborator were also examined by Kim and Cho (2025), who found these perceptions to be shaped by media, algorithmic literacy, and public attitudes. The authors explored the different ways of explaining AI through technical,

analogical, or behavioral descriptions. They found that behavioural or analogy-based explanations led to more concrete and nuanced mental models compared to only technical or no explanations.

Sanusi et al. (2024) explored how social, educational, or technological interventions influence students' and teachers' MM and interactions with AI systems. The authors found that both groups' initial mental models relied heavily on anthropomorphic or familiar analogies, prior familiarity with AI, domain knowledge, and individual differences. Participants whose mental models better aligned with actual system capabilities achieved better use outcomes and expressed greater trust in technology. Baez et al. (2023), who also examined students' and teachers' perceptions of AI, highlighted the importance of motivation and self-efficacy in developing positive perceptions and effective use of AI by both groups in a learning setting.

Zirenko et al. (2025) investigated how the instructional interventions influenced university students' mental models. The initial mental models, which were often fragmented or simplified, became more accurate with instruction, leading to improvements in the use of technology. However, similarly to Sanusi et al. (2024), the authors identified individual differences in students' mental models and performance, with a subset of students reverting to simpler or erroneous models under stress or novel tasks, indicating that their mental models are not stable. Katsantonis and Katsantonis (2024) explored how social science (non-STEM) university students perceive AI across cognitive, emotional, and behavioural dimensions, and examined how demographic and contextual factors influence these perceptions. The authors found that emotional responses to AI (e.g., enthusiasm, affective disposition) drive intention more strongly than cognitive beliefs. The authors recommend introducing AI literacy curricula, integrating AI topics across courses, and scaffolding students' emotional and cognitive comfort with AI tools.

Zhu et al. (2024) examined how AI ethical anxiety, risks, and awareness shaped university students' intention and use of GenAI systems. The study found that ethical awareness both motivates adoption and increases perceived risk, and that ethical anxiety deters the actual use, even if it does not affect intention directly.

In summary, studies of school and university students typically reveal simplifications and inaccuracies in the initial mental models of AI systems, which are often influenced by media and experiences with GenAI. Studies tend to emphasise the importance of AI education in improving students' mental models and the effective use of GenAI.

Method

With many of the prior studies focusing on the factors that affect MM and exploring (sources of) interventions that could increase their accuracy, we prioritised understanding the main components of the mental models of GenAI. We conducted a study to investigate GenAI adoption by students of the Pratt Institute (New York City) School of Information (iSchool). The study used a convenience sampling to collect data about students' uses and attitudes towards GenAI through an online questionnaire (N=30; *the discussion of the questionnaire findings can be found in Lopatovska et al., in press*). Additionally, two focus groups (N=9) were conducted to expand the questionnaire findings and investigate students' mental models of GenAI (http://bit.ly/42BmXje). Students from the two largest programs of the Pratt iSchool, library and information science, and user experience design, volunteered for the study. This paper presents the findings on students' mental models of GenAI, with additional study results included to provide context for the discussion.

The data about mental models were collected during the focus groups, which lasted approximately 75 minutes. During the warm-up segment of the focus groups, participants were asked to visually represent how they think GenAI works using colourful pens and paper. Focus group moderators asked participants to label the main objects in their drawings for clarity before facilitating

discussions about both their drawings and their understanding of GenAI. This activity was followed by a discussion on the use of GenAI for academic tasks and students' attitudes towards this technology. Sessions were recorded, and three researchers took detailed notes. Participants received $20 gift cards. The study was approved by the institutional review board.

The drawings of GenAI and the recordings of participants' verbal explanations were anonymised and analysed by two researchers using inductive thematic analysis. The researchers applied Braun and Clarke's (2012) six phases of thematic analysis to familiarise and immerse themselves in the drawings and narrative, build codes, group them into themes, and identify broader families after multiple rounds of iteration and re-examination to unearth a user's implicit and explicit understandings of GenAI. The codebook can be found at http://bit.ly/3W2gFpi, with the summary findings presented below. Participants are referred to with the letter "D" followed by a randomly assigned number.

Findings

All study participants used at least one GenAI tool for academic tasks, primarily brainstorming and writing. The most frequently used platform was ChatGPT, followed by Grammarly, Gemini, and other platforms. More than half of the participants used advanced prompting techniques in their GenAI interactions, and over 90% were skeptical about the quality of the GenAI outputs (Lopatovska et al., in press). Four focus group participants described themselves as advanced, four as intermediate, and one as a beginner GenAI user.

The analysed drawings and corresponding narratives shared many similarities, which were grouped into three high-level families: a system, a human, and value judgments.

The visual elements of the mental models that represented GenAI as a system of interconnected elements were grouped under the System family. Elements related to human interaction (or lack thereof) with the GenAI system formed the Human family. The Value Judgments family was formed by elements that represented personal assessments of GenAI and its ethical, social, and environmental impacts (complete coding hierarchy with examples can be found at http://bit.ly/3W2gFpi.)

Theme 1: The system

All nine drawings included elements of the GenAI system, represented with various degrees of detail and accuracy.

1.1 Accurate understanding

1.1.1 Pattern-seeking or clustering information (6/9)

Six drawings represented GenAI as a system that seeks patterns, matches, or clusters information (see example in Figure 1).

Participants' verbal descriptions of their models reiterated this understanding:

> *'To me, AI is about grouping similar things. For example, if I say, 'I like food,' the AI connects 'like' and 'food.' My mental model of AI is like a graph'.* D5

1.1.2 GenAI as probabilistic system (5/9)

Five drawings represented GenAI as a probabilistic system where outputs are generated predictions (Figure 2 example).

1.1.3 Presence of information collections (5/9)

Five participants included information collections as a necessary component for GenAI training and/or processing (Figure 3).

> *'I have an arrow that says collection. So, the data will be collected, and I have a drawing of a computer and some servers. The data is collected and stored'.* D6

Three representations of collections emphasised the human-generated nature of collections' content:

> *'I drew art, writing, science, and research, and then added a little thief stealing all of it... Then the AI trains all night while the sorting continues'.* D8

> *'data like images and text are collected and stored on servers, then processed through algorithms and sent back to the user'.* D6

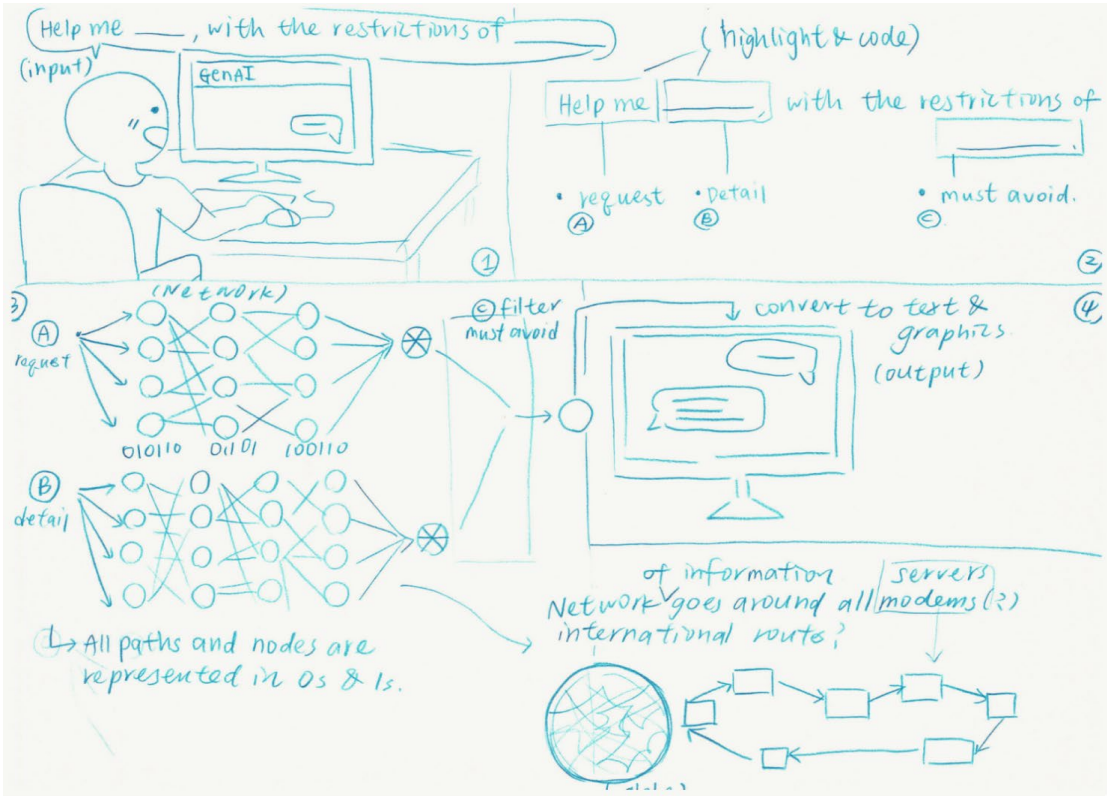


Figure 1. D7 MM illustrates clustering by analysing the structure of a prompt and generating its output.

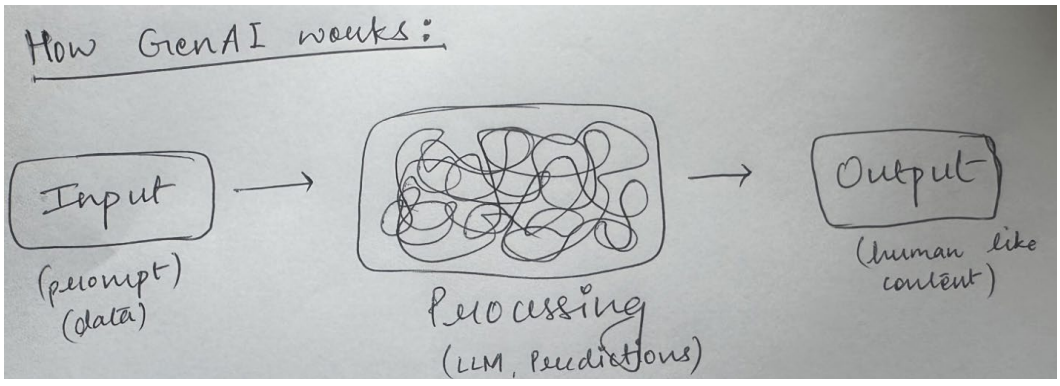


Figure 2. D1 MM illustrates how GenAI generates outputs based on a prediction model but simplistically explains complex processing.

1.1.4 Opaque technical complexity (5/9)

While five drawings represented the inputs and outputs into the system, they lacked representations of information processing within the system, suggesting that it is difficult or impossible to understand the workings of this complex system (see example in Figure 2).

The mysteriousness of the information processing within the system was also represented by the lack of details in participants' explanations of drawings:

> '*Despite a linear flow from input to output, the processing of the system goes through a complicated and deep process*'. D4

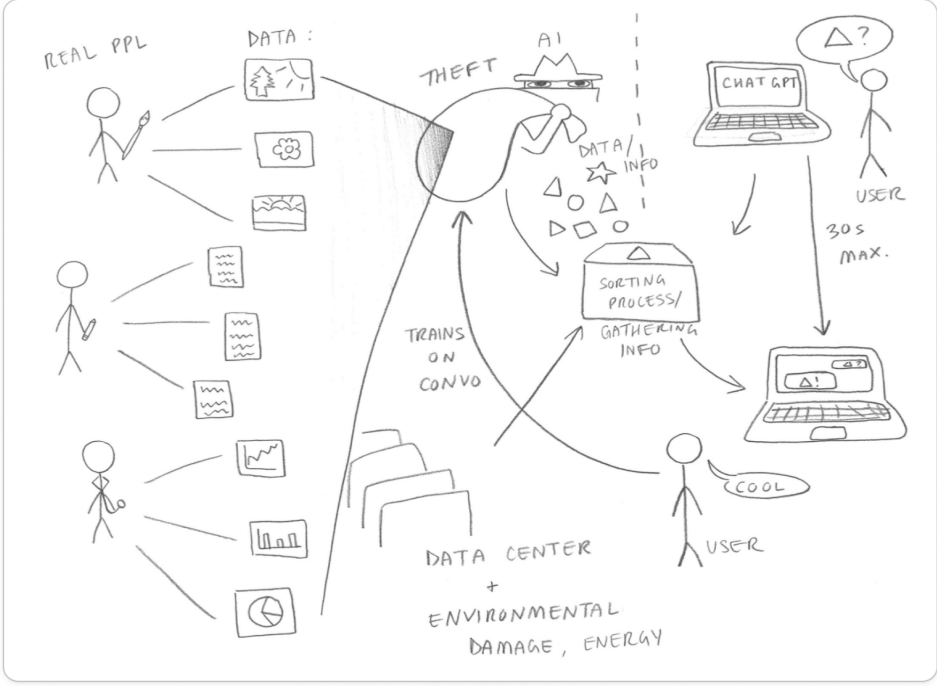


Figure 3. D8 MM represents GenAI use of information from the human-created collections as theft.

1.1.5 Presence of hardware (4/9)

Four drawings acknowledged the necessity of hardware to interface with or support GenAI (examples in Figures 1, 3, and 7):

> '*…then I have a drawing of, like, a computer and some servers…*' D6

1.1.6 Input and output (4/9)

Similar to the understanding of the collections and hardware that is needed to run GenAI, participants also illustrated their knowledge of clearly defined inputs, outputs, and a flow between them (Figure 1):

> '*The user provides a prompt… the computer highlights and encodes the prompt, then processes it through multiple networks… it comes back together… and produces a text or graphic on the screen*'. D7

1.2 Misconceptions

1.2.1 Retrieval not generation (4/9)

Inaccurate representations of GenAI finding and presenting existing information, as opposed to content creation or generation, were included in four drawings (Figure 4). Participants' explanations confirmed their misconception of GenAI as a retrieval system, for example:

'*[My drawing depicts] how it's trained to, maybe, retrieve from current and updated data.*' D9

1.2.2 Anthropomorphism (3/9)

Three participants described GenAI as having anthropomorphic features, for example, participant D8 represented GenAI's use of existing collections in the form of a thief (Figure 3):

Another participant used anthropomorphic language in describing the system:

'*...it just receives and* ***knows*** *a lot of information... then it* ***studies*** *it*'. D2

This quote and drawings like Figure 3 illustrate participants' attribution of human characteristics or behaviors to GenAI.

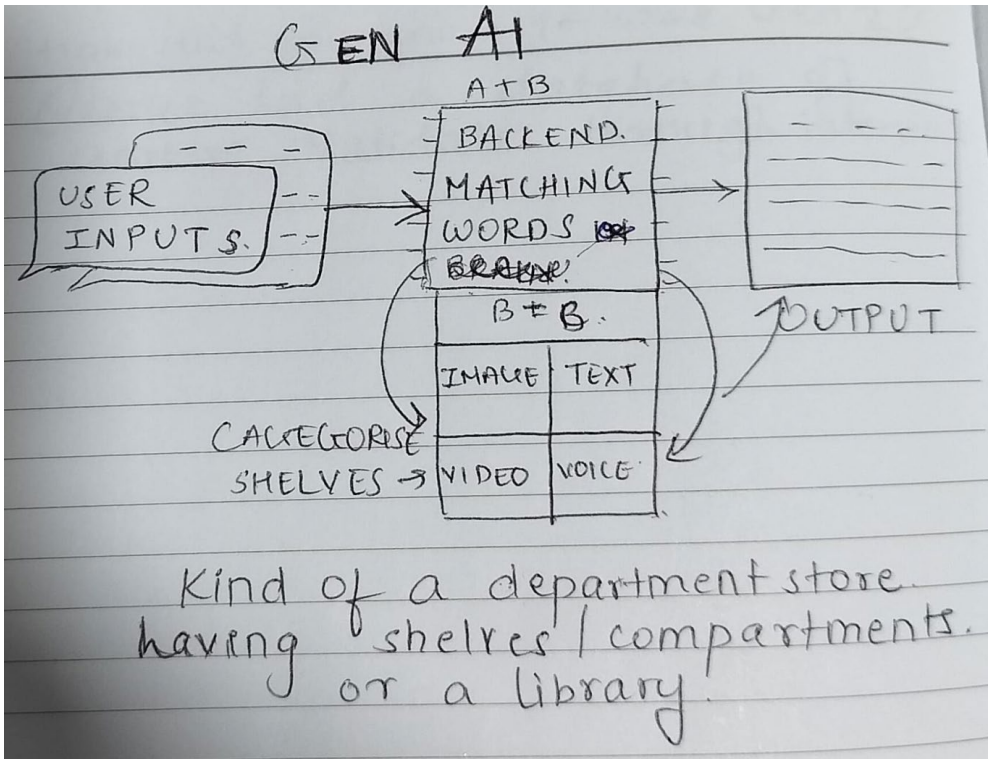


Figure 4. D4 MM describes GenAI as retrieving organised information.

Theme 2: The human

2.1 Presence of a human (5/9)

Five drawings (see examples in Figures 1, 3, and 5) included direct representations of humans, usually as end-users, in relation to the system (in their drawings, participants used the words 'user', 'client', or 'I'). One participant included humans as creators of collections used by AI (Figure 3).

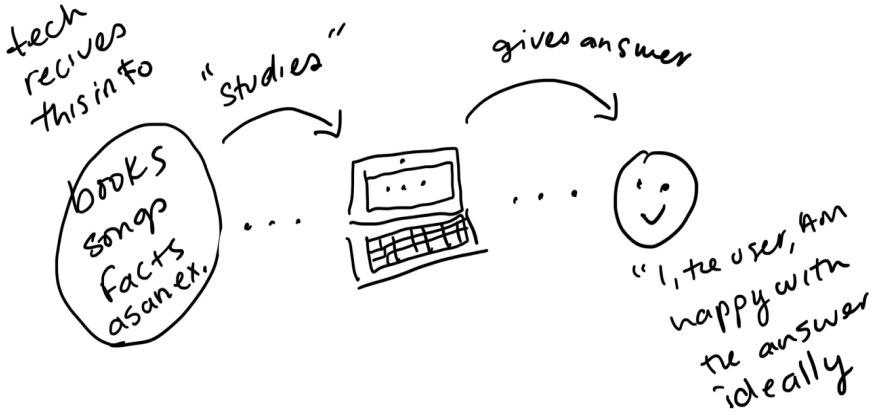


Figure 5. D2 shows a user with no interaction or influence within the system.

2.2 Absent human (4/9)

Four mental models did not contain any representations of a human in drawings or verbal descriptions (see example in Figures 2 and 6).

Theme 3: Value judgments

Three participants' mental models included references to the judgments about the function or use of GenAI.

3.1 Ethical concerns (3/9)

Ethical concerns about what is *right* or *wrong* about GenAI were depicted in three drawings (Figure 3, for example) and described by the participants:

> '*I drew art, writing, science, and research, and then added a little thief stealing all of it*'. D8

3.2 Environmental concerns (2/9)

Two participants expressed understanding of the environmental impact of GenAI in their mental models (Figures 3 and 6):

> '*I also drew a data centre showing how this process consumes energy, causes heating, and leads to environmental damage*'. D8

> *'There's a lot happening, such as how the model was trained, how it retrieves updated data, and even environmental impacts*'. D9

3.3 Quality concerns (1/9)

One participant's MM (Figure 7) represented concern for the deteriorating quality of AI-contaminated training collections:

> '*…I used red and a little bit of it to show that it has more like, this bleed of, like, the AI into this work that's producing. … I added red to show that AI created data becomes part of the system, which is then used in future outputs. So, it's a cycle that grows more and more*'. D6

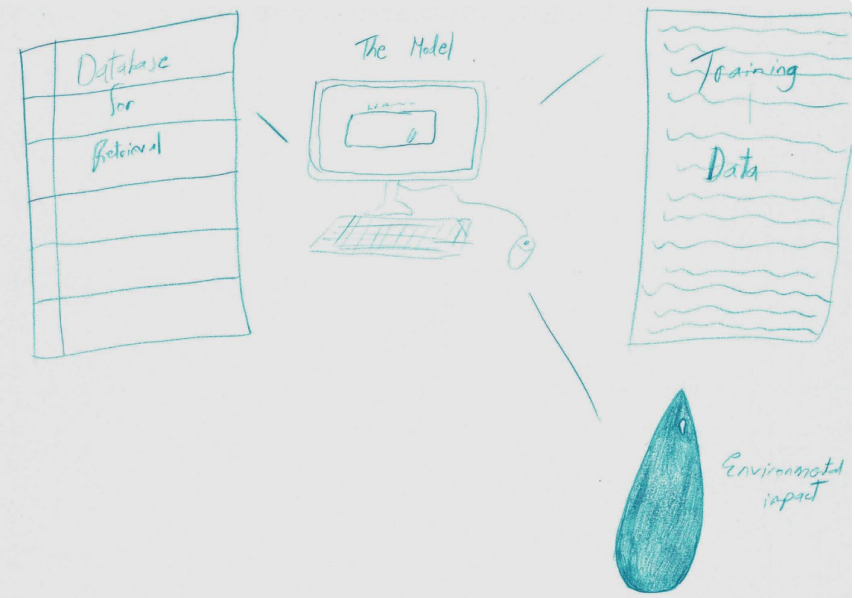


Figure 6. D9 includes a user entry point but lacks human representation; this MM also represents the environmental impact of GenAI.

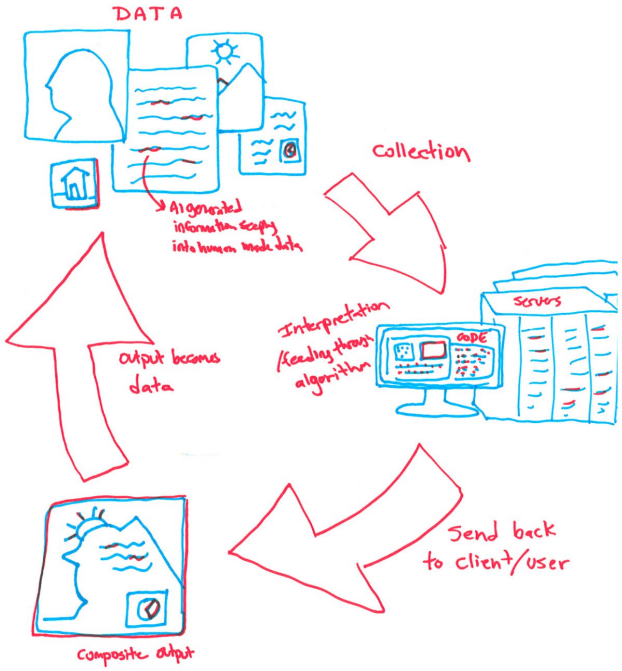


Figure 7. D8's MM represents GenAI's use of information generated from human-created collections, with the GenAI output becoming part of the collections.

Discussion

As part of the study, nine graduate students participated in two focus groups, in which they were asked to draw and discuss their mental models of GenAI. Three families of themes emerged from the qualitative data. The system family included the largest number of themes (the most grounded), which is not surprising considering that participants were asked to represent their understanding of the workings of the GenAI system. The themes that were present, or absent, from the human and value judgment families added nuance to the understanding of the students' mental models of GenAI.

Participants demonstrated a fairly accurate high-level understanding of GenAI as a pattern-seeking probabilistic *system* that relies on human-created (training) collections, and includes hardware, input, and output components.

Several participants incorrectly portrayed GenAI as an information retrieval system rather than a generation system, attributing human-like qualities to it.

These findings align with previous research: initial GenAI mental models could be simplified (Marx et al., 2023; Zirenko et al., 2025) and include erroneous or anthropomorphic features (Sanusi et al., 2024). Participants drew and discussed selected parts of the GenAI system, with many of the complex inner workings of the system omitted or represented abstractly (e.g., wiggly lines, connected dots). Such omissions and general representations of the system complexity point to the cognitive limitations in understanding of the opaque systems (Bansal et al., 2019), levels of technological literacy (Druga et al., 2022; Long & Magerko, 2020), and poor explainability of GenAI systems (Ehsan et al., 2022). The informal, intuitively grounded ideas represented in the mental models of the algorithmic systems can also be understood through the lens of folk theories (DeVito, 2021) and their role in constructing mental models that are grounded in experience, observation, and interaction with the platform.

The transfer of the information retrieval model to the information generation context could be explained by the human tendency to project the MM of the known systems into the unknown contexts (Norman, 1983). While assigning human features to the system is not accurate, it also represents a known trend of anthropomorphising systems to explain and predict their behaviours (Epley, Waytz, & Cacioppo, 2007). The use of anthropomorphic or familiar analogies has been shown to ease users' initial understanding of the GenAI systems (Sanusi et al., 2024). Additionally, GenAI systems are naturally human-like, with outputs mimicking the human-created data they are trained on. This may further encourage users to project familiar but potentially inaccurate mental models onto them (Bandi et al., 2023).

Human stakeholders were present in five mental models: four participants included end-users in their drawings and explanations, and one included humans as producers of the collections used by GenAI. Notably, none of the participants included humans as engineers of GenAI, suggesting that they perceive the systems as autonomous, detached from the human designers and engineers who create them. This perception might stem from limited transparency and the tendency to attribute independent agency to algorithmic systems (Nyholm, 2018; Langer et al., 2021).

Three participants assigned *value judgments* to the GenAI models, demonstrating their awareness of ethical and environmental concerns associated with GenAI technology. While these concerns among student GenAI users have been previously documented (Zhu et al., 2024; Baek et al., 2024), one of our participants expressed a deeper understanding of the adverse effects of AI-generated content 'polluting' the training collections and decreasing the overall quality of generated information. Another participant framed the issue critically, describing training data as stolen, highlighting concerns about the authorship of content.

Our exploratory study relied on a small sample of students from a single academic department. The study employed self-report methods, which, on one hand, might have obscured some of the students' opinions and behaviours, but on the other hand, it aligns with the study's interpretivist goal of capturing rich, authentic accounts from those most engaged with GenAI (Patton, 2015; Lincoln & Guba, 1985). Despite these and other limitations that restrict the generalisability of the findings, the study confirms and expands prior work on student adoption of GenAI and on mental models of information technology in general, and offers promising directions for further research.

Conclusion

As part of a larger study aimed at examining iSchool graduate students' adoption of GenAI tools, we explored students' mental models of these systems. All participants reported using GenAI systems with varying frequencies, most commonly utilising a multi-purpose ChatGPT artificial intelligence tool for academic tasks, primarily writing or brainstorming.

Asking graduate students to draw and explain their mental models facilitated informative and engaging discussions about their understanding of GenAI. Participants' familiarity with GenAI was demonstrated by the MM that included elements of AI's global behaviour (e.g., understanding GenAI as systems that generate outputs from user inputs) and knowledge distribution (e.g., recognising that GenAI models are trained on large datasets as well as user interactions, Gero et al., 2020). Some mental models accurately included elements of GenAI systems, such as probabilistic algorithms, reliance on hardware, training collections, the presence of inputs and outputs, and the general flow of information. Three participants extended their mental models to include the environmental and social impacts of GenAI. Students demonstrated a high-level understanding of GenAI complexity, although they often omitted descriptions of its detailed technical components. Students occasionally applied their knowledge of prior technology, specifically information retrieval systems, to explain the generative system. While some of the mental models included representations of end-users, creators of information collections, and occasionally, anthropomorphic system features (e.g., GenAI as a thief), human designers or engineers were not present in the representations of GenAI systems.

The findings suggest that an even more technologically literate group of information science students who frequently use AI tools for routine academic tasks has exhibited limitations in understanding GenAI, similar to other previously studied groups (Marx et al., 2023; Zirenko et al., 2025; Sanusi et al., 2024). The most notable omissions of the GenAI mental models were not technical, but rather social: students' mental models did not include human creators of AI within the system. Such *black-box* perceptions obscure the underlying human decision-making embedded in system design and functionality, and therefore need to be corrected. Students' awareness of the social and environmental impacts of GenAI should also be promoted, as only one-third of the models included these elements. Some of the MM limitations may be unavoidable and explained by psychological tendencies to draw analogies from familiar, but not always adequate, models of human and technology behaviour. Because users' experiences and the broader, societal adoption of GenAI are constantly changing, the accuracy of the mental models will be changing too and should be viewed as an ongoing process, as opposed to a one-time goal (Doyle et al., 2021; DeVito, 2021).

However, many misconceptions and omissions in the mental models, which stem from the technological and social complexity of GenAI, can be mitigated to improve students' expectations, trust, and appropriate uses of these tools (Bansal et al., 2019; Makri et al., 2006; Zhang et al., 2021). Strengthening students' metacognitive skills, such as self-awareness and monitoring abilities, can be addressed through educational resources and an AI-dedicated curriculum (Marx et al., 2023; Zirenko et al., 2025; Dahri et al., 2024; Tankelevitch et al., 2024). Developers of GenAI systems should prioritise transparency and limit cognitive overload (Davis, 1989; Dahri et al., 2024) by designing explainable features (e.g., features that give users greater control over how outputs are generated, enabling them to understand the system's limitations through interaction). Media coverage, which at the early stages of innovation tends to swing between hype and fear, obscuring AI's social and ethical dimensions (Metz & Diakopoulos, 2020), should focus on presenting AI as a sociotechnical system—shaped by data, algorithms, and humans, not autonomous entities, and communicate both its capabilities and limitations (West et al., 2019). Media can support informed public discourse by involving diverse stakeholders, offering clear explanations and examples (Long

& Magerko, 2020), and bringing attention to who builds, benefits from, or is harmed by GenAI (Crawford, 2021; Eubanks, 2018).

iSchool students are not only avid users of GenAI, whose greater understanding of this technology could lead to greater efficiency and satisfaction, but they are also future GenAI designers who can gain from an accurate and critical understanding of GenAI's technological and social components.

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What is left unshared: using a third space lens to explore information sharing behaviour within scrum in agile software development

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Abstract

Introduction. Examines information sharing and withholding within the scrum framework (an agile software development methodology) through a third space lens. Transparency is vital within scrum. However, in practice, transparency is limited; team members frequently negotiate what information to share and what to withhold. A third space lens can explore transparency according to rigid, formal scrum framework requirements versus how transparency is practised in real-world teamwork. It forms a middle zone (third space) where rigid structures (first space) and informal, lived realities (second space) intersect. Here, different viewpoints, discourse styles, knowledges are created. A third space lens can reveal how culture, context and relationships shape what information is shared, withheld, or negotiated.

Method. Scoping literature review on information sharing in agile, scrum and software development literature and use of a third space lens, combined with findings from individual interviews from a use case to exemplify information withholding in scrum.

Analysis. Thematic analysis of literature and interview data.

Results. Information sharing and withholding are negotiated practices in scrum. Information withholding is often conscious, intentional personal or strategic decisions, indicating agency, power dynamics.

Conclusion. Further research on practical implementations might inform information behaviour research in other contexts and information sharing practices in scrum.

Introduction and rationale

Rapid and continuous technological developments put pressure on organisations to develop new business models and frameworks, and change their mindsets to accommodate adaptability, innovative thinking, and constant focus on satisfying market demands (Tshabalala and Marnewick, 2021). That is especially true for software development, where many companies are adopting agile methodologies (Muthucumaru, 2021) to adjust to ever-changing business environments, approaches, standards and practices. 'Agile methodologies are a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organising, cross-functional teams and customers' (Kaur and Jajoo, 2015, p. 832). Numerous agile methodologies have been introduced over the years (e.g., Scrum, Lean, eXtreme Programming [XP], Kanban). Scrum is one of the most widely used project management frameworks in agile methodologies in the software industry (Dada and Sanusi, 2022; Kadenic et al., 2023). It is an incremental and iterative framework for software development that includes a set of values, principles, roles, events, and artefacts to create an environment that promotes transparency, flexibility, and adaptation (Kadenic et al., 2023). One of the key strengths of scrum is its emphasis on transparency, communication and information sharing (Petter, 2018). This serves as the life force that fuels collaboration, trust, mutual learning, and successful project delivery among cross-functional teams (Dixit and Bhushan, 2019; Downey and Sutherland, 2013; Lee et al., 2024). Transparency in scrum requires that all information relevant to the project must be shared and visible. However, in practice, transparency is limited, as team members frequently negotiate what information to share and what to withhold (Collignon et al., 2022; Diebold et al., 2015; Masood et al., 2020; Petter, 2018). Van der Valk et al. (2018, p. 23) define transparency 'as the degree/level of information that is shared' among all stakeholders involved in agile projects. Hosseini et al. (2016) note that transparency in agile is crucial for understanding the intended degree of information shared between partners, particularly with respect to openness, efficiency, and accountability, as well as for informed decision-making. Information sharing in scrum enables teams to track progress, identify issues, implement changes and overcome complex tasks (Petter, 2018). However, Petter (2018) points out that in practice, information is not always fully shared. He explains that team members may choose to withhold, reframe, remain silent or filter information due to the potential negative impact on team members, the organisation, or project outcomes.

As teams become more diverse and projects become more dynamic and complex, there is a need to understand transparency, information sharing, and withholding in ever-changing landscapes (van Engelenburg et al., 2019; Klein et al., 2010; Muthucumaru, 2021). Thus, it is essential to understand information behaviour and, in particular, information sharing practices from an information behaviour lens (Savolainen, 2019). Acknowledging a variety of information behaviour definitions (Bates, 2010; Case, 2012; Ingwersen and Järvelin, 2005; Savolainen, 2007; Wilson, 1999), this paper defines information behaviour as an umbrella concept that encompasses all information-related activities, including information sharing, seeking, encountering, withholding, avoidance, use, recognition, processing, articulation, and making sense of information needs (Fourie and Julien, 2014). Savolainen (2017, Discussion, para. 3) notes that limited research has been done on information sharing and withholding in comparison to information seeking and retrieval. Understanding transparency, information sharing, and information withholding within the scrum framework and in the lived realities of teams can offer a more realistic view of how collaboration unfolds in practice. But even more, it can highlight how individuals continuously negotiate what they share or withhold, often due to personal, strategic or protective reasons. To gain this understanding, the researchers explore the use of a third space as a theoretical lens.

Third space as a theoretical lens has been applied in various contexts, including education (Beck, 2024; Sedawi et al., 2023), library and information science (Elmborg et al., 2015; Kuhlthau and Cole, 2012), human-computer interaction and participatory design (Hansen et al., 2021), and linguistic

and cultural studies (Källén, 2021; Maddamsetti, 2023). Homi Bhabha (1994) introduced third space as a postcolonial theory. He defines third space as a liminal or in-between space where cultures intersect, creating hybrid identities, new meanings, and opportunities for resistance and challenge to dominant discourses (hegemonic narratives) (Bhabha, 1994). This space can be virtual, physical, or conceptual, where negotiation and translation among different cultures, discourses, and identities collide and merge to form something new (Hite et al., 2018; Jordan and Elsden-Clifton, 2014). Thus, this lens offers the opportunity to examine how transparency in scrum emerges through practices of information sharing and withholding, which are shaped by context, culture, and power.

In essence, using a third space lens can allow us to understand scrum not as a rigid structure but as a dynamic, living environment where collaboration and information sharing are continuously renegotiated. With this in mind, the paper endeavours to address the following research question:

> How can a third space lens be utilised to understand information sharing and withholding in scrum teams in agile software development?

Sub-questions to be answered include:

> RQ1: What has been reported in the literature on information sharing, third space lens and scrum in software development?
>
> RQ2: What can be learned from the literature in combination with empirical findings from individual interviews at a use case applying scrum to understand information withholding in software development teams?
>
> RQ3: How can insights from RQ1 and RQ2 be combined to exemplify the potential of third space as a lens to understand information sharing and withholding in scrum?

Apart from the introduction and rationale, the paper will clarify key concepts (agile, scrum, information sharing, information withholding and third space); methods applied in the paper (an exploratory scoping literature review based on thematic analysis of information sharing, third space lens and scrum in software development combined with empirical findings from individual interviews on information withholding at a use case); mapping third space lens themes for application in use case; a discussion of findings from the literature and use case to exemplify the potential of third space as a lens to understand information sharing and withholding in scrum; recommendations for further work, and a conclusion. The use case was conducted in mid-August 2022 with a scrum team from an international automobile company.

This paper aims to shift our focus away from viewing scrum purely as a set of formal, rigid structures and instead explore how these ideals intersect with real-world practices in teamwork discourse and information sharing from a third space lens.

Clarification and contextualisation of concepts

Concepts are defined in the order they first appear in the text. A more detailed discussion is used to support the contextualisation of the concepts (not explained elsewhere in the paper) for purposes of the paper, thus providing a richer understanding of their meaning and application.

Agile methodology

Agile methodology (highly valued in software development) is an umbrella term for project management and software development approaches and practices (e.g., Scrum, Lean, eXtreme Programming [XP], Kanban) (Goyal et al., 2023; Hinderks et al., 2022; Muthucumaru, 2021). Agile is iterative, incremental, and evolutionary, allowing collaboration and rapid responses to changes in people, technology, and environments. It uses 'just enough ceremony' (e.g., scrum events) to meet the changing needs of stakeholders and society (Beck et al., 2001; Laanti et al., 2013; Pardo et al.,

2021). It is highly valued in software development (Muthucumaru, 2021). The paper will focus on the scrum framework.

Scrum

Scrum, a project management framework in agile (Beck et al., 2001), works by breaking large services and products into small pieces that can be completed (and potentially released) in short timeboxed iterations (also known as sprints) (Muthucumaru, 2021). Sprints can last between one and four weeks and occur consecutively with no breaks in between (Baxter and Turner, 2021). Each sprint begins with a sprint planning meeting, has daily progress sessions (daily stand-ups), and concludes with a sprint review meeting and a retrospective meeting. These scrum events offer a variety of communication mechanisms designed to enhance communication, information sharing, and feedback in product development (Baxter and Turner, 2021). Thus, creating a scrum information sharing ecosystem.

Information sharing

Sonnenwald (2006) defines information sharing as a

> set of activities by which information is provided to others, either proactively or upon request, such that the information has an impact on another person's (or persons') image of the world, i.e., it changes the person's image of the world, and creates a shared, or mutually compatible working, understanding of the world. (Introduction, para. 1)

Savolainen (2007, p. 1) explains that 'in the broadest sense, information sharing may include providing information, receiving information provided by other people, confirming receipt of the information, and confirming that the information is jointly understood'. The process of information sharing thus includes two main aspects, that is, giving information to others, and receiving information provided by the information giver (Pilerot, 2012). Additionally, Gholami et al. (2022) highlight that 'information sharing as an activity is the result of cooperation and collaboration of individuals, enables participants to create collective knowledge, maintain collaborative awareness and create a common understanding' (p. 954).

Various related terms like information exchange, information transfer, and information giving appear in information behaviour literature. However, this paper focuses only on the term information sharing.

Operationally, 'information sharing behaviour describes the explicit and implicit exchange and sharing of data between people, groups, organizations and technologies' (Widén and Hansen, 2012, Information sharing section, para. 1). In addition, information sharing could occur synchronously (i.e., in real-time) or asynchronously (i.e., non-real-time) and can both take place through face-to-face dialogue as well as through online conversations as complementary forms of mutual exchange to achieve a common goal (Du, 2014; Pilerot, 2012; Savolainen, 2017).

Information withholding

Talja (2002, p. 153) discussed the occurrence of non-sharing, where respondents withhold relevant information or consciously refrain from disclosing acquired information to others. Hence, respectively, making two distinctions between non-sharing as withholding information and retaining information. Both concepts refer to participants who considered sharing information but ultimately decided not to do so. Almehmadi et al. (2014) defined information withholding as 'a type of information sharing, i.e., deciding to keep it to oneself'. Haas and Park (2010) define information withholding as the 'intentional failure to share potentially useful information with others' (p. 873). Huisman et al. (2020) define it as the decision to share or not to share information due to a conscious consideration of keeping the feelings, wishes, and (information) needs of others in mind.

From an agile software development perspective, information withholding has been linked to employee silence (Petter, 2018). 'Silence in IS *[information systems]* projects occur in a variety of ways, including withholding information, reframing information in a more positive light, or delaying the reporting of information' (Petter, 2018, p. 43). Therefore, withholding (intentionally not sharing) information about an individual's behaviours, thoughts, and feelings regarding their organisational circumstances.

Operationally, information withholding, described as a non-sharing behaviour, is the intentional decision to keep relevant information to oneself or choosing not to share information due to its perceived lack of relevance to a problem or context or the conscious consideration of others' feelings, wishes, and information needs.

Third space

The concept of third space was originally developed to define a physical public space distinct from one's home (first space) and work environment (second space), where informal meetings could take place, known as a Third Place. This place-based space has evolved over time also to include virtual, conceptual and imaginary spaces (Singh and Kender, 2023). Therefore, moving from Third Place, which is geographically bounded, to third space, which is more abstract, conceptual, and fluid.

Emphasis on nature and characteristics of the space: Initially, third space was seen as a social setting for interaction and dialogue (Oldenburg, 1989, p. 16), where individuals from diverse backgrounds can meet, share experiences, and create new meanings (Bussert-Webb and Lewis, 2021). However, there has been a shift from viewing third space as a space to a theoretical framework. Theorists Homi Bhabha (1994) and Edward Soja (1996) realised that this space offered much more than just a location (space), but a conceptual theory (lens) that provided new ways of viewing new identities, knowledges, and cultural meanings developed through hybridity and negotiation. Bhabha (1994) defines third space theory as an '*in-between* space in which identities and literate, social, and cultural practices developed characterized by *hybridity*' (i.e., hybridity theory). Similarly, Soja (1996) describes third space as a hybrid, transformative space where traditional binaries and static notions of identities are challenged, allowing for new forms of cultural practices and social relations to emerge (i.e., spatial theory). Apart from this body of work, interest has also developed in using third space as a theory (lens) (Beck, 2024). This will be the focus of this paper.

Emphasis on the potential as theoretical lens: third space theory has been applied in several disciplines, for example, in education, it is used to bridge students' everyday life experiences, cultural practices and languages, with academic knowledge to co-create new knowledge (Maniotes, 2005; Tatham, 2023; Veles, 2022); in communication and cultural studies to understand cultural hybridity, identity negation, and plurilingual (Källén, 2021; Maddamsetti, 2023), library and information science to understand social inclusion and co-construction of new worldviews (Elmborg et al., 2015; Kuhlthau and Cole, 2012); and participatory design to 'challenge assumptions, learning reciprocally, and creating new ideas, co-creation of identities, understandings, relationships, and polyvocal (many-voiced) dialogue across and through differences' (Preben et al., 2021, p. 42). The original concept of Third Place has also been noted in work on informal information sharing and information grounds (Fisher et al., 2005, 2007; Savolainen, 2009).

Operationally, a third space lens is defined as a space that is a hybrid, transformative space (which can be a physical, virtual, conceptual or imaginative space) where individuals negotiate their disciplinary boundaries (crossing boundaries), degree of information shared, establish a shared understanding, build trust, form new identities, and celebrate the richness of diverse cultures, languages, perspectives and experiences. Its purpose as a theoretical lens, explaining a phenomenon, is to transform discourse that addresses complex problems (e.g., moral and ethical

issues), promote transparency, and foster fruitful collaborations that enable a more innovative and interconnected society (Maaß and Buchmüller, 2018; Roundtree and Shirzadian, 2020).

Method and analysis

The paper is based on (i) an exploratory scoping literature review and (ii) empirical findings from a use case.

(i) The exploratory scoping literature review aims to identify the information sharing practices in scrum teams during software development viewed through a third space lens. We, therefore, focused on:
    - studies looking at the use of third space as a lens in any context (theoretical grounding).
    - studies explicitly dealing with information sharing in agile, scrum and software development (study context).
    - studies mentioning the use of third space in agile, scrum and software development (theoretical application in study context).

(ii) The empirical findings are from a multimethod qualitative information behaviour study conducted at an international automobile company in South Africa that uses scrum. Data were collected through observation, digital diaries and individual interviews in one scrum team. This paper will report only on the post-sprint face-to-face individual interviews conducted in mid-August 2022 with eight team members, providing deeper and richer insights into the reasons why information was intentionally not shared. Informed consent was received from participants, and permission from the institutional ethics board.

Search strategy and eligibility criteria for scoping literature review

Key library and information science, business, information technology and multi-disciplinary databases were searched such as Library and Information Science Abstracts (LISA), Library Information Science and Technology Abstracts (LISTA), Library and Information Science Source, Emerald Insight, Web of Science (Clarivate Analytics), ScienceDirect, EBSCOhost, ProQuest, Scopus, ACM Digital Library, ABI/INFORM Collection, IEEE Xplore, and SpringerLink were searched. To ensure we did not miss anything, Google Scholar was used as a complementary search tool to identify interdisciplinary and emerging work not consistently indexed in the selected databases. This extended the systematic search strategy described earlier. We performed the following searches on the aforementioned databases:

1. Third space theory or lens in combinations of title, abstract and keywords.
2. Information sharing (in the title of the document) in combination with either agile, scrum or software development, in combinations of title, abstract or keywords.
3. Third space in combination with either agile, scrum or software development, in combinations of title, abstract or keywords. This is to broaden the search, since limited literature is available.

The following eligibility criteria were applied for manual selection on all of the above searches: only full-text publications in English; articles, full-text conference papers, books and book chapters; and no limit on publication date. All retrieved documents were uploaded to Covidence, a systematic reviews tool that integrates PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), and reviewed by one author and subsequently checked by the other authors. These were the outcomes:

- Search one: a total number of 51 documents were retrieved. Twenty-three (23) duplicates were removed. The remaining 28 documents were screened and selected based on the aforementioned eligibility criteria. Eleven (11) documents were excluded due to not meeting the eligibility criteria (i.e., wrong scope and source type). Only 17 papers remained for the review.
- Search two: a total of 42 documents were retrieved. Eleven (11) duplicates were removed. The remaining 31 documents were screened and selected based on the aforementioned eligibility criteria. Twenty-five (25) documents were excluded due to not meeting the eligibility criteria (i.e., wrong context, wrong source type or wrong/limited concept use, i.e., articles focusing on agility rather than agile methodology or only referring to terms once) were excluded. Only six (6) papers remained for the review.
- Search three: a total of five documents were retrieved. Zero (0) duplicates were retrieved. The remaining five (5) documents were screened and selected based on the aforementioned eligibility criteria. One (1) document was excluded due to not meeting the eligibility criteria (i.e., use of concepts). Only four (4) papers remained for the review.

To structure the findings from the literature, we used thematic analysis. Thematic analysis is 'a method for systematically identifying, organising, and offering insight into patterns of meaning (themes) across a data set' (Braun and Clarke, 2012, p. 57). We identified themes related to information sharing in scrum for further analysis. These findings will be combined with the empirical findings to illustrate the potential of third space as a lens (i.e., third space theory) for understanding scrum teams' information sharing and withholding during agile software development.

Several approaches exist for thematic analysis, for example, inductive, deductive, semantic, latent, (critical) realist, essentialist and constructionist approaches (Braun and Clarke, 2012). This paper followed an inductive approach. Thus, the content of the literature directed the coding and theme development.

Identifying themes from the literature

We start with analysing literature on (i) third space as a theory and lens, followed by (ii) examining literature on information sharing in agile, scrum and software development, and (iii) concluding with literature that explores the use of third space in agile, scrum and software development.

Theoretical grounding: Understanding third space as a lens

A total of 17 articles were identified that could substantiate our decision to use third space as theoretical lens to study information sharing and non-sharing behaviour in a scrum team. We specifically focused on how a third space lens is defined, applied and the purpose of using it within various contexts.

Definitions of third space as a lens are predominantly from education and cultural studies. Across the 17 articles, most studies began by defining third space as a concept (the space itself), for example, conceptual, physical or imaginative space, and then examining its application as a theoretical lens. Third space is first defined as a space, zone, territory, place or interstice (Benson, 2010; Bryant, 2013; Verbaan and Cox, 2014; Witenstein and Cervantes, 2020; Zhang and Yuan, 2019; Zhu et al., 2020) that offers a lens (theory) to view negotiations, knowledges, identities, and cultural boundary crossing, thus enabling various dialogues, meaning-making and collaborations to emerge (Balloo et al., 2024; Bartmes and Shukla, 2020; Sedawi et al., 2023; Levy, 2008). Delving deeper into what a third space lens can entail, the following themes emerged:

(i) Hybridity and in-betweenness (liminal) (e.g., Balloo et al., 2024; Levy, 2008; Zhang and Yuan, 2019; Zhu et al., 2020).
(ii) Co-construction and negotiation (e.g., Maddamsetti, 2023).

(iii) Agency, identity and resistance (e.g., Beck, 2024; Benson, 2010; Bryant, 2013; Witenstein and Cervantes, 2020).
(iv) Cultural and worldviews (knowledge systems) integration (e.g., Bartmes and Shukla, 2020; Idrus, 2015; Kang, 2017; Ramkellawan-Arteaga, 2020; Sedawi et al., 2023).
(v) Transformation and educational dimensions (e.g., Jordan and Elsden-Clifton, 2014; Tatham, 2023; Verbaan and Cox, 2014).

A condensed view of the 17 articles and how they define a third space lens is presented in Table 1, Appendix A.

Attention then shifts to how a third space lens is applied and its purpose. The same 17 articles were analysed. Across the literature, third space examines identity formation and negotiations across intersecting boundaries and hybrid contexts. Balloo et al. (2024) examine identity formation where professional boundaries intersect, highlighting the fluidity of identities within institutional structures. Bartmes and Shukla (2020) apply the lens to transformative intercultural learning to support decolonising education via blending indigenous knowledge and academic knowledge. Beck (2024) reviews third space use in teacher education, revealing depoliticisation and misapplication. Benson (2010) explores learner agency and literacy resistance to motivate for inclusive multimodal literacy practices, while Bryant (2013) examines agency and language as crucial sites for racial and gendered identity reconstruction.

Idrus (2015) links cultural values, personal experience, and curriculum texts to foster shared identity and intercultural understanding. Jordan and Elsden-Clifton (2014) examine the formation of hybrid technological identities in education to challenge technocentric research binaries, and Kang (2017) investigates cross-cultural literacies as spaces of conflict, negotiation, and hybridity. Levy (2008) focuses on bridging home and school literacies to negotiate reader identity, while Maddamsetti (2023) examines teacher advocacy for emerging bilingual learners as a way of navigating tensions and challenging binary views. Ramkellawan-Arteaga (2020) highlights identity complexity and the role of educator support in moving beyond fixed labels. These studies emphasise the role of culture, context, and practice in identity negotiation in third spaces.

The remaining studies focus on the use of third spaces to promote culturally responsive and power-conscious practices. Sedawi et al. (2023) explore the blending of Indigenous knowledge and Western knowledge to explore culturally relevant, context-specific learning. Tatham (2023) examines identity negotiations and meaning-making in multicultural classrooms to foster agency and negotiate power dynamics. Verbaan and Cox (2014) analyse boundary crossing between academic research and professional services to understand hybrid roles, while Witenstein and Cervantes (2020) illustrate how familial and academic contexts merge to shape hybrid identities and gendered academic decisions. Finally, Zhang and Yuan (2019) examine the intersections of classroom practice, research, and policy to explore boundary crossing in identity formation, and Zhu et al. (2020) focus on student teachers' identity construction during teaching practicums, highlighting how reflective hybridity can bridge theory and practice.

Themes relating to the application of a third space lens and its purpose have been identified and are presented in separate sections to maintain clarity. The following themes emerged when focusing on the application of third space as a lens for:

- *boundary crossing and bridging practices* between home/school, Indigenous/Western knowledge, theory/practice, and academic/professional domains (e.g., Zhu et al., 2020);
- *tension negotiation*, *dialogue engagement*, *and co-creation of meanings* across professional, institutional and cultural boundaries (e.g., Tatham, 2023);
- *binaries*, *identity reconstruction*, *agency reclamation and challenge marginalisation* within diverse groups (e.g., Maddamsetti, 2023);

- *blending of academic, Indigenous and local knowledges* within education and research (e.g., Sedawi et al. 2023);
- *the transformation of pedagogical/learning environments and professional practices* to support collaboration (e.g., Bartmes and Shukla, 2020).

The following stood out when analysing the purposes for which a third space lens to deepen our understanding of how to:

- transcend *binary thinking and foster inclusivity* for holistic learning, knowledge and identity creation (e.g., Bartmes and Shukla, 2020; Maddamsetti, 2023);
- recognise *complex interactions* in co-transformations and co-meaning-making to construct shared interpretations (Benson, 2010; Idrus, 2015);
- challenge *dominant discourses* and empower *marginalised voices* to promote equal participation (Tatham, 2023);
- validate *multiple worldviews* and *decolonise knowledge systems* to promote inclusive and context-specific understandings, and (e.g., Bartmes and Shukla, 2020; Sedawi et al., 2023);
- enable *innovation* that leads to new ideas, insights, and practices (Levy, 2008; Zhu et al., 2020).

A condensed view of the 17 articles and how they applied a third space lens and the purpose of using it is presented in Table 2, Appendix B. Overall, in educational and cultural contexts, a third space lens is applied to examine and analyse boundary crossing, role and identity negotiations, agency reclamation, different knowledge systems, and transformation in pedagogical, professional practices. The third space lens is used to achieve a specific outcome (purpose), namely: to understand complex, fluid identities; challenge dominant discourses and binary thinking; validate multiple worldviews; and understand how innovation leads to new ideas, insights and practices.

The analysis of information sharing literature in agile, scrum and software development contexts will provide insights into information sharing behaviour, interactions, and communication in such contexts that can be combined with the theoretical grounding gained in this section to shape the third space lens that will be applied to study non-sharing in a use study applying scrum.

Information sharing in agile, scrum and software development

Huisman et al. (2020) note that few studies have focused on information sharing due to its multifaceted communicative manifestations, surrounded by prevailing conceptual multitude and vagueness (Pilerot, 2012; Savolainen, 2017). Almehmadi et al. (2014) developed a framework to support our understanding of the what, which, how and why information is shared. Although the aforementioned framework could be used to investigate the information sharing behaviour during scrum, it does not include why information is not shared (non-sharing). Thus, the authors will have to include the 'why not' (non-sharing) when analysing the corpus of work focusing on information sharing during product design in agile, scrum, and software development. Relatively few studies have focused on non-sharing (Grubb and Begel, 2012; Mombeshora and Dekoninck, 2013; van Engelenburg et al., 2019). A total of six studies were selected to be reviewed based on the eligibility criteria noted earlier. Table 3 presents how these studies relate to what (content shared), how (methods used), why (motivations) and why not (non-sharing) information was shared, based on an adapted list of information sharing dimensions from Almehmadi et al. (2014).

The following was evident:

Authors	Information sharing findings

Cho and Song (2023)	**What:** Ideas; data structures (e.g., databases); algorithms; solutions; contextual information (i.e., about environment, situation).
	How: Internet of Things, applications, devices.
	Why: To support conceptual integrity in achieving the project purpose; managing complexities to solve problems; ensuring high-quality information; and empowering context awareness to provide suitable responses to changing requirements.
	Why not: Unstructured information in the wrong format.
Grubb and Begel (2012)	**What:** Source code; bug databases; testing plans; project specifications; release schedules; project schedules.
	How: Face-to-face, computer-mediated team meetings; emails; instant messages; phone calls; via entries on Collaborative IDE (i.e., coding platform).
	Why: To promote individual and group awareness (i.e., progress on a project in teams and problems); to perform work tasks.
	Why not: Poor communication practices; sense of control; failure to comprehend request; social biases (through team isolation); organisational culture; confidentiality requirements (sensitivity); legal issues; malicious intent; lack of trust; feel unauthorised to speak on behalf of team.
Klein et al. (2010)	**What:** Resource requirements; progress status; technical difficulties; competencies of core team members.
	How: Nothing mentioned.
	Why: To coordinate decisions (e.g., design and resource allocation decisions); cooperatively negotiating conflicting interests; gain incentive payments; and achieve functional and quality goals.
	Why not: Conflicting, competing stakeholder interests (i.e., misalignment of requirements); lack of or missing information (causing miscommunication); self-interest (misreporting information for an incentive, e.g., promotion, recognition or financial gain).
Mombeshora and Dekoninck (2013)	**What:** Supply chain and manufacturing process information; product and service information related to production and supply; eco-information (i.e., information on the environmental impact of products).
	How: Internet communication technologies (e.g., web portals).
	Why: To minimise costs; acquire resources and capabilities; create, sustain fruitful collaborations and relationships; make investment decisions; create environmental impact awareness of products.
	Why not: Security reasons, lack of trust.
Phuwanartnurak and Hendry (2009)	**What:** Knowledge base; project details, files.
	How: Wikis.
	Why: To support collaboration across locations; to encourage brainstorming; and to enable project tracking.
	Why not: Nothing mentioned.
van Engelenburg et al. (2019)	**What:** Metadata, access control information; context information; documents on detailed goods description; transactional data.
	How: Blockchain technology (e.g., distributed ledger system tracking origin, transformations and sharing of information on goods in a supply chain).
	Why: To improve safety and security (e.g., identifying information on smuggling of goods); perform risk assessments; enable decision making.
	Why not: Fear of sharing competitively sensitive information (vulnerability); becoming liable, not being compliant with the law; lack of incentives; keeping information confidential to prevent misuse; lacking trust to share due to others' opportunistic behaviour; cannot share unknown information

Table 3. Selected findings on information sharing studies in agile, scrum and software development contexts.

The thematic analysis of Table 3 identified the following themes to inform information sharing practices during agile, scrum and software development:

- *Multifaceted nature of content shared (what)* allows for both more abstract ideas (intangible) and more concrete (tangible) elements to take form (e.g., data structures, project-related information, practical solutions, contextual information) (e.g., Cho and Song, 2023).
- *Methods, mechanisms and tools of information sharing (how)* allow for sharing between organisations, individuals, individuals/groups, and individuals/technologies (e.g., Grubb and Begel, 2012).
- *Diversity of motivations for information sharing (why)* can be intrinsic, extrinsic, power-related or incentive-based motivations to drive project success, align actions with strategic goals, manage complexities, foster collaboration, and address both practical and ethical considerations (e.g., Mombeshora and Dekoninck, 2013; Phuwanartnurak and Hendry, 2009).
- *Varied influences and complex reasons behind the decision to withhold information (why not)* can involve social, individual, organisational, and legal factors (e.g., Klein et al., 2010; van Engelenburg et al., 2019).

Third space in agile, scrum and software development

Searching the aforementioned databases, no studies were found that mentioned the use of third space for scrum. Four articles were found that mentioned the use of third space in software development. Across these studies, third space has been contextualised as an in-between, evolving environment that enables collaboration that crosses traditional boundaries. Kendall et al.'s (2020) study explores a Third Design Space that offers practitioners and researchers a new intellectual perspective on corporate-communal engagements in software development. This shows its contradictory, unpredictable, and continually changing nature, which supports mutual understanding, equal participation, and community building through shared values such as transparency and meritocracy. Lutze (2020) applies the third space to the development of health and medical software for elderly people, focusing on the boundary region where analogue, digital, and conceptual discourses intersect and must be negotiated.

Maaß and Buchmüller (2018) describe third space as a mutual ground created through cultural probes as boundary objects, highlighting it as an in-betweenness space where collaboration, negotiation, inclusivity, mutual learning, and multidisciplinary participation and co-creation of identities and relationships take place. Similarly, White et al. (2021) use the third space to examine blended professional roles in higher education, presenting it as a flexible and dynamic space that allows for role and identity crossing, integrates academic and professional knowledge, and fosters shared learning, mutual respect, and collaboration.

A condensed view of the four articles discussed previously is presented in Table 4, Appendix C. Ultimately, the following themes were noted. A third space lens in software development studies offers:

(i) hybridity between spaces for identity formation, cultural translation and inclusive discourses (e.g., Maaß and Buchmüller, 2018);
(ii) co-meaning-making and knowledge creation (e.g., Maaß and Buchmüller, 2018);
(iii) agency, empowerment and equal participation (e.g., Kendall et al., 2020);
(iv) negotiation of differences (e.g., White et al., 2021);
(v) a range of interactions and activities for shared learning (e.g., Lutze, 2020);
(vi) support of transformative, collaborative and relational processes (e.g., Kendall et al., 2020).

These themes (*cf.* Table 4, Appendix C) correspond to the themes identified in the corpus of works focusing on third space as a lens, as presented in Table 2 (*cf.* Appendix B).

Mapping third space lens themes for application in use case

This section maps the themes identified in Tables 1-4 to demonstrate how a third space lens can be used in a use case. Table 1 (*cf.* Appendix A) identified themes based on what third space as a lens entails, Table 2 (*cf.* Appendix B) presented themes on the application and purpose of a third space lens, Table 3 highlighted findings on the information sharing behaviour in a specific context, and Table 4 (*cf.* Appendix C) illustrated the application of a third space lens in agile, scrum and software development contexts.

We mapped themes across Tables 1-4, and it became evident that the application of a third space lens in an information sharing study using scrum supports:

(i) Hybridity and in-betweenness (liminal): This theme examines boundary crossing and bridge practices, with the purpose of transcending binary thinking and fostering inclusivity. Information sharing in this theme focuses on what is shared and reflects the nature, content, and knowledge brought into a space. In a scrum context, this theme supports identity formation, cultural translation, and inclusive discourses.
(ii) Negotiation and co-construction: This theme examines tensions, dialogue engagement, and co-creation of meanings, with the purpose of understanding complex interactions in co-transformations and co-meaning-making. Information sharing in this theme can be considered as the process of sharing that is negotiated through dialogues and interactions using methods, tools, and mechanisms. In a scrum context, this theme supports co-meaning-making, knowledge creation, and equal participation.
(iii) Agency, identity and resistance: This theme examines binaries, identity reconstruction, agency reclamation and challenging marginalisation, with the purpose of challenging dominant discourses, empowering marginalised voices and eliminating power dynamics (equal participation). Information sharing in this theme focuses on why tensions, challenges, and constraints of sharing may not be revealed, due to factors such as lack of trust, incentives, confidence, organisational barriers, and power hierarchies. In a scrum context, this theme supports negotiation of differences.
(iv) Cultural and worldviews (knowledge systems) integration: This theme examines the blending of academic, Indigenous and local knowledges, with the purpose of validating multiple worldviews and decolonising knowledge systems (inclusive and context-specific understandings). Information sharing in this theme addresses why sharing occurs by revealing the reasons, motivations, and intent behind sharing, such as building trust, awareness, decision-making, collaboration, and understanding. In a scrum context, this theme supports a range of interactions, activities, behaviours, and knowledge.
(v) Transformation and educational dimensions: This theme examines the transformation of pedagogical/learning environments and professional practices, with the purpose of enabling innovation that leads to new ideas, insights, and practices. Information sharing in this theme also addresses why sharing occurs. In a scrum context, this theme supports transformative, collaborative and relational processes.

These mapped themes can be viewed in Table 5 (*cf.* Appendix D). In summary, the following apply to a third space lens to study information sharing in scrum:

- Table 1: Hybridity and in-betweenness (liminal); co-construction and negotiation; agency, identity and resistance; and cultural and worldviews (knowledge systems) integration.
- Table 2: Boundary crossing and bridging to transcend binary thinking, fostering inclusivity; co-creating of meanings via dialogue interactions; negotiating tensions, identities, power dynamics, and discourse dominance; blending of worldviews, work roles and responsibilities; and transformation of professional practices.

- Table 4: Identity formation, cultural translation and inclusive discourses; co-meaning-making, knowledge creation and equal participation; negotiation of differences; support through various interactions, activities, behaviours and enablement of transformative, collaborative and relational processes.

Overall, a third space lens can reveal the nature of discourse spaces (e.g., physical, conceptual, virtual) and the accommodation of various worldviews, practices, and paradigms that are applicable to the scrum context. This can especially support transparency and information sharing. However, information is not always visible or shared in real-world scrum practices. To illustrate the value of a third space lens in understanding non-sharing, a selection of the mapped themes will be applied to verbatim quotes from the individual interviews in a scrum use case that specifically relates to non-sharing. They are: negotiations of tensions, power dynamics, and co-meaning-making.

Empirical findings from use case interviews and triangulation with findings from scoping reviews

To illustrate the value of a third space lens, a selection of the mapped themes in Table 5, Appendix D (i.e., negotiations of tensions, power and group dynamics, and co-meaning making) will be applied to verbatim quotes from individual interviews in a scrum use case that relates to non-sharing (*cf.* Table 6). The interview empirical findings discussed here are from a multimethod qualitative information behaviour study conducted at an international automobile company in South Africa that uses scrum. For the larger project, data were collected through observation, digital diaries and individual interviews during one project sprint, which spanned over two weeks in August and September 2022. This paper will report only on the post-sprint face-to-face individual interviews conducted within one scrum team. Written informed consent was obtained from the participants, as well as ethical clearance from the institutional ethics board, and permission from the company via the signing of a confidentiality agreement. Eight team members, fulfilling the role of Developers in the team, voluntarily participated in the interviews. They were given pseudonyms to ensure anonymity and privacy. Verbatim quotes are presented in a table to enhance transparency and analytical rigour, enabling readers to quickly appraise and compare how participants' words support the identified themes and interpretations.

Selection of third space themes applied	Verbatim quotes reflecting non-sharing at a use case
Negotiations of tensions (include emotional, relational, identity, epistemic/relevance tensions)	• Garnett notes that 'there might be things that I did not share, which I feel like there were problems with work done by other people.' For example, 'now you find that you are working on something and find out there are problems with the work. So, just not to cause tensions and problems. What you do as an honourable person or as a mature person is just fix things without having to shout out and say, this is a problem. You know?' **(***Identity and relational tensions***)** • Teagan mentions that 'I am not comfortable with speaking in a space where there are too many people.' Teagan offers the following example: 'office days used to make me so nervous that I would have to say something in front of people.' **(***Emotional tensions***)** • Charlie notes that 'we have to share information if it belongs to the project. We cannot keep it. I mean, we cannot hide it.' Charlie further explains that 'if it is not relevant, we do not need to share, but if it is relevant, we definitely have to share.' **(***Epistemic/relevance tensions***)** • Garnett says that 'if there are things that I can deal with myself, I will not share.' **(***Personal and Epistemic/relevance tensions***)** • Tyler explains that 'sometimes you can tell that people decided to take a certain path and then the information you want to share may sound irrelevant… or sounds like you want to antagonise them.' Tyler points out that you 'would be a better team player by agreeing with the team.' **(***Epistemic/relevance and relational tensions***)** • Garnett mentions that 'there is some deep personal stuff that I think I will reserve for myself'.' Garnett explains that there is, however, 'personal stuff that I share so that they can understand' (e.g., feeling sick due to a vaccine). Garnett highlights that 'if you listen to how the people in the team respond' *[about being sick on short notice and missing work]*, you would not want to easily miss work when you are sick.' Garnett then notes that 'I just didn't want to share this with anyone.' (*Personal tensions*) • Damian explains that 'oh, well, I do not share that I am going to fetch my daughter. I do not say I need to rush.' (*Personal tensions*)
Power and group dynamics	• Garnett emphasises that 'there is quite a lot' not shared regarding frustrations experienced. There are others that I vented out to. There are others that I did not vent out my frustrations.' (*Group dynamics*) • Garnett also notes that 'there are some frustrations that I may not vent out, like when I was new. You know, the challenges of a new person, I would request a meeting. Say, please, can we meet? Can we do this? A person said, I am busy. So maybe that person is the one who is the leader? You cannot complain.' (*Power dynamics*) • Sammy mentions that 'there are a lot of things that we do not share.' Sammy gives the following example, 'as a contractor, you are working for your next renewal. It is not like you are permanent and you are protected by the law and everything', and so information is withheld regarding workload and frustrations. Sammy further explains that if colleagues are rude, 'you just keep it to yourself *[and]* do not get involved in company politics.' (*Power and group dynamics*)
Co-meaning making of situations (via dialogue and reflection)	• Teagan states that 'something I decided not to share, but I chose not to do so because I saw that it was creating more work after we had done so much.' Teagan explicates that they decided not to share the specific event *[or information]* with the wider team, as 'it was being handled privately'. • Sammy explains that 'sometimes you just bad mouth a person. You do not know what they went through the previous day. So, you withhold to say, I did not find them. You just say they said they will come back to me.'

Table 6. Applying a selection of third space lens themes to non-sharing verbatim quotes from a use case.

As noted earlier (*cf. Section: Theoretical grounding: Understanding third space as a lens*), third space theory holds the potential to understand the complexities surrounding non-sharing and transparency by offering a lens to examine various themes (*cf.* Tables 1 and 2). In addition to what we know about information sharing and transparency, it is important to gain a richer understanding of situations where information is intentionally not shared (withheld). Therefore, the application of a selection of third space lens themes to non-sharing verbatim quotes (*cf.* Table 6) illuminated the negotiation practices, power dynamics, and co-meaning-making within complex group interactions. Providing us with a rich understanding of aspects influencing transparency and information sharing in scrum, thus exemplifying the potential of a third space lens.

Recommendations for future work and conclusion

Third space as a theoretical lens holds great potential to better understand how transparency and information sharing behaviour emerge within scrum context. It turns your attention to focus on power dynamics, tensions and co-meaning-making during collaborative activities and complex interactions. From a third space lens, one can examine transparency in the rigid, formal scrum framework versus how transparency is practised in real-world teamwork. In this liminal space, information sharing and non-sharing (often a conscious, intentional personal, or strategic decision) are viewed as negotiated practices that develop from emotional, relational, identity, or epistemic/relevance tensions.

The use of a third space lens makes it possible to understand transparency as a constant negotiation of information sharing and non-sharing between the formal requirements and informal practices of scrum. Therefore, non-sharing should not just be seen as a negative deviation from transparency, but rather as a form of meaning-making and negotiation, a process influenced by relations, culture, politics and collaboration. This can be seen in the non-sharing verbatim of the interviews. Additional third space lens themes can be applied to the interview data, for example, hybridity, identity formation, cultural differences and professional boundary crossing.

We have shown the potential of mapping the third space lens themes from Table 5 (*cf.* Appendix D) in a scrum use case. This can further be applied in other contexts. Further research can also move beyond the application of third space as a lens to also include the focus of third space as a concept/space within other contexts. For instance, applying third space further in hybrid contexts like interdisciplinary project teams (digital humanities, health informatics), professional communities of practice (academic industry networks, digital education groups), and roles that bridge technical and organisational domains (data stewards, knowledge brokers). A specific example can be of data stewards working in a third space between technical systems, institutional policies, and everyday research practices, requiring ongoing translation and information sharing. This demonstrates the possibilities for real-world application across diverse contexts, as it highlights how new meanings, identities, and practices emerge through interaction between different social, cultural, or institutional spaces.

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Appendices

To improve readability and narrative flow, four of the six tables are summarised in paragraph form in the main text, with the full tables provided in the appendices to retain an at-a-glance overview of the supporting detail. Tables 3 and 6 are retained in the main paper for the reasons noted there.

Appendix A – Table 1

Article	Context	What third space as a lens entails
Balloo et al. (2024)	Higher education	Provide hybridity between non-academic and academic roles, where professional boundaries, norms and identities blur.
Bartmes and Shukla (2020)	Higher education	Provide hybridity to blend Indigenous knowledge (IK) and academic knowledge.
Beck (2024)	Higher education	Third space is linked to hybridity, power, politics, resistance and racism.
Benson (2010)	Secondary literacy education	Provide hybridity and liminality, merging everyday knowledge and academic literacies to overcome resistance and create new identities.
Bryant (2013)	Cultural and literacy studies	Provide hybridity, liminality and liberality to resist rigid racial, social, and patriarchal constructs.
Idrus (2015)	Multicultural literature education	Offers hybridity and transformation by bringing individuals together across social and cultural boundaries.
Jordan and Elsden-Clifton (2014)	Teacher education	Offers in-betweenness, hybridity and transformation to challenge binary discourses, identities, and practices.
Kang (2017)	Cultural studies	Offers hybridity and integration of worldviews beyond binaries.
Levy (2008)	Early childhood literacy education	Offers in-betweenness where discourses meet.
Maddamsetti (2023)	Advocacy and teacher identity	Offers hybridity as an in-between negotiation zone that disrupts binaries.
Ramkellawan-Arteaga (2020)	Cultural studies	Provide hybridity between Indo-Caribbean identity, Indian and Caribbean cultures.
Sedawi et al. (2023)	Education	Provide hybridity to facilitate negotiations between Western and local Bedouin (nomadic/semi-nomadic Arab communities) worldviews (indigenous knowledge).
Tatham (2023)	Multicultural educational	Offers in-betweenness, hybridity for transformation and negotiation where cultural boundaries intersect and blur.
Verbaan and Cox (2014)	Higher education	Provide an emergent territory where tensions between academic and professional domains are challenged.
Witenstein and Cervantes (2020)	Higher education	Provide hybridity, liminality between cultural and identity constructs.
Zhang and Yuan (2019)	Teacher education	Offers hybridity as an in-betweenness.
Zhu et al. (2020)	Teacher education	Provide an 'And/also hybrid place' for a boundary-crossing.

Table 1. What literature reveals about third space as a lens.

Appendix B – Table 2

Article	Application as a lens	Purpose of the lens in research projects to deepen understanding
Balloo et al. (2024)	Examination of identity formation where professional boundaries intersect.	To explore opportunities and challenges of multiple, fluid identities within institutional structures.
Bartmes and Shukla (2020)	Encouragement of intercultural dialogue and perceptual shifts in students' knowledge via transformative learning.	To understand decolonised education by blending Indigenous knowledge and academic knowledge.
Beck (2024)	Reviewing top-cited teacher-education case uses of third space.	To explore challenges based on the misapplication and depoliticised use of third space theory.
Benson (2010)	Enabling agency and ownership in literacy resistance (traditional reading and writing tasks).	To explore the inclusive multimodal literacy practices.
Bryant (2013)	Identification of racial resistance and self-definition of identity, femininity and morality via language and agency.	To navigate oppression and recreate oneself (selfhood) via orality, naming, and gender role deviation. Identity reconstruction.
Idrus (2015)	Connecting students' cultural values, personal experiences and curricula texts.	To explore shared identity formation and intercultural understanding among multi-ethnic students.
Jordan and Elsden-Clifton (2014)	Connecting teachers' personal and institutional uses of technology to create hybrid learning identities.	To explore the challenges of technocentric binaries (one lens, view or approach) in educational technology research.
Kang (2017)	Exploring cross-cultural literacies and identities.	To examine cultural conflict, negotiation and integration through hybridity.
Levy (2008)	Merging children's home and school literacies.	To negotiate reader identity via creatively bridging home and school experiences.
Maddamsetti (2023)	Examining how teachers negotiate dialectical tensions in their advocacy for emerging bilinguals.	To navigate advocacy tensions, challenge binary views, and cross work boundaries.
Ramkellawan-Arteaga (2020)	Studying identity complexity and role of educator support.	To navigate identity negotiations beyond fixed labels and reaffirm agency.
Sedawi et al. (2023)	Blending Indigenous knowledge and Western knowledge through outdoor learning.	To explore culturally relevant, context-specific learning.
Tatham (2023)	Examining multicultural classrooms where identity negotiations and meaning-making occur.	To examine power-dynamics and foster agency.
Verbaan and Cox (2014)	Boundary crossing between academic research and professional services.	To examine cross-boundary collaboration and hybrid roles.
Witenstein and Cervantes (2020)	Illustrating how familial and academic contexts merge to negotiate identities and navigate academic challenges.	To explore hybrid realities and the effects of gender identity on academic decisions.
Zhang and Yuan (2019)	Examining the intersection between classroom practice, research and policy.	To explore how hybridity and boundary-crossing shape identity formation.
Zhu et al. (2020)	Examining student teachers' identity construction in teaching practicums, where practical experiences blend with theoretical knowledge.	To understand how to bridge theory/practice gaps by creating hybrid reflective identities.

Table 2. Application and purpose of third space as a lens.

Appendix C – Table 4

Authors	Third space findings
Kendall et al. (2020)	**Contextualisation:** Propose the 'Third Design Space' that offers practitioners and researchers a new intellectual perspective on corporate-communal engagements in software development.
	Potential of third space lens: Present 'Third Design Space' as a transformative space that is contradictory, unpredictable and continually evolving, fostering mutual understanding, connections and equal participation. It crosses traditional boundaries by navigating differences in meaning, norms, and interests, and supports community building and shared learning through meritocracy, honesty, and transparency.
Lutze (2020)	**Contextualisation:** Use third space in the development of health and medical software for elderly people.
	Potential of third space lens: Delve deeper into understanding the boundary region that forms between the different discourses (e.g., analogue, digital and conceptual spaces).
Maaß and Buchmüller (2018)	**Contextualisation:** Use cultural probes, as boundary objects, to form a mutual ground and environment, as a third space, to support participatory design activities for and with older adults.
	Potential of third space lens: Explain that third space is an 'inbetweenness' space (common ground) where collaboration, negotiation, awareness, inclusivity, mutual learning, multidisciplinary participation and co-creation of identities, understandings, and relationships occur. These are based on Muller and Druin's (2012) set of attributes of third space experiences in human-computer interaction and participatory design (p. 2).
White, White and Borthwick (2021)	**Contextualisation:** Use third space to explore the creation of blended professionals between the academic and professional spheres in higher education.
	Potential of third space lens: Offers a dynamic, flexible space where border-crossing of roles, disciplines, and identities can occur, promoting shared learning, integrating diverse forms of professional and academic knowledge, facilitating negotiation of differences, nurturing mutual respect, and collaboration.

Table 4. Selected findings on third space studies regarding agile, scrum and software development.

Appendix D – Table 5

From Table 1: What third space as a lens entails themes	From Table 2: Third space lens application and purpose themes	From Table 3: Information sharing themes in a specific context	From Table 4: Third space lens applied in scrum context themes
Hybridity and in-betweenness (liminal)	**Applied** to examine *boundary crossing and bridge practices*. **Purpose:** To transcend *binary thinking and foster inclusivity*.	*What* is shared reflects the nature, content and knowledge brought to a space.	To support identity formation, cultural translation and inclusive discourses.
Negotiation and co-construction	**Applied** to examine *tensions, dialogue engagement, and co-creation of meanings*. **Purpose:** To understand *complex interactions* in co-transformations and co-meaning-making.	*How* the process of sharing is negotiated through dialogues and interactions via methods, tools and mechanisms.	To support co-meaning-making, knowledge creation and equal participation.
Agency, identity and resistance	**Applied** to examine *binaries, identity reconstruction, agency reclamation and challenging marginalisation*. **Purpose:** To challenge *dominant discourses*, empower *marginalised*	*Why not* reveal the tensions, challenges and constraints of sharing, due to lack of trust, incentives, confidence,	To support negotiation of differences.

	voices and eliminate *power dynamics* (equal participation).	organisational barriers and power hierarchies.	
Cultural and worldviews (knowledge systems) integration	**Applied** to examine the *blending of academic, Indigenous and local knowledges*. **Purpose:** To validate *multiple worldviews* and *decolonise knowledge systems* (inclusive and context-specific understandings).	*Why* reveals the reasons, motivations and intent of sharing to build trust, awareness, decision-making, collaboration, and understanding.	To support a range of interactions, activities, behaviours, and knowledge.
Transformation and educational dimensions	**Applied** to examine the *transformation of pedagogical/learning environments and professional practices*. **Purpose:** To enable *innovation* that leads to new ideas, insights, and practices.		To support transformative, collaborative and relational processes.

Table 5. Mapping themes across Tables 1-4

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Is trust enough? Parents' health information behaviour around childhood vaccination

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Abstract

Introduction. This study explores parents' information behaviour in the context of childhood vaccination, focusing on source selection and on the role and formation of epistemic trust. It applies two frameworks to analyse the results: the elaboration likelihood model of persuasion (ELM) and the behavioural and social drivers of vaccination (BeSD) framework.

Method. In-depth individual interviews were conducted with a purposive sample of 25 respondents. Sampling (Polish/Ukrainian and vaccine-hesitant/supportive) aimed to maximise variation across these groups, and data collection proceeded until thematic saturation was reached.

Analysis. The study used iterative analytic cycles: (1) inductive coding and (2) an explanatory, framework-based mapping of inductively derived categories onto the ELM and BeSD of vaccination domains to deepen understanding of information behaviour patterns.

Results. Parents' accounts allow the distinction between central and peripheral information seeking, as well as the phenomenon of information source proximity creation. They also indicate which behavioural and social drivers are salient in shaping information behaviour.

Conclusions. Viewing information seeking as a continuum with endpoints of systematic and heuristic processing captures parents' behaviour well. For the creation of information source proximity, epistemic trust is necessary but not sufficient; closeness—understood as both immediate accessibility and an emotional bond that includes understanding—is also required.

Introduction

In 1961, Hannah Arendt published her essay *What Is Authority*?, claiming that '*authority has vanished from the modern world*' (Arendt, 1961/2006, p. 49). While tracing the origins of this situation to political movements, she noted that it concerns numerous areas of social life. Although this stance—mainly philosophical in nature—may or may not be shared, this observation resonates in many more recent publications in the context of contemporary problems, such as the rapid spread of misinformation and conspiracy theories facilitated by modern technologies, the existence of echo chambers, and the multiplication of information paradoxes (Haider & Sundin, 2022). In this vein, Tom Nichols' (2017) book *The Death of Expertise* diagnoses as commonplace '*the aggressive replacement of expert views or established knowledge with the insistence that every opinion on any matter is as good as every other*' (p. 21). He supports this claim by describing numerous manifestations of distrust, and even hostility, toward experts in critical domains such as medical treatment and public policy. Inevitably, beyond other dangerous consequences—such as the weakening of democracy mentioned by the author—this approach undermines science. However, this view may be too simplistic.

Maya Goldenberg, in *Vaccine Hesitancy Public Trust, Expertise, and the War on Science* (2021), refers to Nichols' thesis: '*Calling this phenomenon the end of expertise is in part a refusal to recognize alternative expert sources as legitimate*' (p. 87). She also notes that, in the context of science, a limitation of this perspective lies in its focus on the experts of science rather than on scientific claims. She proposes that a key notion for science is trust, a necessary element for '*scientific knowledge creation, the management of dissent and disagreement, consensus building, and the legitimation of consensus*' (Goldenberg, 2021, p. 89). Goldenberg also emphasizes that, in the context of science, trust is understood in an epistemic sense—as trust in someone as a provider of information.

Trust as a criterion of information relevance has long been central in LIS and has been variously conflated with or distinguished from related notions such as credibility. Hilligoss and Rieh (2008) state that trustworthiness, together with expertise, is a key factor in credibility assessment. Alongside concepts such as information quality (Rieh, 2002) and cognitive authority (Wilson, 1983), these constructs have served as lenses that researchers use to understand the logic behind people's preference for choosing one source over another —a perennial problem intensified by the internet (Hilligoss & Rieh, 2008; Rieh & Danielson, 2007; Savolainen, 2007, 2011). This topic has not ceased to be relevant; studies have shown the high importance of situational context, and with the rise of new problems, such as the COVID-19 pandemic (Brylska, 2024; Savolainen, 2023), the Russo-Ukrainian war (Savolainen, 2025), or AI-generated misinformation (Lao et al., 2025), the necessity of understanding the rules and heuristics by which people decide which information to trust has become even more pressing. Evidence also shows the phenomenon's complexity; for example, higher levels of information literacy or education have not necessarily led people to choose scientific sources (Haider & Sundin, 2022; Hicks & Lloyd, 2024; Lorini et al., 2018).

On the other hand, Dan M. Kahan, who has conducted extensive research on crisis communication—especially on public perceptions of the climate crisis and of vaccination risks—already drew attention in 2014 to what he considered unwarranted claims that declines in vaccination coverage or climate scepticism constitute a global problem attributable to a general erosion of trust in science. Drawing on wide-ranging studies of attitudes toward vaccines (Kahan, 2013, 2014), he argued that a lack of trust in vaccines and in science more broadly characterizes only relatively small social groups (a topic that is, however, heavily amplified by the media, which can unintentionally exacerbate the problem). In the context of trust and the credibility of information, he made a particularly interesting observation, namely that individuals who place their trust in science often orient themselves not only by expert guidance but also by the views of people in their close social surroundings with whom they share everyday life and experience:

> *Ordinary citizens come to know what is known to science through their immersion in networks of other people who share their basic outlooks. They enjoy the company of those people, and thus naturally spend more time with them. They trust them. They are able more readily to 'read' them, and thus to discern when those who purport to relate the insights of collective knowledge are reliable sources of guidance or mere posers. (…) Cultural conflict over decision-relevant science is not the norm. Indeed, it is a pathology, both in the sense of being rare and in the sense of being inimical to well-being.* (Kahan, 2014, pp. 49-50)

These observations are consistent with recent results from Edelman, which report a high level of public trust in science (2023), which found that 75% of respondents said that they trusted scientists. Larson and Bersoff (2025), commenting on this report in the context of vaccination decisions, note that, given the complexity of the broader information ecosystem in which scientific information is embedded, '*the public are turning to friends, family, journalists and others to help them filter and interpret the vast amounts of information available*'. In light of this observation, the relevance of the concept of cognitive authority is worth considering again. Reijo Savolainen has written about the erosion of the traditional picture of authoritative information sources in networked information environments (Savolainen, 2021). However, is the initial definition of cognitive authority — '*The person whom I recognize as having cognitive authority is one whom I think should be allowed to have influence on my thinking*' (Wilson, 1983)— still relevant, even if some of the traditional attributes used to characterize those sources (e.g., objectivity, formal media properties, or references) have eroded?

In this study, we take a closer look at the information behaviour of parents making decisions about their children's vaccinations. Beyond its social importance, this situation provides an excellent context for examining the dynamics of information behaviour, with a focus on the process of selecting information sources: parents of young children are repeatedly required to decide about vaccination on the basis of prior knowledge or newly acquired information. Thus, this study explores parents' information behaviour, focusing on source selection and on the role and formation of trust. To guide the analysis, three research questions were posed:

- **RQ1.** What does the process of information seeking—and avoidance—look like?
- **RQ2.** How do parents select the information they trust and use?
- **RQ3.** Which factors (e.g., social norms, values, emotions, practical issues) are important in this process?

Theoretical framework

In this study, I apply two frameworks to analyse the results. First, I draw on a theory already used in LIS (Hilligoss & Rieh, 2008) and particularly apt in light of literature highlighting the importance of proximity to information sources: the elaboration likelihood model of persuasion (ELM). Although ELM explains how individuals process persuasive communications, in this study I use it as a lens to observe information behaviour in the context of source selection. At the core of ELM is the elaboration continuum, which reflects a person's '*motivation and ability to think about and assess the qualities of the issue-relevant information available in the persuasion context*' (Petty et al., 2003, p. 67). Within the ELM framework, information processing tends toward one of two routes: (1) the central route**,** when motivation and ability to process information are high and individuals carefully scrutinise issue-relevant information—including the source, message, and context—to reach an accurate judgement; or (2) the peripheral route**,** when either motivation or ability is low (e.g., due to low personal relevance or distraction), and individuals rely on mental shortcuts rather than deep processing. Such shortcuts may be based, among other things, on perceived source credibility, identification with the source, the sheer number of arguments, or one's own intuition. In the central route, individuals typically not only analyse the conveyed information in greater detail, but also draw on a larger number of information sources; in the peripheral route, the

number of sources they consult is more limited—sometimes to just one. Importantly, ELM treats central and peripheral processing as the endpoints of a continuum rather than a strict dichotomy. I also use ELM to shape my interpretation of information seeking in this study. The definitions of information gathering and information seeking used in the analysis are presented in the Results section and are grounded in participants' accounts

The second framework relates directly to the topic of this study: parents' decision-making about their children's vaccinations. The Behavioural and Social Drivers of Vaccination Working Group, drawing on theoretical models and qualitative studies, identifies four domains of such drivers: (1) thinking and feeling—cognitive and emotional responses to vaccines and vaccine-preventable diseases; (2) social processes—the influence of social norms and vaccination recommendations; (3) motivation—intention, willingness, or hesitancy to be vaccinated; and (4) practical issues—logistical factors that affect access, such as clinic availability or cost (World Health Organization, 2022). Within the behavioural and social drivers of vaccination (BeSD) framework, these dimensions influence vaccine uptake; they can also be viewed as factors shaping the information behaviour that underpins this process. Accordingly, the aim of this study is to examine this process through the BeSD framework using the lens of information behaviour.

Research design

This article presents qualitative findings from a study examining the attitudes of parents with children under six toward vaccinations. The overall study design was an exploratory sequential mixed methods design (qualitative interviews followed by a quantitative survey). Although the quantitative results (Mierzecka & Łączyński, 2025) are not reported in this article, they informed a second, framework-based analytic cycle of the interview data.

First, to conduct in-depth individual interviews, this study recruited a sample of 25 respondents: 12 interviews were conducted with Ukrainian parents (six supportive of vaccination and six sceptical or opposed), and 13 with Polish parents (seven supportive and six sceptical or opposed). As the Ukrainian minority has become an important part of Polish society and studies indicate a high level of distrust among Ukrainians regarding vaccination (Ganczak et al., 2021; Januszek et al., 2022; Zaprutko et al., 2022), it is important to examine the experiences of Ukrainian parents in this regard. Sampling was purposive (Polish/Ukrainian and vaccine-supportive/vaccine-hesitant), aimed to maximise variation across these groups, and data collection proceeded until thematic saturation was reached.

SAMPLE CHARACTERISTIC	n	%
Gender		
Male	4	16
Female	21	84
Number of children		
1 child	9	36
2 children	8	32
3 children	8	32
Subjective economic wealth		
Living poorly	0	0
Living modestly	6	24

Living average	10	40
Living well	3	12
Living very well	6	24
Education		
Primary	0	0
Vocational	1	4
Secondary	8	32
Higher	16	64
Children's vaccine status		
None	9	36
Some	3	12
All mandatory	6	24
All mandatory and recommended	7	28

Table 1. Sample structure (n=25).

Participants were recruited via questionnaires distributed in 138 kindergartens (with a request to share them with parents), through social media platforms—particularly parent-oriented groups and pages—and among refugees at assistance centres. Participants were selected from recruitment-survey respondents who chose extreme responses to the item '*Childhood vaccines are unhealthy and unnecessary*' (1 = strongly disagree; 5 = strongly agree): 1–2 (vaccine-supportive) or 4–5 (vaccine-hesitant).

Participants received financial compensation for the time spent on interviews. All participants gave informed consent. The interviews were fully anonymous, and respondents were clearly informed that participation was voluntary and that they could withdraw at any time. Ethics approval was received from Rector's Committee for the Ethics of Research Involving Human Participants, University of Warsaw, prior to the start of data collection. The interviewers were fluent in Polish, English, Ukrainian and Russian, allowing respondents to choose their preferred language. The interviews were conducted between February and April 2023, either online or face to face.

For reporting purposes, respondents were assigned pseudonyms (first names). Nationality and vaccination stance are indicated by letter subscripts attached to each pseudonym (P = Polish, U = Ukrainian; S = vaccine-supportive, H = vaccine-hesitant); e.g., $\text{Sandra}_{\text{PH}}$ (Polish, vaccine-hesitant), Zlata_{US} (Ukrainian, vaccine-supportive).

This study adopted a constructivist grounded theory approach (Bryant & Charmaz, 2007) and used iterative cycles of data collection and analysis with the constant comparative method and memo-writing. Sampling was initially purposive (Polish/Ukrainian × vaccine-supportive/vaccine-hesitant) and, as analysis progressed, I sought to further contrast cases by socio-demographic characteristics (subjective economic situation, education, and number of children). However, recruitment—particularly among Ukrainian parents—was challenging, which limited the extent of theoretical sampling. During data collection, I reviewed early interviews and refined the interview guide to probe emerging issues (e.g., experiences with healthcare professionals). A team of coders

developed and refined a shared codebook and used analyst triangulation; disagreements were resolved through discussion.

First analytic cycle (inductive)

Interviews were coded inductively. Emerging themes informed the development of a detailed quantitative questionnaire (not reported in this article, see also (Mierzecka & Łączyński, 2025).

Second analytic cycle (integrative, framework-informed)

In light of the quantitative results, I re-examined the interviews using constant comparison to refine the inductively derived categories. The quantitative findings drew my attention to the diversity of information seeking patterns, both in terms of trusted sources and the level of proactive engagement. I then used ELM as an interpretive lens to interpret these patterns in the interview data by relating them to differences in information seeking activities, and I used BeSD to indicate the behavioural and social drivers that appeared to shape them. Importantly, ELM and BeSD were used to interpret and communicate the qualitative findings rather than as predefined themes for deductive coding.

The findings below focus on three information behaviour activities—information gathering, information seeking, and information source proximity creation (defined below). I then indicate the main factors that, in respondents' accounts, appear to shape these activities, using the BeSD domains to organise these drivers. Together, these subsections address RQ1–RQ3 by describing information behaviour activities and the drivers that shape them.

Results

Firstly, it is important to note that—as in many other health-related situations—information seeking, or more generally information behaviour, is linked to the decision-making process; in this case, the decision whether to take up the vaccine. From the perspective of this information behaviour study, this linkage makes the information behaviour process more visible and temporally concentrated. Typically, information behaviour is non-linear and iterative, involving individual loops and back and forth movements; however, we can distinguish two types of behaviour at stages that differ in their temporal proximity to the decision point: (1) information gathering and (2) information seeking.

Information gathering

Information gathering is used here, following Krikelas (1983), to mean casual, largely undirected activity in which stimuli are noticed and stored for possible later recall. Related behaviours were subsequently described in the LIS literature under other labels, including undirected viewing (Choo et al., 1999), information encountering (Erdelez, 1999) and, in the context of parents' information behaviour, McKenzie's (2003) non-directed monitoring, which involves both regular monitoring of an information source without a specific information-seeking goal and serendipitous encounters of various kinds.

Respondents often mentioned acquiring information about vaccines, sometimes before they had even decided that it might be relevant to their life circumstances. One respondent described the experience as follows—a pattern echoed in other interviews:

> *There was this woman who was collecting signatures against those vaccinations (…) I was young at the time, I wasn't thinking about children yet, and it all felt distant to me (…). She was also giving fairly medical arguments, which I don't remember, because back then I was only moderately engaged with it—until I had a child, and then the responsibility for his health, for his mental well-being, for his later adult life just became more important to me.* (Paula$_{PH}$)

Others recalled information that had reached them from family or friends—stories about vaccines. Unsurprisingly, these recollections were mostly negative; prior research shows that negatively valenced news tends to spread more readily (Robertson et al., 2023; Rozin & Royzman, 2001). Such accounts were connected with bad experiences or complications: '*I also know, like, acquaintances in the family who are doctors—people whose views sort of changed after they had problems with their own child, supposedly after vaccinations*' (Hugo$_{PS}$), and from the media: '*Here it was mainly the media—both online and TV—that stirred up, like, confusion in me and made me doubt these vaccinations, their rightness, rather than giving me any reliable knowledge*' (Daria$_{PS}$). These kinds of stories were mentioned by both supportive and vaccine-hesitant parents. Obviously, information relevant to vaccination decisions concerns not only the vaccines themselves but also the credibility and usability of information sources. A range of such information—shaped by social processes (World Health Organization, 2022) and by personal experience—constitutes the knowledge individuals possess at the moment when they feel information need and decide to begin active information seeking. For parents, this most often coincides with the first child's vaccinations, but it may also occur at other times—for example, when health complications arise or when other events trigger the start of information seeking.

Information seeking

In this article, information seeking is understood as a conscious, need-driven effort to acquire information in response to a gap in one's knowledge, through reading, conversation, observation, or other ways of locating information (Given et al., 2023). This distinguishes it from information gathering. In this study, such needs most often arise when parents face a vaccination decision. Importantly, if information seeking is understood as a conscious effort, it also includes assessing the quality of the issue-relevant information available—a stage that is crucial from the perspective of ELM. The information seeking patterns described by respondents can be situated on a continuum whose endpoints correspond to central and peripheral processing - in the sense of ELM (Petty et al., 2003)- reflecting differences in personal motivation and ability to engage in this process.

Central information seeking

Central information seeking is characterised by higher motivation to look for and examine diverse information. In our sample, this motivation was linked to several types of situations, most commonly to health-related complications. The quotation below exemplifies a transformation from peripheral to central information seeking:

> *I remember myself as that kind of mother I trusted specialists uncritically. At first—when my second little boy was getting sick a lot and, basically on the doctors' advice, I started having him checked for immune deficiencies—it began with me mostly reading the leaflets for those vaccines, because with my first child I hadn't even thought to read them.* (Sandra$_{PH}$)

Central information seeking may also be prompted by a previously negative attitude (resulting from prior information gathering or experience) in which the necessity of child vaccination becomes an impulse for intensive examination of information sources; such behaviours appear particularly in the statements of vaccine-hesitant parents (i.e., Sandra$_{PH}$, Jacek$_{PH}$, Paula$_{PH}$, Alina$_{UH}$, and Oksana$_{UH}$).

However, central information seeking does not need to be connected with negative experiences. For some parents, the effort invested in information is identified with care and responsibility for a child's safety, as described by Anna$_{PS}$: '*I double-check that information before [the vaccination], so I don't—well, as they say, step on a landmine*' or by Zlata$_{US}$ '*I'd like someone to explain it to me step by step. As it is, I always say I'll check a bunch of different sources—as many as I can*'.

Interestingly, the reasoning behind the choice of trusted sources was similar regardless of parents' attitudes toward vaccination. The authority of medical professionals (mainly doctors) as direct sources of information assessed very highly:

> *I didn't look for information, like, on the Internet—stuff like Wikipedia—because that could be written by just anyone. I looked for books written strictly by doctors—doctors who had been trained by [pharmaceutical] corporations, but who had since walked away from that.* (Magda$_{PH}$)

This quotation illustrates a pattern visible in other statements (i.e., Sandra$_{PH}$, Jacek$_{PH}$, Marta$_{PH}$, Ewa$_{PH}$, Anna$_{PS}$, and Zlata$_{US}$): the choice of source was guided not only by the source's education, but also by the format of the message (books). Among people who reported information sources triangulation, family and friends with children were also very often selected as sources, for example:

> *And of course those private conversations—when it turned out these aren't some far-fetched, one-in-a-million cases, but that in my own circle, my immediate surroundings, there are at least a few such children.* (Ewa$_{PH}$)

or

> *I consult with my sister, who had those vaccinations done for her kids earlier, so I kind of take that into account. And friends who had previously given them to their children as well—so, basically, I turn to people who've already been through it.* (Daria$_{PH}$)

These statements point to two main considerations: (i) the possibility of empirically checking experiences within one's close circle, and (ii) similarity of life situation.

Peripheral information seeking

Peripheral information seeking occurs when either motivation or ability is low and individuals rely on mental shortcuts or personal heuristics rather than deep, extensive processing. In this study's sample, several variants of such behaviour were observed. Some respondents (Polina$_{US}$ and Paula$_{PH}$) indicated that they had no concerns or doubts; their only source of information was the doctor, which they considered sufficient. A slightly different yet similar situation appeared among respondents (e.g., Daria$_{PS}$, Kasia$_{PS}$, and Svitlana$_{US}$) who also indicated the doctor as their sole source, but here the reason was that the information received was perceived as complete and tailored to their specific circumstances. This trust bond was described by Adam$_{PS}$:

> *She [the doctor] always remembers. When you come to her after a few years with some illness, or with a question, or even just for a vaccination, she remembers, and she always examines you very thoroughly. And when my youngest son had that thing—when it wasn't clear what was going on—she was really engaged.*

Another variant relates to information overload: Dawid$_{PS}$ noted that there is too much information on the topic and, feeling a lack of expert knowledge, preferred to rely on the doctor's opinion. A slightly different behaviour was reported by a mother who, in the same circumstances, decided to trust her sister, citing similarity of experience as the motivation: '(…) *my sister—because her kids are a few years older and she's already been through it many times—so she's the one who confirms/validates any potential doubts I have*' (Julia$_{PS}$).

Completely different is the situation in which the primary factor driving reliance on mental shortcuts is affective overload. Ewa$_{PH}$ described her experience after hearing that some children had complications after a vaccine shot as follows:

> *Stories like that make you think—so you stop and reflect, analyse how to handle it if you do have to decide. But when you don't know what to do next or where to go, or even whom to turn to, it's hard—it's scary—and sometimes it feels better to do nothing.* (Ewa$_{PH}$)

Her decision was to trust her own intuition instead of seeking additional information. In the same vein were the words of Alina$_{UH}$: '*I only trust myself and my intuition, and then every time, believe it or not, I get hysteria, hysteria, because, like you know, I always asked myself*', and Milana$_{UH}$ who stated, '*I have to be responsible for it, because it's my child. I can't say, 'It's the doctor's fault'. This is my decision alone*'. Even in these brief statements, the affective burden is clearly visible. These parents' information seeking relies on observing their own children's behaviour.

Another respondent, Paula$_{PH}$, who also experienced very strong emotions after hearing stories about autism as a vaccination result, stated: "*I'm scared—I don't want to play around with my child's life*'. After being curtly treated by the doctor when she raised her concerns, she turned to Facebook groups of anti-vaccine mothers who shared similar stories with her.

In our sample, parents sceptical toward vaccination more often spoke about strong negative emotions they had experienced.

Information source proximity creation

Following Kahan (2014) reasoning, people are guided not only by the expertise of sources—many sources may be deemed knowledgeable—but, among these, they choose those that feel close to them. Respondents' statements were examined to identify how such a sense of proximity is formed. A key condition Kahan highlights is direct contact, and this is visible in these data (see also: Mierzecka & Łączyński, 2025): the most frequently indicated sources include doctors, friends, or family members.

Respondents' expectations toward doctors clearly concern an individualised approach and a readiness to discuss their concerns (Daria$_{PS}$, Kasia$_{PS}$, Adam$_{PS}$, Marta$_{PH}$), a pattern evident even among vaccine-sceptical parents:

> *He [doctor] is a real authority for me, because he showed genuine, human interest in my problems. He didn't make fun of me, didn't yell at me, and didn't treat me with that kind of nonchalance—as if I were stupid and not worth talking to at all.* (Sandra$_{PH}$)

Interestingly, when doctors use arguments that are not relevant to respondents' everyday situations, the effect can be the opposite:

> *He [doctor] says it's a danger, that parents are shirking and it's all the fault of parents who don't vaccinate—and then, when you really dig into it, he says it actually happened among the Roma. It's absurd.* (Ewa$_{PH}$)

Magda$_{PH}$, on hearing a doctor say that children had died in hospital from certain illnesses, responded: '*That's no argument. When you work in a hospital, there's always someone dying*'.

This need for understanding and for relevance to one's personal situation also appears as a pattern in choosing sources among friends and family: similarity of experience enables identification with the situation—for example, Anna$_{PS}$ trusted '*Friends who had already given [those vaccinations] to their children as well—so, like, people who had been through it before*'. This pattern can extend to selecting people not known personally, provided their circumstances appear comparable:

> *[I chose] often groups that are focused exactly on what interests me in everyday life—places where I want to learn from people who simply have experience. (…) For example, ones related to my profession, to my approach to raising children.* (Sandra$_{PH}$)

As illustrated, information source proximity creation can be understood as an information behaviour activity in which parents create a sense of closeness to a source through ongoing assessment of its accessibility, shared experience, and perceived understanding. This process, in turn, strongly influences which sources—and which information—they use. The creation of information source proximity does not occur in isolation; it is shaped by behavioural and social drivers, which I outline below using the BeSD domains.

Social processes

Perceptions of the practices referred to in the BeSD framework as social processes are mainly related to health workers' recommendations and to family, peer, and community norms. The study sample was rather homogeneous in this regard, regardless of nationality or vaccine attitude. Respondents unanimously spoke of health workers as people who recommend vaccinating children (although the perceived effectiveness of their communication methods varied). Responses were also similar when participants were asked with whom they discussed vaccine-related issues. Only two respondents (Dawid$_{PS}$ and Iryna$_{UH}$) reported that they did not discuss the topic with anyone; the remainder admitted that they talked about it with peers and friends who also had children. Among them, some (Anna$_{PS}$, Julia$_{PS}$, Marta$_{PH}$, Magda$_{PH}$, Ewa$_{PH}$, Oksana$_{UH}$, and Olena$_{US}$) also mentioned discussions with family members. It was clear that the key criterion for selecting interlocutors was similarity of attitude, as in Magda$_{PH}$: '*I talk with family or friends. I have two female friends who are flat-out opposed [to vaccinations], like I am*'.

Practical issues

With regard to practical issues, variation in views was more pronounced. First, Ukrainian respondents, describing prior experiences, spoke about uncertainty regarding vaccine quality and the need to pay for a better vaccine. They also often complained about the lack of explanations from health workers: '*I don't really understand, what`s inside that vaccine, and no one would explain; not doctors, no one*' (Iryna$_{UH}$, see also Alina$_{UH}$, Ksenia$_{UH}$, Lina$_{UH}$, Milana$_{UH}$, Vita$_{US}$ Zlata$_{US}$). Some Polish respondents likewise noted that doctor appointments were too short and routinised: '*Honestly, you can learn very little from a doctor about vaccination. If they're mandatory, it's just a routine, so to speak, visit*' (Julia$_{PS}$, see also Marta$_{PH}$, Ewa$_{PH}$, Sandra$_{PH}$). In general, vaccine-sceptical parents more often reported disrespectful treatment from doctors, e.g., '*There's awful hostility toward the mother once the paediatrician decides you're one of those anti-vaxxers*' (Sandra$_{PH}$).

Thinking and feeling

Examining parents' emotions, it was evident that much stronger feelings accompanied those who were sceptical toward vaccination. Their stories were saturated with negative emotions, indicating a lack of belief in vaccine safety: '*I'm scared—I don't want to end up suffering later, having to watch my little boy suffer (…) I think that's the hardest part—that I'm afraid I may have hurt him, kind of not knowing what the truth about [vaccines] is*' (Paula$_{PH}$). Besides fear, they spoke about guilt, sadness, and the burden of responsibility for their children's health: '*parents are often left alone with their problems*' (Ewa$_{PH}$).

However, negative emotions concerned not only potential vaccine complications but also the way their doubts were treated by health workers, as noted by Marta$_{PH}$: '*I got told off—'that's a normal reaction after a vaccination, and why are you even coming here anyway*?' Moreover, their accounts also raised the issue of being pigeonholed by others:

> *That we're anti-vaxxers, that we're flat-earthers—that's how people start labelling the sceptical ones (…). The ones who vaccinate are the 'good' ones who want everyone to be healthy, and the anti- ones are the 'bad' ones.* (Marta$_{PH}$)

Positive emotions mentioned by respondents did not concern vaccines themselves but rather positive experiences with health workers: '*I'm delighted, because there are always—there are plenty*

of people, doctors. Even if our family doctor can't see us, other doctors will take us, explain things well' (Svitlana$_{US}$).

Another important observation concerns not only the type of emotions, but also the moment at which they play a crucial role—when parents are especially vulnerable and fragile. Undoubtedly, one such moment is parenting a newborn during the child's first vaccinations. At this time, information processing can be challenging, and affective modes of communication tend to be remembered—both in the case of positive emotions:

> *I have good memories of my stay in that last hospital where I gave birth to my daughter—there was no pressure, but there was a thorough intake and a serious, nice conversation, and together we reached a consensus to rule out any potential risks. It was great, and that's exactly what I would expect.* (Sandra$_{PH}$)

Negative experiences were also remembered, as in the case of Paula$_{PH}$, who, after being criticised by doctors, turned to vaccine-hesitant mothers who shared similar experiences.

Discussion and conclusion

Using the combined lens of the ELM and BeSD frameworks enabled a fresh examination of patterns in parents' health information behaviour. Existing health-behaviour models (e.g., the Transtheoretical Model, the Health Belief Model, and the Theory of Planned Behaviour) do include information practices—typically as patterns of resource use (Greyson & Johnson, 2016). However, deepening this area of research remains recommended, as information behaviour has predictive potential for some health behaviours (Greyson & Bettinger, 2022; Greyson et al., 2021). This study's findings could inform the development of such a model, albeit with several caveats.

First, vaccine attitudes: respondents were recruited to represent supportive or hesitant stances. Nevertheless, this study does not view vaccine attitude as binary. As shown in (Mierzecka & Łączyński, 2025), a typology was developed—vaccine/authority sceptics, unengaged adopters, expert-guided supporters, advocates of evidence-based decisions, and unquestioning supporters—to encompass a fuller spectrum of attitudes toward vaccination. The present interviews were not analysed through this typology, as doing so would overcomplicate the narrative. Second, parents' health decision-making and related information practices evolve as their children grow (Greyson & Bettinger, 2022; Orhierhor et al., 2023), a dynamic captured in this study only to a limited extent.

Starting with influencing factors, vaccination is treated as a social norm: it is recommended by health workers and expected by peers—something that vaccine-hesitant parents also experienced as inconvenient or pressuring. Accessibility of childhood vaccines was not viewed as a problem in Poland, whereas Ukrainian parents' prior experiences were less positive. The importance of communication with healthcare professionals—well established in prior studies (Bettinger et al., 2016; Forster et al., 2016; Greyson & Bettinger, 2022; Gust et al., 2005; Leask et al., 2012; Orhierhor et al., 2023; Wiley et al., 2015) – was evident here as well; extended, individually tailored

communication was associated with satisfaction and positive feelings, while routinised, overly brief encounters were associated with frustration.

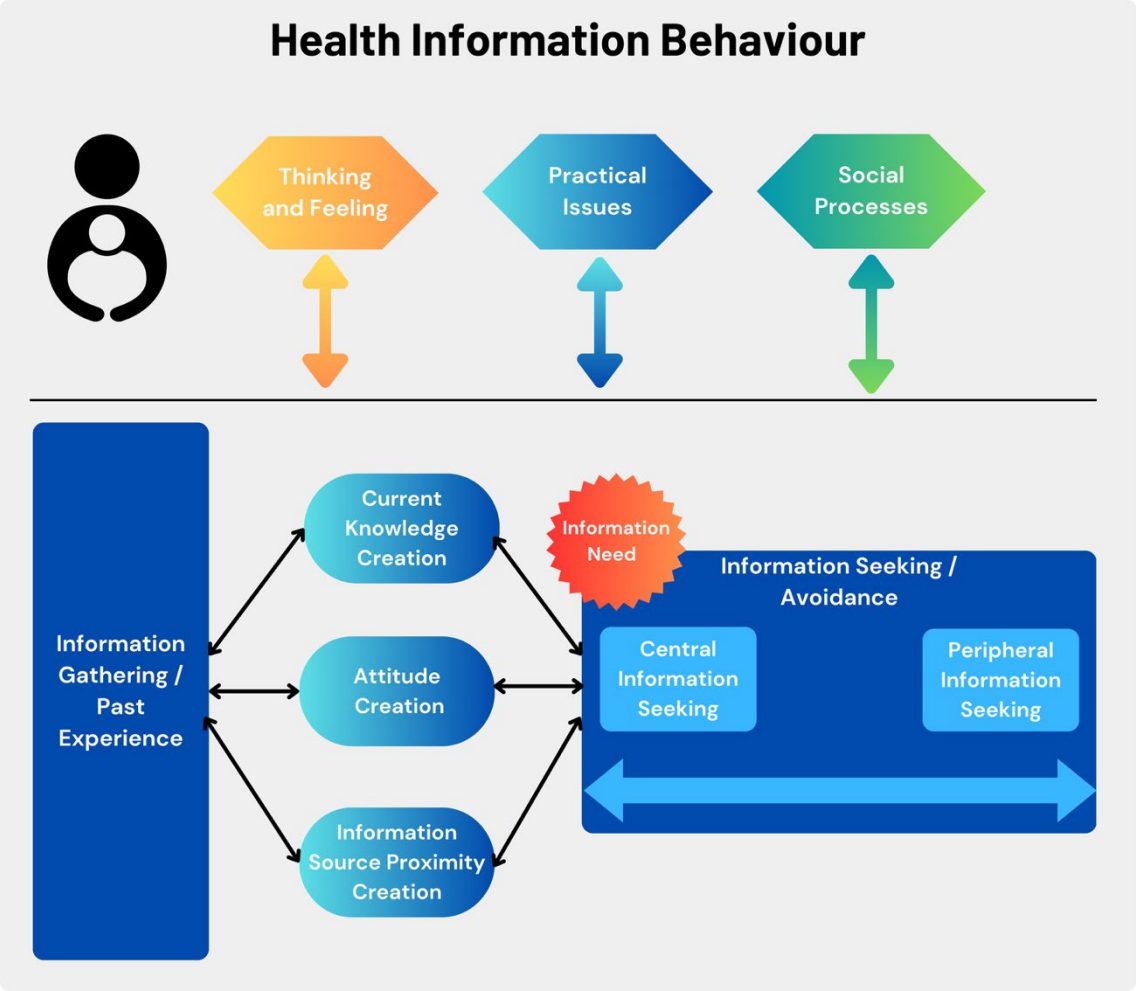


Figure 1. Vaccine-related health information behaviour model.

Emotions were a significant part of respondents' accounts. Positive emotions were mentioned mainly in relation to high-quality communication with doctors and—among Ukrainian parents—to access to good-quality vaccines. Stronger arousal was visible in negative emotions, often not tied to specific health experiences but triggered by fear-evoking stories. This is an important context for health information behaviour in communities with broad access to effective medicines and vaccines: such access quickly becomes standard and does not elicit positive emotions. The reflection of this dynamic is visible in public discourse and media coverage, which, in Kahan's (2014) view, can have harmful, counterproductive effects.

The ELM lens – viewing information seeking as a continuum with endpoints of systematic and heuristic processing – captures parents' behaviour well. In this study, I use 'central' and 'peripheral' to label ELM-informed modes of engagement that accompany information seeking and source selection, not to claim that ELM is a standalone theory of seeking strategies. Similar distinctions in behaviour have also been observed in other studies, for example, the contrast between deliberative and non-deliberative decision-making (Forster et al., 2016). Notably, in this approach, information avoidance, recently reconceptualised in LIS scholarship by Hicks et al. (2025), is an integral element of peripheral information seeking. This perspective is also evident in the Risk Information Seeking and Processing model (Choo, 2017; Yang et al., 2014), which is likewise

grounded in ELM. The parallels are to be expected, as health information seeking can be understood as a specific form of risk information seeking (Hicks, 2023, 2025). In the original formulation, Griffin et al. (2004) introduced the notion of an 'information insufficiency threshold', referring to the level of confidence one seeks in one's knowledge about a risk. Here, I propose using the concept of information need, more firmly grounded in LIS research (Given et al., 2023), as the trigger between information gathering and information seeking, where information gathering is understood, following Krikelas (1983, p. 9) as casual, largely undirected noticing and storing of information for possible later recall. Information seeking is then a conscious, need-driven effort to acquire information (Given et al., 2023). In this approach, the stage of assessing the quality of the issue-relevant information and the level of individual engagement in the process (motivation, ability) are crucial for the whole process. The results presented in this study show that, in the case of central information seeking, ways to locate information lead to the triangulation of information sources, a phenomenon described by Greyson (2018), even though this statement needs further empirical and theoretical reflection to confirm the relation.

I introduce the idea of information source proximity creation, drawing directly on Kahan's (2014) explanation of source choice via '*immersion in networks of other people*' (*p.* 49), on Goldenberg's (2021) call to recognise alternative expert sources as legitimate, and on ELM's account of mental shortcuts (Petty et al., 2003). The results show reliance on one's own intuition, understood here as '*the ability to use nonconscious information for conscious decision making*' (Fellnhofer, 2022, p. 492); the importance of source choice related to professional status (e.g., doctors) or message format (e.g., books); appeals to the number of sources supporting a claim; and, above all, identification with a source based on shared experience and feelings. The importance of the affective load of messages has been demonstrated in numerous studies (Bettinger et al., 2016; Greyson & Bettinger, 2022; Larson & Bersoff, 2025; Ruthven et al., 2018). In sum, information source proximity rests on epistemic trust—a necessary but not sufficient condition. It also requires closeness, understood as both immediate accessibility and an emotional bond that includes understanding. The concept of information source proximity is closely related to cognitive authority: it refers to someone permitted to influence my thinking, yet it does not assume the irrefutability of arguments and encompasses what Savolainen (2021) calls affective authority.

One limitation of this study is that participating parents were those for whom vaccination was already a salient issue, so the findings may not be representative of the broader parent population. However, as Greyson and Bettinger (2022) note, the purpose of modelling of the kind presented here is to identify times and places in the parenting trajectory when parents may be most receptive to changes in vaccine attitudes, as well as the ways in which new trust might be built and information provided to inform vaccine-promotion interventions. In this light, the limitation may be viewed as an advantage rather than a concern. Further research is needed to deepen these findings.

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'Transparency would be lovely': differences in information seeking and assessing behaviours between vaccine hesitant and vaccine confident mothers of newborns

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Abstract

Introduction. While today's vaccines have robust scientific evidence supporting broad distribution and use, many individuals experience concerns about vaccination, resulting in vaccine hesitancy. Many factors may contribute to vaccine hesitancy including lack of trust in vaccination recommendations, misinformation about vaccine safety and effectiveness, and social norms. This study explored the information seeking and assessment behaviours of new mothers regarding infant vaccination schedules.

Method. Participants were recruited within two communities identified for low vaccine uptake. Semi-structured interviews were conducted with 32 mothers. Interview transcripts and researcher fieldnotes formed the data for analysis.

Analysis. Reflexive thematic analysis was used to qualitatively analyse interview transcripts, resulting in four overarching themes addressing the research questions.

Results. Vaccine hesitant mothers appear to have different information needs and subsequent information seeking and assessment behaviours compared to vaccine confident mothers in the same communities. Vaccine hesitant mothers reported consistently unmet vaccine-related information needs and described more intensive information seeking and triangulation practices because of these unmet needs.

Conclusion. Increased and creative vaccine communication opportunities are necessary to address vaccine hesitancy in target communities. Additionally, the relationship between mistrust and information seeking should be further explored, ideally in collaboration between information scientists and public health.

Introduction

Humans have attempted to protect themselves from illness and disease-related death for centuries. While various forms of intentional inoculation have existed for centuries, vaccine technology has improved significantly since the late 18th century (Plotkin, 2014). Today's vaccines have robust scientific evidence supporting broad distribution and use; however, many individuals experience doubts and concerns about vaccination and engage in *vaccine hesitancy*, the 'delay in acceptance or refusal of vaccination despite availability of vaccination services', leaving themselves and their communities at risk for preventable disease (MacDonald, 2015, p. 4161). Many factors may contribute to vaccine hesitancy including lack of trust in vaccination recommendations or services, misinformation or inadequate information about vaccine safety, and social norms. Researchers attempt to address and understand vaccine hesitancy from many disciplines, including information science, which has literature focusing on information and media literacy (Melki et al., 2023), perceived information overload (Chen et al., 2022), public health communication and human information interaction (Giese et al., 2021), misinformation (Roozenbeek et al., 2020), and the effects of social media on vaccine opinions (Argyris et al., 2021; Hagen et al., 2021).

This study approaches vaccine hesitancy by exploring the health information behaviour and information needs of new mothers. Through analysis of interviews conducted with mothers of newborns regarding British Columbia's infant immunisation schedule, this study explores 1) the information needs of vaccine hesitant mothers and whether those needs are adequately met, and 2) the information behaviours of vaccine hesitant mothers compared to those with vaccine confidence. By exploring these topics within a specific geographical and social context, this study aims to inform future vaccine communication research as well as improve patient healthcare experiences by expanding healthcare provider understandings of the complex information behaviours and needs relating to vaccine hesitancy in new parents.

Literature review

Vaccine hesitancy

Vaccination, as a preventative treatment for disease, has ample scientific evidence for its efficacy and overall safety for use. Despite near-universal public health consensus that the benefits of authorised vaccines outweigh the risks and established vaccination schedules from infancy to old age, some individuals experience doubts, concerns, or other forms of reluctance to vaccinate. The resulting delay or refusal of a particular vaccine or vaccination altogether for oneself or one's children when vaccines are available and accessible is considered *vaccine hesitancy* (MacDonald, 2015). While vaccine hesitancy has existed as long as we have documented vaccination efforts (Eddy et al., 2023; Smith et al., n.d.), the Covid-19 pandemic and accompanying widespread campaigns to vaccinate all adults, brought vaccine hesitancy into the public's consciousness.

Scholars have developed various tools to quantitatively measure vaccine perceptions, confidence, and hesitancy (Frew et al., n.d.; Gilkey et al., 2014, 2016; Larson et al., 2015, 2016; Opel et al., 2013; Sarathchandra et al., 2018). Researchers have also focused on identifying significant psychological predictors of vaccine perceptions; MacDonald's (2015) 3C model was expanded to Betsch and colleagues' 5C scale of psychological antecedents of vaccination which include *confidence*, *complacency*, *constraints*, *calculation*, and *collective responsibility* (Betsch et al., 2018). The World Health Organization now uses a revised model of MacDonald, Betsch and colleagues' work called the *WHO behavioural and social drivers of vaccination framework* (World Health Organization, 2022) to measure vaccine hesitancy.

Research aiming to understand vaccine hesitancy comes from various disciplines. Within political science and psychology, Lalot and colleagues (2023) tested vaccine hesitancy's association with *distrustful complacency*, a state within which an individual exhibits both low political trust in their

governing bodies and low concern regarding the virus/illness at hand. They found that individuals were generally more willing to accept vaccination when their concerns about the illness had increased, noting that 'anxiety prompts individuals to actively search for new information to deal with the perceived threats', (Lalot et al., 2023, p. 986). Immunology and public health researchers explored underlying factors for vaccine hesitancy by reviewing 22 qualitative studies, finding that 'parental vaccination decisions are complex and multi-dimensional', (Dubé et al., 2018, p. 989). In this review, the authors name several thematic complexities to vaccine hesitancy including individual risk perceptions of vaccination and non-vaccination, vaccine safety perceptions, and direct and indirect experiences with relevant illnesses. Anthropologist Brunson (2023), explored parental decision making about childhood vaccination and suggests that 'the process of parents' vaccination decision-making is complex, but… a general process does exist' p. 5467). While individuals move through this process at a unique pace, Brunson notes that *how* parents make decisions regarding childhood vaccinations is unique, requiring researchers to consider the originating beliefs and levels of understanding that lead to vaccine hesitancy in the first place. For instance, parents considering vaccination may be categorised as 'acceptors', 'reliers', or 'searchers', with each group having different information needs to be considered and addressed by public health providers. Other researchers note that opinions on childhood vaccination can change depending on positive or negative information seeking experiences (Greyson & Bettinger, 2022). These researchers note that having supportive healthcare providers who were able to mitigate mothers' fears through suggestions for addressing potentially traumatic vaccination experiences was appreciated by those who experienced vaccination-related fear and anxiety. Individuals who experienced increasing hesitancy over time were often found to have underlying concerns that were not adequately addressed within their healthcare experiences; this was regardless of whether participating mothers sought additional information or kept their questions to themselves.

Parental health information behaviour

The internet has become an essential resource for individuals seeking health information (Ashfield & Donelle, 2020; Jones et al., 2012; Meppelink et al., 2019). Online information seeking has become a key focus for scholars investigating parental health information behaviour. In their scoping review of parental online health information seeking behaviours, Ashfield and Donelle (2020) found that 50% of reviewed literature stated parents are looking online specifically for vaccination-related information. They found that online information seeking 'may have implications for the way that parents perceive the health and safety consequences of childhood vaccinations,' (Ashfield & Donelle, 2020, p. 4).

Research has also found online health information seeking to be key in parental vaccine decision making (Ashfield & Donelle, 2020; Ebi et al., 2022; Mossey et al., 2020; Tustin et al., 2018; Yudianto et al., 2023). Some scholars have connected online information seeking with increased health anxiety and vaccine hesitancy in some parents (Ebi et al., 2022; Tustin et al., 2018). In their comparative study of parents in Poland and Ukraine, scholars found distinct information seeking behaviours between those with vaccine hesitancy and those with vaccine confidence; vaccine confident parents often trusted a single source of information, usually a primary healthcare provider, while vaccine hesitant parents often sought information from multiple sources (Mierzecka et al., 2023). With distinct information seeking behaviours identified, scholars suggest that targeted vaccine communication strategies are necessary (Mierzecka & Łączyński, 2025). Researcher have also argued that primary healthcare providers have the unique opportunity to support parents as they make childhood vaccination-related decisions within clinical settings (Mossey et al., 2020).

Research questions

This study explores the information needs and behaviours of new mothers regarding infant vaccination and was guided by the following research questions:

1. What are the information needs of new mothers regarding infant vaccination schedules and are those needs adequately met by publicly available resources?
2. What information behaviours are exhibited by new mothers regarding their vaccine-related information needs and do these behaviours differ significantly between vaccine hesitant and vaccine confident mothers?

Methods

This study is grounded in a social constructivist epistemology (Creswell & Poth, 2025). Through this interpretive framework, the researchers sought to understand the complexity and breadth of experiences reflected in the research participants by acknowledging that everyone's experiences are unique and fully true to them, especially as these experiences are socially constructed within specific contexts, histories, and relationships. Reflexive thematic analysis (Braun et al., 2022) was chosen as a methodology that aligns with these epistemological groundings.

Study setting

This study is a secondary analysis of data that were collected for a collaboration between Fraser Health Authority, the body responsible for health in one of five geographic regions of British Columbia (BC), Canada, and researchers at the Vaccine Evaluation Centre at the BC Children's Hospital Research Institute. Within BC, health authorities provide healthcare services, resources, and policies for communities that exist within their purview. While healthcare is funded provincially, programming and policies of one's local healthcare authority can affect experiences and opportunities when accessing care. Funding for this study was provided by a project grant from the provincial immunisation committee to explore geographic pockets that had low uptake of routine infant vaccination despite availability of free vaccines and vaccination clinics.

The provincial recommended infant immunisation schedule includes multiple vaccinations given at two, four, and six months of age, followed by a childhood vaccination schedule offered from twelve months through adolescence. The original collaboration focused on mothers of newborns in two communities within the Fraser Health region that were identified by health officials as having suboptimal uptake of infant vaccination. One of the identified communities was affluent and had a high number of requests for alternative vaccination schedules by new parents. The other was less affluent and had a high level of newcomers (recent immigrants) who spoke languages other than English or French as their first language. The second community had recently experienced a pertussis outbreak due to low vaccination rates.

Participant recruitment and data collection

Participants were mothers of infants aged six months or younger, living in one of the two communities of interest. While the authors acknowledge that parents of all gender identities can birth and raise children, all participants in this study identified as cisgender women; therefore, the authors have chosen to use the language of 'mother' to accurately describe this study's specific sample. Recruitment involved referrals from the regional health registry of patients interested in participating in research and community outreach efforts through community organisations and programming aimed at new parents, such as library baby-times and 'mommy and me' drop-in programs.

Data were collected by one researcher (EG) who is a White female graduate student with a background in midwifery, had personal experiences as a mother and immigrant, and as someone who grew up in a vaccine hesitant community. Interviews were audio-recorded and took place within participants' homes. Researcher fieldnotes described each interview setting and the researcher's perceptions of the participant and interview process, generating preliminary analytic memos in conversation with one of the senior authors (DG). Initial analysis focused on reporting to inform public health infant immunisation programming and communications. Lead author on the current article (MM) performed systematic data analysis following initial reporting, and is a

racialised, trans-nonbinary graduate student with a professional background in doula/non-medical birth work and a research background in pregnancy/birth experiences within transgender communities and pregnancy decision-making about cannabis consumption.

Data analysis

This analysis used reflexive thematic analysis (Braun et al., 2022) to explore information needs and information behaviour themes that were noticed in the data but not pursued during the original study's analysis. Reflexive thematic analysis is a form of thematic analysis that asserts the subjectivity of data analysis in qualitative coding; it also asserts that the researcher takes an 'active role in coding and theme generation' (Braun et al., 2022, p. 8). Reflexive thematic analysis involved reflexive journalling (Janesick, 2015; Trainor & Bundon, 2021) and regular discussions among authors during initial data analysis and reflexive thematic analysis theme generation phases. Reflexive journalling can increase a researcher's own awareness of their positionality in relation to the research topic, allowing for deeper understanding of the data and findings (Meyer & Willis, 2019). Braun and Clarke (2023) assert that reflexive thematic analysis cannot exist within a vacuum void of the researchers' own biases, assumptions, and epistemologies. Relating to this study, the lead author's (MM) reflexive journalling contributed directly to their inductive coding of the interview data and shaped their theme generation. Reflexive thematic analysis-based theme generation was iterative and reliant on regular meetings and discussions between researchers where personal reflections and ongoing reactions to the data were integrated into the analysis and final theme descriptions and application.

Deductive and inductive coding occurred simultaneously. Some codes relating to information behaviours, needs, and sources had been created for use across vaccination studies and were broadly applied to the data during the initial analysis. For this analysis, many of the original codes were removed and refined while new codes were simultaneously introduced to the codebook and applied.

Results

Thirty-two semi-structured interviews were included in this analysis; 9 participants were referred to the study through the health authority and 23 were recruited through community outreach efforts. A summary of participant demographics is presented in Table 1.

Demographic Characteristics	Number of Participants (total n=32)
Age	
24-29 years old	7
30-34 years old	16
35-39 years old	9
Newborn Vaccination Decisions	
Fully vaccinated	27
Selective or delayed vaccination	3
Did not vaccinate	2
Self-Reported Ethnicity	
African	2
East Asian	3
European	21
Latin American	1
South Asian	5
Annual Household Income	
$20k - $40k	3
$40k - $90k	6

$90k - $140k	13
$140k - $200k	3
$200k +	1
No data	6
Number of children	
1 child	20
2 children	9
3-4 children	3

Table 1. Demographic details of 32 semi-structured interview participants.

Four overarching themes were developed throughout the course of data analysis. Each developed theme illustrates common experiences described by study participants that were identified by researchers as key findings relating to the study's research questions. The four themes are listed below and explored individually in the following subsections:

1. Unmet information needs, though varied, persist among new mothers
2. Unmet vaccine-related information needs galvanise existing vaccine hesitancy
3. Vaccine hesitancy leads to more intensive information seeking and assessing behaviours
4. Trust and relationality are key aspects affecting vaccine hesitancy and confidence

Unmet information needs, though varied, persist among new mothers

In response to this study's first research question, researchers found that unmet needs persist among new mothers. While it is unsurprising that mothers experience dynamic information needs, this study found the information needs of vaccine hesitant mothers differed from the needs of those with vaccine confidence. Vaccine hesitant mothers consistently reported complex, vaccine-related information needs that remained unmet. In contrast, vaccine confident mothers did not report unmet information needs regarding vaccination, even though many had other unanswered infant health questions.

One participant did not feel a need to engage in additional vaccine-related research because she and her partner decided to vaccinate. Due to her lower infant vaccination information needs, she was surprised by how much information the public health nurse provided at the vaccination appointment:

> *To be honest, I didn't do a ton of research before [we vaccinated her] because we both did want to immunise her […] I was actually surprised about all the information that we were provided with.* (Cynthia, vaccine confident)

While she did not have any unmet vaccine-related information needs, Cynthia reported many instances where questions regarding her infant's health arose:

> *For instance, giving Tylenol; that might be something that I would Google and see if it was totally normal […] I think you do kind of have to walk the line of taking advice or recommendations but also knowing what is best for your baby.* (Cynthia, vaccine confident)

In contrast, Sarah, who chose to refuse all infant vaccinations, reported many vaccine-specific information needs that remained wholly or partially unmet:

> *Any of the real information: the ingredients that are in the vaccines, why they need to use the ingredients that they use…we can't find them[…] [For example] the ingredients in the vaccines given. Why aluminum? Why formaldehyde? What is its purpose? […] Why do they need to be in there?* (Sarah, vaccine hesitant)

Sarah's vaccine-specific information needs were numerous and largely unmet by local public health resources. Another mother voiced similar concerns, including specific questions regarding why public health resources excluded certain types of information, '*I mean you walk into a tobacco store and it says, 'Caution cigarettes have formaldehyde.' Why doesn't it say the same thing on vaccinations*?' (Hebah, vaccine hesitant). These concerns illustrate how these mothers pay close attention to public health resources; if resources do not adequately meet one's information needs, confidence in the public health system and healthcare providers may falter.

Vaccine confident mothers did not report having unmet information needs regarding infant vaccination even though every participant named instances in which other health-related information needs arose. However, vaccine hesitant mothers reported many vaccine-specific information needs that remained unmet by public health resources and other encountered information sources. For some, these complex information needs extended from questions directly relating to vaccines and vaccination to additional questions about public health authority policies, communications, and the trustworthiness of specific sources of information.

Unmet vaccination-related information needs galvanise existing vaccine hesitancy

While data analysis quickly revealed the differing information needs of new mothers, further analysis revealed that some vaccine hesitancies were affirmed or galvanised by information needs being left unmet. Galvanisation may be particularly acute when significant time and effort are invested into information seeking behaviours with no satisfactory results.

Sarah, who refused infant vaccination, had many unanswered questions that strengthened her and her partner's hesitancy. While she stated she would be more inclined to follow the suggested vaccine schedule if their specific questions were adequately answered, she also mentioned being unable to answer her questions affirmed her lack of trust in the public health system:

> *If you can tell me why you have to [use specific ingredients] and it makes sense, okay, I will take the risk and vaccinate my kid, but you're being so secretive about it[…] What is it that you're [the public health system] hiding from us?[…] It shouldn't be this hard to find information on both the pros and cons of vaccines[…] That's where the transparency would be lovely.* (Sarah, vaccine hesitant)

Being unable to answer her questions, even after extensive searching, Sarah noted that the lack of transparency from both the pharmaceutical and public health sides left her and her partner feeling distrustful of the entire healthcare system:

> *If I knew the research behind it and I knew the ingredients and they [public health authority and pharmaceutical companies] were open and upfront and non-dismissive, I would perhaps be […] less resistant to having it done, regardless of age.* (Sarah, vaccine hesitant)

For Mei, vaccination decisions were complicated by information needs not being adequately met. Her ultimate decision to delay some vaccines and exclude others stemmed from vaccine-specific questions not being satisfactorily addressed by public health resources:

> *[The public health fliers] didn't really tell you what […] it was treating […] I did try to look online a bit [in] official research from journals and what not but it's so hard to know what's right and wrong and there's always a bias one way or the other and there's no really middle ground that just gives you the fact. So, it was a hard decision.* (Mei, vaccine hesitant)

Sources of information participants found inadequate included public health pamphlets, academic journal articles, and conversations with healthcare providers. Healthcare providers were

significant sources of information. However, their responses to questions about vaccination had the potential to galvanise vaccine hesitancy when they failed to address a mother's concerns. For Hebah, the advice of a prenatal educator left her feeling unsatisfied and unwilling to vaccinate her infant:

> *The discussion in my prenatal class about vaccination wasn't really a discussion. It was just a statement […] 'Get them' […] And that wasn't enough for me […] I wasn't just going to go and do what I was told based on that.* (Hebah, vaccine hesitant)

Unmet vaccine-specific information needs thus galvanised existing vaccine hesitancies, and the inadequacy of information participants sought or encountered about vaccination had the potential to affirm distrust not only of vaccination but extending to public health more broadly.

Vaccine hesitancy leads to more intensive information seeking and assessing behaviours

Addressing the study's second research question, this study found that while all study participants described various forms and amounts of information seeking and assessing behaviours, vaccine hesitant mothers described significantly more time- and labour-intensive information seeking and assessing practices than those with vaccine confidence. Many vaccine confident participants did not feel a need to participate in information seeking in addition to information encountering; this was, in part, due to an established trust in the public health system and the advice and recommendations received.

Instead of active information seeking regarding infant vaccination, many vaccine confident mothers described information encountering through public health resources that were automatically provided. This encountered information included public health pamphlets, published booklets, and verbal advice:

> *I got something in the mail that said vaccines are coming up and these are the ones that you need to get and when. I found that very helpful […] It was from [the government-run public health services]. It was in the mail […] and I received it right before] when her first set of shots was going to happen.* (Taylor, vaccine confident)

> *[The public health nurse] gave me a lot of paperwork to read and she gave me also the passport for the vaccinations.* (Jessica, vaccine confident)

> *I do however like that the public health unit gives you that Best Beginnings book […] We were given all the pamphlets and stuff like that; we read all of those.* (Catalina, vaccine confident)

In addition to different seeking or monitoring practices, participants described differing information assessment practices, some of which were more involved and intensive than others. For some vaccine confident mothers, having robust trust in their healthcare providers made assessment simple and quick. One such participant described not feeling the need to read provided vaccine resources because she already trusted the public health recommendations for infant vaccination:

> *I just trust that what's being recommended is backed up by the best research available […] [The public health nurses] passed out a few like info sheets to do with common questions to do with vaccines and all this stuff. Honestly, I didn't even really read them I was like, okay, well I've kind of made my mind up that I'd rather […] get them […] It's always worked out fine for me so far to just kind of go with what the doctor recommends and that's what I've stuck with.* (Manpreet, vaccine confident)

Manpreet did not feel the need to triangulate or individually assess information coming from a source she deemed trustworthy. Meanwhile, Maki described a greater degree of information

assessment despite foundational trust in and typical acceptance of the recommendations of healthcare providers:

> *I'll take everything with a grain of salt. I'll take their information and kind of do my own thing. If I feel it's best for him, then yeah, I would go with that for sure. I usually feel like I do side with the doctors like I take their opinion pretty seriously. So if they recommend something, then I'll definitely take that into consideration […] I trust their opinion.* (Maki, vaccine confident)

While vaccine confident mothers in this study had information needs that ranged from newborn feeding to vaccinations and beyond, those were often easily satisfied either through a conversation with a health provider or through previously provided written resources, such as mailed pamphlets.

In contrast, vaccine hesitant mothers described frustration with the lack of answers they received, both during attempted conversations with healthcare providers and when reading public health resources. Hebah noted no detailed information about specific risks and side effects were available on the public health website; this dearth of detailed information contributed to her infant vaccination refusal and led to additional active information seeking in collaboration with her partner:

> *The public health website has six reasons that you should vaccinate your child. And one of them says reason number five is because serious side effects-because serious […] reactions or serious side effects […] are rare. So, it says blatantly serious side effects are rare. But nowhere on the website does it tell you what they are… Completely unhelpful […] And [my husband and I] weren't on the same page when it came to vaccinations so I asked him to find me some studies that show […] the positive outcomes of vaccinations and he searched for weeks and […] he couldn't find anything […] I couldn't find any credible information on why vaccinations were safe.* (Hebah, vaccine hesitant)

While some vaccine hesitant participants sought scientific literature, others described going 'beyond' research while information seeking. Rebecca stated that she knew a certain study had been debunked, but hearing anecdotal stories from many parents triggered her search for more information:

> *Medical professionals often say, 'Well that study has been debunked', and fair enough [but] I'm not going based on the study. I'm going based on the thousands of parents whose children have been negatively affected. I'm going on the fact that there was a lawsuit [and] the companies settled […] Those were some of the things that […] informed my decision.* (Rebecca, vaccine hesitant)

Rebecca engaged in extensive information seeking and assessment in direct response to her underlying hesitancy being galvanised by anecdotal information she encountered. Her information assessments prioritised first-hand experiences as key pieces of information and she actively triangulated not just anecdotal and scientific evidence, but also legal and cultural contexts that informed her decision.

Vaccine hesitant mothers described information seeking and assessment behaviours that were more time- and labour-intensive than those with vaccine confidence. While some hesitant mothers increased their information seeking and assessing specifically in response to unmet information needs, others expanded their search for answers out of distrust in the public health system due to perceived lack in transparency.

Trust and relationality are key aspects affecting vaccine hesitancy and confidence

All mothers in this study described intentional decision-making, caring deeply for the health and wellbeing of their infants. Most participants raised the importance of developing trusting relationships with their healthcare providers. For one participant, having a public health nurse come to her house to offer postpartum support contributed to a trusting relationship with the public health system:

> *Yeah, and then the nurse came to the house […] within that first week and that helped a lot […] 'Cause she checked on how I was breastfeeding and they weighed her- cause she was such a low weight, so I guess the local health care came and checked on her and […] I thought that was great.* (Taylor, vaccine confident)

Many vaccine confident mothers reported having trusting relationships and good rapport with their healthcare providers:

> *The Health Canada website I find I probably trust the most […] 'cause I'm a librarian […] And of course my family doctor, if we have something that we really want a good answer for, we would wait […] and ask the doctor.* (Charlotte, vaccine confident)

> *I trust them […] We get a lot of our information from our doctor and the [public] health nurses were fabulous at giving out the most recent up-to-date information.* (Liliana, vaccine confident)

> *The doctor. I have been working with him for ten years so I totally trust him.* (Harpreet, vaccine confident)

Some hesitant participants also described trusting their doctors because of good encounters with them while receiving care. For one such mother, having a doctor provide good care for postpartum depression really improved her provider-patient relationship:

> *She's made me feel […] like I can come to her, you know. She's like trying to make sure that I don't have any postpartum depression issues or anything like that […] That incident has actually made me fe[el like] we've [got] a better relationship with my doctor.* (Rebecca, vaccine hesitant)

For this participant, who chose to exclude one specific vaccine from her infant's vaccination schedule due to family medical history, being able to build rapport with her primary healthcare provider was crucial in her personal health decision-making to accept most vaccinations.

Many of this study's vaccine confident mothers used the word 'trust' to describe their relationships with healthcare providers. In contrast, some vaccine hesitant participants were openly distrustful of public health resources and providers, academic journal articles and other sources of information as well as the pharmaceutical industry. When asked what made her question medical advice regarding vaccination, one mother described how her negative birth experience resulted in broken trust in the healthcare system saying, '*If I had just done what I was told, I would've […] put her at greater risk. So […] I lost a little bit of faith in the medical system*' (Hebah, vaccine hesitant).

Discussion

This study found that vaccine hesitant mothers have distinct information needs compared to vaccine confident mothers. While standard public health resources were available to all study participants, the perceived adequacy of these resources varied depending on a mother's vaccine confidence. For this study's vaccine confident mothers, the universally provided public health resources were adequate and satisfied their vaccine-related information needs, relieving them of the need to seek additional information. Vaccine hesitant participants were provided with the same

public health resources. However, they consistently reported this information to inadequately meet their information needs by lacking detail or transparency or by not addressing their specific questions. These findings build on McKenzie's model of information practices in everyday life information seeking (McKenzie, 2003) by revealing how vaccine hesitancy or confidence may result in different 'modes' of information practices. The vaccine hesitant mothers in this study often described 'active seeking' or 'active scanning' (as named by McKenzie) while the study's vaccine confident participants were more likely to describe 'non-directed monitoring'. The study's findings also affirm and extend previous findings that vaccine confident parents are more likely to trust a single source of information, whereas vaccine hesitant parents report more intensive information seeking from multiple sources (Mierzecka et al., 2023).

Previous literature has also established convenience is a key part of information seeking behaviours in many contexts (Connaway et al., 2011). In contrast to this scholarship, this study found that, for vaccine hesitant mothers, a desire for convenience may be overpowered by a more pressing need to adequately address unmet vaccine-related information needs. For these mothers, conveniently encountered information resources that were provided by the public health system were not found to sufficiently address their questions; they engaged in more robust, and sometimes inconvenient and labour-intensive, information seeking behaviours.

This study's vaccine hesitant participants frequently voiced mistrust in the public health system providing vaccine-related resources, often leading them to engage in additional information seeking. Previous literature suggests that increased online information seeking regarding vaccination may lead individuals to increased health anxiety and vaccine hesitancy (Argyris et al., 2021; Lee & Kim, 2015; Rathbone & Prescott, 2019; Tustin et al., 2018). In particular, researchers found increased online information seeking focused on vaccination resulted in higher odds of individuals perceiving vaccinations as 'unsafe' (Tustin et al., 2018). Tustin and colleagues' statistical findings are affirmed by this study's results, which found increased information seeking in response to continually unmet information needs, and galvanised pre-existing vaccine hesitancies in some mothers. As previously mentioned, researchers have also found that increased positive healthcare experiences can significantly alter a mother's vaccine-related fear and anxiety (Greyson & Bettinger, 2022). This study's findings affirm that improved clinician support of complex health information needs may address vaccine hesitancy in some mothers. Further scholarship is necessary to explore the relationship between mistrust, either with individual healthcare providers or the public health system, and information seeking, especially within the context of vaccine hesitancy.

Implications and recommendations

Information science within public health

While vaccine hesitancy is often considered solely a public health concern, this study demonstrates how vaccine hesitancy is a complex issue ideally addressed through interdisciplinary scholarship. Vaccine hesitancy in parents of newborns, while complex and multifaceted, has an informational aspect that could be better addressed through collaborative efforts between information scientists and public health. Considering this, there are several opportunities for collaboration with those in public health to better address the information needs of vaccine hesitant parents.

Firstly, information scientists can play a key role in increasing the knowledge and awareness of primary healthcare providers regarding the sheer complexity of the information needs and behaviours of vaccine hesitant parents. This study found that vaccine hesitant parents often have specific information needs that remain unmet by standard public health resources. Primary healthcare providers must develop a better understanding of how addressing the specific information needs of new parents may reduce or eliminate vaccine hesitancy. Directly addressing the vaccine-related information needs of parents will require major efforts in trust- and rapport-

building. As healthcare providers develop increased awareness of parents' information needs regarding vaccination, they will be better equipped to conduct empowering conversations with their patients within clinical contexts. Public health must understand trust is earned, and taking the information needs of vaccine hesitant parents seriously is a significant opportunity for clinicians and public health providers to build trusting relationships.

Secondly, opportunities are ripe for the interdisciplinary creation of resources that address more complex information needs. While having simplified and straightforward resources regarding vaccination mitigates information overwhelm for many new parents, this study has shown this approach is not appropriate or adequate for many vaccine hesitant parents. Therefore, additional knowledge translation is needed with the stated goal of providing more information to address complex information needs regarding childhood vaccination. Creating additional resources with more complex information may also work to increase trust between vaccine hesitant parents and public health through increased information transparency.

Information science beyond public health

This study revealed that, in addition to having consistently unmet information needs, vaccine hesitant parents often described lack of trust or hesitancy to trust the public health information. Trust and relationality are vital parts of decision-making and engagement with information and information sources; this is especially true for issues that are highly personal and considered 'high stakes' such as the health and medical decisions for one's infant. This study found that, regardless of vaccine opinion, developing trust within clinical relationships is paramount to patients feeling satisfied and supported in their health decisions. Because of a lack of trust in the public health system that was revealed in this study, information scientists must look beyond public health to better support the information needs of vaccine hesitant parents. Grassroots and community-based opportunities for knowledge translation initiatives relating to childhood vaccination, specifically targeting vaccine hesitant parents, should be explored. Individuals must be able to access evidence-based information outside of clinical spaces and relationships. Health information being siloed into clinical spaces can be a significant barrier for those who experience lower trust in their public health and/or medical systems.

Strengths and limitations

This study offers a thorough exploration of the information needs and information seeking and assessing behaviours of mothers of newborns regarding vaccination. In-depth semi-structured interviews and reflexive thematic analysis provide study rigour through reflexive practices that attend to researcher bias. This study did not aim to produce generalisable results. Study findings require further exploration and validation in additional contexts and target communities.

Conclusion

This study found that vaccine hesitant mothers have different information needs and subsequent information seeking and assessment behaviours compared to vaccine confident mothers in the same communities. Vaccine hesitant mothers reported consistently unmet vaccine-related information needs and described more intensive information seeking and triangulation practices because of these unmet needs. Information scientists have ample opportunity to better support vaccine hesitant new mothers by exploring interdisciplinary approaches to vaccine information resource creation and distribution as well as increased clinician education on complex information needs and behaviours that are likely to affect clinical engagement and experiences. Additionally, the relationship between mistrust and information seeking that should be further explored, ideally in collaboration with public health. Findings from this study indicate that increased and creative vaccine communication opportunities should be explored to address vaccine hesitancy in target communities.

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Understanding immigrant information acculturation: perspectives and recommendations for information behaviour research

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Abstract

Introduction. The study explores the relationship between information and acculturation in the lives of immigrants living in the United States, with consideration given to immigrants' information assets as well as bidirectional dimensions of acculturation whereby immigrants inform US-born neighbours.

Method. Initially intended as a mixed-method explanatory study, this preliminary insight is based on survey data. As the researchers discuss, recruitment was disrupted due to factors including sweeping US legislation that culminated in federal research defunding, punitive measures toward higher education, and especially threats to immigrant communities.

Analysis. The preliminary survey findings offer a glimpse into how immigrants adjust informationally. Respondents prefer speed and accuracy of resources and ranked educational/career, health/wellness, and entertainment as top information reasons, while friends and family are the premier information sources. Many respondents share cultural information with US-born neighbors. Yet barriers such as the lack of recent, accurate, or accessible information impact acculturation.

Results. Based on available data, immigrant information acculturation is hardly straightforward and reflects a myriad of decisions related to information seeking, finding, using, sources, problem-solving, and contributions.

Conclusion. Information decision-makers who partner with immigrant groups should account for how community members navigate US acculturation, information ecosystems, and their own self-perceptions. Knowledge of immigrant information acculturation can further both the study and provision of information, particularly in rapidly changing information and political landscapes.

Introduction

How do immigrants transition from one culture to another, especially as it relates to their information norms? The concept of cultural adjustment has been copiously explored within psychology and migration studies scholarship, but to a substantially lesser extent within information behaviour research. As of October 2025, there are fewer than 20 articles specifically linking immigrants, information behaviour, and immigrant acculturation. While concepts such as 'immigrant consumer acculturation' (Peneloza, 1989) and 'immigrant health information-seeking acculturation' (Wang & Yu, 2014) have been examined, the fundamental idea of 'immigrant information acculturation' (Ndumu, 2020, 2021; Ndumu & Park, 2025) remains underexplored.

This study anchors acculturation as an aspect of immigrant information behaviour research by first articulating how information behaviour and acculturative constructs relate and, secondly, conveying what immigrants themselves express about their information acculturation. It adds to scholarship that contests the premise of immigrants as wholesale digitally alienated, technologically beleaguered, and information-deprived (Villa-Nicholas, 2022). Understanding immigrant information behaviour through the lens of acculturation might shift prevalent (mis)conceptions of immigrant information capacities. Reductionist conclusions may not hold entirely amid both record-breaking migration and/or displacement, plus advanced global digital technologies. Immigration and information are increasingly intertwined, particularly as 'technologies of government' (Inda, 2020) are used to conceptualise, categorise, and so-called manage immigrants.

Knowledge of the vastness and complexity, rather than the lack, of information in migration can bring information science scholarship closer to immigrants' real-life encounters. Information is critical to successful resettlement (Caidi et al., 2010); those able to access and act upon information with few or no restrictions are more apt to achieve greater well-being and stability in their new surroundings. Operational definitions of acculturation range from relatively simple descriptions such as a 'normative process that occurs when a person from one culture is exposed to another culture' (D'Alonzo et al., 2019). Other definitions are assimilationist, for example, 'the sociocultural process by which individuals adopt the attitudes, customs, beliefs, and behaviours of another culture when they migrate' (Lee et al., 2020). Entire literature reviews have been dedicated to the domain (Thomson & Hoffman-Goetz, 2009; Rogler et al., 1991). What, then, can acculturation research tell us about how immigrants adjust to new information environments, the challenges or stressors they encounter in new systems, and how immigrants are understood informationally within the psychology and migration studies domains?

Our field must draw attention to the intrinsic links between cultural plurality, normative information, and the politics of immigration. Librarian and law professor, Sarah Lamdan (2023) highlights that '[t]he US government encourages immigrants to assimilate' (p. 34) while simultaneously relying on mechanisms like Immigration and Customs Enforcement to ensnare even those who follow government rules and exhibit model 'American lives', as coined by Funk (2019). It is, therefore, crucial to turn the lens—that is, to invite immigrants to express how they self-determine, navigate, and even contribute to the US information ecosystem as they acculturate. We must attend to the comprehensive nature of immigrant information behaviour that encompasses more than merely functional and task-centered interactions. Researchers must thus uncover the elements of simply existing and acculturating as an immigrant in the United States–indeed, 'life information' or 'the information needed for daily living' (Bates, 1974, p. 51, as cited in Hartel et al., 2024), 'everyday life' (Savolainen, 2023), and 'everydayness' or all that is quotidian (Ghisleni, 2017). Our research questions are thus:

RQ1: What are the characteristics of US immigrants' everyday information acculturation?
RQ2: To what extent do US immigrants experience information challenges as they acculturate?
RQ3: To what extent do US immigrants assist US-born neighbors with information acculturation?

Here, immigrants are understood as permanent US residents who were born in another country, regardless of their immigration status. Likewise, in this study, we operationalise immigrant acculturation as adjusting from one culture to another upon relocating to a new country, while information acculturation represents an immigrant's transition to a new information environment (Ndumu & Park, 2025). The researchers identify as information researchers, two of whom identify as immigrants, who focus on the evolving and vital subfield of immigrant information behaviour as well as the flow of information across boundaries. This work emanates from a multi-part research project at the intersection of immigrant acculturation and information environments. The project was impacted by several challenges, including federal research defunding and the return of a markedly anti-immigration political administration. The researchers thus reflect on ethical and methodological adaptations. The aim is to shift the discourse on immigrant information behaviour away from digital or information novice framings (Ndumu & Park, 2025). Relatedly, population and migration research supports that acculturation is bidirectional or reciprocal in that both immigrant communities and new societies culturally adjust; we probe this notion in this study, as put forward in research question three.

Information behaviour, acculturation, and immigrants: A literature synopsis

Few things convey our humanity like culture. All of our human experiences are shaped by our cultural heritage, and emigrating from one nation to another is no exception. Well-known acculturation theorist Rudmin (2009) argues that information should be examined against the backdrop of second-culture learning or acculturation. Rudmin's theoretical counterpart, John W. Berry, concurs that 'cultural knowledge' is a form of information that is interwoven with successful immigrant adaptation. This study gleans from Berry's (1992, 2005) prominent four-fold typology of immigrant acculturation. Berry postulates that newcomers to a society go through one of four stages: 1) integration, where they retain their original culture while learning about the new one; 2) assimilation, where they gradually replace their cultural norms with the new ones; 3) separation, where they never feel like they belong in either culture; or 4) marginalisation, where they do not feel included in either culture.

The acculturating immigrant not only relocates to a new place, but they must also sort through large amounts of information that may be in unfamiliar formats, locations, or even languages. In one of the earliest theories on acculturation, Kim (1977) posited that the immigrant acculturative process involves 'curiosity, searching out of necessity, and going beyond the customary information' (p. 9). Some scholars suggest a relationship between knowledge of mainstream culture, controversially portrayed as 'cultural literacy' (Hirsch, 1987; Bizell, 1990) and acculturation (Celenk & Van de Vijver, 2011). Although Hirsch and others convey a unicultural America, US society transcends a homogenous or Eurocentric cultural template.

Information leaders, especially those who are non-immigrants, can support immigrants in the acculturative process by mediating between those who have recently arrived, long-established immigrants, and local support organisations. In their research on immigrants' engagement with information, Beretta et al. (2018) suggest that culturally appropriate information is just as important as information types and access.

Other core works substantiate that immigration is a complex undertaking that cannot be separated from myriad cultural and systemic factors. Lloyd et al. (2010) and Kennan et al. (2011) establish that settling in is a multi-phased process where information literacy acts as a prerequisite for citizenship, yet refugees, specifically, often reach a point of divergence where their prior knowledge is misaligned with the complex systems of their new country. Oduntan and Ruthven (2017) further illustrated this information acculturation, especially how a matrix of information needs becomes a must for successful integration. Acculturation can be jeopardised by gaps in decision-makers' service provision or immigrants' service knowledge. Kainat et al. (2022) added a more recent lens; they examined gender-based sociocultural barriers in the acculturation process. In this regard, information behaviour must consider culturally sensitive information practices that are rooted in traditional gender roles, and linguistic isolation, especially for refugee women. They mention the role of personal information mediators and information sites, the latter of which coincides with Fisher's (2004, 2006) examinations of information grounds as key information behaviour locales in the process of trust-making among immigrant and non-immigrant leaders.

Further, acculturation transcends time; it can last decades according to longitudinal studies (Meca et al., 2018). However, the most 'sensitive acculturative period' (Cheung et al., 2011) is within the first five years, which coincides with what is known as the 'immigrant health paradox', also known as the healthy immigrant effect, whereby recent immigrants often exhibit better health outcomes than long-standing residents. This initial health advantage deteriorates to the point of falling below their counterparts within the 5 to 10 years post-migration (Markides & Rote, 2015). Acculturative stress, or 'the negative reaction to intercultural contact or the cultural adaptation process' (D'Alonzo et al., 2019) is a leading contributor. Berry (2006) defines acculturative stress as 'a negative response to life events that are rooted in new intercultural contact'. Information overload, too, is an extension of acculturative stress (Ndumu, 2021), and immigrants can feel the strain of voluminous, complex, or pressure-inducing resources as they need, seek, use, or process information. Other research reveals connections between acculturative stress and external forces, including a lack of trust in governing officials (Bekteshi & van Hook, 2015) and anti-immigrant sentiment (Viruell-Fuentes et. al., 2012). Twenty-five years ago, Roysicar-Sodowsky and Maestas (2000) explained that researchers in this domain collectively recognise that visible ethnoracial minoritised immigrants face four unique challenges: 1) experiences of racism and discrimination due to their immigrant and minoritised status, 2) interactions with the dominant culture, 3) preservation of ethnic or cultural heritage, and 4) acculturative stress relating to any of these. It stands to reason that these challenges persist today. While the preliminary study herein does not explicitly explore harms such as racial nativism and xenophobia (especially after the unpreventable suspension of the planned follow-up qualitative study), the researchers acknowledge that discussions on immigration and adjusting to the United States culture cannot ignore US race-making and social inequities (Bernstein et. al, 2021; Black Alliance for Justice in Immigration, 2023).

In addition to what happens when immigrants arrive in the US, pre-migration information access, mainly distilled through social media, also determines one's acculturation. Prior knowledge or contact with the host society is a key acculturative factor, according to Cabassa (2003). It seems plausible, then, that information is elemental to pre-migration preparation; those with relevant, trusted, and accessible interpersonal and documented resources can embark on informed emigrations. However, pre-migration information can also be counterproductive to a successful journey when there are disconnects between positive portrayals and negative experiences. The reality for most immigrants is that they will face a mixture of satisfactory and unsatisfactory encounters (Negy et. al, 2009). Misinformation, in the form of either nativist, racist, and anti-immigrant views on the part of US-born groups or distorted, inaccurate, and even positive

embellishments of life in the United States on the part of those in diaspora, influences eventual emigrants in other countries (Bhattacharya & Schoppelrey, 2004).

There is a storytelling aspect to acculturation in that cultural stories can promote a positive image throughout media and other community information sources, according to Bekteshi & van Hook (2015). Bekteshi and Kang (2020) similarly write that climate—interpreted as perceived discrimination, immigrant depictions, and one's overall quality of life and happiness in the US–also relies on information ecosystems. The fear of identification, tracking, and deportation is very real among those existing with fluid immigration status and can prompt reluctance to rely on service providers. Those who face legal and penal systems are susceptible to information stress and, thereby, systems avoidance (Brayne, 2014). Consequently, a critical aim of this study is to convey immigrants' accounts of adjusting to labyrinthine and polarised information environments like that of the United States.

Method

Study design

The researchers set out to employ an explanatory mixed-methods, survey-to-interviews study to garner evidence and characteristics of immigrant information acculturation. The questionnaire incorporates literature-derived acculturation constructs based on a synthesis of acculturative scales. The scale emanates from a previous work on immigrant information overload (Ndumu, 2020). The initial tool, encompassing behavioural, qualitative, and quantitative aspects, did not account for acculturative indicators. The researchers conducted a bibliographic search, thematic review, and thematic annotations to uncover 56 scales across 128 articles that measure immigrant acculturation or acculturative stress (Appendix A). They examined areas of congruence and divergence within the corpus, including the prevalence of proxy measures, the absence of bidirectionality or reciprocity, and the incorporation of stereotypical and essentialist depictions of immigrants. Following the elimination of defective scales, four scales were chosen to serve as the foundation for a refined, comprehensive scale aimed at investigating the influence of information in the acculturation process. The constructs were integrated into this study's questionnaire. Appendix B includes the original and revised instruments. Key improvements include:

1. avoiding indicators that conflate immigrants' life circumstances with acculturation. Although family composition and statuses, including immigration, socioeconomic, and employment, these indicators are often presented as causals of various maladies. Rather than requiring participants to disclose sensitive or personally identifiable information, the researchers included the following question: *We invite you to share any other details about your background (e.g., language spoken, city in which you reside, level of education, etc.)*
2. avoided asking respondents to categorise themselves according to Berry's four-part typology of integrated, assimilated, separated, or marginalised. Immeasurable fixed parameters cannot describe real-world immigrant assimilation.
3. included questions on bidirectionality after heeding expert guidance that acculturation is necessary among both newcomers and long-standing residents.
4. adapted to various contexts by offering a Qualtrics language translation feature. The researchers are themselves multilingual, which was significant, especially for the planned interviews.

Data collection

Data collection began in the fall of 2023, subsided in 2024, and was again boosted in the summer of 2025. The study relied on snowball sampling in conjunction with convenience sampling. It was distributed nationally by email, followed by social media, with the support of immigrant non-profit organisations along with the library and information science community. The 2023 wave garnered 33 responses; the 2025 wave yielded another 38 responses, totaling 52 usable responses after filtering for US-born and incomplete survey responses (N value). Where appropriate, item and weighted *n* scores are included. Throughout the data collection process, the researchers considered ways of increasing participation by, for example, utilising Amazon MTurk. Ultimately, Amazon MTurk presented a myriad of risks pertaining to bots, data validation, and information breaches and was thus eliminated as an option.

Data analysis

The data comprised of respondent demographics like country of birth, year moved, age, language, and a wide range of questions about information sources, information-seeking behaviour, perceived importance of information facets, and experiences with information overwhelmed. Aggregated or cross-tabulated data (e.g., country-level counts and age ranges) were analysed using descriptive statistics. The descriptive data were presented primarily in tables, and participant countries of origin were displayed on a map to illustrate the geographical range of representation. Inferential statistics was used to analyse the relationships between length of residence and experiences with information sources and overload.

Disruption and limitations

The study findings are thus limited in that a GPower analysis indicated that 74 responses were needed for statistical power. Consequently, the study findings are not generalisable, and the degrees of freedom are slightly lower, hindering the detection of the extremes of values. The was impacted by changes to the research team, heightened anti-immigrant policies starting (i.e., hardline political rhetoric, Immigration and Customs Enforcement raids, and close to twenty nationalist 'America First' executive orders such as Executive Order No. 14,160 (2025): Protecting the Meaning and Value of American Citizenship and Executive Order No. 14,159 (2025): Protecting the American People Against Invasion, along with the dismantling of the government agency that funded the study. Widespread political changes threatened many immigrants' sense of safety, which impacted their participation in US society. It stands to reason that these forces also influenced the research herein, and this manuscript thus concludes with methodological reflections. The researchers felt that it was important to publish in light of direct and indirect disruptions.

Findings

Descriptive statistics

Participants (N= 52) were born in 32 different countries across six continents. The most represented continents were Africa and Asia, followed by Europe, North America, South America, and Australia. Their ages ranged from 18 to over 65, with the average age being 33 years. The majority of participants (*n*=39) arrived in the United States between 2000 and 2025; twenty-four immigrated to the United States after 2010. The average length of stay was 17.4 years. Table 1 displays participants' backgrounds.

Age	*n*
18-24	12
25-34	23
35-44	7
45-54	6
55-64	2
65+	2
Year of Immigration	
1980-1989	5
1990-1999	5
2000-2009	15
2010-2019	18
2020-2025	6
Incorrect input	3

Table 1. Participant demographics
Note: N=52

In response to the optional question on personal backgrounds, some participants shared additional aspects of their intersectional identities. Among those who opted in, four shared that they hold bachelor's degrees, one a master's degree, and a middle school-level education. Most respondents expressed that they were fluent in English and also shared their heritage languages, including: Spanish, Portuguese, Urdu, Punjabi, Nepali, Hindi, French, Tagalog, Japanese, and Danish. US states of residence were, although few in number, widely represented, spanning the West Coast (Washington, Las Vegas, California), the Midwest (North Dakota), and the East Coast (Maryland, Massachusetts, Florida).



Figure 1. Geographical distribution of respondents by continent
(Note: North America in this map excludes the United States)

RQ1: Acculturation and information behaviour

When it came to information behaviour, the acculturating immigrants who participated in the study shed light on the extent to which needing, seeking, and using information is an aspect of their everyday lives. Of the 52 total respondents, 49 responded to this survey item. Among them, 63% (*n*=31) indicated that they need information daily; and 14% indicated four to six days per week (*n*=7). They also regularly sought information; 55% (*n*=27) sought information daily, while 23% (*n*=11) indicated that they sought information four to six times per week. 67% (*n*=33) reported using information daily. The respondents were also asked to select their top three reasons for needing, seeking, and using information. A total of 51 respondents participated in this survey item. Since multiple responses were permitted for this survey item, the percentages were calculated based on the number of respondents to each selection, and the total may exceed 100%. In ranking the top three reasons for needing, seeking, or using information in everyday life, respondents ranked education/career information (*n*=37; 73%), health/wellness information (*n*=22; 43%), and shopping/entertainment (*n*=18; 35%) highest. Among the lowest-ranked reasons for needing, seeking or using information were parenting/marriage/dating (*n*=10; 20%), religion/spirituality information (*n*=8; 16%), and politics/current events information (*n*=7; 14%). Legal/immigration information featured moderately, and 25 percent of respondents (*n*=13) ranked it among their top reasons.

When asked about their preferences when seeking, needing, or using information, 52 participants responded. Among them, 42 respondents (81%) indicated that they placed significant importance on speed and accuracy. However, with respect to the ease of getting an answer (*n*=33; 63%), familiarity with resources (n=31; 60%) and the currency of those resources (*n*=32; 62%), responses slightly varied. There also appeared to be some variation in the type of resources and sites that respondents used to gather information. When asked to rank their top three sources of information, family and friends, including household members and social media contacts (*n*=39; 75%), internet reference tools such as Google and Wikipedia (*n*=42; 80%), and their employers or coworkers (*n*=18; 35%) were chosen at the top. Responses ebbed thereafter; however, television/radio/news channels (*n*=16; 31%), school/university (*n*=13; 25%), and public library (*n*=10; 19%) ranked lower. Church/temple or community centre ranked last (*n*=8; 15%).

Ultimately, the findings reify what information behaviour suggests about immigrants' information-seeking: acculturating immigrants, whether recently arrived or long-residing as per migration scholarship, perpetually seek information as they navigate a new society. Almost all study participants require daily information. This constant need for information, and the breadth of information that respondents engage with, suggests that immigrants must bridge cultural nuance while also navigating their new information environments. The prioritisation of education and career information highlights that economic and professional integration are key drivers of acculturation. Interestingly, legal and immigration needs ranked as moderately important, indicating that initial immigration status management may later shift toward long-term socioeconomic stability in the process of acculturation, as will be discussed further on. Strong reliance on family, friends, and social media reflects the importance of sociocultural or ethnic networks in easing the transition. Furthermore, the preference for speed and accuracy in information demonstrates a pragmatic approach to overcoming the uncertainties of living in an unfamiliar culture. These information behaviors support that acculturation involves a practical, daily effort to master the informational landscape of the country to which an immigrant relocates.

RQ2: Adjusting to information challenges

Of 49 who responded, 13 respondents (27%) selected *online/digital information* to be overwhelming most often, followed by *the lack of recent information* (*n*=12; 24%). Similarly, 24%

(*n*=12) reported being *very often* overwhelmed by *deadlines and appointments*. Reflecting a similar trend, 14 respondents (22%) indicated that they are *often* overwhelmed by *the lack of information* in general, while 13 respondents (28%) reported feeling *often* overwhelmed by *excess information* and *difficulties in obtaining information*.

In response to the question about how immigrants *navigate* information challenges ($n\bar{x}$ or weighted n=47), the highest percentage of respondents (*n*=21; 45%) expressed strong agreement with doing research on their own, followed by 40% of respondents (*n*=19) strongly agreeing with the statement that they seek help within their personal networks, for example, friends, loved ones, and community. More nuanced responses were observed regarding a statement about making a quick decision based on available information. Approximately 28% (*n*=13) neither agreed nor disagreed with the statement, while 32% (*n*=15) indicated that they somewhat agreed. While most respondents (*n*=13; 28%) somewhat agreed with postponing a task when faced with information challenges, 15% (*n*=7) strongly disagreed. This represents the highest number of respondents who selected the *strongly disagr*ee option among all response options.

When asked about how immigrants *overcome* information challenges, the open-ended questions corroborated the results from the information challenge navigation tendencies. Most respondents indicated that they seek help from community networks, including community centres, trusted bilingual services, and cultural organisations. Some indicated that they engage in independent research by using Google or listening to the news. Reliance on personal and professional connections, including coworkers and 'information-savvy' field/subject experts, was another recurring information source. Additional strategies included developing language fluency and digital literacy skills as well as increasing familiarity with the host country's government systems and cultural orientation.

When asked about specific ways to *improve* the difficulties of getting information, several prominent themes emerged. Respondents emphasised that offering information services for free or at a low cost increases access to information. Another prominent theme was language accessibility. Several respondents expressed a preference for having multiple language options and translation services. Relatedly, respondents also stated that having various modes of access, via print, in-person, or online, can increase information accessibility by tailoring to the information user's preferences. In addition, the provision of technology devices, as well as Wi-Fi access ('internet for all'), was suggested. Several respondents emphasised the importance of creating a welcoming and hospitable information environment that provides accommodation. In this context, it is worth noting that 'library' was specifically mentioned as a way to address information challenges. Additional responses included a one-stop resource hub where immigrants can access multiple services at once, the provision of culturally relevant resources, and community outreach programs.

Regarding how leaders can improve information quality and access for immigrants, responses leaned toward establishing a systematic approach to enhancing information quality and accessibility. Suggestions included providing acculturation services through support agencies and educated workers, improving existing governmental information infrastructures by keeping information on official websites up to date, and establishing oversight of information for immigrants, including vetting search engines for transparency, accuracy, and fairness.

Assessing how often information overwhelms or burdens respondents, on average, 31% reported that they are sometimes overwhelmed by all 18 categories of information stressors (see Table 2). Most participants (*n*=17; 35%) indicated that they are sometimes overwhelmed by *the required attention*, followed by *excess information* (*n*=16; 33%) and *the required action* (*n*=16; 33%).

Several items either rarely or never overwhelmed respondents. The largest number (*n*=15; 31%) reported that they are *rarely* overwhelmed by *print information*, while 11 respondents (22%) selected the same about *the authority or formality of information*. Seven respondents shared that they are never overwhelmed by *visual information* (*e.g., posters and advertisements*), which represents the highest number of *never* response options. Consistent with this pattern, the fewest respondents (*n*=1; 2%) reported that they are never overwhelmed by either *a lack of information* or *excess information*. Across all response categories, the degree of overwhelm was most evenly distributed for *visual information* (SD = 0.06), followed by *the lack of recent information* (SD = 0.07). Responses related to *deadlines or appointments* were also moderately evenly spread (SD = 0.8).

Field	Very often		Often		Sometimes		Rarely		Never	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Identifying a need for information	11	22%	11	22%	15	31%	7	14%	3	6%
Searching for information	10	20%	10	20%	15	31%	10	20%	2	4%
Selecting information	10	20%	10	20%	14	29%	11	22%	2	4%
Using or applying information	11	22%	9	18%	16	33%	8	16%	3	6%
Print information (e.g., print dictionary)	5	10%	7	14%	14	29%	15	31%	6	12%
Online/Digital information (e.g., online dictionary)	13	27%	10	20%	11	22%	10	20%	3	6%
Verbal information (e.g., radio)	10	20%	5	10%	12	24%	15	31%	5	10%
Visual Information (e.g., posters, advertisements)	10	20%	6	12%	13	27%	11	22%	7	14%
Excess information (i.e., too many resources)	8	16%	13	27%	16	33%	8	16%	1	2%
The lack of information (i.e., too few resources)	12	24%	14	29%	11	22%	10	20%	1	2%
The lack of recent information (i.e., age of resources)	12	24%	8	16%	12	24%	10	20%	4	8%
The variety of information (i.e., too many kinds of resources)	10	20%	11	22%	15	31%	7	14%	3	6%
Difficulty in getting information (i.e., accessibility of resources)	8	16%	13	27%	15	31%	9	18%	2	4%
The authority or formality of information (e.g., government, university, or other "official" resources)	8	16%	11	22%	16	33%	11	22%	1	2%
The required attention (i.e., reading or understanding resources)	8	16%	11	22%	17	35%	8	16%	3	6%
The required action (i.e., processing or submitting resources)	10	20%	8	16%	16	33%	8	16%	4	8%
Deadlines or appointments (i.e., urgency of the resources)	12	24%	10	20%	14	29%	7	14%	4	8%
Visiting places that provide information (e.g., libraries, government offices, community centers)	11	22%	10	20%	14	29%	7	14%	4	8%

Table 2. Immigrants' Information Overload Scale

RQ3: Reciprocal acculturation

The respondents also shared that they support their non-immigrant neighbours' acculturation. Some respondents indicated that they share information with their US-born counterparts. The types of interactions listed ranged from news to sports. Several specifically listed 'cultural events', 'community gatherings', 'community updates and cultural events', 'local event updates', community safety, and music as the type of information that they offer. One survey participant noted, 'Yes, I have shared information with US-born neighbours, such as local community events, safety alerts, and helpful services, often through conversations, social media groups, or neighbourhood apps to keep everyone informed and connected'.

Others provided knowledge of their heritage or birth country with their US-born neighbours. Examples include 'history, music, and politics of my home country'. A similar account is demonstrated in this anecdote, 'I have shared information about my culture and my country'. News is a crucial area of cross cultural exchange, and one respondent indicated 'Yes. I discussed news about Shohei Ohtani going to the LA Dodgers'. Another pinpointed, 'Yes, I have shared community event details and health-related alerts that I learned from immigrant networks with my neighbours'. Similarly, safety was listed in 10 of the 32 open-ended responses.

Survey respondents also appear to provide neighbours with references and resources. One explained that they recently 'shared educational information with my neighbour whose son is about to resume college'. Several other open-ended resources reified that immigrants share guidance on navigating local networks with non-immigrant neighbours. This insight captures this dynamic: 'Being an immigrant, there are places I know which some of my friends don't know, so I share some information to them when needed'.

Discussion

The study highlights the pivotal role that information plays in the daily lives of acculturating immigrants. Many of the respondents are under the age of 34. At the same time, the sample included relatively recent arrivals who migrated in the last 20 years. The average age was 33, while the average length of time in the United States was 16.7 years. Likewise, respondents represented 32 countries and spoke 10 languages. Despite this remarkable variance, the respondents felt that they were still acculturating to US society. Their accounts were consistent in some instances.

Preferences and daily habits

Some of the data aligns with information scholarship, particularly studies exploring immigrants' financial or employment realities, in that survey participants ranked career, education, and employment as top reasons for needing seeking or using information. These patterns align with the work of Williams (2024) on immigrants' financial information-seeking, Mabi's (2020) studies on highly skilled immigrants, and Shuva's (2022) research on immigrants' employment-related information-seeking. Immigrants turn to trusted sources such as family and friends. Indeed, family and friends continue to be primary sources, as firmly entrenched in the information behaviour scholarship (Chu, 1999; Grossman et. al, 2022).

There were counterintuitive results, however. Despite prevalent research indicating that immigrants rely substantially on diasporic media such as television, radio, and news sources, only 16% of respondents appeared to turn to media. Even so—and as explained further on—when asked how they help non-immigrant neighbours acculturate, many respondents included news-sharing as an example. Apropos, although immigrants are thought to want primarily legal and political information, the respondents herein did not rank these as preferred information resources. In fact, only seven, or 4%, of respondents regularly need, seek, or use politics/current events in their

everyday lives. At the same time, 18% sought legal and immigration information. It must be noted that this relatively lower percentage does not equate to a lack of information needs. Immigrants require varied legal information and services, particularly depending on their time of arrival and financial circumstances (Bach, 1994). It is possible to infer that, with an average length of stay of 17 years since arrival, the majority of respondents have moved beyond the settlement phase. However, there are significant barriers to immigrants seeking legal information, including language, cultural, and immigration status-related factors (Ahmed et al., 2016). Consequently, the reported ranking of legal information seeking may not representatively reflect the actual realities of immigrants' legal information needs. The findings might suggest that, although immigration dominates the current US sociocultural landscape, some immigrants attend to legal or immigration matters while also avoiding current political events. This might coincide with the need to safeguard against nativist, anti-immigrant sentiment while navigating immigration and acculturating.

Another paradoxical finding lies in that, while health and wellness were noted as an information priority from the aspect of acculturation, few respondents (*n*=8; 5%) sought religious or spiritual information. Few turned to religious leaders and places of worship (*n*=8; 5%) as essential information grounds, at least according to the participants in this study. Yet, for decades, social science research has illustrated how immigrants often deepen their faith or spirituality upon migration (Croucher & Kramer, 2017; Sharp, 2010; Stephen & Merrill, 2011). These divergences might enhance what we know about immigrant wellness; religious participation is not the only facet of well-being. The participants in this study listed other outlets—for example, entertainment, which constituted the second highest-ranked information preference. In other words, everyday or quotidian immigrant information behaviour can span from serious pursuits to respite and personal interests.

Respondents prefer both seeking information on their own and consulting with community members. This duality again affirms the breadth of immigrant information behaviour. Most respondents indicated that they seek help from community networks, including community centres, trusted bilingual services, and cultural organisations. There is an important element of collective knowledge and mutual aid. However, they also shared that they search and get information on their own. Some indicated that they engage in independent research by using Google or listening to the news.

Barriers and overwhelm

Acculturative stress and overwhelm coincide with specific information features, according to respondents. Both the scarcity of information and, conversely, an abundance of information appeared to prompt stress. Similarly, the required attention and action prompted stress. This coincides with the data point that 33% of respondents (*n*=16) expressed a certain level of overwhelm when it comes to information use while 14 respondents (29%) reported having a somewhat similar overwhelmed experience visiting information-providing organisations. In this context, incorporating immigrants' suggestions on improving information accessibility might shed light on potential ways to reduce information barriers and overwhelm.

Furthermore, respondents expressed varying levels of overwhelm regarding information stressors. Notably, 31% reported feeling overwhelmed by information demands, with specific challenges including *online information* and *deadlines*. In other words, temporal limits along with internet-based information induce barriers or stress. The respondents offered key suggestions for improvement, all of which are important to information leaders. Examples include enhancing language options and offering affordable information services.

It is also worth noting what does not overwhelm, according to the respondents. Visual, print/analog, and audio information were ranked least overwhelming, which might suggest that resources are best when they not rely solely on online and traditional access. Offline and straightforward information may facilitate information acculturation. In other words, some immigrants prefer formats that are simple and familiar, possibly to their cultural contexts.

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What immigrants contribute

Acculturation is reciprocal or bidirectional. The data adds unique details regarding how immigrants see themselves contributing to their US-born neighbours' information. The primary influence, according to respondents, is cultural awareness. Respondents shared that they offered a variety of knowledge to non-immigrants, whether local developments, nearby resources, safety tips, or even the latest updates about a baseball team. Again, these findings align with acculturative research in that positive information encounters are also essential to acculturation (Mercado, 1997), and the lack of information is not the only possible circumstance. The data supports that acculturation can also be seen as bidirectional information-sharing whereby immigrants exchange information. This, too, coincides with Bektashi and van Hook's (2015) point that cultural stories promote positive acculturation. Crucially, positioning respondents as information providers rather than recipients changes the view of immigrants as high-need and information novices. The findings demonstrate that other members of society benefit when immigrants are informed and knowledgeable throughout their acculturative journeys. Ultimately, positioning immigrants as knowledgeable contributors challenges prevalent misconceptions of one-way exchanges and highlights how positive information encounters facilitate successful integration for the entire community.

Thoughts on ethics in immigrant information behaviour methods

This study gleans from literature to tie immigrants' acculturation, their ordinary responses to information, and broader societal forces. In keeping with the thread of understanding and affirming immigrants' culturally situated information behaviour, this study builds on previous work (Ndumu, 2021) exploring immigrants' experiences with information overload, specifically behavioural (information need, seeking, use), qualitative (print, digital, verbal, visual), and quantitative (excess, scarcity, timeliness, spatial, urgency, treatment, complexity, authority) dimensions.

The survey development was itself a deeply contemplative and deliberately slow process, but the even more difficult work of caring for respondents came afterward. The researchers learned valuable lessons on, ironically, adjusting or acculturating to fraught and uncertain social and political times. Throughout this initiative, they reflected on how best to and/or whether to collect more data. It was imperative to remain sensitive and thoughtful of vulnerabilities when immigrants opt into research, no matter their backgrounds. Foregoing interviews and weaning survey questions to the necessary while also making room for agency and open responses are among the various ways that this study espoused beneficence.

Conclusions

Although the accounts from this small sample do not represent all US immigrants, the evidence offers a glance at immigrant information acculturation—a promising and timely information science subfield in need of expansion. Here, the researchers explore the experiences of US-based immigrants with information during acculturation primarily through immigrants' perceptions. The study identifies characteristics of their everyday information behaviours, information challenges, and cultural information-sharing with US-born neighbours, or bidirectionality. By analysing preliminary data on immigrants' perceptions of information challenges, strategies to overcome them, and the mutual benefits of bidirectional acculturation for both US-born non-immigrants and immigrants, the study findings shift the current notion of immigrants as mere recipients of information services to potential providers of rich, multicultural acculturative information. The current anti-immigrant US political climate in addition to the consequential defunding of federal research led to methodological disruption, prompting us to analyse quantitative data primarily. Adaptations were necessary to prioritise immigrant participants' safety. To the extent possible, the researchers plan to collaborate on future discussions and convenings on external factors that must be considered when conducting immigrant-centred empirical research, especially ways to practically and ethically mitigate impact. Information behaviour researchers have an opportunity to uncover evidence of what happens when immigrants adjust to labyrinthine and polarised information environments in countries like the United States. These reflections on the methodological adaptations and the ethical considerations around the choices highlight what is required to continue the commitment to accurately and multidimensionally representing immigrants' acculturative information behaviours, including seeking, stressors, and assets.

While the current study focuses on gauging the extent of immigrant acculturative experiences through a survey, future research focusing on their narratives on how they engage in acculturative information seeking is recommended. Hopefully, there will be more studies on the acculturative dimensions of information norms—that is, the ways in which people remain rooted in their culture while navigating US information environments. Information acculturation involves not only immigrants' knowledge of US culture and infrastructure, but also institutional and societal responsibility. There is promise in a line of immigrant-related information behaviour research that adds to ongoing migration studies scholarship on acculturation by underscoring information as a cornerstone of successful acculturation as well as an antidote to acculturative stress.

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Appendices

Appendix A: Revised Information Overload Scale

Section 1:

For this research study, an immigrant is defined as a person who:

- and was not born in the United States or its territories
- but permanently resides in the U.S., whether documented or undocumented.

Q1. Are you an immigrant?

- Yes
- No →Skip Pattern to Section 6

Q2. Which country were you born in? _____

Q3. What year were you born in? _____

Q4. What year did you move to the U.S.? _____

(Optional) We invite you to share any other details about your background (e.g., country in which you were born, language spoken, city in which you reside, level of education)

_____

Section 2: Information Behavior

Information is described as knowledge that is necessary to manage one's daily life. Information can be used for any reason (for example, education, health, entertainment/recreation, etc.). Information resources can be formal or informal, verbal or print, digital or hard copy, and can be obtained in many ways (such as friends, family, books, online search engines, libraries, news outlets, and more).

Q4. In your everyday life, how often do you:

	Daily	4-6 times a week	2-3 times a week	Once a week	Rarely
NEED information to answer a question or complete a task?	○	○	○	○	○
SEARCH FOR information to answer a question or complete a task?	○	○	○	○	○
USE information to answer a question or complete a task?	○	○	○	○	○

Q5. Which of the following resources and/or places do you use most? Please select the top three.

- ○ Family or Friends (Household members, Facebook contacts)
- ○ Internet reference tools (Google, Wikipedia)
- ○ School/University
- ○ Television/Radio/Newspaper
- ○ Employer or Coworkers
- ○ Church/Temple or Community Center
- ○ Public Library

- Other (Please specify) _____

Q6. In the past week, which have been your top three reasons for needing, seeking, or using information in your everyday life:

- Education/Career
- Legal/Immigration
- Community/Housing
- Parenting/Marriage/Dating
- Religion/Spirituality
- Shopping/Entertainment
- Social/Recreation
- Health/Wellness
- Finance/Employment
- Politics/Current Events
- Other (Please specify) _____

Q7. How important are these factors when gathering information?

	Extremely important	Somewhat important	Unimportant
How quickly I get an answer	○	○	○
The accuracy of the answer	○	○	○
The ease of getting an answer	○	○	○
Familiarity with sources	○	○	○
Obtaining the latest sources	○	○	○

Section 3: Information overload

Information overload is described as a general feeling of frustration or anxiety as a result of needing, seeking or using information resources.

Q8. Do you ever feel overwhelmed or burdened by the following?

	Very often	Often	Sometimes	Rarely	Never
Identifying a need for information	•	•	•	•	•
Searching for information	•	•	•	•	•
Selecting information	•	•	•	•	•
Using or applying information	•	•	•	•	•
Print information (e.g., print dictionary)	•	•	•	•	•
Online/Digital information (e.g., online dictionary)	•	•	•	•	•
Verbal information (e.g., radio)	•	•	•	•	•
Visual Information (e.g., posters, advertisements)	•	•	•	•	•
Excess information (i.e., too many resources)	•	•	•	•	•
The lack of information (i.e., too few resources)	•	•	•	•	•
The lack of recent information (i.e., age of resources)	•	•	•	•	•

The variety of information (i.e., too many kinds of resources)	•	•	•	•	•
	Very often	Often	Sometimes	Rarely	Never
	Very often	Often	Sometimes	Rarely	Never
Difficulty in getting information (i.e., accessibility of resources)	•	•	•	•	•
The authority or formality of information (e.g., government, university or other "official" resources)	•	•	•	•	•
The required attention (i.e., reading or understanding resources)	•	•	•	•	•
The required action (i.e., processing or submitting resources)	•	•	•	•	•
Deadlines or appointments (i.e., urgency of the resources)	•	•	•	•	•
Visiting places that provide information (e.g., libraries, government offices, community centers)	•	•	•	•	•

Q9. Do you agree or disagree with the following?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I deal with information challenges by asking my friends, loved ones, or community for help.	•	•	•	•	•
I deal with information challenges by doing more research on my own.	•	•	•	•	•
I deal with information challenges by deciding quickly based on the information I have.	•	•	•	•	•
I deal with information challenges by postponing the task.	•	•	•	•	•

Section 4: Solutions

This section asks questions about ways to improve information systems and processes in the U.S. Your answers can be 1-2 sentences. There are no right or wrong answers.

Q.10 In your opinion, how do immigrants overcome information barriers in the U.S.?

_____

Q. 11 In your opinion, what are way to determine reliable sources of information in the U.S.?

_____

Q. 12 In your opinion, how can leaders improve information quality and access for immigrants living in the U.S.?

_____

Q.13 In your opinion, what are ways to improve the difficulty of getting information (e.g., cost, time) for immigrants living in the U.S.?

_____

Section 5: Expertise

This section asks questions about your information habits prior to migrating to the U.S. We are interested in what others can learn from immigrants and how immigrants' information skills can be used to help those born in the US The term "U.S.-born neighbors" here refers anyone born in the U.S., whether they are relatives,

coworkers, or those in your community. Your answers can be 1-2 sentences. There are no right or wrong answers.

Q. 14 Have you ever shared information (e.g., news, alerts, community) with your U.S.-born neighbors? If so, please describe?

_____

Q. 15 Have you ever explained the way information resources (e.g., government, educational, faith) work in your birth country? If so, please describe.

_____

Q. 16 Have you ever given your U.S.-born neighbors any tips about information resources (e.g., apps, websites, books)? If so, please describe.

_____

Q. 17 Have you ever helped your U.S.-born neighbors find information?

_____

Q. 18 What are aspects of information resources from your birth country that have helped you adjust to living in the U.S.?

_____

Q. 19 Is there anything else that you would like to add about your experiences with information since immigrating to the U.S.?

- o No
- o Yes

Section 5: Follow-up Study

You are eligible to earn a $25 Tango gift certificate by participating in a follow-up research activity that asks you to draw your information world. The gift card is sent in 2-4 weeks. Are you willing to take part in a 5-10 minute follow-up activity?

- o No
- o Yes

Please provide your contact information:

Name :

Email :

Phone # :

Appendix B: 56 Scales Identified to Enhance Immigrant Acculturation Constructs

Scale	Author, Year
A Short Acculturation Scale for Filipino Americans (ASASFA)	Cruz, F. A. D., Padilla, G. V., & Agustin, E. O. (2000).
Abbreviated Multidimensional Acculturation	Zea, M. C., Asner-Self, K. K., Birman, D., & Buki, L. P. (2003)
Acculturation Attitudes Scale	Berry, J. W., Kim, U., Power, S., Young, M., & Bujaki, M. (1989)
Acculturation Attitudes Scales (Latin and Canadian acculturation attitudes)	Don & Berry (1994)
Acculturation Index	Ward & Kennedy (1994)

Acculturation Questionnaire for Children	Van de Vijver, F. J., Helms-Lorenz, M., & Feltzer, M. J. (1999)
Acculturation Rating Scale for Mexican Americans (ARSMA)	Cuellar, I., Harris, L.C., & Jasso, R.(1980).
Acculturation Scale	Ghuman (1991)
Acculturation Scale American-International Relations Scale (AIRS)	Sodowsky & Plake (1991)
Acculturation Scale for Southeast Asians	J Anderson, M Moeschberger, MS Chen, P Kunn, ME Wewers, R Guthrie (1993)
Acculturation Scale for Vietnamese Adolescents (ASVA)	Nguyen, H. H., & von Eye, A (2002)
Acculturation Strategies Scale	Kosic (1998)
Acculturative Stress Index	Noh & Avison (1996)
African American Acculturation Scale	Landrine & Klonoff (1994)
African American Acculturation Scale Revised (AAAS-R)	LKlonoff & Landrine (2000)
American and Puerto Rican Cultural Involvement Scales	Cortés, D. E., Rogler, L. H., & Malgady, R. G. (1994)
ARSMA-II (30-item)	Cuellar, I., Arnold, B., & Maldonado, R. (1995)
Asian American Acculturation Inventory (AAI)	Flannery, W. P. (1996)
Asian American Multidimensional Acculturation Scale (AAMAS)	Gim Chung, R. H., Kim, B. S., & Abreu, J. M. (2004)
Asian Value Scale (AVS)	Kim, Atkinson & Yang (1999)
Behavioral and Value Acculturation Scale	Szapocznik, J., Scopetta, M. A., Kurtines, W., & Aranalde, M. D. (1978)
Bicultural Involvement Questionnaire (BIQ)	Szapocznik, J., Kurtines, W. M., & Fernandez, T. (1980)
Bicultural Stress Scale (BSS)	Romero & Roberts (2003)
Biculturalism/Multiculturalism Experience Inventory	Ramirez (1983)
Bidimensional Acculturation Scale	Marin & Gamba (1996)
Brief Acculturation Scale (A)	Norris, Ford & Bava (1996)
Brief Acculturation Scale (B)	Meredith, Wenger, Liu, Harada & Kahn (2000)
Campisi's 1947 Scale	Campisi (1947)
Chief's 1940 Scale	Chief (1940)
Children's Acculturation Scale	Franco (1983)
Cultural Adjustment Difficulties Checklist (CADC)	Shim, Y. R., & Schwartz, R. C. (2007)
Cultural Attitudes Scale	Rudmin & Ahmadzadeh (2001)
Cultural Lifestyle Inventory	Mondoza (1989)
Cultural Values Conflict Scale (CVCS)	Inman, A. G., Ladany, N., Constantine, M. G., & Morano, C. K. (2001)

Enculturation Measure for Native American Youth	Zimmerman, Ramirez-Valles, Washienko, Walter, and Dyer (1996)
European American Value Scale for Asian Americans (EAVS-SS)	Wolfe, M. M., Yang, P. H., Wong, E. C., & Atkinson, D. R. (2001)
Evaluation of acculturation stress (EBEA)	Urzúa, A., Henríquez, D., Caqueo-Urízar, A., & Smith-Castro, V. (2021)
Greek-American Acculturation Scale	Harris & Verven (1996)
Hazuda Scale	Hazuda, Stern & Haffner (1988)
MASALA Scale	Needham, B. L., Mukherjee, B., Bagchi, P., Kim, C., Mukherjea, A., Kandula, N. R., & Kanaya, A. M. (2017)
Multidimensional Acculturative Stress Inventory (MASI)	Rodriguez, N., Myers, H. F., Mira, C. B., Flores, T., & Garcia-Hernandez, L. (2002)
Multiphasic Assessment of Cultural Constructs-Short Form (MACC-SF)	Cuellar, Arnold, & Gonzalez (1995)
Na Mea Hawai'i Scale American	Rezentes (1993)
Nagaraj biculturalism measure	Nagaraj, N. C., Vyas, A. N., McDonnell, K. A., & DiPietro, L. (2018)
Native American Acculturation Scale (NAAS)	Garrett & Pichette (2000)
Psychological Acculturation Scale (PAS)	Topp, L., Hando, J., Dillon, P., Roche, A., & Solowij, N. (1999)
Scale of Acculturation	Rissel (1997)
Short Acculturation Scale for Hispanics (SASH)	Marin, G., Sabogal, F., Marin, B. V., Otero-Sabogal, G., & Perez-Stable, E. J. (1987)
Social, Attitudinal, Familial, and Environmental (SAFE)	Negy, C., Schwartz, S., & Reig-Ferrer, A. (2009)
Sommerlad 1968 original Likert measure	Sommerlad, E. A. (1968)
Stephenson's (2000) Multigroup Acculturation	Stephenson, M. (2000)
Suinn-Lew Asian Self Identity Acculturation Scale (AKA SL ASIA)	Chun, K. M., Kwan, C. M., Strycker, L. A., & Chesla, C. A. (2016)
Taiwan Aboriginal Acculturation Scale (TAAS)	Cheng, A. T., & Hsu, M. (1995)
The Hispanic Stress Inventory (HSI-I)	Cervantes, R. C., Padilla, A. M., & Salgado de Snyder, N. (1991)
The Revised Hispanic Stress Inventory (HSI-II)	Cervantes, R. C., Fisher, D. G., Padilla, A. M., & Napper, L. E. (2016)
Traditional Behavior Scale	Solomon, T. G. A., & Gottlieb, N. H. (1999)
Vancouver Index of Acculturation (VIA)	Ryder, A. G., Alden, L. E., & Paulhus, D. L. (2000)

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Self-stigma, alcohol use disorder, information behaviour: a theoretical and conceptual synthesis

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Abstract

Introduction. This study explores how self-stigma influences the information behaviour of individuals living with alcohol use disorder by integrating Goffman's theory of stigma and impression management with Chatman's theories of information poverty and small worlds. It examines how secrecy, selective disclosure, and bounded trust shape information seeking, sharing, and avoidance in stigmatised contexts.

Method. A conceptual and theoretical synthesis approach was used, drawing from sociological and information behaviour literature to identify points of intersection between stigma, identity management, and information control.

Analysis. The analysis highlights how individuals with alcohol use disorder construct trusted small worlds where insider trust is high, but information exchange remains limited. Within these worlds, secrecy and selective engagement with information function as protective strategies rather than mere barriers.

Results. The study introduces the adapted concept of *information insularity*—a self-protective form of information control where individuals create informational islands to maintain safety, identity, and belonging.

Conclusion. Findings suggest the need for stigma-sensitive and anonymous information systems that foster trust while expanding access to credible, evidence-based resources. Theoretically, this work reframes self-stigma as an informational condition and contributes to understanding how social vulnerability shapes everyday information behaviour.

Introduction

Alcohol use disorder is a chronic medical condition characterised by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences. Recovery from alcohol use disorder involves a complex, ongoing process that may include formal treatment, peer support groups, behavioural therapies, and behavioural changes over time. However, individuals in recovery face significant challenges in accessing and managing the information necessary for treatment decisions, relapse prevention, and social reintegration. These challenges are compounded by the pervasive stigma surrounding alcohol use disorder, which can lead to social isolation and barriers to seeking help or knowledge.

Stigma is an attribute reflective of a tainted and devalued identity caused by a deviation from the norm (Goffman, 1963). Alcohol use disorder is among the most stigmatised health conditions globally. People with alcohol use disorder, and those with substance use disorders more broadly, are often blamed for their condition (Corrigan et al., 2009; Cheetham et al., 2022) and face a social environment characterised by secrecy, fear of disclosure, and negative societal judgements. Importantly, this burden can persist even after misuse has ended, a factor that Ginspoon (2018), identifies as a distinguishing feature of addiction compared to other medical conditions.

These factors directly influence how individuals seek, avoid, and share information. Stigma is pervasive and present throughout the pre-, during, and post recovery journey (for those who attain sobriety). While research in information science has examined marginalised groups' information behaviour, for instance, parents of individuals with disabilities (Gibson & Martin, 2019; Chatman, 1995), limited attention has been paid to alcohol use disorder specifically. It is equally important to note, though not within the scope of this work, that stigmatisation for people with alcohol use disorder is further compounded by other intersectional factors like race, sexual orientation, economic status.

Goffman's (1963) theory of stigma management provides a foundational understanding of how individuals negotiate discredited or discreditable identities in everyday life. His framework highlights how people manage information about themselves to avoid social rejection, often engaging in concealment, secrecy, or selective disclosure. These strategies resonate strongly with patterns observed in information behaviour, particularly when individuals perceive that seeking information could expose them to judgment or loss of status.

Chatman's work on information poverty offers a complementary perspective by situating information behaviour within the boundaries of social norms and trust. Chatman (1996, 1999) demonstrated that people living in marginalised or closed social environments often restrict their information seeking to insiders and avoid external sources perceived as risky or irrelevant. Her theories illuminate how social norms, fear of exposure, and self-protective behaviours can limit access to potentially beneficial information, a dynamic that closely parallels the experiences of individuals facing stigma due to alcohol use disorder.

By synthesising Goffman's stigma management theory with Chatman's information poverty theory. This paper conceptualises stigma as a defining context for information behaviour. This theoretical synthesis contributes to information behaviour research by offering a framework that links the management of stigma with the experience of information poverty, thereby deepening our understanding of the informational dimensions of living with alcohol use disorder.

Objectives

The objectives of this paper are to:

1. theoretically connect self-stigma with Chatman's constructs of information poverty,
2. explain how self-stigma gives rise to *insider* and *outsider* small worlds and how these shape trust, disclosure, and information engagement among individuals with alcohol use disorder, and
3. identify and conceptualise *stigma-shaped information behaviour*, including selective trust, information avoidance, and anonymized information seeking, as they manifest in the context of alcohol use disorder.

Literature review and theoretical foundation

Stigma and information behaviour in alcohol use disorder

The National Institute on Alcohol Abuse and Alcoholism (2025) defines stigma as 'negative beliefs about individuals or groups based on characteristics that may set them apart from others, such as mental health conditions including alcohol use disorder (AUD)' (para. 2). It is a form of prejudice (Bathje & Marston, 2014), the consequences of which might be severe, leading to avoidance of treatment and help seeking (National Institute on Alcohol Abuse and Alcoholism, 2025; Docksey et al., 2022), social isolation and ostracism (Prizeman, Weinstein & McCabe, 2023), loss of self-esteem (National Institute on Alcohol Abuse and Alcoholism, 2025), and disempowerment and discrimination (Bathje & Marston, 2014) among others. The concept of stigma thus appears to connote a socially conferred identity by otherness in society, further leading to social inequalities.

Stigma has been categorised into three interrelated types: structural or institutionalised stigma, public stigma, and self–stigma (Cheetham et al., 2022; Corrigan, Larson, et al., 2009). Structural stigma is embedded in institutional policies, laws, and funding structures that limit access to comprehensive and evidence-based treatment (McCullock & Scrivano, 2023), for alcohol-related problems. The historical separation of alcohol and substance use treatment from general health care, combined with limited trained professionals and hospital-focused detoxification, has fragmented care and reinforced perceptions that individuals with alcohol use disorder are less deserving than other patients. Policies favouring punitive or abstinence-only approaches over harm reduction further exacerbate these inequities, contributing to missed diagnoses, preventable health complications, and barriers to effective treatment (Nelson et al., 2017). Moreover, public stigma, reflected in widespread negative stereotypes and discriminatory attitudes, positions people with alcohol use disorder as morally weak, irresponsible, or personally at fault for their condition (Na et al,, 2022; McCullock & Scrivano, 2023). Russel et al. (2023) and Bosworth et al. (2025) noted that such representations are perpetuated through media narratives that frame alcohol dependence as a behavioural failure rather than a medical or social issue, reinforcing societal prejudice and discouraging empathy or support for treatment access. Together, structural and public stigma establish a reinforcing cycle that legitimises discriminatory treatment practices (Cheetham et al., 2022), sustains social exclusion, and exacerbates health inequities (Bolster-Foucault et al., 2021), and operates outside the locus of control of these individuals.

Previous studies confirm that stigma significantly shapes help-seeking, social avoidance, and both public and self-stigma responses among individuals with alcohol use disorder. Research in Denmark found that stigma and shame were major barriers to formal treatment seeking, especially among heavier drinkers (Finn, Mejldal & Nielsen, 2023). Another large survey linked

higher levels of stigma with lower preferences for both formal and informal help-seeking, indicating that stigma influences individuals' decisions about where and how to seek information (Finn, Mejidal & Nielsen, 2023). Population-level reviews further show that people with alcohol use disorder face higher public stigma and social distance than many other mental health conditions (Kilian et al., 2021). Qualitative work on online mutual aid communities highlights how anonymity and peer support shape engagement with recovery information and identity negotiation (Chambers et al., 2017). Cross-cultural studies also illustrate that stigma contributes to avoidance and social distancing behaviours, reinforcing the relevance of socially bounded information practices (Yang et al., 2025). Given its enduring psychological and behavioural effects, self-stigma constitutes a critical component of the broader stigma framework, both reflecting and perpetuating the structural and public forces that constrain recovery for individuals living with alcohol use disorder (National Academies of Sciences, Division of Behavioural, Social Sciences, Board on Behavioural, Sensory Sciences, & Committee on the Science of Changing Behavioural Health Social Norms, 2016).

Moreover, self-stigma, the internalisation of societal prejudice and negative stereotypes, represents a deeply personal and psychologically damaging dimension of stigma (Corrigan, Larson & Rusch, 2009) for individuals with alcohol use disorder. When individuals internalise beliefs that they are devalued, flawed, or undeserving, they often experience diminished self-worth, shame, and hopelessness, which can significantly deter help-seeking and engagement with treatment services (Chaudoir et al., 2014). Self-stigma may lead individuals to conceal their condition, withdraw socially, or discontinue therapy prematurely, thereby reinforcing a cycle of isolation and relapse (Corrigan, Larson & Rusch 2009). Empirical evidence links self-stigma among people with alcohol use disorder to poorer mental health outcomes, including heightened depression, anxiety, and reduced quality of life (Cheetham et al., 2022).



Figure 1. Micro-level, source, impact, and strategies to reduce stigma. Adapted from Cheetham et al., (2022).

Self-stigma emerges when public devaluation becomes self-directed, producing shame, guilt, and a diminished sense of personal worth. These internalised emotions profoundly shape individuals' information behaviours, that is, how they seek, access, avoid, interpret, and use information related to their condition. According to Wilson's model of information behaviour (Wilson, 1981 in Wilson, 1997), information seeking is often motivated by a perceived need, but is constrained by intervening variables such as personal, social, and environmental barriers. For individuals experiencing self-stigma, these constraints manifest as avoidance of health information, reluctance to disclose alcohol-related problems, and mistrust of professional sources (Romo & Obiol, 2023). The anticipation of being judged or labelled can suppress motivation to seek information about treatment or recovery options, leading to delays in help-seeking and the perpetuation of misinformation.

Information seeking is therefore not an automatic response to the existence of an information need (Wilson, 1997). Other factors, including the perceived importance of satisfying the need, accessibility of information sources, economic constraints (Wilson, 2006), and stigma,

can mediate whether individuals act on their information needs. In this context, self-stigma functions not only as a psychological barrier but also as an informational one, influencing both the recognition of information needs and the strategies individuals employ to address them. This issue is particularly significant given that active information seeking has been widely recognised as a critical determinant of health behaviours in the literature on health information behaviour (Mirzaei et al., 2021; Zimmerman & Shaw, 2020; Weaver et al., 2010; Lambert & Loiselle, 2007).

Several information behaviour frameworks could potentially be applied to the study of health-related information practices, including Wilson's (1997) model of information behaviour and sense-making approaches. However, these frameworks are less well suited to capturing the social regulation of information interaction and engagement under conditions of stigma. Chatman's theory of information poverty is uniquely concerned with secrecy, perceived risk, and socially bounded trust, while Goffman's theory of stigma explicates the identity management processes that produce concealment and selective disclosure. Together, these theories offer a complementary lens for understanding how self-stigma constrains information behaviour in the context of alcohol use disorder.

Goffman's theory of stigma and information behaviour

Erving Goffman (1963) conceptualised stigma as a socially constructed process in which certain attributes or behaviours mark an individual as 'spoiled', creating challenges in social interactions and identity management. He distinguished between visible (discredited) stigmas and concealable (discreditable) stigmas. Individuals, such as people with alcohol use disorder, bearing a discreditable stigma often engage in impression management—strategically controlling information about themselves to present a favourable identity and avoid social devaluation. This process may involve hiding, passing, or selectively disclosing stigmatised traits to mitigate the risk of judgment or exclusion (Goffman, 1963).

Furthermore, Goffman categorised stigma into three types: physical deformities, blemishes of individual character, and tribal stigma. Physical deformities denote visible bodily differences; blemishes of individual character include perceived weaknesses such as addiction, mental disorder, and moral failings and so forth, categories highly relevant to those living with alcohol use disorder; and tribal stigma which refers to a form of devaluation stemming from membership in marginalised social group (Goffman, 1963). While it is important to acknowledge the full scope of Goffman's conceptualisation, this paper specifically focuses on what some people perceive as blemishes of individual character, given its direct relevance to self-stigma. Future research could adopt an intersectional approach to examine how physical and tribal stigmas interact with individual character stigma to influence identity, disclosure, and information behaviour.

The interplay between stigma, 'spoiled' identity, and impression management has direct implications for information behaviour. Individuals with alcohol use disorder may carefully regulate disclosure of their condition, avoiding formal healthcare sources or limiting discussions to trusted peers to protect their social image. This selective engagement with information mirrors Goffman's notion of maintaining a socially acceptable identity, demonstrating how stigma not only affects interpersonal interactions but also shapes access to knowledge, help-seeking behaviour, and participation in recovery processes.

Although Goffman's work on stigma is often cited in media and sociology studies, it is equally applicable to library and information science because it provides a framework to understand how self-stigma shapes information behaviour. His concepts help explain why individuals selectively seek, share, or conceal information, particularly in marginalised or stigmatised

contexts such as alcohol use disorder, where managing social identity is closely tied to information behaviour.

Chatman's theory of information poverty and self-stigma in alcohol use disorder

Lingel and Boyd (2013) observed that within health information behaviour scholarship, the concept of information poverty is particularly significant in contexts shaped by stigma, as it defines and reinforces the boundaries between insiders and outsiders. Chatman (2000) described an impoverished information world as one in which individuals either cannot or choose not to seek out sources that could assist them. Instead, they adopt secretive and self-protective behaviours to conceal their information needs from others who might otherwise provide support. Such individuals may distrust information from external or 'outsider' sources and instead rely on strategies of secrecy or selective sharing to maintain a sense of control over their everyday lives. This dynamic reinforces a boundary of privilege in which insiders, those within the stigmatised community, are seen as possessing unique insight into their shared experiences, while outsiders remain unable to fully understand the social and informational contexts of those living with stigma.

This highlights the distinction between the actual availability of information and the perceived richness or scarcity of informational resources. Individuals experiencing stigma or marginalisation may perceive their informational environment as impoverished, even if resources exist, because trust, social norms, and fear of judgment shape their engagement with information (Ligel & Boyd, 2013; Lannin et al., 2016). Within the framework of information poverty, such perceptions create real constraints: individuals may avoid seeking information from formal or external sources, rely solely on familiar peers, and selectively share or withhold knowledge to manage social risk. The insider concept further clarifies this dynamic, as marginalised individuals often inhabit tightly bounded networks where information circulates within trusted circles. This is reinforced by one of Chatman's (1996, 2000) propositions that information poverty can be a self-protective behaviour that is used in response to social norms. While these trusted insiders offer safety and social validation, they can reinforce perceptions of scarcity by limiting exposure to external, potentially valuable information. In this sense, information poverty is as much about perceived accessibility and trustworthiness as it is about objective availability, demonstrating how self-stigma and insider–outsider dynamics shape the flow, control, and use of information. Within this framework, individuals facing self-stigma due to alcohol use disorder inhabit an information environment where seeking information is constrained by fear of judgment or exposure. Information-seeking behaviour is therefore not merely a response to an information need (Wilson, 1997), but is shaped by social, psychological, and structural factors that can restrict engagement with formal sources.

Thus, individuals with alcohol use disorder often rely on trusted peers or small networks for information, selectively disclosing only what is deemed safe (Lannin et al., 2016). This corroborates the findings of the study by Bronstein (2014), which showed that information poverty was experienced through users' strong preference for insider knowledge, particularly insights drawn from others with similar lived experiences. This selective disclosure serves as a form of impression management, protecting their social identity and minimising the risk of further stigma. However, these practices can reinforce information poverty, limiting access to credible, evidence-based information about treatment and recovery, and perpetuating misconceptions or delayed help-seeking (Mikolajczak-Degrauwe et al., 2023). The interplay between self-stigma and restricted information access highlights how psychological barriers translate into tangible limitations on knowledge acquisition.

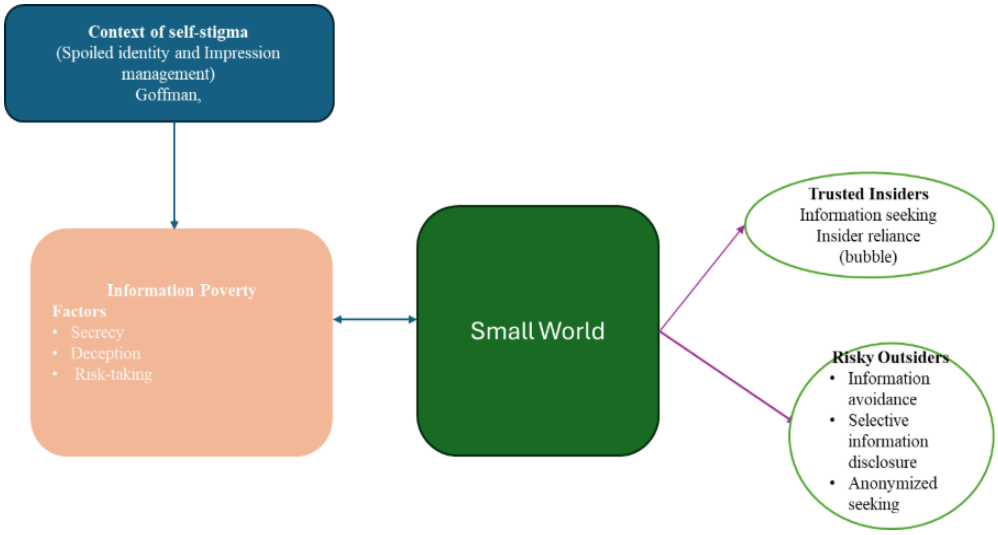


Figure 2. Conceptual synthesis of Goffman's stigma management and Chatman's information poverty theories.

Method

This study employs a conceptual and theoretical synthesis approach to explore how self-stigma influences information behaviour among individuals with alcohol use disorder. Rather than relying on empirical data, the analysis integrates insights from Goffman's (1963) stigma management theory and Chatman's (1996, 1999) information poverty theory alongside relevant literature in behavioural addiction and information science.

The selection of these theories is grounded in their complementary focus on secrecy, social norms, discrimination and trust concepts essential to understanding information behaviour in stigmatised contexts. While Goffman's framework originates from sociology, it provides critical insight into how individuals manage 'spoiled identities' through concealment, selective disclosure, and impression management, behaviours that directly affect information seeking and sharing. Chatman's theories, on the other hand, are foundational within library and information science and explain how marginalised groups experience information poverty due to secrecy, risk aversion, and distrust of outsiders. Integrating these perspectives enables a nuanced understanding of how stigma creates both structural and psychological barriers to information access and use.

Analytical framework

Using interpretive reasoning, this study compares the constructs of secrecy, deception, trust, and risk across both theories to identify areas of conceptual overlap and divergence. Through this synthesis, the study develops the concept of information insularity, which describes how individuals create bounded and protective information environments as a form of identity and risk management.

By emphasising theoretical integration over empirical testing, this approach contributes to health information behaviour research by framing self-stigma as an informational condition and offering a conceptual foundation for designing stigma-sensitive, trust-based information systems that promote safer and more inclusive engagement with information.

Theoretical synthesis/ implications/contribution

This synthesis brings together Goffman's (1963) theory of stigma management with Chatman's (1996) information poverty. It explores how self-stigma influences the information behaviour of people living with alcohol use disorder. Although this study is conceptual, existing empirical research supports the plausibility of the proposed framework. Qualitative studies of individuals with alcohol use disorder document reliance on peer-based information sources and avoidance of formal healthcare due to anticipated stigma (e.g., Romo & Obiol, 2023). Research on online recovery communities similarly shows that anonymity fosters engagement while limiting exposure to diverse perspectives (Brooks et al., 2017). These findings illustrate how information poverty and small-world reliance manifest in practice.

Secrecy, stigma, and information seeking

Goffman's (1963) idea of the 'spoiled identity' provides an important foundation for understanding how people manage stigma in everyday life. Individuals who see themselves as discredited or at risk of being discredited often control what they reveal and to whom, using strategies like concealment or selective disclosure to remain socially acceptable. For those with alcohol use disorder, revealing their condition or seeking treatment may lead to judgment or discrimination, making information seeking a socially risky act.

Chatman's (1996) theory of information poverty parallels this experience. She explained that people who face marginalisation often use secrecy, deception, and risk avoidance as strategies to protect themselves in environments they perceive as unsafe. In this sense, information poverty is not simply about lacking access; rather, it is about how social identity and safety shape what people are willing to know and share. When viewed alongside Goffman, these behaviours can be understood as protective and adaptive.

Trusted insiders and suspicious outsiders

Chatman's (1999) small world concept helps to explain how people build and maintain information networks within spaces of trust and shared experience. For individuals living with lcohol use disorder, these small worlds often include recovery groups, online peer communities, or close social circles where belonging and mutual understanding provide emotional safety (Brooks et al., 2017). Within these insider environments, information exchange tends to be selective, guided by shared norms, lived experiences, and a collective effort to manage stigma. While these trusted spaces support identity rebuilding and a sense of community, they can also limit access to professional, clinical, or evidence-based information, thereby reinforcing information poverty and what this study describes as information insularity.

From this perspective, small worlds both protect and confine. They reduce social and emotional risk by fostering trust, but their insularity can also narrow informational horizons. The intersection of Goffman's and Chatman's ideas reveals that information poverty is not only about lack of access; it is relational and perceptual, shaped by how people negotiate trust, visibility, and self-protection in response to stigma. In this insider–outsider tension, the 'trusted insider' becomes a gatekeeper of information, while 'outsiders' such as health professionals or unfamiliar sources are often viewed with suspicion or fear of judgement.

While similar dynamics may occur in other substance use contexts, the moral normalisation of alcohol use combined with the stigmatisation of 'problem drinking' intensifies impression management and secrecy in alcohol use disorder, making insider–outsider boundaries particularly salient compared to illicit substance use context.

Implications for theory

This synthesis deepens the theoretical understanding of information behaviour in stigmatised contexts by positioning self-stigma as an informational experience. It shows that seeking, sharing, and avoiding information are not simply cognitive or rational acts but are also social and moral performances shaped by identity and perceived social risk. In this way, it extends existing frameworks (e.g., Wilson, 1997, 2006) by highlighting how emotional safety and social belonging condition engagement with information.

Furthermore, this insider–outsider perspective contributes to ongoing ISIC conversations about contextuality and everyday life information practices. It demonstrates that for stigmatised individuals, information behaviour emerges from lived experiences of exclusion, trust boundaries, and constant negotiations between visibility and concealment. Recognizing these dynamics allows information scholars to better theorise the role of stigma, secrecy, and belonging in shaping how people construct their informational worlds.

Implications for practice and design

In practice, understanding the insider–outsider divide projects the need for stigma-sensitive information environments. Health information systems, online recovery platforms, and public education campaigns should be designed to offer safety, trust, and anonymity for individuals with alcohol use disorder. Anonymous or pseudonymous features can help users with alcohol use disorder explore information systems without fear of exposure, while clear ethical and empathetic communication can reduce perceptions of risk.

At the same time, this synthesis recommends the development of digital and community-based spaces that preserve confidentiality and trust but gradually open pathways to authoritative, inclusive, and evidence-based content. Embedding expert knowledge within trusted peer contexts can help bridge the insider–outsider gap, mitigate misinformation, and promote healthier engagement with information.

Ultimately, in the end, seeing self-stigma as an information-related issue helps to change how we understand marginalised users. They should not be viewed as passive receivers of information but as active individuals who carefully navigate complex moral and emotional situations. This understanding encourages information researchers, system designers, and practitioners to create systems that respect users' real-life experiences while providing safer and more supportive ways to access and share information.
By conceptualising information insularity as an adaptive response to stigma rather than a deficit, this framework offers actionable guidance for designing information environments that respect users' need for control while expanding access to supportive, evidence-informed resources.

Conceptual contribution

Based on the foregoing synthesis, I propose *information insularity* as an emerging concept for exploration within health information behaviour scholarship. Insularity has been widely explored across various disciplines, including economics (Deidda, 2016); biology (Drake et al., 2002); and cultural studies (Farrell, 2014). In this context, insularity can be understood as a social-psychological and informational state shaped by stigma, identity and control. It develops when individuals or groups construct bounded 'information islands' grounded in shared lived experiences and collective identities, often in response to social exclusion or the imposition of a 'spoiled identity' (Goffman, 1963). Within these islands, information is filtered, circulated, and validated internally, while information from outsiders is viewed with suspicion or rejected outright.

Information insularity is therefore conceptualised as an information control mechanism, it describes how people build bounded 'information islands' based on their shared experience and identities, a way individuals manage exposure, trust, and risk in environments where disclosure carries moral or social consequences. It reflects a deliberate attempt to preserve psychological safety and self-integrity by limiting engagement with information perceived as stigmatising or threatening. For individuals with alcohol use disorder, for instance, insularity may manifest in reliance on peer-based information networks or recovery communities, where shared understanding and emotional validation substitute for professional or public sources that may feel unsafe or judgmental.

This concept extends Chatman's (1996, 1999) theories of information poverty by emphasising not only restricted access but also self-imposed boundaries as forms of informational resilience. Unlike traditional notions of information deprivation, information insularity acknowledges agency, the active construction of protective information worlds that both shield and constrain. Theoretically, it invites scholars to examine how stigma, identity, and emotional safety interact to shape not just what information people seek, but what information they allow themselves to encounter.

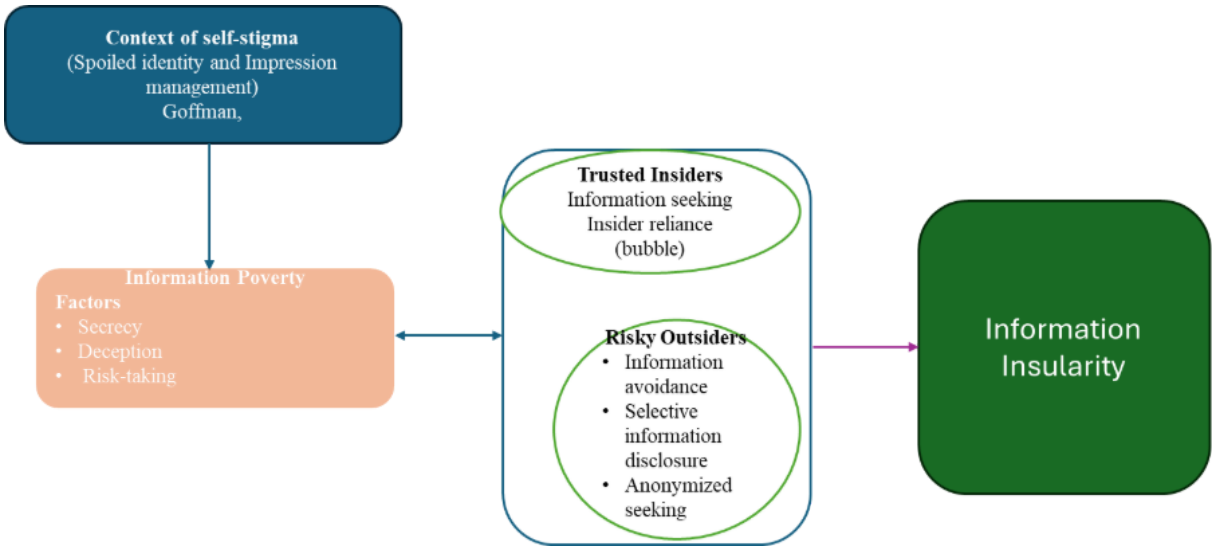


Figure 3. Conceptual synthesis and extension.

Figure 3 depicts information insularity as the outcome of a recursive process in which self-stigma, information poverty, and small worlds continuously reinforce one another. The process begins with self-stigma, understood through Goffman's concept of spoiled identity, which heightens individuals' sensitivity to social judgment and perceived risks of disclosure. As information seeking and sharing become associated with potential identity threats, individuals anticipate negative social consequences and respond through secrecy, selective disclosure, and avoidance. These responses mark the emergence of information poverty in Chatman's sense—not as a lack of available information, but as socially and emotionally constrained access to information.

Information poverty, in turn, shapes how individuals with alcohol use disorder classify their information environments into *trusted insiders* and *risky outsiders*. Within trusted insider small world such as peer recovery groups or anonymous online communities, shared experience and norms reduce emotional risk and enable limited information exchange or create an informational bubble. By contrast, outsider contexts, including healthcare institutions or workplaces, are

perceived as threatening and are managed through selective disclosure, anonymised seeking, or avoidance. Crucially, this differentiation does not resolve information poverty; rather, it reinforces it. Reliance on insiders narrows informational horizons, while avoidance of outsiders restricts access to formal, diverse and validated information sources, feeding back into the very conditions of secrecy and risk perception that define information poverty.

Over time, this recursive loop stabilises into information insularity, where information practices are internally coherent but externally bounded. Information insularity thus emerges not from a single decision or barrier, but from the ongoing interaction between stigma-driven risk assessment and small-world reliance. While this condition serves a protective function by preserving emotional safety and identity, it may also limit opportunities for broader information engagement. By making this feedback loop explicit, Figure 3 emphasises that information insularity is a dynamic and adaptive information control system shaped by self-stigma.

Suggestions for future studies

During the process of developing this work, several areas for further study emerged, which also highlight the need to subject this theoretical synthesis to empirical testing and validation.

Future studies, particularly those employing qualitative approaches, could empirically explore how self-stigma influences or determines the information behaviour of individuals with alcohol use disorder. Such research would provide valuable empirical evidence to inform the integration of existing theories and support the development of a comprehensive model for further testing.

Additionally, examining stigma from an intersectional perspective would allow researchers to understand how various social and personal variables interact to shape human-information interactions within the context of addictive behaviours.

Conclusion

This study brings together Goffman's theory of stigma and impression management with Chatman's theories of information poverty and small worlds to deepen understanding of how self-stigma shapes the information behaviour of individuals living with alcohol use disorder. By highlighting how secrecy, selective disclosure, and bounded trust operate as adaptive strategies rather than mere deficits, this synthesis reframes information avoidance and concealment as socially and psychologically meaningful acts. It underscores that information poverty in stigmatised contexts is not solely a structural limitation but a lived negotiation of visibility, belonging, and moral safety.

Theoretically, this work contributes to information behaviour literature by introducing the concept of *information insularity*, a form of self-imposed informational boundary through which individuals protect themselves from stigma, judgment, or exposure. Information insularity extends Chatman's ideas by emphasizing agency within marginalisation: individuals are not only restricted by external structures but also actively construct informational 'islands' to maintain identity integrity and emotional safety. This perspective calls for broader recognition of how self-stigma, identity, and trust interact to shape both access to and engagement with information.

Practically, these insights have implications for the design of health information systems and interventions. To support individuals with alcohol use disorder and similar stigmatised conditions, information environments must prioritise anonymity, empathy, and credibility. Designing spaces that preserve trust and confidentiality while facilitating gradual exposure

to diverse, high-quality information can help counter misinformation and information bubbles. Such systems should acknowledge the user's need for control and discretion while encouraging safe expansion of their informational horizons.

Beyond general calls for anonymity and safety, this analysis demonstrates *where* and *how* information interventions should operate. Specifically, the framework shows that effective systems and services must engage with existing insider small worlds rather than bypass them. Embedding credible information within trusted peer environments and designing pathways that gently bridge insider and outsider worlds can mitigate information poverty without undermining users' need for identity protection.

In sum, this study advances both theoretical and practical understanding of information behaviour in stigmatised contexts. By situating self-stigma as an informational condition and proposing information insularity as a new analytical lens, it contributes to ongoing ISIC conversations on contextuality, vulnerability, and the everyday life information world.

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When digital systems meet human-centred work: a qualitative study of information behaviour

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Abstract

Introduction. This study explores how employees engage in information behaviour in professional environments undergoing digital transformation. While digital tools are introduced to support documentation and knowledge sharing, they may disrupt established information practices and professional routines. The study focuses on how individuals negotiate and adapt their information behaviour in response to new documentation tasks, particularly in contexts where interpersonal communication and professional judgment are central.

Method. The study is based on qualitative fieldwork conducted over several months in day care institutions within one municipality in Denmark. Data were collected through observations and informal conversations with managerial staff as they engaged with a newly introduced digital documentation task. Nine observation sessions in total are included in the analysis. Audio recordings were transcribed using the Whisper transcription tool and WhisperX for speaker diarization, processed within a secure, GDPR-compliant research infrastructure.

Analysis. Information behaviour was analysed using a thematic approach and furthermore interpreted through the lens of information culture. This analytical perspective enabled an examination of the values, norms, and practices shaping their everyday engagement with information and digital documentation systems.

Results. The findings show that employees consistently prioritized human-centred and relational work, while digital documentation tasks were often perceived as peripheral and time-consuming. The introduction of the new system conflicted with established information cultures, highlighting uneven digital competencies, uncertainty regarding responsibility, and limited trust in the system. Adapting to the new documentation practices required additional skills, time, and a renegotiation of existing routines.

Conclusion. The study demonstrates that understanding everyday information behaviour is essential for aligning digital documentation initiatives with professional values in relational workplaces. Information culture plays a critical role in shaping how individuals respond to technological change.

Introduction

Digital systems are increasingly embedded in workplaces to support collaboration, streamline documentation, and enhance access to information. Organizations across the world encourage their employees to share information and invest heavily in systems developed specifically to allow employees to engage in knowledge sharing (Chen & Wei, 2019; Pitafi et al., 2025). While designed to improve teamwork and access to knowledge, such systems may also overwhelm users with excessive information and thereby cause information overload. When the volume of information exceeds employees' capacity to process it, even well-intentioned sharing practices can lead to stress, disengagement, and thus reduced productivity (Sun et al., 2025; Wynen et al., 2025). The paradox of information abundance is that, despite having access to vast amounts of information, it can be time-consuming to scan to uncover meaningful insights (Bhambri, 2021). Information overload is a persisting challenge tied to information at work and also draws the attention of researchers (Widén & Steinerová, 2019).

Digitalisation impacts everyday work by introducing new demands, such as increased workload, slower workflows, and the need for new skills. While digital tools are often seen as beneficial, their implementation can overlook practical challenges faced by employees, especially when time and support for learning new systems are limited. If these issues are not adequately addressed, digital solutions risk undermining rather than supporting core work tasks (Kaihlanen et al., 2023). These challenges are closely linked to how individuals engage with information in their daily work. Information culture is the 'socially shared patterns of behaviours, norms and values that define the significance and use of information' (Choo et al., 2008). Information culture is an inherent aspect of every organization, shaped by its mission, historical background, leadership practices, and the people who work within it (Choo et al., 2008; Cusick, 2025; Oliver, 2008; Widén & Steinerová, 2019). There are many similar concepts, including information climate, information environment, and information ecology (Widén & Steinerová, 2019), but also many related concepts including data culture (Oliver et al., 2023).

In human-centred work, working with information is often embedded in collaborative processes and tacit knowledge, making it highly contextual and dynamic. Systems or tools may demonstrate potential in assisting human-centred professionals in their work, however, if the tool or system is not perceived as optimally integrated into daily practice, implementation may fail (Becqué et al., 2025). In many human-centred workplaces, documentation systems have been introduced to increase efficiency and quality (Meißner & Schnepp, 2014). However, implementing an electronic documentation system does not necessarily have the full support of the staff. They may see it as a benefit if working routines can be simplified, but if working routines become more complicated in the system, it is perceived as a burden (Meißner & Schnepp, 2014).

The intended increased data quality in documentation when implementing new documentation systems is, however, tied to perceived usefulness of the system. Staff members are more inclined to document information if they believe it will be accessed and used effectively (Monticelli et al., 2025). Perceived usefulness of the documentation systems thus influences the accuracy and completeness of data. Furthermore, working with information technology in the daily work processes is influenced by trust in others but also in technological systems and in the broader organizational culture (Huisman et al., 2020). Information systems, for example, are designed to help users manage large volumes of data and reduce overload by collecting and processing relevant information. However, trust in these systems is necessary for them to work efficiently (Meeßen et al., 2020). Trust in information systems is defined by Meeßen et al. (2020, p. 12-13) as 'an experienced state, defined as the willingness to depend on and be vulnerable to an [information system]'.

This study investigates how employees navigate digital systems in relational workplaces where empathy is essential. While digital tools are designed to support information use, they may also introduce challenges such as information overload, uncertainty, or resistance. These tensions become particularly visible when employees are asked to adopt new practices that shift focus away from core interpersonal tasks. Through qualitative fieldwork, this study explores how individuals engage with digital documentation tasks and how they interpret their responsibilities. The analysis focuses on everyday information practices, including how participants make sense of new systems and negotiate their roles within broader organizational structures.

More specifically, this project aims to explore the following research question: How do employees in relational workplaces adapt to new digital documentation systems?

In the following sections, we introduce the setting, which is Danish day care institutions. Next, we present the information culture framework which is being used in the analysis of the data. After this, we describe the methods used, and present the findings before discussing and concluding.

Case: Implementation of documentation systems in day care institutions

This project examines the implementation of IT technology in day care institutions in one municipality in Denmark. In the day care sector, digital solutions are already part of everyday life, such as platforms for communication with parents. The day care institutions work with several different systems to fulfil their record-keeping obligations. Some systems are accessible to all employees in the day care institution, while others can only be accessed by the managerial staff. Each day care institution also has two G-drives: one accessible only to management, and another accessible to both management and staff. All systems used to fulfil the record-keeping obligations automatically create an archival version, meaning that once the system has been used, the record-keeping obligation is considered fulfilled.

In this case study, a new electronic case and document management system is being introduced to allow these institutions to manage documents that contains personal information. As part of the process, the institutions must review and clean up historical material stored on their local drives. Although in this project we are exploring the implementation in day care institutions, in practice we are focusing on the managerial staff in these as they are ultimately the ones facing the challenge of using these new systems. They may choose to share the task with their administrative staff, but the responsibility lies with the managers. All managerial staff have been introduced to the task at a meeting, covering both the formal requirements for document management, as well as the practical processes.

Documentation tasks may, however, describe a broad range of very different tasks. De Groot et al., 2022) uses a framework from OECD to divide documentation tasks for health care professionals into clinical documentation and documentation regarding organizational and financial issues. Clinical documentation characterises working with patient electronic health records to document medical conditions and the care provided by healthcare professionals. Organizational documentation characterises working with records related to personnel management and shift coordination. Financial documentation characterizes tracking hours worked for billing or insurance purposes. Although the tasks are characterised using these three categories, OECD also stresses that a clear demarcation of administrative tasks is challenging because many tasks can serve both an administrative and a clinical purpose (OECD, 2017). Organizational and financial documentation seem to have increased over time but as documenting organizational and financial issues is not the core focus of relational workplaces, these aspects of documentation might be perceived negatively (De Groot et al., 2022). In this case, the tasks related to the new systems are focusing primarily on tasks related to organizational and financial documentation and the systems are not being used for tasks directly related to the children in the day care institutions.

Information culture

The information culture framework is used in this study as the framework for examining the values, norms, and practices that shape employees' everyday use of information. The information culture framework is a theoretical model used to understand and analyse an organization's information culture (Oliver & Foscarini, 2014). It focuses on the values, norms, and behaviours that influence how information is managed and used in daily practice. The framework aims to explore how employees relate to information and helps identify the cultural and structural conditions that either support or hinder effective information management. It also enables a human-centred understanding to take into account technological, organizational, and human factors that influence information and knowledge sharing. It emphasizes that information culture cannot be understood in isolation but is closely connected to competencies, infrastructure, trust, and governance. Importantly, the information culture framework is a non-normative theory as it does not prescribe how an information culture should look. Instead, it seeks to describe and explain how information culture functions in a specific context.

A key component of the framework is its three levels, which together form the foundation of an organization's information culture. These levels illustrate how infrastructure, competencies, governance, and trust are interrelated and how they influence information practices. The first level addresses the foundational conditions and contexts for an organization's information culture. It focuses on the cultural and contextual factors that shape how information is used and shared. The second level concerns the skills and competencies within the organization related to information sharing. This includes examining employees' capabilities and knowledge in handling information. Finally, the third level focuses on the overarching organizational values and norms that shape and influence information behaviour. The three levels are interconnected, and challenges at the first level can affect outcomes at the next two. Therefore, it is essential to view these elements as part of a dynamic system that influences and emphasizes information practices.

Methods

The study explored the implementation of a digital documentation tool in professional practice. This project employs a method assemblage approach (Law, 2004), combining elements from multiple methodologies to explore a complex field. Over several months, data was collected through field visits, observations, and informal conversations with staff from day care institutions that volunteered to participate in the study. They were divided into three groups, according to the timeline for their participation. The participants were not informed about what group they were placed in or why. The grouping was used as both a practical tool to maintain the overview of the project and as a guideline for potential challenges appearing doing the fields visits. Challenges were defined as situations in which documentation-related questions could not be immediately addressed by the researcher or where technological issues occurred. Such challenges were subsequently examined and addressed in order to minimize their recurrence for subsequent participants or groups. Throughout the process of collecting data, there was a focus on the iterative perspective.

Participants were introduced to a new digital task and asked to engage with it as part of their documentation responsibilities. The researcher alternated between passive observation and active facilitation, depending on the context. Notes were taken on interactions, challenges, and adaptations. The process was iterative, allowing for adjustments based on what emerged in the field. Participation was voluntary, and informed consent was obtained. Ethical considerations such as confidentiality and the right to withdraw were upheld throughout. The researcher's prior experience in practice-based professions contributed to navigating sensitive situations, building trust, and supporting participants in engaging with a task that lay outside their core responsibilities. The role shifted between observer, facilitator, and practitioner, depending on the situation, and this flexibility influenced both the process and outcomes. The managerial staff was

introduced to the task as well as the researcher at a meeting. They were informed that they would be able to get assistance with understanding and completing the task. The researcher collecting the data has extensive experience working in a relational focused workplace, although in a different sector, namely health care. The researcher guided participants through the submission process and thus acted as both a participating observer and an observing participant.

The data analysed consists of 11 recorded observations, however it was reduced to 9 in the analyses as consent for this study was not obtained in time to perform the analyses. Transcriptions were generated using the Whisper Transcription tool, using the Whisper large language model from OpenAI and WhisperX to add speaker diarization. The tool was accessed via UCloud which is a secure, cloud-based research infrastructure hosted by the University of Southern Denmark. This setup ensured GDPR-compliant processing of sensitive data. In the findings the participants are named B-K (observations with participant A and E are omitted due to lacking consent).

The analysis followed in two stages: initial coding and focused coding (Charmaz, 2014). During the initial coding phase, we examined words, lines, and segments to identify what the data were about. We applied short, action-oriented codes that remained close to the data, allowing us to build a relationship with both the material and the participants. This phase emphasized openness to possibilities within the data rather than fitting it into predefined categories. Although the codes reflected our interpretations, they were shaped through repeated engagement with the data. In the focused coding phase, we identified which initial codes were most analytically significant. This allowed us to organize the data and highlight emerging themes and categories. Focused coding provided the foundation for conceptual development and guided the transition from descriptive coding to analytical abstraction. Finally, the information culture framework levels formed the basis for organizing codes. Together, these phases supported an iterative and abductive process, through which our understanding evolved in dialogue with the data.

Findings

From the analysis of the observations, we identified the following themes that capture both individual reflections as well as collective reflections within the group: systematics and guidance, difficulties, technology, time, responsibility, deletion, and reuse. Each theme is explored in more detail below.

Systematics and guidance

Participants consistently emphasized the necessity of clear guidelines and a structured approach to documentation tasks. The municipality of these institutions had a standardized procedure that guides the process of saving various documents, however, despite being familiar with this procedure, a new technology creates room for uncertainty. The uncertainty results in the tasks become very time consuming as each step is characterized by hesitation and second-guesses. These two statements from one of the participants clearly shows that there are uncertainties despite formal procedures and the participant feel that there is a need for shared workflows.

> I really find it difficult to figure out what is actually supposed to go where. (C, 18:32–18:40)

> So we probably also need, in some way, to have a bit of a system in place. But what do we do? How? (C, 18:32–18:40)

This lack of clarity not only increases cognitive load but also inhibits the establishment of efficient routines. Without predictable workflows, participants struggled to perform documentation tasks consistently, undermining both confidence and perceived competence.

Difficulties and burden

Several participants address several difficulties arising described the documentation process as cumbersome, particularly because it involves unfamiliar procedures. As one of the participants notes, the system may not necessarily support their current workflow:

> Now we have a problem with this system, because we're not good at adding detailed information here. (J, 00:22:03 - 00:22:11)

The simultaneous introduction of new systems and new tasks compounds these difficulties and difficulties arise in both cases. This convergence of technological and new procedures transforms the documentation process into an additional burden rather than an integrated component of daily work. One of the participants stresses that this is something that will require a lot of work:

> That really does sound like a very large task (H, 06:20 – 06:22)

Consequently, participants perceive the task as an extra burden rather than as a natural part of work.

Technology

Observations revealed significant variation in the technical proficiency of the participants. While some participants found the system easy to use, others struggled even with the initial basic steps in using the software. One participant stated that 'now everything just goes blank here' (C, 14:34 – 14:36) in a situation where the participant was struggling to use the system. This reveals very uneven levels of technical skills. Some participants struggled more with using the software, which again causes more frustrations. These disparities in digital skills lead to frustration and inefficiency, as participants with lower technical competence require more time and support.

Time

Time constraints are a recurring concern and participants repeatedly stated that it is time consuming and taking up valuable time. Some of the participants clearly stated that they are not patient with the system and that they do not have the time to struggle with the tasks. Participants repeatedly noted that documentation tasks are highly time-consuming, diverting attention from core responsibilities. Statements such as 'It's just very time-consuming' reflect a perception that the system imposes an undue burden on limited time resources.

The participants are afraid of how time consuming these processes will be which is stated by Participant G:

> You would think that it would take a really long time if we had to [include a large number of documents] and document everything. (G, 12:20 - 12:25)

They clearly state that they could make better use of their time. The participants can in many cases recognize that the lack of time available for these processes makes them even more time-consuming when addressed at a later stage. The lack of patience and available time intensifies resistance to adopting new workflows. Others explicitly articulated that time spent on documentation competes with essential duties, highlighting the perception that the system detracts from rather than supports professional priorities. These perspectives, which frame documentation as a non-essential task, indicate that even though the municipality attempts to establish foundational practices at the first level of the Information Culture Framework, this alone is not sufficient if the skills and competencies at the second level are not adequately developed across the organizational units. Furthermore, the values and norms embedded at the third level exert a significant influence on whether documentation is perceived and treated as a core organizational task.

Responsibility

There is confusion about accountability and participants worried about personal liability for sensitive data. The participants worry that they are managing sensitive data incorrectly. As one of the participants stated:

> We can say that we're now doing what is legally correct by sending it off, even if that means we end up keeping too much stored on our side. That's what we feel safest doing. No one is going to come after us for that. (B, 46:59 – 47:08)

They understand the importance of protecting sensitive data carefully and worry that the new procedures and systems cannot live up to these expectations. Uncertainty about compliance with data protection standards is a cause for concern and unfamiliarity with new procedures and systems creates uncertainties. Consequently, concerns about roles and obligations complicates task completion and erodes confidence in the process.

Deletion

Furthermore, deleting files is a cause for concern for some participants. They see the deletion of files as something risky. They might accidently delete important information. On the other hand, some participants see deletion of old, unused files as a time-saving necessity that may prove valuable for managing information at a later stage. As stated by one of the participants, it may even feel good to delete:

> Then we can delete that folder afterwards. We can go in and delete the folder completely afterwards. That way you get a clear conscience, right? (F, 22:53 – 23:03)

Regardless of their view of deletion, many participants reflect on these aspects.

Reuse

Finally, concerns about future access to archived files influence attitudes toward deletion and overall trust in the system. Many participants see the current procedures and systems as insufficient for meeting future information needs. The participants are concerned with the trustworthiness of the new system and this uncertainty fosters hesitation to fully adopt new workflows, as participants fear that essential information may become irretrievable.

Summing up, across all themes, there are many uncertainties. Some of them are tied to the new workflows whereas others are caused by difficulties or unfamiliarity with the new software. The analysis highlights that unclear guidelines, technological challenges, and time constraints significantly hinder the adoption of new documentation systems. Uncertainty about roles, data sensitivity, and future file access further erode trust and create resistance. Furthermore, participants do not see the new IT system as helpful in solving what they consider their core tasks and this obviously limits motivation.

Focusing on the information culture and the three levels, this analysis is organized according to the three levels. The first level addresses the cultural and contextual factors that shape how information is used and shared. The participants struggled to get into routines with the new system and to some extent this is related to the lack of prioritizing these processes for years and in many cases not even conducting them by themselves. Participant G has taken over a number of folders from a previous employee and struggles to organize more effectively:

> Yes. And what if you have a really bad system? Yes. Well, that's because, well, this is [a number of folders], which I took over a year and a half ago from another manager. Another manager who has been there has had that folder system for 25 years. (G, 00:25 - 00:25)

Similarly, participant H describes how this person has just received access to a vast amount of information from a previous employee without fully realizing the extent of this information:

> And there could be anything in here, because I got access to it in January. And I haven't spent any time trying to clean up in here at all. So there could be anything in here. (H, 21:53 - 22:02)

The second level in the information culture framework concerns the skills and competencies within the organization which includes the capabilities and knowledge of employees in handling information. In this study, we see that the participants are unfamiliar with processes but become more familiar with them during the process.

> Yes. So it's about learning how to put the different things where they need to be. And some examples like that. […]. I've learned something new already. […] That's crazy. […] There are a lot of passwords you have to know. […] And they're long. (H, 15.38-17.35)

However, introducing this new system also sheds light on some not being familiarised and comfortable with existing systems. Participant I shares experiences with colleagues that have developed their own procedures for managing information:

> I don't know where this information is from. I've had a colleague here who has printed everything out, or saved all sorts of emails from everything. (I, 00:23 - 00:24)

Finally, the third level focuses on the overarching organizational values and norms that shape and influence information behaviour. The participants are struggling to find the time for working with the IT-system as they find the task less important than many of their other tasks. As stated by participant F:

> What I think is the problem for me is finding the time to do it. Yes. If I'm being completely honest, because I have so many tasks, this, it feels... I can hear and see and understand that it's important, but in my book, there's just a lot that's... (F, 39:27 - 39:45)

Similarly, Participant I clearly says that working with information and IT-systems is not a priority:

> I know that I must document things, but... Well, we're not supposed to sit here just to document. And sit and document... No, we're not supposed to document for the sake of documenting. I have a different core task. (I, 01:23 - 01:23)

Summing up, the findings show that long-standing information cultures in relational workplaces prioritize human interaction over systematic information processing. As a result, introducing high-quality documentation practices requires not only new systems but also time, skill development, and a renegotiation of values and norms surrounding information work.

Discussion and conclusion

Before discussing the results of this case study, some limitations need to be highlighted. First, the case design could have been communicated more clearly to the participants. The different systems used by the day care institutions and their role in documentation tasks were clear to the project team, but the participants were not aware. This misalignment led to confusion about tasks and technologies. Second, the small number of observations (nine included in the analyses) allow us to see only a small fraction of how the day care institutions work with documentation tasks and the new system. Furthermore, only institutions participating in the project were observed and they may not be comparable to the non-participating institutions. Finally, although the observation approach was very flexible and allowed the observant to adapt to various situations, it also

compromised consistency. A more structured approach could have enabled us to compare across institutions and increased generalizability. In sum, flexibility in method and data collection enabled contextual sensitivity but introduced complexity and potential participant confusion.

Turning to the discussion of the results, the lack of time and the need for prioritizing according to the human-centred nature of their work obviously introduced barriers to the implementation process for a new IT-system and information management procedures. The prioritization of the human-centred nature of their work also defines the information culture in the organization. The three levels are interconnected, and challenges at one level can affect outcomes at the other two levels. Therefore, it is essential to view these elements as part of a dynamic system that influences and emphasizes information practices. This study thus highlights the complex interplay between digitalisation and everyday information behaviour in professional settings. While digital documentation tools are introduced to streamline workflows, their implementation may overlook the deeply embedded information culture within the organizations. Participants' responses to the new documentation task were shaped not only by individual preferences, but also by shared norms and values that prioritize the human-centred nature of their work.

At the individual level, employees made deliberate choices to minimize engagement with the digital task, often reframing it as peripheral to their core responsibilities. These actions reflect a form of resistance rooted in professional identity and practical judgment. In a study of perceived time spent on various documentation tasks by nurses De Groot (2022) found that the nurses perceived a high workload due to documentation activities and despite spending twice as much time on clinical documentation as on organizational documentation, they considered the workloads comparable. The organizational documentation led to many frustrations whereas working on clinical documentation was perceived as worthwhile. Furthermore, they highlighted the importance of user-friendly documentation systems.

The findings in this study indicate that relational workplaces may not necessarily see the value of documentation and may thus not prioritize this work over what they consider their core tasks. The findings also suggest that information culture is a valuable lens for understanding how digital tools are received and used. Rather than viewing resistance as a barrier, it can be seen as a meaningful expression of professional values. Designing supportive digital systems requires acknowledging these values and creating space for adaptation and skill development.

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Bridging theory and practice: affordance theory as a methodological link in information interaction and repository design

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Abstract

Introduction. Information practices research and information systems design remain disconnected despite their complementary aims. Affordance theory offers a methodological bridge by translating cognitive-contextual insights about user interaction into actionable design specifications for repository systems requiring culturally appropriate, context sensitive governance.

Method. I integrate Ingwersen and Järvelin's information interaction model with Pozzi et al.'s affordance process framework, adapting it to explicitly incorporate signifiers and decision-making stages. This integration maps user cognitive space, task contexts, and interface functionalities to affordance perception, actualisation drivers, and design specifications.

Analysis. The adapted model provides systematic translation between user cognition and system features, enabling diagnosis of implementation gaps where governance capabilities exist but remain hidden or un-actualised due to inadequate signification or institutional constraints.

Results. Using Indigenous data territorialisation as an illustrative context, the framework reveals hidden and false affordances, specifies governance-relevant signifier and decision points, and produces actionable repository design requirements for context-sensitive governance.

Conclusion. Affordance theory systematically converts information interaction insights into repository design specifications, bridging the theory-practice gap through relational analysis that makes contextual governance requirements analysable and designable across diverse cultural settings.

Introduction

There has been a longstanding disconnect between information practices research and information systems design (Fidel, 2012; Haider & Sundin, 2019; Huvila et al., 2022; Ingwrsen & Järvelin, 2005; Julien, Pecoskie & Reed, 2011; Julien & O'Brien, 2014). This gap persists even though systems designers acknowledge the need for deeper insight into user needs (Leitch & Warren, 2010) and information practices, with its human-centred focus on digital information environments, is well positioned to provide it (Bates, 1986). A key reason is a mismatch in emphasis: information practices often treats information technology artefacts as secondary to people and practices, while fields such as human–computer interaction and information systems design centre technological artefacts (Buckland, 1991; Gorichanaz & Venkatagiri, 2021). As a result, information practices frequently produce rich, contextual understandings that prioritise explanation over operational guidance, making translation into concrete system requirements difficult. Responding to this challenge, scholars have urged information behaviour practice to frame findings in ways that more directly support practice, including systems design (Huvila et al., 2022).

Affordance theory offers a practical bridge across this theory–practice gap. Affordance theory translates insights from information interaction models into actionable repository design by mapping user cognition and context to perceived/actualised actions to concrete features, signifiers, and governance outcomes. By conceptualising affordances as relational properties that arise from the interaction of user capabilities and system features, it provides an analytical and translational vocabulary for turning insights about information practices into actionable design guidance.

This paper demonstrates how affordance theory can serve as that bridge by integrating information interaction models with repository design practice. First, I explore Ingwersen and Jarvelin's (2005) information interaction model showing how users' cognitive structures, contextual knowledge, and situated perceptions shape engagement with repository systems. Building on this foundation, I then position affordance theory as the translational mechanism that converts understanding of information practices into systematic design guidance. Lastly, I use our adapted affordance process model that explicitly incorporates signification and decision-making to show how sovereignty-respecting features can be embedded within repository architectures and evaluated in practice. I use examples from Indigenous data territorialisation contexts where sovereignty-respecting governance creates particularly complex requirements, to demonstrate how the affordance-based approach can be applied to a repository system requiring culturally appropriate, context-sensitive governance practices. The outcome is an adapted, stage-based diagnostic that yields implementable design specifications (features + signifiers + decision points).

Indigenous data sovereignty and data territorialisation

This paper uses Indigenous data territorialisation as an illustrative example to demonstrate how affordance theory can translate information interaction insights into concrete repository design guidance. Since this context may be unfamiliar to some readers, I briefly introduce the core concepts that underpin its relevance for information systems design.

Indigenous data sovereignty refers to the rights of Indigenous peoples to govern the collection, ownership, access, use, and reuse of data that relate to them, their communities, cultures, lands, and knowledge systems. These rights are grounded in Indigenous self-determination and collective governance traditions, and they challenge dominant research data practices that treat data as universally shareable resources detached from social and cultural context (Carroll et al. 2020). In practical terms, Indigenous data sovereignty requires that data infrastructures support differentiated access, community authority, contextual decision-making, and accountability to

collective protocols—rather than relying solely on individual consent or open-by-default dissemination models.

Within this broader framework, Indigenous data territorialisation refers to governance practices that explicitly link data to place, jurisdiction, and relational responsibility. Territorialisation does not imply that data are static or confined to geographic boundaries; rather, it reflects the idea that data remain socially and culturally situated, even when digitised and shared. Territorial actions may include restricting access based on community authority, signalling provenance and jurisdictional relationships, embedding cultural protocols within metadata, or structuring discovery interfaces around place-based logics rather than abstract classification schemes. These actions require users to make governance decisions during information interaction—decisions that are often invisible or unsupported in conventional repository systems.

Repository environments provide a particularly instructive setting for examining these issues because they are designed to mediate between diverse users, institutional policies, and technical infrastructures. Many contemporary repositories already possess technical capabilities that could support context-sensitive governance—such as access controls, metadata customisation, or differentiated user roles—but these capabilities are frequently underutilised or misunderstood. In Indigenous data sovereignty contexts, the consequences of such gaps are especially visible: governance features may exist but remain hidden due to inadequate signification, misaligned workflows, or institutional constraints that discourage their use.

For this reason, Indigenous data territorialisation serves in this paper not as a specialised or exceptional case, but as a diagnostic lens. The complexity of cross-cultural signification, collective authority, and contextual decision-making foregrounds precisely the kinds of translation problems that affordance theory is well suited to address. By examining how users perceive, decide upon, and actualise governance-related affordances in this setting, I can more clearly demonstrate how information interaction models and affordance process models can be integrated to produce actionable design specifications. While the example is grounded in Indigenous governance contexts, the analytical approach applies broadly to any repository system that must support culturally appropriate, context-sensitive, or differentiated governance practices.

Information interaction as a foundational lens

Sociotechnical approach to information systems

Our approach draws on critical data studies and sociotechnical systems, which offer both an analytic lens and a design orientation. Sociotechnical systems hold that technologies cannot be understood apart from the social and technical relations that shape them and their users—a fundamentally relational view (Fox, 1995). This stance explicitly counters 'data universalism' and related forms of technological determinism that strip away cultural specificity and context (Milan & Treré, 2019).

Within this lens, policy, education, and infrastructure work in concert to support data ethics across diverse governance contexts. Policy and law regulate; education builds capacity; and infrastructure mediates practice through affordances and constraints. Our focus is the infrastructure of research data management systems—examined in relation to policy, education, and research culture. Because repositories do not operate in isolation, I use an information interaction model to account for interface use and the social-cultural factors that shape decisions. This model aligns with Pozzi et al.'s (2014) affordance framework, which I adopt as a translational mechanism linking interaction insights to concrete repository design.

Information interaction

To move from a high-level sociotechnical view to the lived experience of repository use, I adopt Ingwersen and Järvelin's (2005) information interaction model. The model foregrounds three

foundations: 1) a cognitive–contextual stance in which meaning and relevance are constructed by users within layered social and organisational settings (Ingwersen & Järvelin, 2005; Marchionini, 2008; Savolainen, 2018); 2) purposive, task-oriented activity—work tasks shape information needs and drive seeking, evaluation, and use (Ingwersen & Järvelin, 2005; Wilson, 1999); and 3) polyrepresentation and nested contexts, which recognise multiple, overlapping representations of needs and objects operating across interface, system, and socio-organisational layers (Ingwersen & Järvelin, 2005).

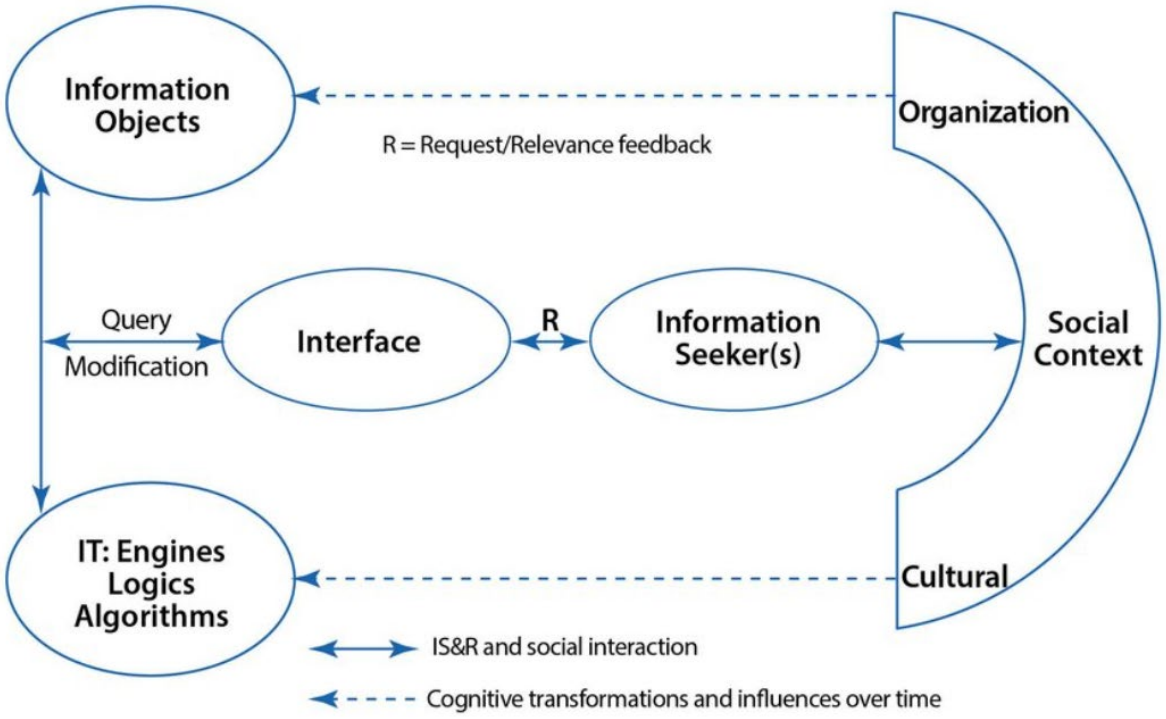


Figure 1. Integrated model of information seeking and retrieval. Simplified model, based on Ingwersen and Järvelin, 2005 (Saracevic, 2017).

Structurally, the model organises interaction around five interrelated components: information objects (knowledge representations), information technology infrastructure (algorithms, indexing, logic), interface functionalities (the cognitive intermediary), user cognitive space (knowledge state, uncertainty, intentions), and the socio-organisational environment (domains, norms, work practices) (Ingwersen & Järvelin, 2005). This framing is deliberately relational and ecological, aligning with perspectives that situate human–information activity within broader environments of practice and technology (Fidel, 2012; Savolainen, 2018; Marchionini, 2008).

These same foundations provide natural bridging points to affordance theory. Perception, intention, and context in the interaction model map directly onto affordances understood as relational action possibilities contingent on user capabilities and system features; interface functionalities become the locus for signifiers that make affordances perceivable; and task-driven interaction supplies the decision points where affordances are—or are not—actualised. Accordingly, I integrate Pozzi et al.'s (2014) affordance framework to translate interaction insights into concrete repository design: I treat a) cognitive/perceptual cues as inputs to affordance identification, b) interface elements as carriers of signification, and c) task flows as sites for decision and actualisation. These bridging points are not metaphorical—they represent systematic correspondences that enable direct translation between frameworks. As I will demonstrate in subsequent sections, perception in the interaction model maps to the perception stage in the

affordance process; intentionality maps to decision-making; interface functionalities map to signifiers; task contexts map to actualisation drivers; and cognitive space supplies the actor component that conditions all stages of the affordance process. This systematic mapping transforms affordance theory from a general concept into a precision tool for operationalising information interaction insights.

Translational power of affordance theory

Cognitive viewpoint as an epistemological bridge to affordances

The cognitive tradition in information interaction holds that meaning, relevance, and action arise through users' mental models, knowledge states, and intentions as they encounter information systems (Ingwersen & Järvelin, 2005). Cognition operates bidirectionally: designers and systems embed cognitive structures into features and algorithms, while users interpret and act through their evolving knowledge and goals (Belkin, 1990; Ingwersen, 1982). This activity unfolds within nested contexts and benefits from polyrepresentation—multiple representations of needs and objects that jointly shape perceived relevance and actionability (Ingwersen & Järvelin, 2005). This relational epistemology establishes a principled connection to affordance theory: just as information becomes meaningful through user-context relationships, affordances emerge from the fit between actor capabilities and environmental features (Pozzi et al., 2014).

This bridge becomes concrete through systematic mapping of cognitive constructs to affordance constructs. Perception aligns with affordance recognition; intentionality supplies the motivational frame selecting among possibilities; mental models condition what is perceived and feasible; polyrepresentation creates multiple potential affordances through diverse representations (metadata fields, labels, overlays); and interface functionalities provide signifiers that render affordances perceivable (Ingwersen & Järvelin, 2005; Pozzi et al., 2014).

This mapping is bidirectional: the information interaction model analyses user-side phenomena (knowledge, perception, intention), while affordance theory analyses system-side phenomena (features, signification, enablement). Together they form a complete circuit—user cognition → affordance perception → decision → actualisation → effects feeding back to cognitive space. This makes theory-to-practice translation systematic. Consider Indigenous data territorialisation as an illustration:

Integrated Component	Indigenous data territorialisation
Perception (cognitive space → affordance perception)	If users' mental models do not include territorial data governance concepts, they will not perceive repository features as affording territorial actions. Therefore, signifiers must be keyed to users' cognitive structures—labels, icons, territorial overlays, protocol badges that resonate with existing mental models or scaffold new ones through culturally appropriate signification.
Intentionality (task context → decision-making)	If users' work tasks do not explicitly include sovereignty-respecting goals, they will not actualise territorial affordances even if perceived. Therefore, workflows should surface governance decision points at moments aligned with users' task flows—e.g., scoping search by jurisdictional territory during the information-seeking task, not as a separate compliance step.
Context (socio-organisational → actualisation drivers)	If institutional policies do not support territorial governance, perceived affordances won't be actualised even if users are motivated. Therefore, viability and feasibility drivers must be designed

	into both technical systems and organisational policies—permissions, training, incentives that enable rather than obstruct sovereignty-respecting actions.

Table 1. Mapping user factors in the effectiveness of Indigenous data territorialisation strategies using integrated components between information interaction and affordance theory.

In each case, the information interaction model diagnoses the user-side constraint (what cognitive, task, or contextual factors impede appropriate action), while affordance theory prescribes the system-side intervention (what features, signifiers, or drivers address that constraint). This bidirectional analysis makes theory actionable.

Building on the information interaction and affordance theory foundations, I integrate signifiers and decision-making into Pozzi et al.'s (2014) process model. Signifiers, drawn from interface functionalities, mediate between user cognitive space and system features to make affordances perceivable—a component the original model did not explicitly analyse. Decision-making, positioned between perception and actualisation, accounts for motivations and institutional constraints—feasibility, viability, responsibility, and desirability—that determine whether perceived affordances translate into action.

Conceptualizing affordances

Within information science, affordance theory takes a sociomaterial perspective: affordances are neither intrinsic to technology nor purely socially constructed, but emerge from dynamic interactions between users, technologies, and organisational settings (Wang et al., 2018; Mora et al., 2021). This positioning avoids both technological determinism and social constructivism, making it particularly valuable for contexts requiring culturally appropriate governance. Gibson first coined the term 'affordance' in 1966 within the context of the emerging field of ecological psychology but the foundational definition 'the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill' (p. 127) appeared in 1979. At its core, affordance theory examines how actors perceive environments as landscapes of possibilities for action—what the environment affords to an organism. The theory has been widely adopted across psychology, engineering, education, and information systems design (Pozzi et al.'s, 2014; Wang et al., 2018).

Relational properties and action possibilities

Affordances are relational properties that exist only in the relationship between actor and environment (Chemero, 2003; Turvey, 1992). They are that which is made possible by the actor interacting with an object in their environment, not properties of the object or the object itself. For example, a metadata field alone is not an affordance; rather, the affordance is the potential action—the inputting of text by the user—that is made possible through interaction (Gaver, 1991). While affordances are relational, they are also objective in that they are measurable and can be studied empirically (Gaver, 1991; Turvey, 1992). Affordances are 'features of whole situations' rather than isolated properties of objects (Chemero, 2003). Understanding affordances as existing at the nexus of relations means that an actor's ability to perceive an affordance is dependent on their cognitive space—whether or not they have the knowledge structures necessary to perceive the existence of the affordance (Rojas, 2024). Further, their decision of whether to act arises from their knowledge structures and cultural competencies.

Ethical dimensions and values

Gibson's (1966) original conception included an ethical dimension often overlooked in contemporary applications: 'I have coined this word 'affordances' as a substitute for 'values'... I mean simply what things furnish, for good or ill' (p. 285). Here Gibson is saying that what things *mean* to an organism—good, bad, useful, dangerous, inviting, prohibiting—does not originate in abstract values imposed by the mind, but in directly perceivable action possibilities in the environment. For example, a cliff affords falling, that is, danger, and a chair affords sitting, that is, rest. These are not judgments added afterward—they are directly perceivable properties of the organism–environment relationship. Affordances do the work that *values* were supposed to do, but without separating facts from meanings. This demonstrates that affordances inherently carry ethical implications (Evans et al., 2017). An affordance is not merely a single available action, but an action carrying a goal with meaning within its larger context—resonating with our information interaction lens.

From interaction model to affordance process: Translational requirements

Having established both the information interaction framework and affordance theory foundations, I now synthesise these perspectives into an integrated process model. This synthesis requires two key adaptations to Pozzi et al.'s (2014) original affordance framework: explicitly incorporating signifiers and distinguishing decision-making as a separate stage.

First, I must explicitly incorporate signifiers as a mediating layer. In the information interaction model, interface functionalities serve as the primary point of contact between user cognitive space and system infrastructure. These interface elements don't merely exist—they communicate through signifiers that make potential affordances perceivable. However, the original model treats perception as emerging directly from user-object interaction without explicitly modelling the signification mechanisms that enable or constrain perception. By adding signifiers as a distinct component attached to objects, I operationalise the interface functionalities layer from the interaction model, making signification an analysable design target rather than an implicit assumption.

Second, I must distinguish decision-making as a separate stage between perception and actualisation. The information interaction model emphasises that users operate within nested task and socio-organisational contexts that shape their actions. A user may perceive an affordance (recognise its possibility) but choose not to act on it due to competing priorities, institutional constraints, or misalignment with their goals. The original model conflates perception with actualisation, suggesting that perceived affordances are automatically acted upon. By separating decision-making, I create analytical space to examine the drivers (feasibility, viability, responsibility, desirability) identified by Ostern and Rosemann (2021)—factors that directly correspond to the task and socio-organisational contexts in the interaction model.

These adaptations transform affordance theory from a descriptive framework into a translational methodology that systematically converts information interaction insights into design specifications.

Affordances as a process concept

While the relational nature of affordances provides crucial theoretical grounding, understanding how affordances unfold in practice requires a process-oriented framework. Drawing on Pozzi et al.'s (2014) synthesis of affordance theory in information science, this project conceptualises affordances through a four-stage process model that has been successfully applied to information technology artefacts including data repositories (Wang et al., 2018; Wen et al., 2021). This framework enables systematic analysis of how Indigenous data sovereignty principles might be embedded within and actualised through repository systems.

Within this framework, affordances are modelled as having four stages: existence, perception, actualisation, and effect (Pozzi et al., 2014; Wang et al., 2018). This process model clarifies the distinction between what a repository makes possible and what users can actually do, moving beyond static feature inventories toward dynamic analysis of sociotechnical interactions.

The existence stage refers to what some consider the *objective* aspect of an affordance—the actions that the features of a technological artefact make possible, regardless of a user perceiving or actualising them (Wang et al., 2018). In repository contexts, existence encompasses the technical capabilities embedded within system architecture: metadata schemas, authentication protocols, access control mechanisms, and search functionalities. These features exist as potential regardless of whether users recognise or engage with them.

The perception stage occurs when users recognise possible affordances, influenced by object features, actor capabilities, goals, and external information (Wang et al., 2018). For Indigenous data sovereignty, perception depends on users' knowledge of Indigenous data sovereignty principles and repository capabilities. Affordance gaps occur when users do not perceive action opportunities due to inadequate signification (Sadler & Given, 2007).

The actualisation stage is when users take action to interact with the properties of an object to transform an affordance from a possibility to a reality (Pozzi et al., 2014). Actualisation depends not only on perception but also on users' capabilities, motivations, and the broader institutional contexts (Wang et al., 2018). Users typically take actions that support their goals, in our case, that either support or constrain sovereignty-respecting practices.

Finally, the effect stage captures outcomes from actualising affordances. Actors assess whether outcomes align with their goals, providing feedback that shapes subsequent interactions (Pozzi et al., 2014; Wang et al., 2018).

This process model provides methodological guidance for repository assessment that requires us to consider not only the availability of features, but user's context and whether they will perceive and take action to utilise available features. For example, a repository may include a field for community ownership (existence), but users must be both aware of the field and understand its purpose (perception), otherwise they may not complete it. Then, even if they recognise it, if they lack the tools, permissions, or institutional support to fill it appropriately (actualisation), then the intended outcomes—respect for community protocols—may never fully materialise (effect). This framing helps us identify not only whether sovereignty-supporting affordances exist within repository systems, but whether they are effective in achieving sovereignty-respecting outcomes. It also enables analysis of unintended effects that may emerge when affordances are actualised in ways that differ from designers' intentions.

The process model further recognises that user context significantly influences both perception and actualisation. Users' knowledge of Indigenous data sovereignty principles, their motivation to respect Indigenous data rights, which are influenced by personal ethics, disciplinary norms, and institutional requirements, and their technical capabilities all shape how affordances unfold in practice (Gregory et al., 2020; Rojas, 2024).

Affordance properties and signification

To operationalise affordances within Indigenous data sovereignty contexts, it is essential to understand their distinct properties, perceptibility patterns, and the signification mechanisms that enable their recognition and actualisation. Crucial to this process are signifiers (Norman, 2013)—the cues that communicate the presence and meaning of an affordance. Signifiers are culturally situated: what makes sense in a Western academic interface may not resonate with Indigenous community members. Without culturally appropriate signifiers, sovereignty-supporting affordances remain hidden or are misinterpreted, creating gaps between system design and actual

practice. Ostern and Rosemann (2021) provide a framework for analysing affordance properties that describes both the state and perceptibility of affordances. When integrated with Norman's (2013) concept of signifiers—the perceivable cues that communicate affordance possibilities—this framework enables systematic analysis of how sovereignty-respecting features are perceived, understood, and actualised across different user communities and institutional contexts.

Affordance properties

Affordances can be characterised as either canonical or relational based on their perceptibility patterns across user communities (Ostern & Rosemann, 2021). Canonical affordances are likely to be perceived and understood by everyone in the same way. They are determined largely by social conventions rather than individual user characteristics or designer intentions. Within repository contexts, canonical affordances include widely recognised interface elements such as search bars or download buttons, where the afforded actions are understood consistently across user groups due to established design conventions and shared signifiers (Norman, 2013). However, it is crucial to recognise that what constitutes a canonical affordance operates within particular organisational or sociocultural contexts; conventions that appear universal within Western academic environments may not be canonical for Indigenous community members who are operating from different technological and/or governance frameworks. The signifiers that make these affordances perceivable are culturally situated, requiring what Ramstead et al. (2016) describe as 'socioculturally scaffolded forms of affordance learning' to distinguish between natural affordances —relying on natural information—and conventional affordances—depending on cultural expectations, norms, and cooperative social practices.

Relational affordances, by contrast, are not determined by overarching social conventions but by the distinct relationship between a user and an object (Ostern & Rosemann, 2021). These affordances are more subject to particular users' contexts and are likely to be perceived and understood differently by different user groups. For Indigenous data sovereignty, many crucial affordances are inherently relational. The signifiers that make these affordances perceivable require cultural competency and contextual knowledge to interpret appropriately.

The framework distinguishes between hidden and false affordances, both critical for understanding implementation gaps in sovereignty-respecting repository design (Ostern & Rosemann, 2021). Hidden affordances exist regardless of perception. The affordance exists but is not made visible to users through adequate signifiers. There are possibilities for action, but these are not perceived by actors due to inadequate, missing, or culturally inappropriate signification systems. Within repository contexts, governance features might exist within the system architecture but remain hidden due to poor interface design, inadequate documentation, or lack of culturally appropriate signifiers. For example, a repository might technically support distinctions-based access control, but if researchers are unaware of this capability or cannot locate the relevant configuration options due to insufficient signification, the sovereignty-supporting affordance remains hidden and unusable.

False affordances represent the inverse problem; they are apparent affordances that do not have any real function (Ostern & Rosemann, 2021). The actor perceives possibilities for action that are non-existent, often due to misleading signifiers that suggest capabilities not actually implemented. False affordances can emerge when repository interfaces suggest capabilities through their signification systems that are not actually implemented, or when features exist but fail to function as expected within specific institutional or cultural contexts. For Indigenous data sovereignty, false affordances pose particular risks because they can create illusions of compliance while failing to provide actual governance capabilities.

The effectiveness of affordance actualisation in Indigenous data repositories depends critically on users' ability to interpret signifiers appropriately within cultural contexts. Standard research

ethics training does not prepare researchers for collective Indigenous data governance requirements, and researchers often lack an understanding of Indigenous worldviews and governance systems that inform data practices (Hudson et al., 2023). Without cultural competency, even well-intentioned users cannot perceive affordances that respect Indigenous data sovereignty. This challenge is compounded by persistent misconceptions and myths that obscure proper implementation of Indigenous data governance, such as the beliefs that involvement of a First Nations researcher automatically ensures data sovereignty compliance. These misconceptions show how inadequate cultural knowledge can lead to false perception of affordances. Users may believe they are acting in sovereignty-respecting ways when their actions actually perpetuate extractive practices. Cross-cultural training and raising the cultural competency of staff is essential for meaningful engagement with Indigenous data systems (Liggins et al., 2021). Without this competency, users cannot properly interpret signifiers or engage affordances in culturally appropriate ways. Studies confirm that 'digital literacy acted as a mediator between perceived affordances and motivated learning behavior' (Rojas, 2024), demonstrating that literacy—both technical and cultural—is not just helpful but essential for affordance actualisation.

Affordance drivers

Beyond perceptibility properties, Ostern and Rosemann (2021) identify key drivers—measurable resources that trigger affordance actualisation—and impact categories that describe anticipated or actual effects. The four primary drivers are feasibility (the degree to which actions can be easily or conveniently accomplished), viability (ability to work successfully within existing systems), responsibility (institutional and individual accountability for outcomes), and desirability (motivation to engage with available affordances). For Indigenous data sovereignty implementation, these drivers interact with signification systems in complex ways. A repository might include comprehensive Indigenous governance features with clear signifiers, but if institutional policies discourage their use (low viability), researchers lack appropriate training (insufficient responsibility), or academic incentives favour rapid sharing over consultation (low desirability), intended affordances won't be actualised.

Our framework should emulate the distinction between functional impacts—what an object provides for actors to accomplish specific goals—and social impacts—object-actor relationships aimed at supporting or constraining societal goals (Ostern & Rosemann, 2021). This distinction is particularly valuable for Indigenous data sovereignty because it enables analysis of how repository affordances operate simultaneously at individual task levels (functional) and at broader levels of community governance and cultural protocol maintenance (social). Signifiers play crucial roles at both levels, communicating not only what actions are possible but also their social and cultural significance.

In the next section I will apply the insights gained to the methodological guidance provided by this integrated property, signifier, and driver framework to position affordance properties and signification as complementary analytical tools for developing metrics-based assessment frameworks. This provides both diagnostic capabilities for identifying implementation gaps and design guidance for creating repository systems that effectively communicate and enable sovereignty-respecting practices across diverse user communities and institutional contexts.

Adapted affordance process model

In this section I will use the insights from the integrated property, signifier, and driver framework to adapt Pozzi et al.'s (2014) affordance process model in two important ways:

1. Adding signifiers as a mediating component attached to objects; and
2. Adding decision making as a distinct stage in the affordance process.

Each stage in this adapted process corresponds to specific components of the information interaction model. The existence stage maps to information objects and information technology infrastructure—the material substrate of repositories. The signifier component maps to interface functionalities—the mediating layer between system and user. The perception stage maps to cognitive space and polyrepresentation—how users recognise possibilities given their mental models and the multiple representations available. The decision-making stage maps to task context and socio-organisational context—the motivational and institutional forces that shape whether perception translates to action. The actualisation stage represents the moment of interaction itself—when user intention meets system capability. Finally, the effect stage feeds back into cognitive space, updating knowledge states and potentially reshaping future interactions. The resulting model improves repository assessment by enabling systematic diagnosis of affordance gaps and misalignments. The signifier component further directs as to consider the properties of the affordance and the decision-making component directs us to consider the drivers of the user's actions. Together, these modifications make the model more attuned to the sociocultural realities of Indigenous data governance.

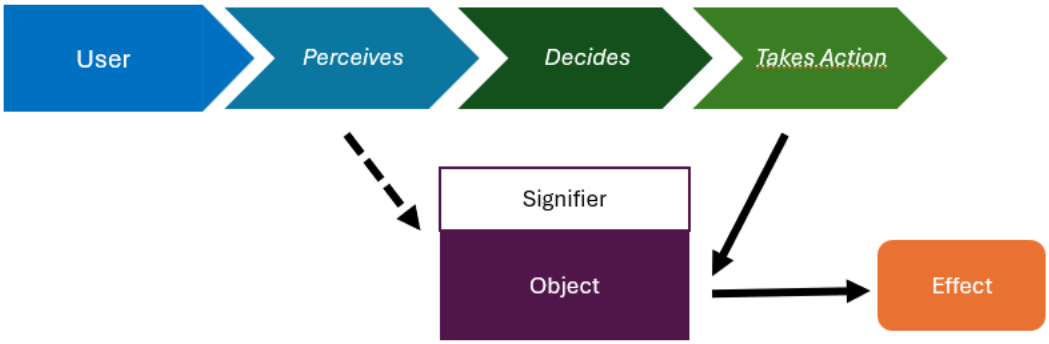


Figure 2. Adapted affordance process model. Adapted from Pozzi et al.'s (2014) affordance process model.

By explicitly adding the signifier component, I can move beyond simply inventorying technical features to analyse whether sovereignty-supporting capabilities are canonical or relational within target user communities, the effectiveness of an object's signifier and whether they remain hidden due to inadequate signification or are falsely perceived due to misleading signifiers. By adding decision-making as an intermediary stage in the process, I am pushed to consider what drivers influence decision-making and either enable or constrain their actualisation. It is the evaluative process through which users weigh whether, how, and to what extent they will engage with a perceived affordance, given their goals, responsibilities, and constraints.

Separating decision-making from perception and actualisation is particularly important in the context of Indigenous data sovereignty. A user may perceive a sovereignty-supporting affordance, such as a metadata field for recording community ownership or a consent-management module, but still decide not to act on it. That decision may be shaped by limited time, uncertainty about community protocols, lack of institutional incentives, or even a deliberate choice to bypass Indigenous governance requirements. Conversely, a user may decide to act but then be prevented from actualising the decision by technical barriers (e.g., restricted permissions) or institutional disincentives. Decision-making thus captures the ethical, contextual, and relational dimensions of user practice that are often invisible in purely technical or cognitive models.

By adding these additional components, I can better inform targeted interventions: educational initiatives to increase cultural competency for interpreting Indigenous governance signifiers,

interface redesign to address hidden affordances through improved signification systems, policy changes to improve viability and responsibility drivers, or signifier redesign to eliminate false affordances that create compliance illusions. This expanded model clarifies why sovereignty-supporting features in repositories often fail: it is not enough for an affordance to exist or even be perceived; users must also be motivated and enabled to act on it in ways that align with Indigenous governance. Extending the affordance process model to include decision-making acknowledges that perception alone does not ensure action. Cultural norms, institutional incentives, and individual motivations shape whether a perceived affordance is acted upon. Similarly, adding signifiers emphasises that affordances are not self-evident: they must be communicated in ways that resonate with users' cultural frameworks—which can be modelled using the data culture framework in the next section.

Mapping information interaction to affordance theory: A systematic integration

This systematic mapping reveals how affordance theory operationalises the information interaction model. Where Ingwersen and Järvelin explain why users perceive and act differently (cognitive states, contexts, intentions), affordance theory provides the mechanism for translating these insights into design specifications. The cognitive space becomes the lens through which affordances are perceived; interface functionalities become the sites where signifiers communicate possibilities; and task contexts supply the motivational frame that drives actualisation decisions.

Information Interaction Component	Affordance Theory Concept	Translation Mechanism
Cognitive space (knowledge, intentions, mental models)	Perception stage + decision-making	Mental models condition which affordances are perceived; intentions drive which affordances are actualised
Interface functionalities	Signifiers + existence stage	Interface elements serve as carriers of signification that make potential affordances perceivable
Task context (work tasks, information needs)	Actualisation drivers (desirability, responsibility)	Task-driven goals determine which perceived affordances users choose to actualise
Socio-organisational context	Affordance drivers (viability, feasibility)	Institutional norms and policies constrain or enable affordance actualisation
Information objects (representations)	Object properties (features)	System features create potential affordances (existence stage)
Polyrepresentation	Multiple canonical/relational affordances	Diverse representations increase likelihood that affordances resonate with varied cognitive states

Table 2. The translational mechanisms between information interaction components and affordance theory concepts.

Mapping governance: Applying affordance theory to repository design for Indigenous data territorialisation

The Tsimshian Archaeological Spatial Archive (Gupta et al., 2023), created through collaboration between the University of British Columbia and the Nine Tribes of Lax Kw'alaams and Metlakatla, exemplifies how the integration of the information interaction model and the affordance process model can translate Indigenous data sovereignty principles into concrete design. The archive's

principal geospatial search interface reconfigures archaeological data navigation around the spatial and relational logics through which Tsimshian knowledge is traditionally organised. Rather than relying on hierarchical metadata or taxonomies, the Tsimshian Archaeological Spatial Archive enables users to locate digital objects—documents, photographs, videos, and artefact records—by exploring an interactive map connected to ancestral territorial geographies,

> The spatial archive enables Indigenous community members in using knowledge of their territory to find data that university archaeologists have compiled for specific places, without familiarity with archaeological taxonomy or the province's site-naming conventions. (p. 83)

This interface situates information-seeking within a cognitive and cultural frame that aligns with Tsimshian relational spatiality, transforming the act of search into an engagement with place.



Figure 3. Example of Google Maps based search interface.

Through the lens of Ingwersen and Järvelin's information interaction model, the Tsimshian Archaeological Spatial Archive demonstrates how interface functionalities mediate between information objects, user cognitive space, and socio-organisational context. The Google Maps framework functions as both information technology infrastructure and cognitive intermediary: it externalises geographic knowledge and invites users to interpret data through situated perceptions of territory. This interactional mapping establishes the conditions under which affordances become perceivable—what Pozzi et al. (2014) describe as the perception stage in the affordance process model. The familiar spatial representation acts as a visual signifier that cues meaningful action: to click, explore, or retrieve information linked to a location. The interface thus bridges cognitive and technical representations, turning latent existence affordances (geotagged data) into perceived and actualisable ones by resonating with community epistemologies.

The decision-making and actualisation stages show how cognitive intentions and sociocultural drivers converge. As community members interact with the spatial archive, decision points—such as viewing permissions or data-sharing protocols—are framed not as bureaucratic compliance steps but as natural extensions of territorial governance. The repository's sovereignty-based access structures operationalise what the information interaction model identifies as contextual drivers: collective norms, institutional arrangements, and intended goals. These sociocultural contexts are transformed into measurable drivers of action—responsibility and desirability—that motivate users to actualise governance-respecting affordances. The interface not only supports sovereign access but makes sovereignty perceivable as an inherent property of interaction.

Finally, in the effect stage, the cyclical interplay between user cognition and system environment becomes visible. As community members explore place-based heritage data, their cognitive structures evolve; knowledge is both retrieved and extended, reinforcing local epistemologies of place and stewardship. The system, in turn, learns from these interactions, progressively enacting what Ingwersen and Järvelin frame as iterative cognitive feedback loops wherein information behaviour reshapes both meaning and system affordances. In this mutual feedback between interaction and affordance, the Tsimshian Archaeological Spatial Archive demonstrates the translation of relational theory into praxis: a repository that is simultaneously a semantic map, a governance infrastructure, and a cognitive interface.

The Tsimshian Archaeological Spatial Archive's geospatial search thus synthesises the two theoretical models: the information interaction model clarifies how users perceive and construct meaning through contextual cognition, while the affordance process model explains how these perceptions are operationalised through sequential stages from existence to effect. Together, they reveal that spatial organisation is not merely a design choice but a sovereign affordance—a way of structuring digital knowledge in alignment with Indigenous relationships to land, knowledge, and governance.

Conclusion

This paper has demonstrated how affordance theory serves as a methodological bridge between information interaction models and repository design practice. By integrating Ingwersen and Järvelin's cognitive-contextual framework with Pozzi et al.'s affordance process model, I have established a translational mechanism that systematically converts abstract understandings of user cognition, context, and intentionality into concrete design specifications.

The key to this integration lies in recognising complementary analytical strengths: the information interaction model excels at explaining why users act as they do (what cognitive structures, task demands, and contextual pressures shape their behaviour), while affordance theory excels at prescribing what systems must provide (what features must exist, how they must signify, what decisions they must support). Together, they form a complete design methodology—from user research to system specification, from interaction analysis to feature implementation, from cognitive diagnosis to interface intervention. Three key contributions emerge from this integration. First, the adapted affordance process model—which explicitly incorporates signifiers and decision-making as distinct stages—provides analytical precision for diagnosing implementation gaps between intended and actualized governance outcomes. Second, the framework's attention to affordance properties (canonical vs. relational, hidden vs. false) enables systematic evaluation of how effectively repository features communicate their capabilities across diverse user communities. Third, extending the information interaction model to account for users' dual roles as both information seekers and data managers reveals design requirements that traditional models overlook.

While I have illustrated these concepts through Indigenous data sovereignty contexts—where complex governance requirements and cross-cultural signification challenges make affordance gaps particularly visible—the framework applies broadly. Any repository system requiring context-sensitive governance, culturally appropriate signification, or user-driven stewardship can benefit from this affordance-based approach. The translational power of affordance theory lies precisely in its ability to make relational, contextual phenomena analysable and designable, bridging the persistent gap between information practices research and systems design.

About the author

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Race, identity, and everyday life information-seeking: a study of African American teens in Chicago

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Abstract

Introduction. This paper reports a study investigating the everyday life and academic information-seeking behaviour of African American teens. While youth information behaviour research has examined technology, literacy, and everyday life needs, little attention has been paid to the role of racial identity and sociocultural context in shaping information practices.

Method. A sequential mixed-methods design was employed. Data collection included non-participant observations of 236 teens in public library YOUmedia spaces, surveys and focus groups with 35 African American teens, and interviews with 12 library staff members.

Analysis. Grounded theory, thematic coding, and comparative analysis with existing information behaviour models (everyday life information seeking, radical change, and small world theory) were applied to the qualitative and quantitative data.

Results. Findings show that African American teens rely heavily on personal and trusted networks, while also making complex use of digital platforms such as YouTube, TikTok, and Google. Their information needs paralleled those of peers, but racial identity and systemic inequities uniquely mediated trust, evaluation, and access. Teens also described barriers in cultural representation and reported collaborative, community-oriented practices.

Conclusions. The study demonstrates that racial identity is a critical factor in youth information behaviour. Implications include culturally responsive literacy initiatives and more inclusive youth library services.

Introduction

Public libraries and information institutions play a vital role in supporting the intellectual and social development of young people. Over the past two decades, research on youth information behaviour has explored how teens locate, evaluate, and use information across academic and everyday contexts. Much of this work has examined information literacy, technology use, and digital engagement (Agosto & Hughes-Hassell, 2006; Franklin, 2013; Li, 2018; Williamson et al., 2012). However, despite attention to sociocultural factors such as identity, socioeconomic status, and peer networks, few studies have examined the influence of race and racial identity on how young people seek and interpret information.

This gap is particularly notable for African American youth. Although they share many information needs with their peers—academic success, career preparation, social connection, and entertainment—their experiences are shaped by systemic inequities, digital divides, and racialised social contexts. Historical and contemporary barriers, including economic inequality, educational segregation, and bias within institutions, contribute to disparities in access and trust of information sources (Benjamin, 2019; Carnoy & Garcia, 2017). For many African American teens, information seeking is not only intellectual but also a social and cultural process influenced by identity, belonging, and representation.

The limited research that addresses race in information behaviour often focuses on health or poverty rather than holistic perspectives of youth information practices (Hovick et al., 2011; Mai et al., 2016). Studies on teens frequently generalise findings across populations, assuming homogeneity in motivations and contexts. Yet, as Chatman's (1999) small world theory suggests, marginalised communities develop distinct information networks shaped by trust, privacy, and social boundaries. Likewise, Savolainen's (1995) everyday life information seeking model and Dresang's (1999) radical change theory emphasise the importance of context, access, and digital interactivity—elements central to understanding African American teens' experiences.

This study explores how African American teens in Chicago seek, evaluate, and share information in both everyday and academic contexts. Chicago provides a meaningful setting: nearly one-third of its residents identify as African American, yet persistent educational and digital inequities shape access to information resources (CMAP, 2022; U.S. Census Bureau, 2021). The city's network of YOUmedia learning labs—technology-rich, interest-driven library spaces for teens—offers an ideal environment to observe information behaviour in authentic community settings.

The conceptual foundation integrates three theoretical perspectives central to information behaviour research:

1. Savolainen's everyday life information seeking framework, which explains how people seek information to manage everyday needs and make sense of their social worlds.
2. Chatman's small world theory, which examines how marginalised groups form insular information networks that can lead to information poverty.
3. Dresang's radical change theory, which situates digital youth information behaviour within principles of interactivity, connectivity, and access.

Together, these frameworks illuminate the interplay between sociocultural context, digital engagement, and racial identity in the information practices of African American teens.

The purpose of this study is to examine how sociocultural and racial factors influence the everyday and academic information-seeking behaviours of African American teens, and how their

experiences may expand existing models. By identifying their key sources, motivations, and barriers, this research contributes to a more inclusive understanding of youth information practices—one that acknowledges the intersection of race, technology, and community.

Research questions

- What are the significant characteristics of the information-seeking behaviour of African American teens?
- What are their everyday and academic information-seeking behaviours?
- How does technology influence their information-seeking behaviour?
- What sociocultural factors influence their information-seeking behaviour?

By foregrounding racial identity as a key analytical lens, this study extends the conversation on youth information behaviour and offers practical implications for librarians, educators, and researchers seeking to develop culturally responsive library services.

Literature review

Research on youth information behaviour has evolved significantly over the past two decades, moving from a focus on information retrieval and cognitive processes to more contextual and socially constructed understandings of how young people seek and use information. Theories such as Savolainen's everyday life information seeking, Dresang's radical change theory, and Chatman's small world theory provide valuable perspectives for interpreting the social, technological, and cultural influences that shape youth information practices. This section highlights key developments within these frameworks and establishes how the present study extends them through the lens of race and sociocultural identity.

Everyday life information seeking

Savolainen (1995) introduced the everyday life information seeking model to explain how individuals seek information to navigate daily life. Building on Bourdieu's (1984) concept of habitus, Savolainen argued that information behaviour is influenced by social and cultural structures that determine what people value, how they perceive their environment, and which resources they consider legitimate. Individuals 'internalise a socially and culturally determined system of thinking, perception, and evaluation' (Franklin, 2013, p. 28).

Within youth research, the everyday life information seeking framework has provided insight into how teens pursue information related to identity, friendship, school, and creative expression. Agosto and Hughes-Hassell (2006) applied the model to urban teenagers and identified seven developmental selves—social, emotional, reflective, physical, creative, cognitive, and sexual—that shape the topics and sources youth pursue. Their work suggested that information seeking in adolescence is inseparable from identity construction and social belonging.

Later researchers tested everyday life information seeking across cultures and socioeconomic contexts. For example, Koo (2012) found that South Korean youth prioritised academic and peer relationship information, while Franklin (2013) added the 'playful self' to reflect leisure-based searching among affluent suburban teens. Markwei and Rasmussen (2015) studied homeless Ghanaian youth and discovered distinct needs centred on employment, shelter, and financial stability, showing that information behaviour reflects structural conditions as much as personal motivation.

Despite its flexibility, the everyday life information seeking model has rarely addressed racial identity as a determinant of information practices. Savolainen (2016) later recognised that factors such as class, education, and cultural norms can limit access to information and shape perceptions of trustworthy sources. Yet research directly connecting race, inequity, and information behaviour remains limited. This gap is particularly visible in studies of African American youth, whose experiences are shaped by historical marginalisation and evolving digital environments.

In this study, everyday life information seeking provides a foundation for examining how African American teens orient themselves toward everyday and academic information needs. The framework is expanded to include racialised experience as a structural dimension influencing access, trust, and motivation— factors not explicitly accounted for in traditional everyday life information seeking applications.

Radical change theory

Dresang's radical change theory (1999, 2005) emerged from youth literature research and later described youth information behaviour in digital environments. It posits that digital technologies have transformed how youth interact with information, emphasising three principles: interactivity, connectivity, and access.

According to Dresang (2005), interactivity reflects how young people engage dynamically with digital texts, multimedia, and social platforms, often employing non-linear reading and participatory information creation. Connectivity refers to the social nature of youth information practices, including collaboration and collective meaning-making. Access highlights the dismantling—or persistence—of barriers that determine who can find and use information effectively.

Subsequent research extended these principles. Koh (2015) applied radical change theory to online creative communities, observing that youth information behaviour includes personalising, remixing, negotiating value systems, and seeking identity-related information. These behaviours show that teens are not merely consumers but creators of new knowledge. Li (2018) similarly found that in library makerspaces, teens' information practices are socially oriented and driven by peer collaboration.

Despite its focus on equity and access, radical change theory has not fully accounted for how systemic racism and cultural representation shape youth experiences with information. Benjamin (2019) introduced the concept of engineered inequity to describe how algorithms and information systems perpetuate bias, reinforcing the structural barriers that youth of colour encounter. For African American teens, digital interactivity and connectivity exist within racially coded environments where representation and trust are contested.

This study extends radical change theory by situating African American teens' digital and social information practices within these racialised contexts. The findings explore how interactivity, connectivity, and access intersect with lived experiences of bias and exclusion, offering a culturally grounded interpretation of radical change in practice.

Small world theory

Chatman's small world theory (1991, 1996, 1999) offers a sociological framework for understanding information behaviour within marginalised or insular communities. A 'small world' refers to a bounded social environment in which members share norms, trust, and communication patterns. Within these worlds, individuals rely on familiar sources while viewing outsiders and formal

information systems with scepticism. Chatman (1996) argued that such dynamics can produce information poverty—a condition where communities have limited access to external or alternative resources despite their availability.

This perspective has proven valuable for analysing information practices among underrepresented populations. Markwei and Rasmussen (2015) linked small world theory to youth in Ghana who depended on peer networks for survival information. Buchanan and Tuckerman (2016) similarly found that disadvantaged youth in Scotland relied on interpersonal sources over institutional ones. These studies highlight that information behaviour is embedded in social relationships shaped by trust, authority, and power.

In African American communities, Chatman's insights align with findings that many individuals perceive mainstream institutions—including libraries—as lacking cultural relevance or responsiveness (Folk & Overbey, 2022). Experiences of racial bias or microaggressions further discourage engagement with formal sources, leading youth to depend on peers, family, and digital media that reflect their lived realities. As one participant in a related study stated, 'we look things up online or ask friends because the library does not have what we need or does not feel like it is for us' (Folk & Overbey, 2022, p. 381).

This study employs small world theory to examine how African American teens construct networks of trusted information exchange and how perceptions of institutional exclusion influence their behaviours. By integrating Chatman's framework with everyday life information seeking and radical change theory, this study addresses both the micro-level social interactions and macro-level structural forces that define African American teens' information worlds.

Summary

Together, everyday life information seeking, radical change, and small world theories provide a multidimensional foundation for analysing youth information behaviour. everyday life information seeking highlights orientation toward everyday needs; radical change underscores the impact of digital transformation and participatory culture; and small world theory exposes the social boundaries and trust dynamics that shape access. However, none of these frameworks independently capture the influence of race as both a contextual and structural factor.

This study advances information behaviour research by integrating these models to explore how racial identity mediates information-seeking among African American teens. It posits that understanding information behaviour through the lens of equity and representation is essential for designing inclusive library and educational practices that respond to the realities of diverse youth populations.

Methodology

This study employed an exploratory sequential mixed-methods design to examine how sociocultural and racial factors influence the everyday and academic information-seeking behaviour of African American teens in Chicago. The design integrated qualitative and quantitative data collection and analysis to provide both depth of understanding and empirical breadth. Mixed methods approaches are widely recommended in information behaviour research because they enable exploration of complex social phenomena that cannot be captured through a single paradigm (Creswell & Plano Clark, 2018).

Research setting

Data was collected within Chicago Public Library's YOUmedia learning labs, technology-rich spaces that promote creativity, digital literacy, and social connection among teens. YOUmedia was selected because it serves a high concentration of African American youth and combines informal learning with mentorship and access to digital tools (Homan, 2016). The library's emphasis on open, peer-driven engagement provided a natural environment to observe authentic information practices.

Chicago represents a meaningful sociocultural context. Approximately one-third of residents identify as African American (U.S. Census Bureau, 2021), yet youth in predominantly Black neighbourhoods experience persistent inequities in education, technology access, and public resources (CMAP, 2022). Observing teen information behaviour in these environments enabled examination of how systemic inequities shape everyday information worlds.

Research design and participants

The study unfolded in two sequential phases: a qualitative phase focused on generating contextual data, followed by a quantitative phase to test and support findings.

Phase one: Qualitative exploration

Non-participant observations were conducted across five YOUmedia branches over six months. Observations captured naturally occurring interactions among teens, mentors, and library staff during programmes, independent computer use, and social activities. Field notes documented information needs, sources, and behaviours as they emerged.

Semi-structured interviews were then conducted with 12 staff members (including librarians and part-time mentors) to explore perceptions of teen information needs and barriers to engagement. Focus groups and short surveys were administered to 35 teens aged 13–18. Discussions prompted participants to describe how they searched for school, career, and personal information, which sources they trusted, and how cultural identity shaped their experiences.

Phase two: Quantitative validation

A short survey collected data on technology use frequency and self-reported confidence in evaluating sources. Quantitative data provided descriptive statistics supporting thematic interpretation from the qualitative phase.

Across both phases, approximately 236 unique teen interactions were observed, representing diverse socioeconomic backgrounds within Chicago's African American community.

Data Source	Participants (n)	Age Range	Notes
Observations	236 teens	13–18	Across 5 YOUmedia branches
Focus Groups & Surveys	35 teens	16–18	Conducted at 3 sites
Staff Interviews	12	Adult mentors/librarians	Representing teen, tech, and program staff

Table 1. Overview of data sources and participant demographics.

Data collection procedures

All data collection followed Institutional Review Board approval. Parental consent and youth assent were obtained, and pseudonyms were used to protect confidentiality.

Observation data were recorded in field journals after each session. Interviews and focus groups were audio-recorded with permission and transcribed verbatim. Surveys were distributed on paper to maintain accessibility for participants with limited device access.

Trustworthiness was ensured through triangulation of multiple data sources—observations, interviews, focus groups, and surveys. Member checking occurred informally with librarians, who reviewed preliminary interpretations for accuracy.

Analytic approach

Qualitative and quantitative analyses were carried out concurrently, followed by integration.

Qualitative analysis

Thematic analysis followed grounded theory principles (Charmaz, 2014). Coding proceeded through open, axial, and selective stages. Initial coding identified recurring patterns such as 'trusted sources', 'identity expression', and 'institutional avoidance'. Axial coding refined these into broader conceptual categories aligned with theoretical frameworks— everyday life information seeking orientation, radical change interactivity, and small world trust networks. Selective coding generated core themes linking racial identity to information practices. ATLAS.ti software supported data organisation.

Qualitative analysis

Survey data were entered into Qualtrics for descriptive statistics. Frequencies were calculated for variables including device use, preferred sources, and topic interest. Quantitative trends validated qualitative themes—for example, frequent YouTube use corresponded with observed reliance on visual and peer-recommended information.

Integration

Findings were integrated through data weaving (Fetters et al., 2013), in which qualitative insights explained mechanisms underlying quantitative patterns. The resulting synthesis produced a holistic view of African American teens' information behaviour, accounting for both structural and individual influences.

Researcher positionality

The researcher identifies as an African American information professional with extensive experience in youth services. Reflective journaling was maintained to acknowledge potential biases and positional advantages. This insider–outsider dynamic facilitated trust with participants while requiring constant attention to analytical distance.

Validity and reliability strategies

Several strategies enhanced credibility and dependability:

1. Triangulation: Multiple data sources (teens, staff, observations) and methods (qualitative and quantitative) supported cross-verification.
2. Audit trail: Documentation of coding decisions and analytic memos ensured transparency.
3. Peer debriefing: Findings were reviewed with two colleagues experienced in youth information behaviour.

4. Thick description: Detailed contextual accounts of YOUmedia spaces enable transferability to similar settings.

Ethical considerations

Ethical sensitivity was essential given participants' age and racial identity. Teens were informed of their right to withdraw at any time without consequence. Sessions occurred during regular library hours to ensure safety and voluntary participation. Audio files and transcripts were stored securely and accessible only to the researcher.

As one participant shared, '*I feel comfortable here. Like, I can actually talk and be myself without feeling judged or watched*'. (Teen G, age 15). This underscores the importance of environments where youth feel respected, autonomous, and culturally affirmed.

3.8 Limitations

The focus on a single metropolitan area limits generalisability. Self-selection bias may have favoured teens already engaged with library programmes. Nonetheless, the triangulated design and diverse sample strengthen confidence in the findings' credibility.

This mixed-methods approach provides a nuanced understanding of African American teens' information-seeking behaviour, revealing how sociocultural identity, digital engagement, and institutional trust intersect. Its methodological rigour and theoretical integration position the study to contribute meaningfully to ongoing discussions of equity and representation in information behaviour research.

Findings

The findings are organised around the study's research questions and highlight how African American teens navigate everyday and academic information needs through trusted networks, digital platforms, and culturally grounded practices.

Characteristics of African American teens' information-seeking behaviour (RQ1)

Addressing the first research question, this section identifies the core characteristics of African American teens' information-seeking behaviour, particularly the central role of trust, relational credibility, and informal knowledge exchange.

Across observations, interviews, and focus groups, African American teens consistently expressed a preference for personal and trusted networks over formal or institutional sources. Family members, peers, mentors, and online creators were primary information sources on topics ranging from schoolwork and jobs to social identity and mental health. One participant summarised, '*If I need something, I'll ask my friends first or look it up on TikTok. They explain it better than teachers*' (Teen H, age 16).

Trust strongly shaped how teens evaluated information sources. As Teen C (age 16) explained, '*If I don't think a source is credible, I'll ask an adult or somebody who's heard of the situation—someone I trust. They can be more reliable than what I find online*'. Rather than relying solely on institutional authority, teens prioritised credibility grounded in familiarity and lived experience.

These patterns align with Chatman's concept of small worlds, where trust develops within familiar environments and guides information exchange. Teens viewed interpersonal networks as more relatable and less judgmental than institutional figures. Librarians similarly observed that teens often approached mentors or peers before using reference services. Staff C, a teen librarian,

reflected, '*They'll talk to a mentor or another teen long before they come to the desk. It is about comfort and not wanting to look dumb*'.

Digital platforms amplified these informal networks. YouTube, TikTok, and Instagram were the most frequently used platforms for learning and exploration. Survey data showed that over 80% of respondents used YouTube weekly, while fewer than 30% accessed library databases. Teens valued the visual, peer-created, and on-demand nature of these resources.

Beyond convenience, trust also had a cultural dimension. Teens relied on peers who shared similar experiences of navigating race and identity, perceiving their insights as more authentic. As Teen I (age 17) stated, '*People like me understand what I'm trying to find out—teachers do not always get that*'. Similarly, Teen D (age 17) noted, '*If I had to do a project on segregation, I would want somebody real—like someone who actually been through it*'.

Together, these characteristics indicate that for African American teens, information seeking is inseparable from community and identity. Reliance on trusted networks reflects adaptive strategies for relevance, safety, and agency rather than disengagement.

Information Source	% of Teens Reporting Frequent Use	Primary Context of Use
Parents / Family Members	88%	Academic help, personal advice, career guidance
Friends / Peers	74%	School assignments, social and emotional support
YouTube	70%	Learning new skills, entertainment, tutorials
TikTok	65%	Quick information, trends, news, peer learning
Google / Web Search	60%	General inquiries, school projects
Mentors / Librarians	42%	Creative projects, technology help
Teachers	38%	Academic support (varied trust)
Library Websites / Databases	26%	School-related research, limited awareness

Table 1. Frequency and contexts of information sources among African American teens (n = 35).

4.2 Every day and academic information-seeking practices (RQ2)

Addressing the second research question, this section examines how African American teens seek information across every day and academic contexts and how these domains are deeply interconnected.

Teens rarely separated school-related needs from personal, social, or future-oriented concerns. Instead, they navigated information holistically, drawing on the same trusted networks for homework, career exploration, identity-related questions, and social support. Parents, siblings, peers, and mentors were frequently consulted for academic help, while peers and online creators were often relied upon for everyday life information.

However, teens' every day and academic information-seeking practices were shaped by broader institutional and sociocultural barriers. Despite enthusiasm for learning, many participants reported feeling disconnected from or misrepresented by traditional information institutions. Three interrelated dimensions emerged: access inequities, representation gaps, and perceived bias.

Access inequities

Although YOUmedia offered robust technological access, many participants reported unreliable home internet and shared devices. Teens from lower-income neighbourhoods often depended on the library for Wi-Fi, printing, and homework. One teen noted, '*If the library closed early, I couldn't finish my project because my internet at home barely works*' (Teen I, age 16). Staff confirmed that digital divides persist even in urban areas.

Research gaps

Participants expressed frustration with the limited availability of culturally relevant materials. They struggled to find media reflecting diverse Black youth experiences. One teen remarked, '*I get tired of only seeing slavery or civil rights—there's more to us than that*' (Teen A, age 16). Another teen expressed '*On TikTok, it be a lot of Black people giving out information about what's going on. It feels more real because it's people actually experiencing it*' (Teen E, age 16). This mirrors Folk and Overbey's (2022) findings that limited cultural representation undermines trust in libraries. Teens often turned to Black online creators and community platforms to fill these gaps.

Perceived bias and microaggressions

Several teens recalled feeling surveilled or doubted when using technology. As one participant said, '*Sometimes they think we're playing games or doing something bad, even when we're working*' (Teen B, age 17). These experiences discouraged help-seeking from adults and reinforced reliance on peers and mentors. Staff also reflected on this dynamic stating that '*There is some anxiety and hesitation with authority figures…they're unsure about approaching adults, even when they need help*' (Staff A, teen librarian).

Collectively, these factors shaped how teens navigated every day and academic information needs, often privileging community-based sources over formal institutional ones. This dynamic reflects what Chatman (1996) termed information poverty, where structural and cultural boundaries restrict engagement with formal sources. Yet participants also demonstrated resilience by turning to networks that validated their experiences and identities.

Technology and digital platforms in information-seeking (RQ3)

Responding to the third research question, this section focuses on how technology influences African American teens' information-seeking behaviour.

Digital platforms were central to teens' information practices. YouTube, TikTok, Google, and Instagram were frequently used to learn new skills, complete assignments, explore social issues, and seek guidance. Teens valued these platforms for their visual formats, immediacy, and peer-generated content, which contrasted with the perceived rigidity of traditional academic sources. As one staff member noted, '*They use YouTube a lot to teach themselves things. If they want to learn music or graphic design, they'll watch videos and then come in and try it themselves*' (Staff D, branch librarian).

Technology also supported participatory and creative information practices. Teens described using music production tools, video platforms, and social media to create and share information

with peers. Librarians noted that teens often completed studio certifications, recorded original tracks, and used library technology to produce content. These practices reflect radical change theory's emphasis on interactivity and connectivity, highlighting youth as active creators rather than passive consumers of information.

At the same time, technology use was shaped by structural constraints. Algorithmic bias, representation gaps, and unequal access influenced which sources teens trusted and how they evaluated information. As a result, digital platforms functioned as both sites of empowerment and adaptation within racially coded information environments.

4.4 Community-oriented and identity-affirming information practices (RQ4)

Addressing the fourth research question, this section highlights how sociocultural and racial factors influence African American teens' information behaviour through community-oriented and identity-affirming practices.

Peer learning emerged as the most common form of information exchange. Teens frequently helped one another troubleshoot digital tools, locate tutorials, and share resources. Teen F, age 16, explained, '*If somebody don't know how to do something, we just help each other. Like if one person figure it out first, then everybody else gonna know*'. These exchanges often occurred organically and were reinforced by shared experiences and mutual trust. This collaborative ethos reflects radical change theory's interactivity and connectivity principles, where youth create meaning through shared participation.

Teens also relied on 'veteran' peers to mediate institutional engagement. Staff C described this dynamic, noting, '*There's always one veteran teen in the group who says, oh, well you can do this here or you can do that*'. Such practices demonstrate how expertise circulates horizontally within youth communities.

Mentorship further bridged peer and institutional worlds. Teen librarians acted as culturally responsive intermediaries, providing guidance while respecting teens' autonomy. Their role extended beyond information provision to trust-building, modeling how institutional resources could be engaged without compromising identity or safety. Teens also articulated how racial identity shaped comfort within information exchanges. One participant shared, '*I feel more comfortable asking people who look like me or know where I'm coming from, because I don't have to explain myself first*' (Teen H, age 17).

Creativity served as a key vehicle for identity-affirming information practices. Teens used music, media, and digital storytelling to express themselves and share knowledge. Many participants linked information seeking to collective uplift—helping peers, supporting family members, or improving their communities—highlighting a communal epistemology rooted in shared experience and mutual empowerment. Staff noted that teens often completed studio certification and recorded original tracks using library resources. As one librarian explained, '*They come in with ideas, use the equipment, and really take ownership of what they create*' (Staff C, teen librarian). Others described starting YouTube channels or sharing tutorials and scholarship tips online. These practices exemplify radical change's emphasis on participatory knowledge creation and the transformative role of digital tools.

Collectively, these practices demonstrate that African American teens' information behaviour is shaped by a communal epistemology grounded in racial identity, mutual support, and shared experience.

Synthesis of findings

- African American teens' information behaviour is situated at the intersection of trust, representation, and resilience.
- Trust networks form the foundation of their information world, guided by interpersonal credibility and cultural authenticity.
- Racialised barriers shape perceptions of institutions, leading to reliance on community based and digital alternatives.
- Community-oriented practices demonstrate how youth reclaim agency through collaborative, creative, and identity-affirming exchange.

These findings extend theoretical models in several ways. They expand Savolainen's everyday life information seeking by foregrounding race as a structural determinant of everyday information orientation, enrich radical change theory by illustrating how interactivity and connectivity are mediated by inequity and cultural affirmation, and reinterpret Chatman's small worlds not as bounded deficits but as adaptive ecosystems that preserve culture and enable empowerment within marginalised contexts.

Theoretical Framework	Core Concept	Extension from Findings
Savolainen's everyday life information seeking	Everyday life information orientation	Incorporates racial identity and structural inequities as shaping factors
Dresang's radical change	Interactivity, connectivity, access	Demonstrates how digital engagement intersects with cultural representation and bias
Chatman's small worlds	Trust and information boundaries	Reveals adaptive, community-based strategies that resist information poverty

Table 2. Conceptual relationship between theoretical frameworks and emergent themes.

These findings reveal that African American teens' information behaviour is neither deficient nor disengaged but deeply contextual, relational, and culturally situated. Their strategies challenge deficit narratives and call for an expanded understanding of youth information behaviour that integrates equity, representation, and agency as central constructs.

Discussion

The findings of this study provide new insight into the everyday and academic information-seeking behaviour of African American teens, revealing how racial identity and sociocultural context shape the ways they seek, evaluate, and share information. Building on prior research in youth information behaviour, this section positions the findings in relation to Savolainen's everyday life Information seeking (ELIS), Dresang's radical change theory, and Chatman's small world theory, while also drawing on broader scholarship on youth, equity, and information resilience. Collectively, the discussion demonstrates how the study both confirms existing research and extends it by centering race, representation, and community as structural influences on information practices.

Expanding everyday life information seeking

Savolainen's (1995) everyday life information seeking model posits that individuals' information behaviour is shaped by their way of life and mastery of life within particular sociocultural contexts. The present study affirms this premise while extending everyday life information seeking by demonstrating that racial identity operates as a structural determinant within those contexts.

Consistent with prior everyday life information seeking research on youth, African American teens in this study sought information related to academic success, identity formation, and social belonging (Agosto & Hughes-Hassell, 2006; Franklin, 2013). Like the suburban and urban youth studied by Franklin (2013) and Agosto and Hughes-Hassell (2006), participants relied on interpersonal networks and informal sources to meet everyday needs. However, this study extends those findings by showing that trust and relevance are not only developmentally driven but also racially mediated.

For African American teens, reliance on trusted networks—family, peers, and mentors—functioned as a protective strategy in response to experiences of bias, misrepresentation, and institutional mistrust. This aligns with Savolainen's later acknowledgement that structural factors shape access and perceptions of legitimacy (Savolainen, 2016), while offering empirical evidence that race and representation are central to information orientation. An equity-informed adaptation of everyday life information seeking must therefore account for how historical and contemporary inequities shape not only access but also trust, motivation, and evaluation.

Radical change theory and digital participation

Dresang's (1999, 2005) radical change theory provides a useful framework for understanding how youth engage with digital information through interactivity, connectivity, and access. Consistent with this theory, teens in the present study actively created, shared, and evaluated information using digital platforms such as YouTube and TikTok.

These findings corroborate prior research demonstrating that teens are not passive consumers of information but active participants and creators (Koh, 2015; Li, 2018). Similar to Li's (2018) study of library makerspaces, African American teens used digital tools for collaborative learning and creative expression. However, this study extends radical change theory by foregrounding how digital participation is shaped by racialised information environments.

As Benjamin (2019) argues, digital systems are not neutral but reflect embedded biases that affect visibility, credibility, and representation. Teens' reliance on Black creators and peer-generated content illustrates both empowerment and adaptation—empowerment through agency and cultural affirmation, and adaptation to the absence of representative voices in mainstream information systems. This suggests that radical change's principle of access must be reconsidered beyond technological availability to include cultural accessibility, reinforcing calls by Folk and Overbey (2022) to address race more explicitly within LIS theory and practice.

Small world theory and rethinking information poverty

Chatman's small wtheory (1991, 1996, 1999) offers a sociological lens for understanding trust-based information networks within marginalised communities. Traditionally, small worlds have been framed as sites of information poverty, characterised by limited engagement with external sources. The present findings challenge this deficit framing.

Consistent with studies of marginalised youth in other contexts (Markwei & Rasmussen, 2015), African American teens' peer networks and mentorship relationships functioned as adaptive and resilient information systems. Rather than restricting access, these networks enabled culturally attuned knowledge exchange and emotional safety. This aligns with Jaeger et al.'s (2015, 2020) work on information resilience, which emphasises communities' capacity to adapt information practices in response to structural exclusion

By reframing small worlds as sites of social capital and collective agency, this study extends Chatman's framework to account for how trust-based networks can support empowerment rather than isolation, aligning with contemporary LIS discussions of information resilience. Among African American teens, bounded information worlds were not barriers to participation but mechanisms for navigating inequitable institutional landscapes

Intersections across frameworks

Taken together, the findings demonstrate how everyday life information seeking, radical change, and small world theory intersect to explain African American teens' information behaviour across individual, collective, and structural levels. The study confirms existing research on youth information practices while extending these frameworks by centering race, representation, and community as mediating forces.

This study proposes an integrated model (see Figure 3) in which trust, representation, and community operate as interconnected mediating system rather than a linear process, with access and participation dependent on cultural validation and relational trust as much as technological availability. The middle row—Trust and Representation—captures foundational conditions shaping whether information environments are perceived as safe, relevant, and credible. Trust underpins interpersonal networks; representation informs engagement with digital and institutional sources. Community occupies the bottom central position because it mediates how trust and representation are enacted in practice. Community acts as the connective mechanism through which information flows. Digital and Peer Flows—represents observable behaviours, including platform use, content creation, and collaborative learning. These practices reflect radical change principles of interactivity and connectivity but are shaped by the relational and cultural conditions above. Together, these forces form an equity-oriented information ecology system where access and participation depend on cultural validation as much as on resources or skills.

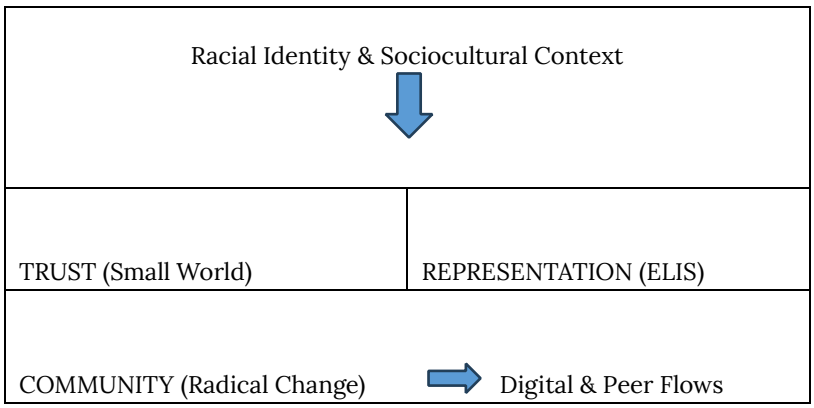


Figure 1. Conceptual model integrating everyday life information seeking (ELIS), radical change, and small world theories within an equity-oriented information ecology of African American teens.

Implications for practice

The findings offer several implications for public libraries, educators, and youth-serving organisations seeking to design inclusive information environments.

1. Culturally responsive information literacy.
   Libraries and schools should embed cultural relevance within information literacy instruction. Teens' skepticism toward institutional sources often stems from experiences of bias or exclusion. Librarians and educators can integrate culturally relevant creators, examples, and scenarios into instruction (e.g., analyzing TikTok or YouTube content alongside databases). This validates teens' existing practices while building evaluative skills. Using culturally familiar examples, creators, and topics can increase engagement and trust.

2. Mentorship and representation.
   Representation among staff is critical. Teens responded positively to mentors who shared their cultural background or lived experiences. Libraries should formalise mentorship roles for youth services staff, particularly those with shared cultural backgrounds. Recruitment and professional development should prioritise diverse staffing and culturally grounded mentorship models. Training should emphasise relational trust-building rather than compliance-driven engagement.

3. Expanding the definition of access.
   Equitable access must move beyond devices and internet connectivity to include cultural access. Collections, programmes, and digital platforms should reflect diverse voices and perspectives so that all youth see their realities represented. Additionally, librarians and educators should conduct regular equity audits of collections, databases, and recommended resources to ensure diverse Black youth experiences are represented beyond historical or deficit narratives.

4. Recognising community-based expertise.
   Librarians and educators can support peer-led learning by positioning teens as co-creators of knowledge. Educators and librarians should acknowledge peer knowledge-sharing as a valid form of information practice rather than informal or secondary behaviour. Programmes that enable youth to teach, create, and share information strengthen engagement and affirm the legitimacy of their practices.

5.6 Contributions to information behaviour research

This study contributes to the field in three key ways:

1. It empirically demonstrates that racial identity is an essential variable in understanding youth information behaviour.
2. It extends foundational theories— everyday life information seeking, radical change, and small worlds—by integrating cultural and structural dimensions of equity.
3. It highlights information resilience and community-based trust as central constructs for studying marginalised youth populations.

By framing African American teens' information behaviour not as a deficiency but as a culturally embedded strategy, this study challenges deficit narratives and affirms the role of public libraries as potential spaces of liberation, creativity, and belonging.

Conclusion

This study examined the everyday and academic information-seeking behaviour of African American teens in Chicago, revealing how racial identity, representation, and trust intersect to shape youth information practices. Grounded in Savolainen's everyday life information seeking, Dresang's radical change theory, and Chatman's small world theory, the research found that African American teens navigate information worlds marked by both resilience and constraint.

Across observations, interviews, and focus groups, participants emphasised trusted networks—family, peers, and mentors—as their most reliable sources of information. These networks offered credibility, cultural understanding, and emotional safety, often compensating for barriers within formal institutions. As one teen shared, 'If I was to go to the library, I would ask a question to the Black librarian instead of the White librarian because I do not want to deal with White guilt' (Teen H, age 17). Such insights underscore the influence of representation and racial dynamics on information engagement.

The findings highlight that while racialised barriers limit access and participation, teens respond through community-oriented and identity-affirming information practices. These behaviours extend existing frameworks by positioning race and culture as structural determinants of information orientation and trust.

Theoretically, this study proposes an equity-oriented information ecology linking trust, representation, and community as mediating forces in youth information behaviour. Practically, it calls for culturally responsive library and educational services, diverse staffing, and peer-led learning models that enhance institutional trust and engagement.

Ultimately, African American teens' information behaviour exemplifies adaptive, community-based resilience, reframing their practices as sophisticated, culturally grounded strategies rather than deficits.

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Information behaviours and the inner life

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Abstract

Introduction. In this paper, I examine internal information behaviours, those information behaviours that deal with information that is already held by a person in their mind or arises from internal information processing. These behaviours have not been a focus in information science research but are critical to how we interact with the external information world.

Method. A review of 10 years of information science literature was undertaken to extract examples of internal information behaviours.

Analysis. Thematic analysis of the information behaviours was conducted to assemble 53 internal information behaviours into 7 overarching themes.

Results. The internal information behaviours cover areas of avoiding, creating, judging, monitoring, realising, seeking, and using information.

Conclusion. What people do with information they have already incorporated into their knowledge of the world has been under-studied. This study reveals what we already know about internal information behaviours and provides a mapping of these behaviours into seven major areas of information behaviours.

Introduction

Information behaviour and practice research examines the various ways in which we engage with information (Given et al., 2023; Pilerot & Ekström, 2025; Savolainen, 2007). These research programmes are often presented under the broad headings of information seeking, information sharing, information use, or information avoidance (Given et al., 2023; Hicks et al., 2025; Huvila & Gorichanaz, 2025; Pilerot & Ekström, 2025). Overwhelmingly, the information that is being sought, shared, used, or avoided is new to the individual and comes in external forms such as documents, speech, or observation of the external world. What is less often studied, and the focus of this paper, is internal information, information that already exists in our minds or comes from our bodies, and the information behaviours which we use to interact with information that we already have incorporated into our knowledge of the world.

The traditional focus in information science on the tangibility of information - see for example, the discussion in Hicks et al. (2025) – has underplayed the importance of what we do with internal information. Additionally, the focus on problem-solving over other uses of information has placed an emphasis on issues such as uncertainty reduction through accessing new information, and under-valued the importance of information processes such as worrying, imagining, or self-appraisal that are important in orientating ourselves towards the world and living successfully in it.

Through an analytic review of the literature, I seek to investigate what I shall refer to as internal information behaviours by answering two questions: (1) what internal information behaviours, defined as information behaviours where the information is already held by the individual, are documented within information science, and (2) what are the main groupings of these behaviours and what do these groupings tell us about internal information behaviours? This is not just a simple categorisation of mental processes but documented information behaviours of internal ways to seek, use, or avoid information. Through this analysis, this paper then contributes to understanding what information behaviours describe the inner life.

Literature review

The inner life refers to a person's internal subjective world (Tashimova et al., 2020), the thoughts, emotions, desires, beliefs, memorise, fantasies, and attitudes that take place within the mind and which may not be available to outside observers. The inner life shapes a world view: it is inherently subjective and is constructed by each individual as a way to interact with the world (Tashimova et al., 2020) and therefore for making decisions about the world. The inner life often involves emotions and how they shape our experience of our lives (Voultsos, 2021) and to how we make moral decisions (Allen & Fry, 2023). The inner life is also important in meaning-making, our sense of existential well-being (Nangia & Ruthven, 2022; Ruthven, 2019b), and, more generally, on our self-awareness and identity (Newitt et al., 2023). As a meaning-constructing place, the inner life can be a creative space through daydreaming, what-if thinking, or fantasy creation (Allard & Caidi, 2018). However, our focus in information behaviour has typically been on interacting with information that is external to ourselves rather than what is happening in the interior of our minds.

Several decades ago Dervin differentiated between what goes on inside and outside of our heads when she described '*internal behaviors (e.g. comparings*, *categorizings*, *likings*, *dislikings*, *polarizings*, *stereotypings*, *etc.) and external behaviors (e.g. shoutings*, *ignorings*, *agreeings*, *disagreeings*, *attendings*, *listenings*, *etc.)*' (Dervin, 1992, para. 9), but I could not find a discussion in her writing that unpacks this differentiation. Our classical models of information behaviour such as Wilson's model (1981), Kuhlthau's Information Search Process framework (1993), and Savolainen's Everyday Life Information Seeking theory (1995), do contain elements of internal information behaviours such as the focus on information need realisation (Wilson, 1981), the awareness of emotional states in the Information Search Process (Kuhlthau, 1993), and the development of an

existing mental ordering of things in Everyday Life Information Seeking (Savolainen, 1995). However, the focus of these models is very much on interaction with external information rather than what we do with information that we already possess. This focus has been noted several times; for example, scholars such as Ocepek (2017) accuse '*both IB* [information behaviour] *and EIB* [everyday information behaviour] *of privileging expertise in documents and people*' (p. 401). Similarly, from Hertzum: '*research on information behavior … [operates] in favor of a focus on how people seek information in documents and by asking other people*' (2023, p. 383), emphasising a focus on external information interactions. Even the cognitive perspectives on information retrieval and information behaviour from the 1980s and 1990s were focussed on cognitive states and representations (not behaviours or practices) and on external dealings with information (Dervin, 1998, 2015; Ingwersen & Järvelin, 2005).

More recently, we have seen recently a greater attention to areas of information behaviour that are less about problem-solving and more about self-discovery, including research on spirituality and contemplative topics (Caidi, 2019; Caidi et al., 2022; Caidi & Innocenti, 2018; Caidi et al., 2025; Gorichanaz, 2016, 2018, 2020a; Gorichanaz & Latham, 2019; Latham et al., 2020; Nangia & Ruthven, 2022, 2023; Robson et al., 2024). We have also seen a recent advance in understanding information behaviours that are about realising one's own beliefs and knowledge states. Knowing what we think, in the sense of what we believe, is important from two sources: spiritual and secular. Secular activities, such as counselling or behaviour change (Meyer & Elsweiler, 2025), often start with asking clients what they already believe as a way of helping clients understand their current beliefs and how to change them. Techniques such as journalling or discovery writing (Heeks, 2012) can be useful here to expose the inner life. Self-dialog can be a way of revealing one's own thoughts as part of recovery (Zhao et al., 2026) and those engaging with online forums are often trying to work through their own situation and how they feel and think about it (Bronstein, 2014; Choi et al., 2014; Gauducheau, 2016; Ruthven, 2019a; Ruthven et al., 2018a, 2018b; Zhao et al., 2026).

Research into religious or spiritual practices show that practices such as meditation which emphasise inner states can lead to revealment. For example Chabot, in his study of New Kadampa Buddhists (2019), talked about the '*heart*' (p. 73), which he described as a '*place in the psychospiritual body*' as 'a *source of, or repository for, realization-like spiritual information*' (p. 73). Further, he noted that realisation is not simply more information but '*an expansive reconstruction of the worldview of an individual*' (p. 71), indicating that the inner life has been transformed by its own mechanisms.

Nangia and Ruthven (2023), in their study of spiritual seeking, reported participants describing their spiritual seeking through qualitative attributes such as interiority and charactering their journey as a search '*inwards*' (p. 931), a search concerned with '*thoughts, feelings and inner experiences of an intimate and private nature*' (p. 928).

Gorichanaz and Latham have concretely discussed the inner and outer world and the connections between them, stating that '*[b]eing sits at the heart of the inner world, as it constitutes a person's engagement with their selfhood, presence and history. Meaning, or more precisely personal meaning, is the activity that springs from being*' (2019, Discussion section, para. 2) but, even though the inner life is important in terms of information interactions, we still lack any coherent model of the information behaviours occurring in the inner life. This paper attempts to examine such behaviours through an analytic review of the literature. This could open up new research directions in to how we use information and also connect what we do with information in the external world to what we do with it in our internal world.

Methods

Data collection

The information behaviours I examine in this paper do not have a standard terminology or classification. Therefore, it was not feasible to undertake a standard search strategy based on indexing terms or key phrases. The aim instead was to create a discovery-based approach to the literature whereby a wide range of material was gathered and then examined. The goal was not to discover all internal information behaviours but to gather a sufficiently wide range to map out the type of behaviours that have been described in the literature. I have only examined information science sources but acknowledge that other disciplines, not least psychology, will also have contributions that can be made here. However, I hope that a framework based on information science research can form the basis for a wider analysis.

Most source material came from exhaustive browsing of all issues of core information science conferences and journals for the 10 years prior to the writing of this paper (all issues/conferences from January 2016 to June 2025). The sources were the Annual Review of Information Science and Technology, the Journal of the Association of Information Science and Technology, the Journal of Documentation, Information Research, the Association of Information Science and Technology Annual Meeting, the Conceptions of Library and Information Science conference series, and the Information Seeking in Context conference series.

All articles were initially screened on titles and abstracts to detect any that might contain information on internal information behaviours. This meant identifying a focus within the paper on the human experience of information and possibly empirical results on information behaviours, although conceptual and theoretical papers were also included at this point. This resulted in 67 articles for analysis; Table 1 presents how many came from each source. Five additional sources (Chabot, 2019; Munro, 2024; Ruthven, 2022a, 2026; Zhao et al., 2026) were added, three from chaining and two in publishers' early view, which seemed to offer a particular focus on internal behaviours.

Source	Articles sourced
Annual Meeting of the Association for Information Science and Technology	3
Annual Review of Information Science and Technology	3
Conceptions of Library and Information Science conference series	5
Information Research	7
Information Seeking in Context conference series	10
Journal of the Association for Information Science and Technology	15
Journal of Documentation	24

Table 1. Sources of articles

Analysis

The analysis was a form of inductive textual analysis in which each article from the set of 67 was read in full for any description or example of an internal information behaviour. Ultimately, 29 sources provide at least one instance of internal information behaviours. Sometimes these were described as behaviours, sometimes as practices, most often as neither. Pilerot and Ekström (2025) characterised information behaviours as primarily about individuals, psychological functions, and cognition, whilst information practices are about individuals/groups, materiality, actions, and habits. The more individual psychological nature of behaviours seems to better fit with studying the inner life as it pertains to that individual rather as it pertains to the outside world, so I have chosen to use information behaviour as the term to cover both. However, the behaviours discovered can have a practice perspective as they are recognisable by most people as ways of

interacting with information, they can form habitual ways of engaging with information, and they are part of common, social, ways of talking about the world and how we interact with it.

To count as an internal information behaviour, I established one main criterion that the information behaviour had to describe a way of interacting with information that was already held by the individual or arose from the individual, such as bodily or emotional states. This includes creating new information based on existing information, forgetting information, and seeking information in the sense of trying to remember something. Interacting with information not already held by the individual, such as reading, or using external information to validate internal information did not count. Some private behaviours such as prayer were also not included as, even if they occur within one's head, they are directed to an external entity.

Any segment of text that described a behaviour that met this criterion was stored and provisionally labelled. In very few cases was there a definition of the internal information behaviour provided and in nearly all cases meaning had to be inferred from the context in which the behaviour was discussed. In several cases, it was not clear whether the information being described was already held or not. I tried to go wide here and if there was an interpretation of the behaviour that fitted with this 'already held' criterion I kept the behaviour in the list as it *could* be an internal behaviour. I expand on this in the discussion.

Text segments were then subject to an iterative thematic analysis (Braun & Clarke, 2006); firstly, creating loose definitions and codes for the behaviours, then compressing duplicates or close-duplicates into single codes, then grouping related codes into emergent themes and using constant comparison approaches for several rounds of coding to improve the definitions and the differences between codes. Next, theme labels were derived, and a further round of code refinement was carried out, including small movements of behaviours between themes.

Findings

The analysis uncovered 53 internal information behaviours arranged into 7 major groupings of behaviours which I describe below.

Avoiding

The first area of internal information behaviours are avoidance behaviours. It may seem strange to be able to avoid information that we already possess, but humans are adept at reducing the impact of what they already know or ignoring inconvenient information (Hicks et al., 2025). In this theme, we see behaviours such as deliberate *forgetting*, a method by which we do not mentally rehearse unpleasant information in order to try to reduce memory creation and thereby make it difficult to encounter the information later; *self-deceiving*, in which we alter our interpretation of a situation or information to avoid dealing with information (e.g., pretending that we are competent at a task so that we do not have to deal with our knowledge of our lack of competence); and *minimising*, in which we try to reduce dissonance by selectively ignoring some existing information. All these behaviours are ways of managing one's inner life and its impact on how one interacts with the world.

Information behaviour	Definition	Indicative sources
eliminating negative thinking	not attending to or trying to change negative belief patterns	(Ruthven, 2026)
forgetting	not rehearsing negative information to make it more difficult to retrieve later	(Hicks et al., 2025)
minimising	selectively ignoring internal information to minimize dissonance	(Ruthven, 2022a, 2022b)
self-deceiving	altering an interpretation of information to avoid having to deal with its consequences	(Ruthven, 2026)
suppressing information	actively trying not thinking about a situation	(Ruthven, 2026)

Table 2. Internal information avoidance behaviours

Finally, there are two related behaviours, both of which are about trying to avoid thinking about negative things, either negative belief patterns (*eliminating negative thinking*), or negative information (*suppressing information*). Not thinking about something also relates to what is referred to as magical thinking (Zusne & Jones, 2014), the belief that one's thought processes can influence the external world, as expressed in statements such as '*don't think of it or it may come true*'.

Creating

A major set of behaviours involves using existing information to create new information or information artefacts. New information forms the basis for how we view ourselves, our experiences, and how we orientate ourselves towards the external world.

Information behaviour	Definition	Indicative sources
creating a memory	creating an internal record	(Gorichanaz, 2019a; Ruthven, 2022a)
creating a plan	using information to create a series of proposed actions to fulfil a goal	(Ruthven, 2022a)
creating beliefs	creating an acceptance of an idea or proposition	(Chabot, 2019)
creating internal states	creating an internal state, e.g., a state of readiness	(Chabot, 2019; Munro et al., 2025; Ruthven, 2022a)
creating narratives	creating a version of an experience or life story	(Ruthven, 2022a, 2022b)
creating identities	creating or changing a view of oneself	(Chabot, 2019; Ruthven, 2026)
engaging in 'what-if' thinking	creating alternative cause and effect scenarios	(Ruthven, 2026)
imagining	creating mental representations of possible futures	(Allard & Caidi, 2018; Ruthven, 2022a, 2022b)
meaning-making	creating a sense of oneself in relation to the external world	(Fourie, 2020)
realising limits	creating an internal representation of one's ability to act	(Ruthven, 2022a, 2022b)
visualising	creating a visual representation of a situation or event	(Chabot, 2019; Gorichanaz, 2019a)

Table 3. Internal information creating behaviours

A cluster of behaviours are about creating new internal artefacts, which may be *memories*, *beliefs*, internal *narratives* of what we believe happened or are preferred accounts of what happened, *identities* that involve creating a new (and usually favoured) version of oneself, creating a *plan* in the form of an internalised set of proposed actions, or creating an *internal state* that becomes the basis for action. The latter may also involve a process of self-reinforcement to use internal information to bolster a decision, view, or plan. Creating memories refers to the conscious production of a representation of a factual experience or information and, like *forgetting* in Avoiding, does not depend on immediate interaction with external information but can refer to information that has been held for some time.

We may also create internal representations such as *visualisations*, which may be an attempt to understand something (e.g., 'I'm trying to visualise how it happened') or a means to make decisions (e.g., 'I'm trying to visualise what this wallpaper will look like in the living room').

A second cluster of behaviours is about creating a sense of our relationship with the external world, including *meaning-making*, a process of creating a mental model of how we believe the external world operates and our relationship to it, (Park, 2005), and *recognising limits*, a process of recognising the limits of one's ability to change the external world. The latter is an internal process in the sense that it often reflects an acceptance of a known situation.

Finally, there are two related behaviours about creating possible futures, *engaging in 'what-if' thinking* and *imagining*. Imagining is a core internal activity involving creating mental representations of possible futures, one which emphasises visual and sensory exploration (see the Using theme about the related behaviours of *meditation*, *wondering*, and *contemplation*), whereas *engaging in what-if thinking* emphasizes problem solving. In both cases, imagined futures are being created as mental representations from existing information.

Judging

This set of behaviours involve judging in the sense of ascertaining the level of something or the meaning of something. There are three groups of behaviours in this theme. The first is about evaluating an internal state as to its level. This might be judging *emotional states*, such as judging one's level of happiness to decide if a course of action is working, judging if we are dissatisfied enough to make a change, *judging normality* to determine if our inner states are comparable to what we have previously observed in others, or *judging our readiness for action*. Finally, we may be engaging in *self-evaluating* or self-re-evaluating behaviours, judging our own behaviour or attitudes possibly against some internal moral code or schema.

A second group of behaviours relates to sense-making activities, including *determining causes* based on existing information, that is creating an explanation of why something happened, and *interpreting feelings*, which involves creating an explanation of one's own feelings towards a situation or an explanation for a feeling such as dissonance. Here we are judging between options. Finally, we have *developing interpretative abilities*, which refers to being able to reason about one's body, such as what is the reason for individual sensations such as pain.

The final group involve attaching significance to possible outcomes, either *predicting* positive or negative *outcomes*, including threats, and *assigning significance to the future*, which involves attaching an emotional or cognitive reaction to these possible outcomes, (e.g., fear or anticipation).

Information behaviour	Definition	Indicative sources
assigning significance to the future	attaching a reaction, e.g., fear, to a possible outcome	(St. Jean, 2017)
determining causes	working out reasons for an event or situation	(Ruthven, 2022b)
developing interpretative abilities	developing the ability to reason about one's body	(Ruthven, 2022a)
interpreting feelings	working out how one feels about a situation including the process of identifying why something does not feel right	(Ruthven, 2022b)
judging emotions	evaluating emotions to assess a state, e.g., am I happy with this situation	(Ruthven, 2022b)
judging normality	estimating how standard a situation is with respect to other known examples	(Gauducheau, 2016; Ruthven, 2022b)
judging readiness	judging one's readiness for action	(Tsai et al., 2019)
predicting outcomes	judging positive or negative consequences	(Gauducheau, 2016; Gorichanaz, 2018; Ruthven, 2022b)
self-evaluating	judging one's own actions and attitudes	(Ruthven, 2022b, 2026; Urquhart et al., 2024)

Table 4. Internal information judging behaviours

Monitoring

A minor theme is monitoring behaviours regarding already held information. Our brains and bodies engage in constant subconscious monitoring of internal states, but monitoring refers to conscious behaviours to detect changes in the inner world.

Three forms of monitoring were uncovered. The first two are *body listening*, monitoring bodily states such as tiredness or pain, and *cognition observing*, where one becomes aware of cognitive states. The latter, alongside other behaviours such as planning, self-evaluating, and self-inquiring, forms part of a general process of meta-cognition which Chabot, quoting Shapiro, defines as '*a type of mental activity wherein individuals develop and maintain an observer status to their mental and bodily awareness, thereby changing their relationship to their process of thinking*' (Chabot, 2019). Finally, there is self-observing, which involves monitoring behaviours around one's actions. Unlike *self-evaluating* in the Judging theme, which involves evaluation and reasoning about one's actions, self-observing simply involves monitoring one's actions.

Monitoring emotional states, such as in anger management or possibly spiritual states, could form monitoring behaviours if they are used as informative states, but I did not find any examples of these in the literature.

Information behaviour	Definition	Indicative sources
body listening	monitoring one's bodily states	(Huttunen et al., 2019; Munro, 2024; St. Jean et al., 2018)
cognitive observing	monitoring one's cognition	(Budd, 2020; Chabot, 2019)
self-observing	taking notice of oneself and ones' actions	(Huttunen & Kortelainen, 2021)

Table 5. Internal information monitoring behaviours

Realising

Information behaviours involving realisation is another major theme. Realisation here is about awareness and the coming to the surface of subconscious, or unattended to, states or sensations as conscious information about oneself that require focus. They relate to the Judging theme in that Judging, such as of internal states, often happens after these states are realised as informative, and to the Monitoring theme, as monitoring often involves monitoring a state that has been previously realised as important.

There are three sub-themes in this theme. One is the realisation of internal states, either *realising cognitive states*, such as confusion, *realising emotional states*, such as happiness, *realising bodily states*, such as tiredness or warmth, or *realising desired states*, a realisation of what one wishes to happen and separate to the realisation of desire itself which is realising an emotional state.

The second is the *realisation of information of knowledge gaps* and corresponds to the classical notion of information need.

Finally, there are three realisation behaviours that relate to a realised sense of incongruity, either a *realisation that something is 'missing'* from one's life (a sense of incompleteness), a *realisation of some kind of dissonance* (a sense of internal conflict), or a *realisation of dysphoria* (a sense of general unease and unhappiness, often used in the context of gender dysphoria). These realisations may have emotional aspects and often involve perceptions of uncertainty and anxiety, but I have separated them out as the focus of the realisation is not of emotional states themselves.

Information behaviour	Definition	Indicative sources
realising bodily states	becoming aware of one's bodily states, including changes	(Gorichanaz, 2018; Munro, 2024; St. Jean, 2017; St. Jean et al., 2018)
realising cognitive states	becoming aware of one's cognitive states, including changes	(Gorichanaz, 2020b; Huttunen et al., 2020; Jia et al., 2022; St. Jean, 2017)
realising desired states	realising a state that one wishes to obtain	(Nangia & Ruthven, 2022; St. Jean, 2017; St. Jean et al., 2018)
realising dissonance	realising a sense of 'wrongness'	(Huttunen et al., 2020; Jia et al., 2022; Nangia & Ruthven, 2022)
realising dysphoria	realising a sense of dysphoria	(Huttunen et al., 2020; Huttunen & Kortelainen, 2021)
realising emotional states	becoming aware of one's emotional states, including changes	(Gorichanaz, 2019a; Huttunen et al., 2020; Ruthven, 2022b; Ruthven et al., 2018a)
realising knowledge gaps	realising a lack of knowledge	(Gauducheau, 2016; Huttunen et al., 2020; Huttunen & Kortelainen, 2021; St. Jean, 2017; St. Jean et al., 2018)
realising something missing	realising a feeling that something is missing	(Nangia & Ruthven, 2022, 2023)

Table 6. Internal information realising behaviours

Seeking

Although information seeking is a fundamental area of information behaviours when dealing with external information, in the case of internal information behaviours, I could only find one behaviour which is the core activity of remembering information. Remembering may be a deliberate activity in which memories are called upon for use, or they may appear spontaneously (Gorichanaz, 2018). The latter may be a form of unconscious information seeking, (see, for example, (Moshfeghi et al., 2016).

Information behaviour	Definition	Indicative sources
remembering	bringing a piece of information to conscious attention	(Chabot, 2019; Gorichanaz, 2018)

Table 7. Internal information seeking behaviours

Using

The largest collection of behaviours was under the theme of Using information. The Using theme is closely related to the Creating theme in which information is being used to create new information or information artefacts such as plans. However, in this theme, the emphasis is not on the output of information use but the process and experience of using information.

A large group of behaviours involve examining internal information such as contemplating, pondering, and wondering. In the literature I examined, these terms are sometimes used as

synonyms but sometimes used with specific meaning. I have tried to create definitions that respects the differences between these related concepts.

First, there are three big behaviours that may act as umbrella terms: *introspecting* refers to the process of turning inwards to think about internal information or thoughts, including motivations and feelings. *Contemplating* refers to the broad activity of deliberate, thoughtful focus on a situation or object. This often refers to external objects but can refer to internal information as well. *Meditating* is usually invoked in the form of a practice of what Chabot calls '*non-conceptual understandings*' (p. 88), in which there is an absorptive nature to the practice and an attempt to create a close relationship with the focus of the meditation. Chabot repeatedly separates these two practices in his writing (2019), whereas others see either contemplation or meditation as an overall term, see for example the discussion in Gorichanaz and Latham (2019).

Also in this category are more specific behaviours that are also about reflection. *Pondering* is a slow form of consideration that is reflective and often used in the sense of weighing up options and so has an outcome focus. *Wondering* also involves consideration, but the sensation is lighter, and more curiosity driven. It is related to imagining, but the process of wondering is more speculative and open. *Worrying* involves repetitive thinking about the future but is characteristically negative and may be seen as a form of anticipatory preparation by which one prepares oneself for a feared outcome. It is related to *engaging in what-if thinking* but is less about creating possible outcomes. *Ruminating* captures the behaviour of repetitive and negative thinking but is usually focussed on the past or present whereas worrying is about the future. Both involve repetitious thinking, but ruminating has the sense of being unproductive and a feeling of being 'stuck'. Finally, *reminiscing* is the process of thinking about the past but with a more positive sense of pleasure or nostalgia.

A second group of behaviours involve using information to make sense. *Sense-giving* is often seen as a process by which one entity provides a way of thinking to another entity, as in political campaigning or marketing (Giuliani, 2016). Here, it refers to the process by which one attaches meaning to information and so is a form of sensemaking. It is related to *assigning significance* from the Judging theme, which attaches emotional or cognitive significance to information based on its possible future implications. A second behaviour is *scaffolding*, in which thoughts are linked and build on each other to build a larger picture. Thirdly, *determining norms* refers to the process of determining what is normal in a situation, usually referring to social norms and acceptable behaviour. This use activity creates a view on what is normal, whereas *judging normality* in the Judging theme is about detecting when something is not normal and therefore may need action. Finally, we have the core process of *understanding*, which involves making sense of information.

Information behaviour	Definition	Indicative sources
contemplating	engaging in deep, considered, and reflective thought	(Chabot, 2019; Gorichanaz & Latham, 2019; Ruthven, 2026)
decision-making	making a choice between alternatives	(Ruthven, 2022b)
introspecting	turning thoughts inwards to reflect on internal information and thought processes	(Gorichanaz & Latham, 2019; Ruthven, 2026; Zhao et al., 2026)
meditating	practicing deep conscious thought on an object or information to gain understanding	(Chabot, 2019)
pondering	considering options in a reflective and deliberate manner	(Samson, 2022)
determining norms	reasoning about what is socially acceptable	(Gauducheau, 2016)
ruminating	thinking repetitively, often in negative or unproductive ways	(Ruthven, 2026)
reminiscing	thinking about past experiences, often in a positive light emphasising fondness or nostalgia	(Dinneen et al., 2024)
scaffolding	linking thoughts to create a bigger picture	(Chabot, 2019)
self-inquiring	asking questions of oneself	(Gauducheau, 2016; Gorichanaz, 2018)
self-realising	using information to realise the possibilities of one's character or abilities	(Ruthven, 2026)
sense-giving	ascribing meaning to internal information	(Urquhart et al., 2024)
understanding	making sense of something	(Huttunen et al., 2020; Ruthven, 2022a)
using intuition	listening to one's unconscious to make decisions	(Munro et al., 2023)
wondering	engaging in curiosity driven speculation	(Allard & Caidi, 2018; Ruthven, 2022b)
worrying	thinking repetitively about future events, usually in a negative context	(Gauducheau, 2016; Ruthven, 2022a)

Table 8. Internal information using behaviours

A third group of behaviours are about behaviours that are focussed on the self. *Self-inquiring* involves asking questions of oneself to realise what one feels or thinks to make concrete, and *self-realising* is the process of realising one's abilities or seeing oneself in a new light with an emphasis on positive potentials. This could be classified under the Realising theme but is listed here as Realising behaviours are all unprompted whereas self-realising, as used in the literature, involves conscious reasoning based on internal information.

Finally, we have the classical process of conscious *decision-making*, using information to create a decision, and *using intuition*, a particular process whereby one uses subconscious information to guide a decision but with a conscious awareness that one is doing so.

The findings are summarised in Figure 1.

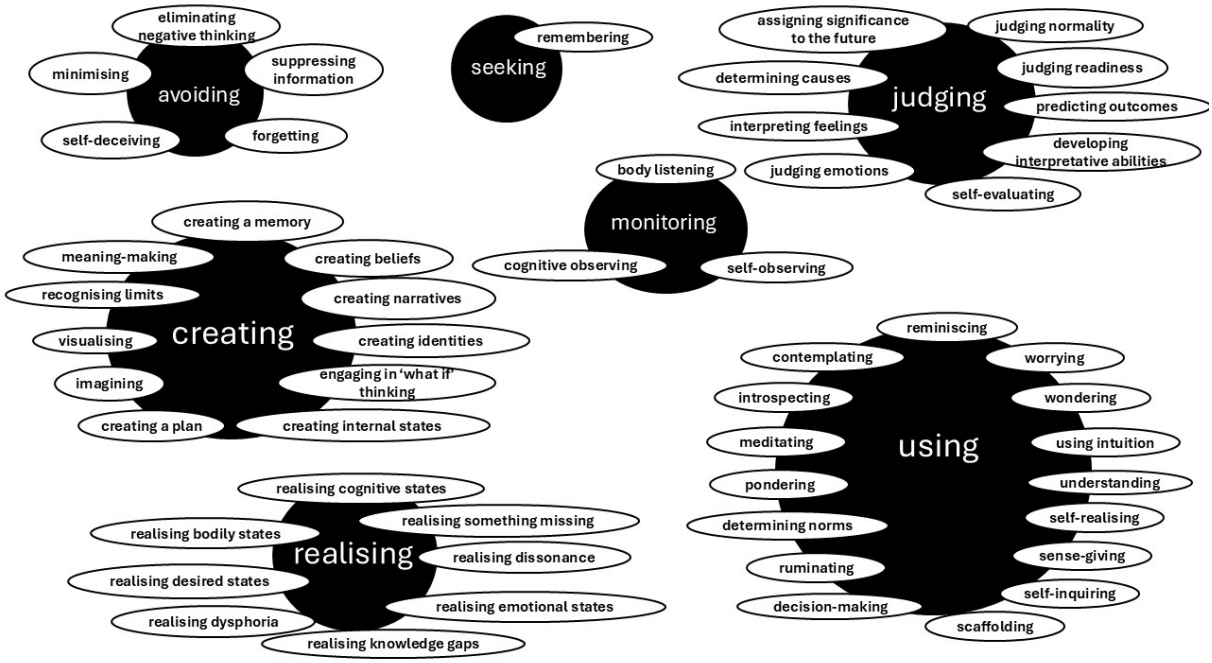


Figure 1. Internal information behaviours

Discussion

The aim of this paper was to investigate internal information behaviours. This was achieved by examining behaviours described in recent information science literature that were internal to the person. In practice, this was challenging in two ways. Firstly, as noted earlier, it was not always clear whether the information was purely internal or not and sometimes using internal information may lead to interacting with external information. Nevertheless, I believe that the behaviours discussed above can all refer to ways in which people engage with information that is only internal even if they end up doing other things later based on this information. Secondly, it was often difficult to decide under what theme a behaviour should appear. I used an inductive approach to broadly organise the behaviours into themes and when naming the themes tried to respect existing categories of information creation, information seeking, information use, etc. so that, later, we could relate internal information behaviours to external ones. However, 'using' information is quite a loose term and there are overlaps with other categories as creating information and judging information which are also ways to use information. I have tried to explain my categorisation in the Findings section, but I think this issue with information creation versus information use is a wider problem with how we use these terms, one that is not unique to this paper but perhaps brought into relief when the same person is creating and using information. Other scholars have pointed to the fact that '*the majority of previous models and empirical research in information behavior tend to focus just on information seeking and use*' (Koh et al., 2015). The research helps support the need to consider other types of information behaviour.

The analysis has uncovered seven clusters of internal information behaviours. Of these, Creating, Using, Realising, and Judging had the most instances of behaviours, especially the themes of Creating and Using. In comparison to accounts of external information behaviours (such as (Given et al., 2023; Pilerot & Ekström, 2025; Savolainen, 2007), there was little on information seeking and no examples of information sharing. The latter is not impossible, as many of us create internal dialogues with imagined figures, for example to practice a conversation, or with imaginary figures as part of fantasy. People with dissociative disorders may have multiple personalities who can

communicate with each other and therefore engage in types of internal information sharing. However, these were not uncovered within the information science literature that I used here. Some of the internal information behaviours related to the body but I believe this counts as part of the internal world and, as Bates points out, even though sensations are felt in the body, they are created in the brain (2018).

The themes do relate to each other. For example, information must be realised to be judged and information that has been realised may be monitored. Some behaviours may be linked; for example, *creating a plan* may happen because of *realising a desired state* and so there may be interesting relationships between the themes and behaviours to be developed. For example, information that is avoided may be less likely to be realised, monitored, or used. However, these relationships are not simple: it is not the case, for example, that information is simply created, realised, then used but rather there may be a more complex set of relationships where created information may be used, avoided, or monitored depending on the context. This is related to the idea of information behaviour patterns suggested by described in Lee, Ocepek, and Makri (2022), who ask us to go beyond conceptual clarification of discrete information behaviours to consider the relationships between behaviours and also Polkinghorne's (2021) elegant discussion on why we need to consider the interconnectedness of information practices as they are actually employed within situations.

It may also be useful to reflect on which internal information behaviours were not observed in this analysis and why they do not appear in information behaviour studies. What I have covered are conscious information behaviours or, at least, they result in conscious information use. Including unconscious ones may be pushing the discussion too far as to what are information behaviours (Gorichanaz, 2022), but even investigating conscious behaviours provides a bridging link to the areas of neuropsychology and neuroscience and their relationship to information behaviour (Moshfeghi et al., 2016).

The work here extends discussion on contemplative studies but also on existing ideas on how the inner and outer information worlds interact with each other (Gorichanaz & Latham, 2019) and how internal information behaviours related to wider concepts such as meaning-making (Gorichanaz, 2019b; Ruthven, 2019b). It also directly relates to novel discussions on different types of information including Gorichanaz's coining of abtrinsic information (information about a person's mental state) and adtrinsic information (personal historical information) (2018). Theoretically, we can also use these internal information behaviours to expand and explain parts of existing theories and models, for example to enhance the externally-focussed aspects of the Information Search Process or Everyday Life Information Seeking, such as seeking, sharing, assessing, etc., with the corresponding internal processes that lead to these behaviours.

Even though the search strategy covered a large time period and a reasonably wide range of resources, the behaviours came from a relatively small set of 29 articles, most of which were focussed on transitions, spirituality, and conceptual papers on contemplation. It is perhaps not surprising that domains such as spirituality and transition (Caidi et al., 2025; Huttunen et al., 2020; Ruthven, 2022b), which place a focus on identity, discuss more information behaviours about the inner life. However, maybe the question is why more studies, including in life critical areas such as health, do not result in learning more about internal information behaviours. In particular, the large area of research on embodiment did not provide much discussion on internal information behaviours, perhaps because the attention in embodiment is on the immediate external environment. The typology here, however, provides a foundation for applied information domains such as mental health information behaviour, creative processes, or spiritual information seeking.

One reason that we may have fewer documented internal behaviours is that we do not ask about them in our research studies, focussing instead on the more easily observable external information even though our internal information behaviours orientate us to the world and create the basis

upon which we act with the outside world. By only focussing on information behaviours oriented to the outside, perhaps we are only seeing half the picture of what we do with information.

Conclusions

This paper has presented a novel categorisation of information behaviours that are internal to the person. Through a literature analysis, it has uncovered 53 distinct behaviours in 7 themes reflecting the various things that people do with information they already hold or are created from internal information. This opens new opportunities to link our inner information world with the external information world and better understand how our inner information world influences how we engage with information.

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Push me, pull you: factors that drive information-seekers away from traditional environments and towards LLMs

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Abstract

Introduction. We report an investigation into the use of generative AI large language model (LLM) tools by information seekers. We elicit the reasons for their use of LLMs in preference to established tools such as social media, interactive search, and libraries.

Method. A mixture of critical-incident retrospective interviews and live observations were used to capture data. The observations were recorded via Zoom, and all sessions were audio-recorded. Transcripts of the interviews and records of the LLM prompts used were all included in the analysis.

Analysis. Thematic analysis was undertaken on the transcript and LLM prompt data. Analysis was done manually, following an iterative process.

Results. Respondent's preferences for when to use LLMs reflected a range of push factors driving them away from traditional environments, and a set of pull factors drawing them to LLMs. This pattern reflects previous research on migrations.

Conclusions. Information seekers are drawn to the potentially personalised and easy-to-access outputs of LLMs such as ChatGPT, and by the bias and difficulty of use that they ascribe to search engines and social media.

Introduction

Large-language model systems (LLMs) such as OpenAI have rapidly been adopted by information seekers, despite cautions from some about risks such as hallucinations. We have only weak evidence of why people adopt LLMs as an information seeking tool in preference to search engines, libraries, or social media. There are known problems with the existing range of information environments: creating effective search queries, especially for complex needs, is often difficult; information needs to be collated and compared from different search results; and social media content can be highly biased. Furthermore, for a variety of reasons, some members of the public have become wary of official sources of information. The technical and jargon terms and sheer difficulty to read of some online material is a proven barrier to information access by many.

It is into this imperfect range of existing tools that LLMs have burst, quickly finding favour with some information seekers. The history of information seeking and information systems research more generally has repeatedly underlined that decisions to adopt and use a technology are complex. Models such as the technology acceptance model and the unified theory of acceptance and use of technology have been used to evaluate the potential uptake of a technology in advance of its deployment. However, these are general-purpose tools that draw on generic concerns such as 'performance expectancy' and 'behavioural intention'. They are not intended to provide a close insight into specific contextually important factors.

In this paper, we rise to the challenge of understanding why information seekers turn to LLMs in preference to search, social media, and print sources. We seek to investigate the factors that influence their choice of LLMs for a particular information need and reveal the contexts in which there is a high likelihood to use LLMs rather than other sources of information. We first review the existing literature, then introduce our research method, and finally present our results. We conclude the paper with a discussion of our findings and suggestions for future work.

Literature review

Until the emergence of generative AI such as ChatGPT, the combination of search engines and web sites were the dominant platform for digital information interaction since the emergence of both in the mid 1990s. The nature of human behaviour both within (Pirolli, 1997) and across (Tauscher & Greenberg, 1997) websites and hypertexts, and in undertaking interactive search (Hertzum & Frøkjær, 1996) have all received extensive research. Understanding the web's impact on information seeking and information behaviour is a continuing focus in information science research (Savolainen, 1999).

In the late 1990s, the emergence of the mobile web transformed these experiences, leading to a second wave of research on web interaction. The ability to use the internet in place while on the move also significantly adjusted information behaviours (Cui & Roto, 2008). The impact of screen size, spanning reading, browsing, and searching were investigated (Buchanan et al., 2001; Jones et al., 1999). This research revealed that users on mobile devices more often resorted to interactive search to locate material, at the expense of browsing seen on larger displays (Jones et al., 2003; Jones et al., 2002). Cognitive factors are a constant and strong influence on the effectiveness and efficiency of information interaction; working memory influences reading, regardless of device, and the synthesizing of multiple search results (Hearst, 2009; Marchionini, 1995).

Social media has more recently grown as a major source of information (Kim et al., 2014; Nielsen & Schrøder, 2014). A significant research concern has been social media as a platform for persuasion. This has particularly focused on the perceived threats of echo-chambers, where people prefer to interact with people and content that share their viewpoints, and filter-bubbles, where algorithmic profiling leads to people being pointed to content that aligns with their existing biases (Ekström et al., 2024; Ross Arguedas et al., 2022). While both concerns remain topics of debate (Bruns, 2019), there is evidence that both social media and the conventional web play substantial roles in view

formation and change (Beall et al., 2023; McKay et al., 2020; Molem et al., 2024). Recent research has shown that view change is a cognitively and informationally intensive (McKay et al., 2020; McKay et al., 2024). It is also emotionally intense (McKay et al., 2020). Judgements of relevance, concerns of bias, and assessing the reliability of information reassessed throughout involves information seeking work that is already mentally complex (Hearst, 2009; Marchionini, 1995).

The emergence of generative artificial intelligence and specifically the technology of LLMs as a new potential means for finding information disrupts the established digital information environment of search and social media. There are known issues with LLMs as an information source. For one, they are prone to hallucination, where they create superficially convincing but false information (Chowdhury & Chowdhury, in press). They also suffer from sycophancy: reflecting the information seeker' existing bias (Malmqvist, 2025). There is growing evidence that both the general public and professional information seekers are adopting LLMs, despite such risks (Chowdhury & Chowdhury, in press). However, where developers of generative AI technology and other computing-oriented disciplines have started to theorise about the use and human factors of generative AI, information science must necessarily wait for usage to both emerge and develop before it can theorise on human behaviour.

This paper takes a first step in understanding LLMs and their impact on information seeking behaviour. The issue of technology adoption is, however, one which information science has little developed theory. As we embarked on the analysis of our research data, the gathering and analysis of which is reported below, we found that a specific model of human behaviour well-matched the reasoning reported by our respondents. While there are complex model of technology adoption, such as the technology acceptance model (Davis, 1989) and unified theory of acceptance and use of technology (Venkatesh et al., 2003), a better fit was the push-pull model of human migration (Bogue, 1969), which has later been expanded and adopted (Moon, 1995) and a recent research team has applied to generative AI (Zhou & Li, in press).

Method

We undertook a two-cohort study, recruiting twenty participants. The first cohort were seven participants who provided retrospective critical-incident interviews (Flanagan, 1954); the second cohort included thirteen participants were observed undertaking interactions with LLMs in pursuit of one or more controversial topics. The total sample size is consistent with related recent studies, ranging from ten (Weeks et al., 2016) to eighteen (McKay et al., 2024) participants. Participants were aged from 22 to 60, with ten women, nine men and one declining to respond on the question of gender. Participants were recruited with a mix of the researchers' existing networks (12), the Medium and other discussion forums (4), and snowball sampling (4).

The critical incident interview participants were invited to choose a past incident of using an LLM that was particularly formative in their use of LLMs (their 'critical incident'). The rest of the interview focussed on this event, investigating why they chose an LLM to find information, and how they exploited it to fulfil their information goal. They were asked to share their LLM history from that episode if they were comfortable doing so. All seven showed us their history. In the observations, participants' screens were shared using Zoom and notes were taken about the LLM interactions. The observation was followed by an interview to elicit further information on the interactions across the session. In both the critical incident and observational settings, focus points for discussion included problems and challenges encountered when both using LLMs and conventional information seeking tools.

We subsequently used thematic analysis to form an understanding of the use, benefits, and challenges encountered with generative AI as compared to conventional information environments. We focus in this paper on one major theme that emerged from the interviews: how different factors pushed our participants away from established information environments, and, in

contrast, the factors that pulled them towards using LLMs. The initial coding was discussed by the primary coder and one of the other authors, refined and checked for consistency and exhaustivity. Two further iterations were taken to distinguish themes and sensitise the coding to the existing literature.

The research was approved by the City St. George's Ethics Board, and consent was given by participants in advance of their interview or observation.

Findings

Our results reveal two major sets of factors that influence how and when information seekers turn LLMs for information in preference to the mainstream established sources of information. *Push factors* that are driving people away from conventional environments and *pull factors* that are attracting people towards the use of generative AI. Each of these had a variety of facets that mixed together in different combinations for each individual participant.

Push factors: Driving use away from existing sources

There were five major push factors: a *lack of personalisation and interactivity*, *dissatisfaction from carry-over effects* (where interactions with LLMs shape expectations of human interactions), *distrust in large institutions* and *in traditional information environments* (e.g., print and social media), and *scaremongering in the information environment*. We address each of these in turn.

Lack of personalisation and interactivity

Traditional static information tools lacked the ability to handle highly personalised and complex queries of some participants, which drove them to use LLMs. P20, who was navigating their fertility journey with additional health considerations, was unable to effectively phrase their specific and complex query in Google such as '*I am a mother, that wasn't pregnant, I want to breastfeed, I'm a certain age, I have certain illnesses, and I cannot be pregnant. What are my options*?'. This difficulty in articulating their unique circumstances, combined with a frustration that '*people don't tend to give clear information online*' on such sensitive topics, led P20 to turn to ChatGPT, which quickly provided a comprehensive '*summary of all the experiences*' and options that '*opened a lot of doors*' which P20 had not considered before.

P4, while researching money transfer through cryptocurrency, highlighted that online information lacks specificity to their '*exact scenario*', which includes being an '*F1 visa holder, trying to send money from an Indian bank account to US bank account for education purpose*'. They said that finding a '*credible*' source on the web that is '*capable*' of answering their specific context is challenging, because regardless of their keywords, '*Google will not able to provide those articles*'.

Traditional information tools fail to meet people's needs for personalised responses to complex queries. Respondents thus choose LLMs for tailored, collaborative advice.

Dissatisfaction due to carry-over effects from human-human interaction

'Carry-over effects' refer to the way people's habits of interacting with LLMs shape their expectations in conversations with real people. Mental models of communication acquired from getting accustomed to LLMs, such as detailed information, empathetic tone, unlimited patience and availability, and emotional safety, create a baseline for participants' expectations of human interactions. When people did not meet these expectations, dissatisfaction or frustration resulted.

P2 expressed disappointment with their doctor's answer about a glaucoma prognosis, stating they '*expected a more coherent and in-depth explanation*', compared to their experience of LLM output, and feared that the doctor might think they '*stupid and dumb to ask questions*' and '*waste their time*'. They turned to ChatGPT '*for getting their answers*' and emotional safety as '*AI won't be mad at them*' for asking the same questions '*over and over again*' and as '*the language it uses really comforts and reassures*' them.

P22, when searching for information on Israel vs. Palestine, said that while they can go to a library and '*have a chat with a librarian*', the librarian's information '*is not necessarily relevant*' to their needs, whereas with ChatGPT they could have a conversation '*like a person*', letting them '*clarify*' information they do not understand and '*dig down quite deep*', something lacking in '*other communication channels*'.

These episodes suggest that expectations are transferred between information seeking with LLMs and seeking with people: participants reported turning to LLMs where they perceived gaps with in-person information seeking.

Distrust in governments and large institutions

Some participants expressed scepticism toward large institutions, perceiving them as biased. In contrast, LLMs were perceived as 'neutral' sources, less influenced by specific agendas and able to synthesise diverse perspectives.

P20 and their partner were navigating Italy and Poland's hostile legal landscape for LGBTQ+ parents. Italy only recognises the biological mother and Poland does not acknowledge lesbian mothers. This created uncertainty about their parental rights and their child's potential statelessness, since P20 is not the biological mother. P20 was frustrated with Italian politicians citing them as a source of '*a lot of misinformation that goes online*' and criticised the Italian government website '*for being incomplete*' stating '*they don't know what they're talking about*'. This led them to seek information from ChatGPT, which '*confirmed*' the '*fact*' that '*Italy is quite bad*' and provided them with '*a more comprehensive*' view from various sources including '*government websites, forums, and user comments*'.

In contrast, P18 strongly believed in the existence of a '*deepstate*' that controls '*the government and the internet*'. P18 saw LLMs as '*neutral*', providing a '*pretty much balanced view*', and finally '*its own recommendation*'.

In these cases of scepticism about officialdom, people see LLMs' use of non-official sources as reassuring, because they are not limited to potentially hostile or suspect official content.

Distrust in traditional information environments

Participants also expressed scepticism about the credibility and transparency of online information, including social media, blogs or articles and search engines. P2, while navigating information on the Israeli-Palestinian conflict, cited the overwhelming effort required to '*verify or cross check*' information, speculating that content might be influenced by partisan groups, '*writing their side of the story*'. The '*complicated*' process of discerning information using existing online tools resulted in a sense of futility and scepticism. Consequently, P2 turned to LLMs to '*save their time and not bother*'.

P4, while trying to transfer money via cryptocurrency, faced significant challenges in discerning valid legal advice online, encountering '*conflicting opinions*' and '*Shady advice*'. To address their cognitive overload, they turned to ChatGPT to get '*more legally sound advice*' and its '*opinion*' on practical feasibility. P4 noted that without ChatGPT it would be '*very tough*' for them to get the information easily, although they acknowledged that '*ChatGPT is not a legal advisor*'. P4 said they would not decide based on '*reading conversations online,*' but they '*gave up on using Cryptocurrency to transfer money*' after their interaction with LLMs, concluding that '*cryptocurrency is legally complex and not worth their time*'.

Scaremongering in information environments

Social media frequently employs algorithmically promoted content that is emotionally loaded and has distorted perspectives. Consequently, participants adopted strategies to avoid anxiety-

inducing content and turned to LLMs for fresh perspectives, that filtered out sensationalism, especially on contentious topics.

P9, while exploring the use of psilocybin, sought to understand the '*potential benefits, risks, and preparation required*' for optimising a psilocybin experience. During their preliminary research on Google, they encountered scaremongering such as '*conspiracy theories, a lot of warnings, and examples of somebody walking off a cliff when they were on psychedelics*'. They turned to LLMs to check '*blind-spots*', anticipating it to output similar information, however, contrary to their expectations, LLM outputs '*weren't actually stark*', didn't '*scaremonger*' and '*didn't lean into the harm*'. While the participant acknowledges they could have prompted more extreme examples, they mentioned they '*didn't go down that rabbit hole*', suggesting they chose not to pursue fear-inducing inquiries, unconsciously seeking agreeable information.

Similarly, P3 who aimed to gain a comprehensive understanding of the dating app landscape, deliberately avoided alarmist Google news search results such as '*people get badly scammed, kidnapped, hurt or raped kind of thing*'. Instead, they sought LLMs as they '*did not want to get into the harms immediately*' and instead wanted an overview of the dating apps landscape, '*balancing both positives and harms*'. Contrary to their expectations that LLMs will output '*extreme crimes like Google*', it provided them '*with an overall view and then drilled down*' into '*novel perspectives*' that were relevant, such as '*swiping culture*'. This increased their trust in LLMs for '*succinctly summarising overall views*' void of sensationalism.

Pull factors

In contrast with factors that were driving our participants away from traditional information environments, we saw a range of pull factors that were drawing them towards generative AI. These included: *presentation capabilities*, *confidence cues*, *perceived expertise* (halo effect), *perceived neutrality*, *low cost of learning*, *personalisation and interactivity*, *niche information discovery*, and *contextual data.*

Presentation capabilities

LLMs used a *neutral framing* and *confidence cues* in their output presentation.

Neutral framing led participants to perceive LLM output as 'facts' or 'suggestions' rather than 'opinions'. Responses that neither explicitly supported nor contradicted their views were often interpreted as in agreement with them.

P1, while exploring whether raising interest rates effectively curbs inflation, highlighted that they '*believed the bits which were stated as facts*', due to '*the way*' ChatGPT presented the information. They stated that ChatGPT '*confirmed their doubts*' that banks are not doing the right thing by simply increasing interest rates '*without actually saying, whether it is right or wrong*'. P1 left the interaction feeling slightly '*mortified*' and '*horrified*,' concluding that '*the situation is worse than I thought.*' While their LLM didn't explicitly state that raising interest rates fails to address inflation, P1 felt validated because the response didn't oppose their '*gut feeling*', reinforcing their emerging views.

P21, who explored how sporting bodies distinguish between men and women, expressed trust in LLM output as there was nothing that made them '*not believe it*'. They stated the responses sounded '*fairly balanced and quite well informed*' and were '*phrased in a very factual way rather than in an opinionated way*'. P21 highlighted an example from the response (Figure 1.): '*So it says, this 'can' discourage some athletes from publicly identifying as non-binary. It doesn't say this 'will' discourage some athletes*', leading them to perceive LLMs' neutrally framed response as a sign of objectivity, increasing their trust.

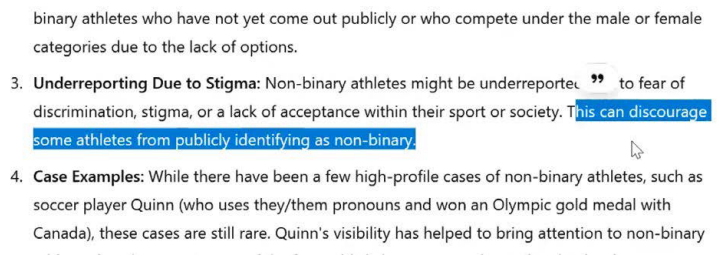


Figure 1. P21's interactions investigating gender

These interactions illustrate how LLM's avoidance of definitive statements and judgment can influence users' views by making them feel validated and amplifying their existing views.

Confidence cues in LLM responses enhanced perceived credibility, aligning with participants' need for reliable information and simplified decision-making via reducing the need to seek additional sources. Participants calibrated their trust in LLMs based on these cues: when high confidence was indicated, their trust increased and led to ready acceptance of information, whereas when it communicated uncertainty, they cautiously verified information from other sources.

P2 who was seeking advice on glaucoma, stated that their decision to verify information from other sources '*really depends on how sure AI is about the answer*'. They mentioned if the LLM is confident that '*it's not a big thing*', it reassures and '*calms*' them down and they '*exercise their credibility assessment in less detail*'. Contrarily, when P2 perceived LLM responses as uncertain, or '*abstract gibberish*', they adopted a more critical stance, verifying information through sources such as '*Harvard medical school, papers*' or posts on '*Reddit*'. Confident LLM responses led P2 to uncritically accept that their prognosis is less serious, reducing their anxiety.

Similarly, P12, who was exploring 'How the American government profits from obesity epidemic', trusted in LLM's directness and expected that if LLMs were truly confident that P12 was '100% *wrong*', it would be '*straight*' and very direct in communicating that '*girl, you're wrong*' and explicitly counter their views. The lack of contradiction to their views and level of assertiveness in its responses led them to believe that their LLM was confident in its information, and they felt reassured that their belief that the USA government profits from the obesity epidemic is true.

These examples illustrate how users interpret and react to the perceived certainty or confidence level of LLM responses, reflecting distinct patterns of reliance on AI guidance.

Perceived expertise

Participants perceived LLM responses as those of a highly knowledgeable domain expert, fostering trust and a '*halo effect*.' This overall impression of LLMs as expert echoes (Cialdini & Goldstein, 2004) principle of 'authority' making users are more likely to be influenced by an LLM they view as 'expert', risking over-reliance on LLMs, and uncritical acceptance of LLM information. This ties in with the participants' trust in AI's 'self-assessment' of accuracy.

P8, who sought LLMs to self-diagnose narcissism, stated that they believe LLMs 'know everything about everything' and have real 'subject matter expertise'. This perception casts LLMs as more knowledgeable and credible than human sources, whether 'a friend' or 'psychiatrist'. The halo effect led P8 to ascribe authority to LLMs even in complex psychological assessments, accepting its explanation that 'narcissists believe they are the best' and 'don't doubt if they're narcissist', despite the complexity of diagnosing personality disorders. This resulted in P8 changing their self-assessment and accepting the LLM's belief that they are 'not a narcissist'. Similarly, P18 quoted their LLM as a '*very knowledgeable friend*' and trusted its expertise and information stating that it will give them '*the most optimal answer*'.

These examples demonstrate that when users regard LLMs as highly knowledgeable experts and trust its responses, they may rely heavily on its guidance, even in deeply personal and complex areas traditionally reserved for human experts and integrate its outputs uncritically.

Perceived neutrality

Participants perceived LLMs as 'neutral', readily accepting output as factual. Turning again to P8's endeavour to use LLMs to self-diagnose narcissism, they mentioned that, unlike these human sources, who might be biased or try to make them '*feel better*', an LLM was '*void of emotions*' and would offer an '*objective opinion*' based purely on information.

Similarly, P1, perceived LLM responses as factual, explaining that on a nuanced topic like '*whether raising interest rates cure inflation*', they didn't expect anyone to have an '*agenda*' that might have been '*fed*' into its data. P1 expected LLMs to be as '*unbiased*' and '*as well researched as BBC news report*'. They assumed with their '*limited knowledge*' that LLMs aggregate data '*from the internet*' rather than filtering content and felt '*less impetus to check the credentials*' compared to their '*news feed*' or information from '*an organisation run by Elon Musk*', indicating that they view humans as biased, but not LLMs.

P9 attempted to '*deliberately push*' their LLM to '*recommend*' whether they should 'take a trip with psilocybin'. The LLM became '*repetitive*' and '*could not be pushed further*', which reassured its output was '*quite a balanced opinion*'.

Participants' perception of LLMs as neutral shifted on controversial topics such as Israel-Palestine conflict and gender identity. All the participants who explored Israel-Palestine conflict, regardless of which side they favoured, perceived LLMs as biased. This was despite varied and personalised responses. This reveals a marked contrast with the general sense of LLMs as neutral, and that strongly held views on deeply divisive topics lead to greater sensitivity about any divergence from a seeker's personal viewpoint.

Low cost of learning

This refers to the reduced time and cognitive effort access and comprehend information, particularly on complex and contentious topics. Participants viewed LLMs' ability to sift through the internet, retrieving and delivering tailored information and synthesised summaries at speed, as a significant benefit to uncover new viewpoints and insights.

While exploring the Israel-Palestine conflict, P2 expressed feeling overwhelmed by the vast amount of conflicting, polarising online information. LLM could help them '*get a summary of the history or evolution of the conflict*', minimise emotional stress and not '*lose their sanity by diving into that much of content online*' and '*save time*'.

Similarly, P9, who was researching optimising psilocybin experience in context of a retreat, mentioned that Google results provided with '*the warts and all*', leaving it up to them '*find the balance themselves*'. LLMs' '*balanced opinion*' and '*high-level information*' '*ticked all the boxes*', saving them having to sift through and reconcile the disparate and conflicting personal anecdotes, research, and opinions online. This summarization reduced both the time and cognitive effort involved in processing the information, especially on a heavily stigmatised and contentious topic such as psilocybin. This was also echoed by P20 and P22, who expressed cognitive load having to sift through contradicting articles online and having to '*disseminate the information yourself*', whereas with generative AI they could talk to it '*like it's a person*' and '*get the information in one go*', making it easier for them to '*accept the information even if it's not necessarily true*'.

Personalisation and interactivity

Personalisation and interactivity emerged as key pull factors of generative AI, drawing participants to its human-like dialogical nature that enabled real-time, tailored responses to complex inquiries.

P8, when trying to self-diagnose narcissism, highlighted that unlike traditional tools that don't offer direct feedback or analysis, they can '*get Gen AI to do anything*'. For instance, they asked generative AI to emulate the role of a psychologist, ask them 10 specific questions, and '*tell*' them '*a conclusive answer*' whether they are '*a narcissist or not*' based on their responses. They particularly appreciated that LLMs do the '*thinking for them*'. This highlights how LLM personalisation and interactivity, allowing users to receive dynamic responses and feedback, influences how they form views even on subjective topics such as self-perception analogous to human discourse.

Niche information discovery

Participants turned to LLMs to retrieve hard-to-find niche information. LLMs also made plausible connections between disparate concepts, especially on contentious and sensitive issues, where non-mainstream sources are limited, fragmented, and have low visibility on the Web.

P9 used LLMs as a supplementary tool while exploring the use of psilocybin, to check their chosen legal retreat adhered to safe and best practices and identify potential '*blind spots*' that traditional searches might not surface. They found LLMs' information '*much more strongly curated*', '*very factual*' and '*synthesised down to key points*' which '*comforted*' them that '*they weren't missing anything*', solidifying their view and confidence in taking a psilocybin trip. Additionally, P9 queried ChatGPT '*whether psilocybin can cure anhedonia (the inability to feel pleasure)*', expressing concern that '*medicinal trials are so deeply buried in the internet*' due to algorithmic suppression and biases on such topics that '*it wouldn't surface*'. LLMs provided a clear '*yes, it can*' answer, retrieving niche information and making connections between different topics (psilocybin, PTSD, and anhedonia). This persuaded P9 of the LLMs' ability to find highly specific information.

Contextual data

Contextual data refers to additional relevant and novel information in LLM responses, that goes beyond simply answering participants' exact questions (prompts) and explores the broader context of the query to interpret the topic. This additional information was valuable for many participants who sought novel perspectives.

P22 who initially viewed gender identity, particularly medical interventions, as an '*epidemic*' and a '*fad*' asked their LLM 'how many genders are there'. In addition to addressing their core query, the LLM provided contextual information on 'cultural variations' and the 'historical existence' of non-binary gender communities (such as Hijras) in South-East Asian countries (Figure 2). P22 found this information '*interesting*' and noted that these cultural practices, must be '*believed in for thousands of years*' and hence '*don't feel like a fad*'. This new information led to a shift in P22's view, who acknowledged '*there is something really in it for them*', and they have begun to '*question*' their stance. P22 expressed a desire to '*learn more about it*' due to the '*deeper insights into the other side*' offered by LLMs. P22 critically reflected on their selective exposure to the '*right side of the lens*' and indicated behavioural changes including seeking '*alternative books*', videos that '*focus on the 'other' side*' and '*adjusting their Tik Tok algorithm*' to explore diverse perspectives. They appreciated that ChatGPT did not outright reject their view, and instead offered contextual '*points to ponder*' that encouraged a more thoughtful engagement with the topic.

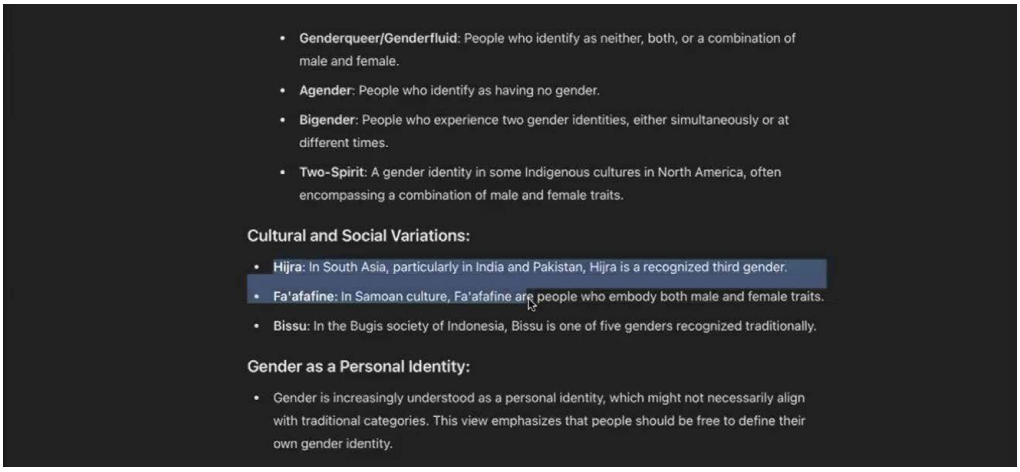


Figure 2. P22's interactions with an LLM

P12, who believed that the U.S. government's inaction on obesity was driven by financial interests, queried LLMs with a leading prompt 'How does the U.S. government profit from obesity?'. The LLM responded with a plausible narrative that included broader, tangential points, blending economic concepts related to the food industry and government and created illusionary correlations about how these factors 'might' contribute to government profit from obesity, rather than directly acknowledging the lack of concrete data (Figure 3). The response gave P12 new information, like fast food chains contribute to government revenue via tax, and they concluded that the '*government would not want to stop the fast-food chains*'. Unexpected information such as food lobbyists influencing labelling requirements was perceived as '*wild*' and '*scary*', leading them to view the relationship between government and food companies as collaborative and '*equal in responsibility*'. Although LLMs presented alternate 'points to consider', and expressed uncertainty through hedging language, P12 readily believed the false connections as factual, reinforcing their view of '*not trusting the government*'. This demonstrates how LLMs' sycophantic tendencies can lead to hallucinated information and create misconceptions.

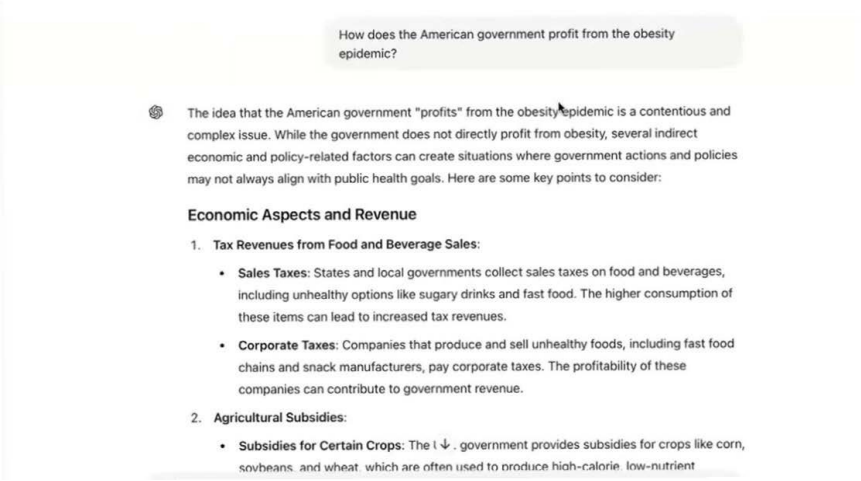


Figure 3. P12's interaction with false information

Discussion

The factors that led our participants to turn to LLMs for information are revealing and present a complex admixture of reassurance and concerns. We did not find the same patterns of push-and-pull as a recent paper (Zhou & Li, in press): however, that paper pre-identified their factors from

existing literature and used an online survey to quantitatively validate their factors. This approach inherently runs the risk of overlooking factors not previously exposed by existing research. Their survey also examined general attitudes and intentions, not specific incidents. Overall, their approach is close to classical technology adoption models such as technology acceptance model (Davis, 1989). In contrast, we focussed on eliciting insights into information seeking behaviour rather than adoption. It should not therefore be a surprise that our findings complement theirs, and our specific, qualitative, and elucidative method should reveal new concerns that theirs does not.

What we do see is that our respondents' existing concerns about conventional sources of information, from difficulties experienced in use, to experiences of barriers, to information for their own personal circumstances, served as push factors. These push factors pushed them away from the existing tools such as search engines and social media, and from sources they saw as biased and unreliable (e.g., LGBTQIA+ parents avoiding information from an Italian government they saw as homophobic). Push factors around platform bias (e.g., sensational social media content) were not uniform to all the existing environments, but still provided an impression of LLMs as being untainted. Given the factual slips we observed in LLM output and recent information science concerns about hallucinations and sycophancy (Chowdhury & Chowdhury, in press), this is a concerningly one-sided assessment at times of the risks of LLMs.

The pull factors start from this impression of (relative) neutrality and widens to include the common attribution of expertise to the LLM systems. Neutral tone and provision of indicators of confidence and uncertainty reassured our participants. However, the confidence signals proved ineffective when warnings were given. The neutral tone of the output added to the sense of expertise and authority. However, this did lead respondents to see even information that contradicted their viewpoint in a positive, affirming perspective.

A second major branch of benefits mirrored the difficult use ascribed to the conventional information environment: the LLMs were perceived as easier to use. More than that, they also were successful at locating specific information that our respondents found challenging to find when, for example, using search engines. Personalised outputs provided another factor where LLM output was seen as superior to search engines and stock material on social media. However, just as neutrality misled respondents into over-rating the level of expertise captured in the LLM output, the immediate ease of use could lead to slips and errors of context being overlooked. For example, P8 and P9 both used LLMs in a nuanced health setting without reporting concerns about the output even as their investigations became more specific, and hence more likely outside the areas where the LLM was most reliable.

The provision of contextual information added to this sense of ease, and in P22's case appears to have enabled them to shift their position on a contentious topic, by raising information previously unknown to them. However, P12's contextual information had numerous flaws and whether due to poor training data or hallucination, led this respondent to conclusions that were likely groundless.

Conclusions and future work

Melvin Kranzberg' s famous first law of technology is that 'technology is neither good nor bad; nor is it neutral', and this certainly applies to each of the pull factors drawing our respondents to LLMs. Similar mixtures of good and bad can be seen in the push factors thrusting respondents away from social media, search engines, and the web. The neutral framing of LLM output is an antidote to social media's more polarised and provocative content. However, the same framing hides factual distortions in the LLM output, and there was a recurring problem of confirmation bias, with even data that diverged from a respondent's views been seen as supportive.

New information literacies are undoubtedly needed, but better interaction design and feedback is also required. The weakness of subtle user feedback is well-established in interactive search (Hearst, 2009). However, the introduction of web-scale search to library catalogues conversely revealed that with the right cues and tools, information seekers can adapt rapidly and effectively exploit even complex tools (McKay & Buchanan, 2013). The demands of search engine result pages, requiring the searcher to collate and compare content between documents, are cognitively demanding (Hearst, 2009). Our respondent's inclination to avoid this effort via LLM output is understandable, as indeed users of search engines have resisted learning advanced search controls (Topi & Lucas, 2005). However, studying actual use has shown that there are effective tactics that are cognitively simpler (McKay & Buchanan, 2013). Closer investigations into effective seeker behaviour are likely to reveal where LLM users are similarly adaptive and adapt strategies that deliver effectiveness without cognitive complexity.

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Celebrating 30 years of the ISIC conference: citation impact and collaboration

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Abstract

Introduction. The ISIC conference series has served as a central venue for interdisciplinary research on information behaviour since 1996. This paper commemorates 30 years of ISIC by examining its scholarly impact and collaborative characteristics.

Method. A descriptive and bibliometric analysis was conducted on 495 ISIC papers published between 1996 and 2024. Citation data (N=20,865) were retrieved via SerpAPI from Google Scholar. Author metadata, including affiliation and academic seniority, were manually extracted from conference proceedings and journal publications.

Results. Collaboration has increased over time, with a shift from single-author papers to multi-authored contributions. Authors from 42 countries have participated and citing authors represent a broad range of institutions and research interests, with 'information behaviour' being the most frequent. ISIC papers have been cited extensively, with an average of 39.8 citations per paper.

Conclusion. The ISIC conference continues to play a pivotal role in shaping the field of information behaviour. Its international reach, interdisciplinary nature, and sustained scholarly influence underscore its importance. Future research should explore citation contexts to better understand how and why ISIC papers are cited.

Introduction

Since 1996, the ISIC conference has been a central international initiative for research on information seeking and behaviour, serving as a focal point for an interdisciplinary community. The first ISIC conference, held in Tampere, Finland, was introduced in the foreword to the conference proceedings by Pertti Vakkari, Reijo Savolainen, and Brenda Dervin as a response to the lack of an international forum for researchers in information needs and seeking (INS), noting that '*the ISIC conference in Tampere signified a new beginning, a time when INS researchers from all over the world could convene*' (Vakkari et al., 1997, p. 8). Following the line of argument in Dervin and Nilan's (1986) landmark article, the new beginning challenged the prevailing system-centred focus in the field, advocating instead of a user- or person-centred approach (Vakkari et al., 1997). While the conference acronym, ISIC, has remained unchanged since 1996, the full conference name has developed from 'Conference on research in information needs, seeking and use in different contexts' in 1996 to the 'The Information Behaviour Conference' today.

The ISIC 2026 Call for Papers (n.d.) signals that the term information behaviour is used as an umbrella concept for research focusing on contextualized information activities including numerous subfields. Even though the use of information behaviour as an umbrella concept has been contested (Savolainen, 2007) and critically reflected upon (Ruthven et al., 2025), recent contributions reviewing trends in research on how people look for and interact with information have adopted the term (e.g., Greifeneder, 2014; Huvila & Gorichanaz, 2025). Thus, the conference title, The Information Behaviour Conference, can be seen as an effort to consolidate and embrace the broad field of information behaviour and related subfields, thereby reflecting the complexity and diversity of information-related phenomena in contemporary society.

The 1996 conference marked the beginning of an uninterrupted series of biennial events sustained and shaped by an active and evolving interdisciplinary research community. This paper commemorates 30 years of ISIC conferences by analysing their impact and characteristics, focusing on collaboration, international reach, and academic influence. A total of 495 long and short papers from 1996 to 2024 are included in the analysis, and the following research questions are addressed:

RQ1: What characterises the ISIC community in terms of authors' academic seniority, publication frequency, and collaboration?

RQ2: What is the scholarly impact of ISIC publications from 1996 to 2024?

Related work

There is an increased focus on measuring impact of scientific research to evaluate the significance, influence, and reach of ideas and research outputs. Bibliometric analysis is an established approach to evaluate the scholarly impact of research activities by measuring their associated publications and the citations they receive (Egghe & Rousseau, 1990). Earlier research has shown how bibliometric analysis can be used to evaluate the impact of scientific conferences by looking at citations, collaboration patterns, alternative metrics, etc. (Gäde et al., 2024; Islam & Agarwal, 2023; Tsikrika et al., 2013). Islam and Agarwal found that, '*While there are a plethora of bibliometrics studies on information science and LIS journals, very few studies have focused on conference proceedings in information science and LIS*' (2023, p. 106).

To the best of our knowledge, there have been no prior bibliometric studies of the entire set of ISIC conference publications. McKechnie et al.'s (2005) citation analysis study of information behaviour research noted that ISIC conference proceedings were relevant to include; however, they were unable to include the first two ISIC conference proceeding papers as these were not indexed in the major citation platform Web of Knowledge (now Web of Science). Instead, several studies have used content analysis to critical examine the content, quality and development of ISIC

conference papers. In a series of papers, McKechnie and colleagues have used content analysis to examine different aspects of ISIC papers, including if and how information behaviour research communicates findings to library and information science practitioners (McKechnie et al., 2008), the use of postmodern approaches in information behaviour research (McKechnie et al., 2012), the use of research rigour tactics in writing research results (McKechnie et al., 2016), and an analysis of how 'users' are constructed in ISIC papers (Julien et al., 2018).

The use of theory in information behaviour research has been studied quite extensively (see, for example Huvila & Gorichanaz, 2025; Julien et al., 2011), and this has influenced researchers within the ISIC community. Recognising the importance of theoretical engagement, two studies have specifically examined the use of theory in ISIC conference papers. Vakkari (2008) compared the use of theory and methods in ISIC papers from the 1996 and 2008 conferences, respectively, and noted a decline in quality, understood as a decrease in studies employing analytical approaches, with a shift towards more descriptive work. In a more recent and extensive study of 243 ISIC papers, VanScoy et al. (2022) offer a more positive account of theory usage. Their analysis shows that '*empirical papers presented at ISIC tend to include at least some theoretical content, and many use theory substantially*' (Conclusion section). The aim here is not to contribute to the discussion of what qualifies as theory usage (Pilerot & Ekström, 2025), but rather to examine what previous studies of ISIC research have focused on and remarked upon. Together, these studies critically examine central aspects and reveal important nuances that may serve as learning points, thereby contributing to the advancement of the field. The present paper complements these studies with quantitative and bibliometric analysis of the entire set of ISIC publications 1996-2024.

Methods

To answer the research questions, we conducted a two-part study comprising: (1) a descriptive, quantitative analysis of basic publication characteristics of the 495 ISIC papers, and (2) an analysis of the 20,865 citations referencing those papers.

Dataset and descriptive analysis

The dataset includes all ISIC conference proceedings papers from 1996 through the most recent conference in 2024. We included both short and full conference papers, as well as keynote papers when these were published in the conference proceedings, such as Dervin's (1997) well-known keynote paper on context and methodological tools for taming the unruly beast. In total, the dataset comprises 495 papers.

Information about authors' affiliation countries was added manually. For the 1996 and 1998 conferences, affiliation data were retrieved from the printed conference proceedings, while for the 2004-2024 conferences we used the 'About the Author' sections of papers published in *Information Research*. Information on authors' academic seniority was extracted using the same sources. Descriptive statistics related to publication output, authorship, and collaboration patterns were calculated using Microsoft Excel.

Citation data collection

Citation data was collected in three steps in September 2025 using Google Scholar via SerpAPI (https://serpapi.com/), a commercial scraping service that provides a programmatic API access to structured search engine data. SerpAPI enables automated retrieval of Google Scholar search result elements, including publication metadata and lists of citing documents (see Figures 1-3 for examples). While we are aware of the heterogenous data quality of Google Scholar, we chose it over more traditional citation indexes such as Web of Science and Scopus for its broader coverage of non-journal sources and of social science and humanities fields (Harzing & Alakangas, 2016), which fits well with the of interdisciplinary nature of information behaviour research.



Figure 1. Google Scholar search result, with title, author(s), snippet (in this example part of the abstract), full text link and link to citing publications in Google Scholar. Source: Google Scholar, September 2025.

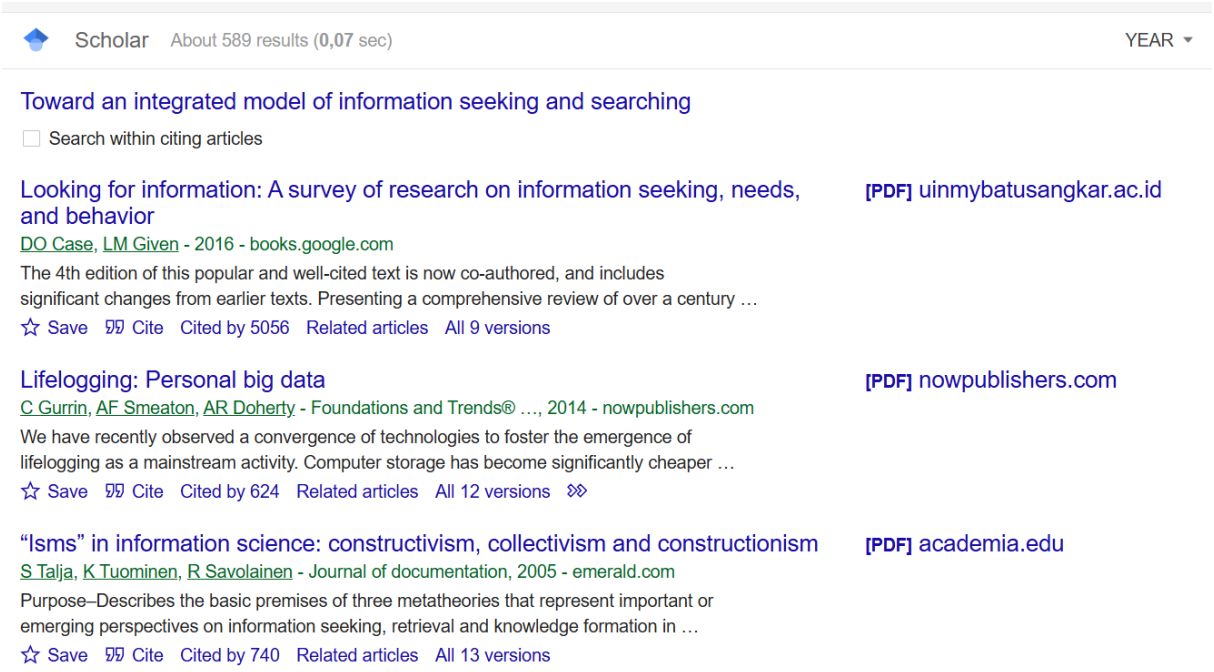


Figure 2. Example list of citing articles from Google Scholar – with title, summary, author(s), source, citing year, domain of citing source, snippet, number of citing publications as well as full text link. Source: Google Scholar, September 2025.

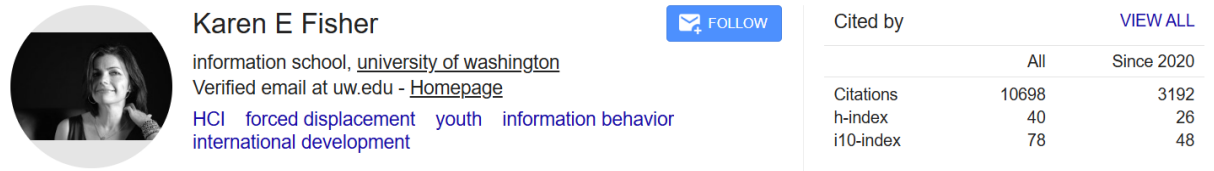


Figure 3. Example Google Scholar user profile - with affiliation (where some include position as well), domain of verified email, homepage as well as Areas of Interest.

First, each of the 495 ISIC papers was queried by title (best match, not phrase search) to retrieve each paper's *cite_id* (the link behind 'Cited by 589' in Figure 1). In 67 cases, a paper produced

multiple potential matches; these were resolved manually to ensure that the correct ISIC paper was included in the analysis.

Second, all publications citing an ISIC paper (like those in Figure 2) were retrieved using the extracted *cite_ids*. This resulted in a total of 20,865 citations originating from 13,223 unique publications. Only 23 of the 495 ISIC papers had not received any citations at the time of data collections. Citing publications were retrieved in batches of 20, following Google Scholar's interface limitations.

Third, metadata for all unique citing authors were collected using *author_ids* extracted from the data downloaded in step two. In total, this yielded 6,682 unique Google Scholar author profiles (see Figure 3 for an example). For authors who had claimed their Google Scholar profiles, metadata included verified email domains and self-reported research interests.

The total cost of SerpAPI usage, including testing, amounted to approximately 8,545 tokens, corresponding to less than USD 100. Data collection and extraction were implemented using vibe coding in Google AI Studio, based on the Gemini large language model. All SerpAPI outputs were saved in JSON format and subsequently imported into Microsoft Excel, which was also used for the data analysis. The dataset is made available and can be assessed through Aalborg University research repository (https://vbn.aau.dk/da/datasets/paper-data-set-celebrating-30-years-of-the-isic-conference-citati/).

Results

The results are presented in two parts. First, we describe key characteristics of ISIC publications, focusing on authorship, collaboration, and geographical reach. Second, we examine the citation impact of ISIC papers and analyse who cites this body of work.

Characteristics of ISIC publications

We begin by examining basic publication characteristics. Figure 4 shows the distribution of the 495 ISIC papers across the 15 conferences held between 1996 and 2024. The figure illustrates considerable variations in the number of papers published per conference year. Across all years, the 495 papers were authored by a total of 1,010 individuals. Figure 5 presents the number of authors per paper. Overall, 41.6% of papers were single-authored, while 27.3% had two authors, with the remaining papers written by three or more authors. This proportion of single-authored papers is relatively high compared to, for example, the ACM CHIIR conference, where only 5% of papers are single-authored (Bogers et al., 2023).

Examining authorship patterns over time, Figure 6 shows a general development trend towards increased multi-authorship. Since the 2014 conference, the majority of ISIC papers have been co-authored by two or three authors. A similar trend can be observed in the publication patterns of the ASIS&T conference, with the share of multi-authored papers rising from 50% in 2000 to 85% in 2020 (Islam & Agarwal, 2023). This trend is noteworthy as it suggests a growing level of collaboration among ISIC researchers, and prior studies have observed higher citation rates for collaborative work (Levitt & Thelwall, 2009). This growth is not limited to information science fields and may be affected by increased external funding that encourages increased collaboration (e.g., Birnholtz, 2006; Larivière et al., 2015).

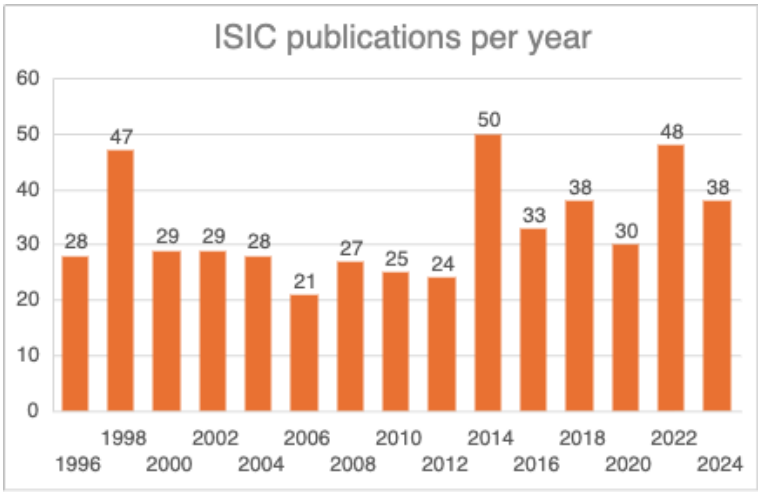


Figure 4. Number of ISIC publications (short, full and keynote papers) included in the dataset from the conferences 1996-2024. N=495.

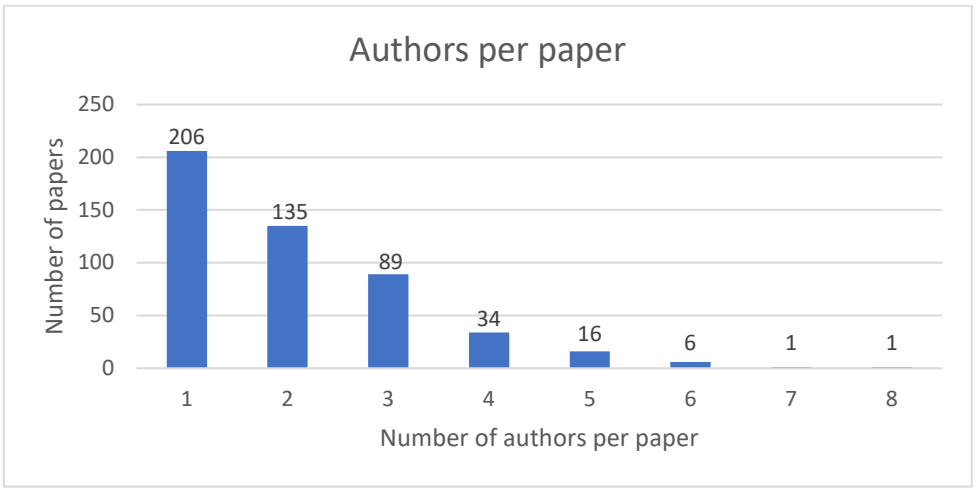


Figure 5. Number of authors per paper across all years (1996-2024).

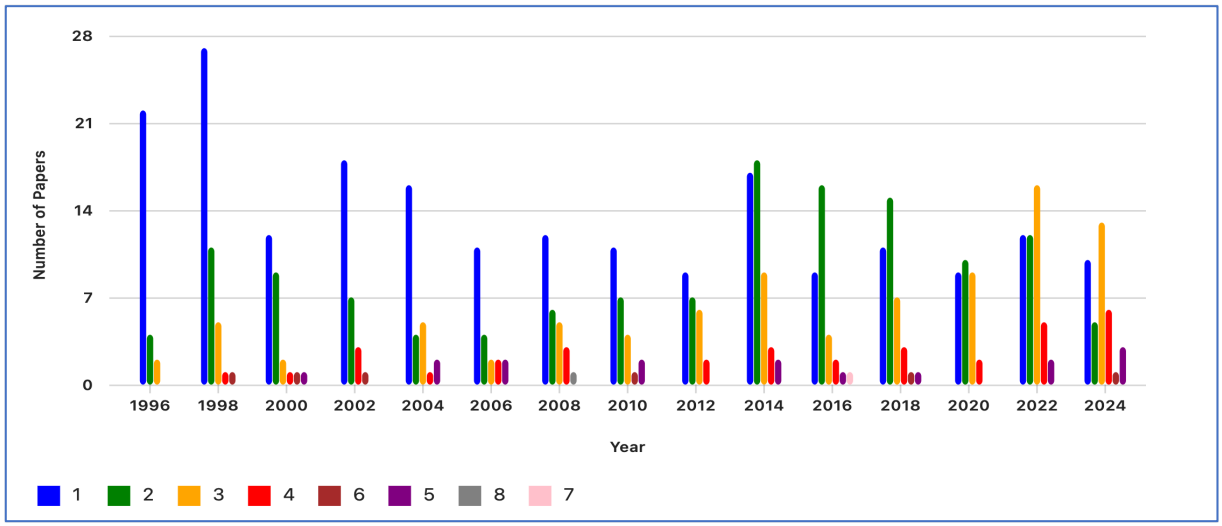


Figure 6. The number of authors per paper for each conference year 1996-2024. Blue column=1 author, green column=2 authors, yellow column=3 authors etc.

The ISIC conference has been described as the 'academic home of the Information Behaviour research community' (ISIC 2026 Call for Papers, n.d.). This sense of continuity and community is reflected in Table 1, which shows how frequently individual authors have published at ISIC over the years. A small core group of authors has contributed extensively to the conference, while the majority of contributors have published only a single paper, forming a classic long-tail distribution.

Information on authors' academic seniority was available from the 2010 conference onwards. Table 2 demonstrates that ISIC attracts researchers at all career stages, ranging from master's-level graduates to full professors. Since the introduction of the Doctoral Workshop at the 1998 Sheffield conference (Wilson & Allen, 1999), PhD students have become a visible part of the conference community. From 2010 onwards, 105 PhD students have published at ISIC, including 19 as sole authors, highlighting the conference's role as a venue for early-career researchers.

#Papers	19	15	13	10	9	8	7	6	5	4	3	2	1
#Authors	1	1	2	1	2	2	5	3	8	14	40	80	477

Table 1. The number of ISIC papers authors have written across the years 1996-2024. One author has written 19 papers; one author has written 15 papers… 477 authors have written one ISIC paper. N=1,010 authors.

Authors academic title	**Frequency**	**%**
Master's degree	23	3,9
PhD student	105	17,8
Postdoctoral researcher	20	3,4
Assistant professor / researcher / lecturer	133	22,5
Associate professor / senior researcher	113	19,2
Professor	171	29,0
Other	25	4,2
Total	590	100

Table 2. Information on academic seniority of ISIC authors across 2010-2024 (N=590). Information on academic title is missing for 420 authors, as the dataset does not include this information for conferences held between 1996 and 2008.

Finally, we examine the geographical reach of the ISIC conference. The foreword to the first ISIC conference proceedings noted contributions from the United States, Australia, United Kingdom, Finland, Canada, Sweden and Germany (Vakkari et al., 1997). As shown in Figure 7 these countries continue to be among the major contributors, but the conference has expanded substantially in scope. Authors affiliated with institutions in 42 countries have published at ISIC, including growing contributions from countries such as China and South Africa. This development reflects the increasingly international character of the ISIC research community.

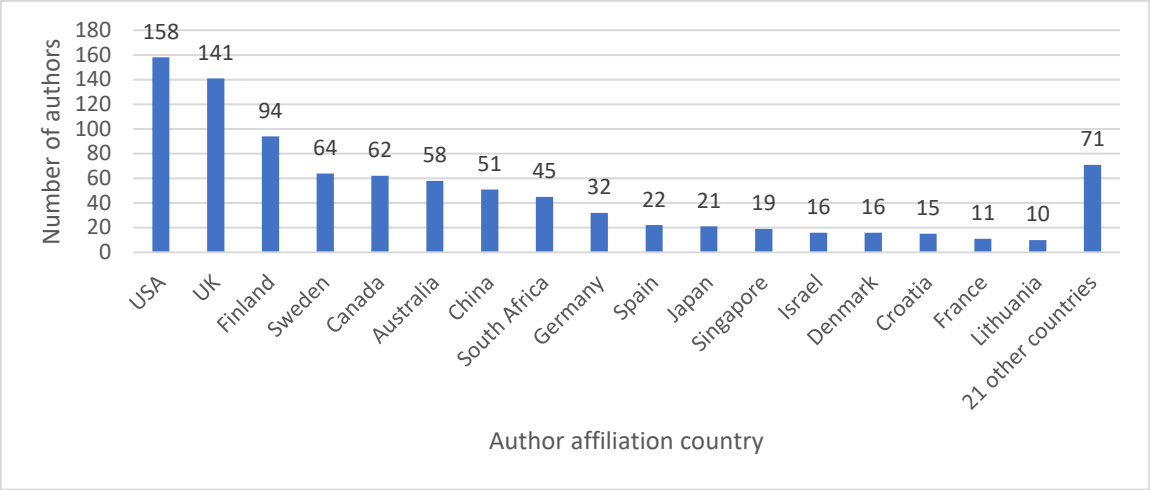


Figure 7. Affiliation country for ISIC authors 1996-2024 (N=906). Information on author affiliation country is missing for 104 authors. The 21 'other countries' include Norway, Poland, New Zealand, Slovenia, Malaysia, Uruguay, Iceland, Portugal, Slovakia, Ireland, Taiwan, Oman, Switzerland, Uganda, Philippines, The Netherlands, Turkey, Norway, Italy, Kuwait, Vietnam, Brazil, Uruguay, India, and Brazil.

Citation analysis

To address the second research question, we conducted a citation analysis of ISC papers published between 1996 and 2024. In an initial analysis, one paper stood out: Tom Wilson's 'Information behaviour: an inter-disciplinary perspective' from the inaugural 1996 conference, which reached exactly 1000 citations. Further inspection revealed that Google Scholar caps search results at 1,000 citations and conflates multiple versions of the same work. Wilson published at least three closely related versions of this work with the same title: 1) A comprehensive (1996) report to the British Library with Christina Walsh, 2) the ISIC paper from the 1996 conference (Wilson, 1997a), and 3) a highly cited (1997b) *Information Processing & Management* article. These three versions have jointly received more than 2400 citations at present. Because it is not possible to reliably distinguish citations to the ISIC version alone, this paper was excluded from the citation analysis.

The remaining 494 ISIC papers have received an impressive total of 19,685 citations in Google Scholar from a total of 12,660 unique citing publications. Only 23 papers have not received any citations at the time of data collection.

Google Scholar assigns publication years to citing documents, but this information is occasionally missing or incorrect. In our dataset, 1,310 citing publications (6.7%) lacked a publication year, while 71 publications (0.4%) had clearly erroneous years (e.g. a 1996 paper citing a 2013 ISIC paper), and three publications were assigned the year 2026. These last 74 records were excluded from the analysis.

Across all years, ISIC papers received an average of 39.8 citations per paper, corresponding to 2.48 citations per paper per year. This citation rate is almost on par with the ACM CHIIR conference, whose 2016–2023 papers received an average of 3.03 citations per paper per year (Gäde et al., 2024) and the ASIS&T annual meeting, whose 2000-2019 papers received an average of 3.6 citations per paper per year (Islam & Agarwal, 2023). As expected, older ISIC papers have accrued more citations. For example, the 27 papers from the 1996 conference (excluding Wilson's paper) have received a total of 2,272 citations, while the 38 papers from the 2024 conference have so far received 92 citations.

To enable comparisons across conference years, we applied fixed citation windows of three and five years. The five-year window includes citations received in the publication year and the subsequent five years (i.e., citations from 1996 to 2001 for a 1996 paper). Figure 8 presents the

development of ISIC citation impact over time using both three- and five-year windows, The citation impact of ISIC papers varies substantially over the years: the 1996, 2002-2006 and 2012 papers overall receive significantly more citations.

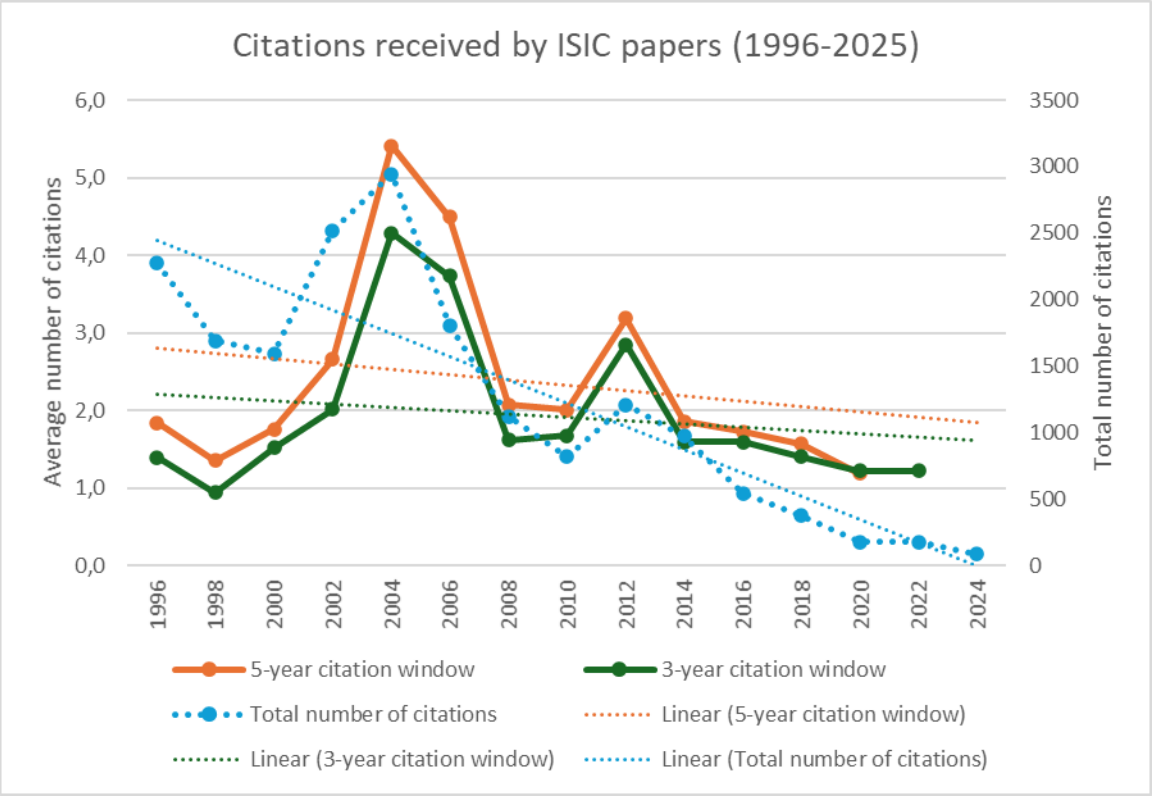


Figure 8. Citations received in the years 1996-2025 by 494 ISIC papers: Citations per year in 3-year (green) and 5-year (orange) citation windows (primary y-axis) and total number of citations (blue) per year (secondary y-axis) – with linear trend lines for each. Based on 18,301 citing publications with a publication year. Source: Google Scholar via SerpAPI, September 2025.

Table 3 and Table 4 shows selected top-cited papers among all the ISIC papers. Table 3 shows the Top-10 most cited overall for all years (where early papers has had longer to receive citations), and Table 4 shows the most cited ISIC papers in the last five years (i.e., cited in papers published 2021-2025 – that shows which papers are cited more recently). The most cited paper overall is Marcia J. Bates' 2002 paper on 'Toward an integrated model of information seeking and searching' with 587 citations at this point in time. The second most cited paper is by Karlova and Fisher (2012), followed by Dervin (1996).

There is a substantial overlap between the two lists: 6 of the 10 are also most cited in the recent five years. Additional papers in Table 4 includes papers by Wilson and Sonnenwald and colleagues.

Several of the papers in Table 3 and Table 4 contribute to the elevated citation impact of specific conference years shown in Figure 8. An exception is the 2004 conference, which has no papers among the top-cited list despite exhibiting high overall citation impact. In this case, the elevated average reflects the cumulative contribution of several moderately highly cited papers rather than a small number of standout publications. Figure 8 also shows that, since the 2012 conference, so far no year stands out as having a significantly higher-than-average impact in either the three- or five-year citation windows or in total citation counts.

Overall, citation patterns indicate that ISIC papers have had substantial influence beyond the conference itself. To further examine who cites ISIC research, we analysed the affiliations and research interests of citing authors. While Google Scholar provides limited bibliographic control, many authors have claimed their user profiles that then often include verified university email domains and self-reported research interests. In total, our dataset of 12,660 citing documents includes 6,682 unique citing author profiles (see an example in Figure 3), and we extracted 2,839 unique and verified email domains of the citing authors. ChatGPT was used to resolve the citing authors' main university or organisation as well as their country.

Paper	Citations	Citations/year
Marcia J. Bates (**2002**): *Toward an integrated model of information seeking and searching*	**587**	25.4
Natascha A. Karlova and Karen E. Fisher (**2012**): *A social diffusion model of misinformation and disinformation for understanding human information behaviour*	**531**	40.7
Brenda Dervin (**1996**): *Given a context by any other name: methodological tools for taming the unruly beast*	**487**	16.8
Sanne Talja (**2002**): *Information sharing in academic communities: types and levels of collaboration in information seeking and use*	**460**	20.0
Diane Sonnenwald (**1998**): *Perspectives of human information behaviour: contexts, situations, social networks and information horizons*	**454**	16.7
Sanda Erdelez (**1996**): *Information encountering: a conceptual framework for accidental information discovery*	**430**	14.8
Carol C. Kuhlthau, Jannica Heinström and Ross J. Todd (**2008**): *The 'information search process' revisited: is the model still useful?*	**409**	24.0
Elfreda A. Chatman (**2000**): *Framing social life in theory and research*	**348**	13.8
Tom Wilson (**1998**): *Exploring models of information behaviour: the 'Uncertainty' Project*	**298**	11
Sanne Talja (**1996**): *Constituting "information" and "user" as research objects: a theory of knowledge formations as an alternative to the information man-theory*	**294**	10.1

Table 3. Top-10 most cited ISIC papers 1996-2024, sorted number of citations received. Source: Google Scholar via SerpAPI, September 2025.

Paper	Citations 2021-2025	In Top-10 cited
Natascha A. Karlova and Karen E. Fisher (**2012**): *A social diffusion model of misinformation and disinformation for understanding human information behaviour*	**312**	x
Marcia J. Bates (**2002**): *Toward an integrated model of information seeking and searching*	**133**	x
Carol C. Kuhlthau, Jannica Heinström and Ross J. Todd (**2008**): *The 'information search process' revisited: is the model still useful?*	**128**	x
Diane Sonnenwald (**1998**): *Perspectives of human information behaviour: contexts, situations, social networks and information horizons*	**92**	x
Brenda Dervin (**1996**): *Given a context by any other name: methodological tools for taming the unruly beast*	**84**	x
T.D. Wilson (**2016**): *A general theory of human information behaviour*	**68**	
Sanne Talja (**2002**): *Information sharing in academic communities: types and levels of collaboration in information seeking and use*	**66**	x
Diane H. Sonnenwald (**2006**): *Challenges in sharing information effectively: examples from command and control*	**60**	
Diane H. Sonnenwald, Barbara M. Wildemuth and Gary L. Harmon (**2000**): *A research method to investigate information seeking using the concept of information horizons: an …*	**54**	
Tom Wilson (**2002**): *Alfred Schutz, phenominology and research methodology for information behaviour research*	**54**	

Table 4. Most cited ISIC papers the last five years (cited in papers published 2021-2025). Source: Google Scholar via SerpAPI, September 2025.

Table 5 presents the top 25 institutions affiliated with authors citing ISIC papers, based on verified email domains. Tampere University (Finland) heads the list of citing institutions, followed by University of Pretoria (South Africa) and RMIT University (Australia). A complete analysis of the geographical distribution of citing authors can be seen in Table 6 across continental region and geographical subregion. Europe and the Americas dominate, particularly Northern Europe and Northern America, although all inhabited continents are represented. With respect to individual countries authors in United States of America, United Kingdom, Australia, Canada and Finland head the list (not shown). The top-citing authors can be seen in Table 7. The list is headed by Lisa M. Given and Donald O. Case, who in their widely acclaimed book 'Looking for Information cite a large number of ISIC papers in each of its five editions.

Finally, we analysed the research interests of citing authors as reported in their Google Scholar profiles. Approximately 90% of citing authors listed at least one research interest in their Google Scholar profiles, while 82% had two and 31% had five. We use a weighted count that accounts for authors citing multiple ISIC papers. That is, the research interests of a citing author that cites multiple ISIC papers are multiplied by that number of papers – giving a proportional weight.

Table 8 shows that 'information behaviour' is by far the most frequently reported research interest of citing authors. This is followed by 'information literacy', 'human computer interaction', 'information science', and 'information seeking'. The current conference name 'The Information Behaviour Conference' is thus heavily reflected in the research interest of the authors citing ISIC papers. Many of the other top research interests are not surprising, but notably include 'artificial intelligence', reflecting broader developments in the research areas that engage with ISIC publications.

University/Organisation (Country)	Sum
Tampere University (Finland)	486
University of Pretoria (South Africa)	404
RMIT University (Australia)	384
University of Kentucky (USA)	364
McGill University (Canada)	298
University of Washington (USA)	294
University of Sheffield (United Kingdom)	290
Uppsala University (Sweden)	279
University of Borås (Sweden)	238
University at Buffalo (USA)	230
Western University (Canada)	202
University of Oulu (Finland)	198
Charles Sturt University (Australia)	197
Åbo Akademi University (Finland)	167
University College London (United Kingdom)	151
University of Toronto (Canada)	143
University of Michigan (USA)	140
Simmons University (USA)	137
University of Strathclyde (United Kingdom)	137
White Gauntlet Design (company, Australia)	133
Robert Gordon University (United Kingdom)	129
Jagiellonian University (Poland)	128
University of Illinois Urbana-Champaign (USA)	127
University of British Columbia (Canada)	121
Nanyang Technological University (Singapore)	119

Table 5. Top 25 among universities, companies and organisations of authors citing 1996-2024 ISIC papers. Retrieved via verified email domains of Google Scholar authors and resolved to main university names and its country by ChatGPT-5. Source: Google Scholar via SerpAPI, September 2025.

Europe	**6861**
- Northern Europe	4509
- Southern Europe	974
- Western Europe	955
- Eastern Europe	423
Americas	**6486**
- Northern America	5819
- South America	563
- Central America	60
- Caribbean	44
Asia	**2762**
- South-eastern Asia	750
- Eastern Asia	735
- Southern Asia	729
- Western Asia	545
- Central Asia	3
Oceania	**1559**
- Australia and New Zealand	1559
Africa	**1293**
- Southern Africa	688
- Western Africa	415
- Eastern Africa	141
- Northern Africa	49
(unknown)	**202**

Table 6. Geographical distribution across continental region and geographical subregion following the United Nations Geoscheme of the affiliations of the authors citing 1996-2024 ISIC papers. Retrieved via verified email domains of Google Scholar authors and resolved to main university names and its country by ChatGPT-5. Source: Google Scholar via SerpAPI, September 2025.

Citing author	# citations to ISIC papers
Lisa M. Given	325
Donald O. Case	308
Reijo Savolainen	257
Rebekah (Becky) Willson	255
Isto Huvila	230
Ina Fourie	209
Heidi Julien	134
Michael Olsson	133
Karen E Fisher	106
Sanna Talja	99
Tumelo Maungwa	94
Louise Limberg	90
Naresh Agarwal	89
Gunilla Widén	88
Pamela J McKenzie	86
Christine Urquhart	83
Brenda Dervin	78
Martha Sabelli	77
Preben Hansen	74
Olof Sundin	74
Jenna Hartel	73
Sei-Ching Joanna Sin	72
Jia Tina Du	70
Heidi Enwald	68
Thomas D. Wilson	62

Table 7. Top 25 authors citing 1996-2024 ISIC papers. Number of citations to ISIC papers where one publication can cite more than one ISIC paper. Source: Google Scholar via SerpAPI, September 2025.

Interest	Count
Information behaviour*	4076
Information literacy	1713
Human computer interaction*	1281
Information science	1170
Information seeking	1006
Social media	751
Library and information science*	704
Information retrieval	649
Information practices	527
Knowledge management	524
Communication	512
User experience	450
Artificial intelligence*	416
Qualitative research	404
Information studies	382
Information management	369
Interactive information retrieval	352
Information seeking behaviour*	350
Information systems	342
Societal impact	332
Social change	330
Policy	316
Digital literacy	303
Scholarly communication	274
Virtual worlds	271

Table 8. Top 25 research interests as given in the Google user profiles of authors citing 1996-2024 ISIC papers. Research interests of a citing author that cites multiple ISIC papers are multiplied by that number of papers. Interests with a star (*) have been merged with semantically identical ones. E.g., HCI, human-computer interaction, human-computer interaction. Source: Google Scholar via SerpAPI, September 2025.

Discussion and conclusion

Whereas earlier studies have examined the content, quality and approaches of ISIC contributions (Julien et al., 2018; McKechnie et al., 2008, 2012, 2016; Vakkari, 2008; VanScoy et al., 2022), this study examines the scholarly footprint of the ISIC conference over three decades by analysing publication characteristics, collaboration patterns, and citation impact. Beyond documenting descriptive trends, the findings offer insights into how ISIC has functioned as a durable intellectual infrastructure for the field of information behaviour research.

One key finding concerns the development of collaboration practices within the ISIC community. While single-authored papers remain common, particularly in the early years, the steady increase in multi-authored papers since 2014 points to a maturing research community characterised by greater collaboration. This shift aligns with broader developments in information science and related fields, where interdisciplinary and collaborative research has become increasingly important (Zhang et al., 2024). Importantly, ISIC appears to support this development without

losing its openness to single-author, suggesting that the conference accommodates multiple scholarly traditions. Although authors from Europe and North America continue to dominate ISIC contributions, the conference has, over time, attracted authors from 42 countries, underscoring its international reach. Future research could examine the extent to which collaboration patterns in ISIC publications transcend national and continental boundaries and the development of this over time.

The analysis of authors' academic seniority further highlights ISIC's role as an inclusive venue. The presence of researchers at all career stages—ranging from PhD students to senior scholars—indicates that ISIC functions not only as a site for presenting mature research but also as a formative space for emerging scholars. The continued participation of PhD students, including a substantial number of sole-authored papers, suggests that ISIC provides an environment in which early-career researchers can engage meaningfully with the field and establish scholarly visibility. In this sense, ISIC contributes to the reproduction and renewal of the information behaviour research community.

Citation patterns demonstrate that ISIC papers have had a sustained and substantial impact beyond the conference itself. With an average of 2.48 citations per paper per year, an average of 39.8 citations per paper and citation rates comparable to other conferences in the field, ISIC emerges as an influential venue within its domain. The analysis further shows that this impact is not driven solely by a small number of outlier papers. While several highly cited foundational contributions elevate specific conference years, other years—such as 2004—achieve high citation impact through the cumulative influence of multiple moderately cited papers. The most cited papers span foundational theoretical contributions and methodological innovations, underscoring ISIC's role in advancing both conceptual and empirical dimensions of information behaviour research. An important observation is that, since the 2012 conference, no single year stands out as having a markedly higher citation impact than others. Rather than indicating stagnation, this pattern may reflect the consolidation of ISIC as a stable and recognised forum whose contributions are routinely integrated into ongoing research across related fields. From this perspective, ISIC's role has shifted from establishing foundational concepts to sustaining and extending them across diverse contexts and applications. While using Google Scholar as a data source will have resulted in higher citation counts, we expect that that the overall trends in the results would remain the same if more limited and more controlled citation indexes had been used.

The analysis of citing authors further underscores ISIC's reach and relevance. Authors citing ISIC papers are affiliated with institutions across all inhabited continents, with particularly strong representation from Northern Europe, North America, and Oceania. The prominence of 'information behaviour' as a reported research interest among citing authors confirms the conference's thematic coherence, while the presence of adjacent interests—such as information literacy, human–computer interaction, and artificial intelligence—illustrates how ISIC research resonates beyond its core domain. Taken together, these findings suggest that ISIC's significance lies not merely in its longevity, but in its capacity to sustain an intellectually diverse yet coherent research community over time.

This study is limited by its reliance on descriptive bibliometric indicators, which capture patterns of influence but do not explain how or why ISIC papers are cited. Future research should therefore examine citation contexts, in order to better understand the specific roles ISIC papers play in subsequent research, for example as theoretical foundations, methodological exemplars, or empirical reference points (Gäde et al., 2024). Future work should also include a more detailed analysis of the development of publication metrics over time.

In conclusion, this study contributes to the literature on scholarly communication by demonstrating how a long-running conference can function as a stable site of knowledge

production, community formation, and sustained impact within a specialised research field. The ISIC conference has established itself as a cornerstone of information behaviour research. Its sustained citation impact, international reach, and inclusive authorship profile demonstrate its importance as both a scholarly venue and a community-building institution. As information-related practices continue to evolve in response to societal and technological change, ISIC appears well positioned to remain a central forum for critical reflection and scholarly exchange in the field.

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Constructing trust in health information: older adults' information behaviours during the COVID-19 pandemic

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Introduction. Using the COVID-19 pandemic as a case study, this article explores how older adults in Québec, Canada, navigated information overload in the context of their everyday information behaviours. Trust was considered a central concept, influencing how individuals select, interpret, and ultimately apply information in their lives.

Method. The project was conducted in partnership with the Conference of Regional Roundtables for Older Adults in Québec. An exploratory qualitative design was employed, involving 24 individual interviews with older adults.

Analysis. All interviews were transcribed, and a thematic content analysis was carried out using NVivo Pro software.

Results. The findings reveal that older adults engaged with information during the COVID-19 pandemic through active evaluation, and critical reflection. Rather than passively receiving official messages, participants carefully assessed information, exhibiting thoughtful and discerning behaviours. Trust operated as both a cognitive and relational mechanism, shaping how they sought, evaluated, and applied information in contexts of uncertainty and overload.

Conclusions. Older adults are active information consumers, critically evaluating sources and content to support their health and well-being. These findings highlight the need for public authorities to communicate transparently, avoid sensationalism, and implement feedback mechanisms, such as forums or interactive sessions, to strengthen trust and address public concerns.

Introduction

Crises, whether health-related, environmental, or political, highlight the importance of information behaviours in everyday life by amplifying the need to search for, assess, and prioritise information under conditions of uncertainty. In such contexts, individuals are confronted with an abundance of information, often contradictory, and must evaluate its credibility in order to decide which sources to trust and which to dismiss. The COVID-19 pandemic illustrates this dynamic particularly well: the rapid production and circulation of scientific, governmental and media content generated a condition of information overload that reshaped how citizens searched for, engaged with and evaluated information.

Information behaviours, as a field within information science, has shifted from focusing on institutional sources and search strategies to a more holistic perspective that considers sociocultural contexts shaping individuals' interactions with information (Given et al., 2023; Julien et al., 2018). Today, information behaviours are understood as encompassing a wide spectrum of activities, from active information seeking to unintentional encounters such as serendipity, as well as practices of information avoidance and emotional responses to information (Given et al., 2023). Research in this area seeks to understand how people engage with information, make decisions based on it, and navigate the complexities of their information environments. These activities are interrelated and must also be situated within their cultural and social contexts (Agarwal, 2022; Given et al., 2023; Savolainen, 2008). A key aspect to consider is that trust emerges as a central dimension of information behaviours, influencing how people select, interpret and ultimately make use of information in their lives.

Building on this conceptualisation, prior research on older adults' information behaviours has primarily examined how they seek, access, and use health information. Although healthcare professionals remain the most trusted sources of information for older adults (Pálsdóttir, 2023), the latter increasingly incorporate digital tools into their health information practices. This trend is partly driven by the need to manage chronic conditions, which become more prevalent with age (Agree et al., 2015; Zhao et al., 2022). Online health information seeking enables older adults not only to explore treatment options, but also to prepare for interactions with healthcare professionals, thereby supporting more informed and participatory clinical encounters (Zhao et al., 2022; Zulman et al., 2011). Members of older adults' social networks, particularly family and close friends, also play a significant role in these information practices. They may provide direct support, such as assistance with administrative procedures or health-related decision-making, as well as indirect support by helping with online information searches (Grosperrin-Legrand et al., 2023). Social media, by contrast, tends to be used less as primary sources of health information and more as a tool for maintaining social ties, coordinating support, and occasionally validating or discussing information encountered through traditional media (Nimrod, 2017; Quan-Haase et al., 2017; Robertson-Lang et al., 2011; Zhao et al., 2022). This body of work highlights that older adults are not a homogeneous group: their information strategies, routines, and degrees of trust in different sources vary according to prior experiences, digital skills, health status, and the configuration of their social networks (Hargittai & Dobransky, 2017; Nimrod, 2017; Quan-Haase et al., 2017).

However, much of this literature examines information behaviours under relatively stable conditions and tends to conceptualise trust as a general attitude toward specific sources, rather than as a situated and evolving process. In addition, older adults are often portrayed as vulnerable to misinformation, yet such representations risk obscuring the strategies, judgments, and experiential knowledge they mobilise when engaging with information. Consequently, limited attention has been paid to how older adults actively negotiate trust across multiple and sometimes conflicting information sources in contexts marked by uncertainty and information overload, such as a large-scale health crisis (Rosales et al., 2024; Shiroma et al., 2023; Vivion et al., 2024).

Thus, the objective of this article is to explore how older adults in Québec, Canada, navigated information overload during the COVID-19 pandemic, with a particular focus on how they constructed trust and assessed the credibility of different information sources. Building on this objective, the study is guided by the following research questions:

RQ1. How did older adults identify, select, and prioritise different health-related information sources during the COVID-19 pandemic?

RQ2. What criteria did older adults use to construct trust in health-related information sources?

RQ3. How did older adults interpret and respond to conflicting or divergent information from experts, authorities, and media sources during the pandemic?

RQ4. How did perceptions of credibility, independence, consistency, and intent shape older adults' trust in institutional information sources over time?

Trust as a central dimension of information behaviours

Trust constitutes a central epistemic dimension of information behaviours, as individuals often rely on recognised experts to support and expand their knowledge (Origgi, 2008; Vicari, 2021). In contemporary Western societies, however, trust in media, journalists, and experts has declined, a trend unfolding within increasingly complex and diversified information ecosystems shaped by the growing role of the internet (Moran & Nechushtai, 2022; Ross Arguedas et al., 2023). Online environments facilitate horizontal information exchanges that bypass traditional hierarchical intermediaries, while offering limited mechanisms for regulation and prioritisation compared to legacy media (Moran & Nechushtai, 2022; Origgi, 2008). As a result, expert authority is no longer taken for granted but must be continuously demonstrated, making trust both contingent and dynamic (Vitali-Rosati, 2018).

Within this high-choice media environment, the relationship between trust and information behaviours is reciprocal: trust shapes information use, while information experiences actively recalibrate trust (Mihelj et al., 2022; Van Dijck & Alinejad, 2020). Research in communication and information studies has examined these processes through two complementary lenses. Credibility research highlights the heuristics individuals mobilise when evaluating unfamiliar sources, including cues related to content, platform characteristics, and social engagement (Gierth & Bromme, 2020; Ross Arguedas et al., 2023). Studies of trust in expertise, by contrast, conceptualise trust as an evaluative judgment of sources based on perceived expertise, integrity, independence, and communication style, as well as contextual factors such as controversy or institutional coherence (Besley et al., 2020; Brewer & Ley, 2012; Mihelj et al., 2022).

Conceptualising trust as a relational and subjectively constructed phenomenon helps explain variations across populations and contexts (Serres, 2021). Beyond epistemic considerations, trust encompasses cognitive, affective, moral, and political dimensions (Origgi, 2008), making it particularly salient in situations of information overload and uncertainty. Research on cognitive authority and credibility further supports this view by showing that individuals assess sources not only on the basis of accuracy, but also on perceived competence, legitimacy, and social recognition, criteria that guide judgment when information is abundant, contested, or rapidly evolving (Metzger et al., 2010; Savolainen, 2007).

Information overload and uncertainty in contemporary information behaviours

A growing body of scientific research examine people's relationship with information overload (Arnold et al., 2023; Bawden & Robinson, 2020; Han et al., 2022; Link, 2021; Shahrzadi et al., 2024). Information overload refers to a state in which an individual's ability to select, use, process and make sense of information is impeded by the sheer volume of relevant and potentially useful information (Link, 2021).

Traditional media institutions, social media users, public health authorities and the government all contributed to the abundance of information that shaped the public's knowledge and perceptions of the COVID-19 virus and of effective prevention measures (Han et al., 2022). A striking feature of the COVID-19 pandemic was the multitude of popular and scientific sources and the sheer volume of information available, which resulted in information overload. This overload and the uncertainty surrounding the global pandemic context were mutually reinforcing: uncertainty created a need for information, leading to an abundance and rapid dissemination of content. However, this flow often included misleading or false information, which in turn further heightened the initial level of uncertainty (Han et al., 2022; Rocha et al., 2021). Despite research on information overload in general populations (Arnold et al., 2023; Shahrzadi et al., 2024), few studies have specifically examined how older adults navigate these challenges, particularly in the context of a global pandemic.

Taken together, these perspectives situate the present study within the information behaviours framework, with a specific focus on trust as a central evaluative dimension in contexts of information overload. In line with this approach, trust is understood not as a fixed attitude toward information sources, but as a situated and dynamic process that shapes how individuals assess, prioritise, and make sense of information under conditions of uncertainty.

Methods

Research ethics

The research project was approved by the Comité d'éthique de la recherche de l'Université Laval Ethics Committee (Project 2021-322-R-1 12-10-2022). Participants gave informed consent, either written or oral, before starting interviews.

Design and settings

An exploratory qualitative design with individual interviews was used for this research (Given, 2008). This approach has been employed in several studies aimed at deepening the understanding of information behaviours (Baines et al., 2023; Lin et al., 2015; Wagner & Boczkowski, 2019). The project was developed in partnership with the Conference of Regional Roundtables for Older Adults in Québec.

Sampling strategy

Participants were recruited through the Conference of Regional Roundtables for Older Adults in Québec network and via snowball method. The Conference of Regional Roundtables for Older Adults in Québec disseminated the call for participants through an email list and Facebook page. Participants were required to be 65 years of age or older, to live in the province of Québec, and to speak French or English to participate in the study. Interested participants could contact the team via phone or e-mail. The research team responded to participants via phone to verify eligibility criteria and schedule the day and time of the interview. Participants were informed that the study would delve into the ways they informed themselves during the pandemic and how they evaluated the information. A total of 24 participants were recruited. An information and consent form was sent to participants a few days before the interview, presenting the main researcher, the research team, the project's objectives and procedures. The research team reviewed the information and consent form with the participants shortly prior to beginning the interview. Financial compensation of $30 was offered to participants.

Data collection

The interviews with older adults took place from July to November 2022, two years into the pandemic. Interviews were conducted by M.V. and researchers trained in qualitative research. Interviews were carried out in French, online or in person at participants' homes, lasted

approximately an hour per participant and were audio recorded. Field notes were made during and after the interviews. Data saturation was discussed during weekly team meetings.

A semi-structured interview guide was developed by the research team based on an information behaviours framework (Given et al., 2023), validated by co-researchers and then used by the interviewers. Interviews were conducted using a semi-structured approach guided by the interview guide complemented by flexible probing to capture participants' experiences and reasoning. The interviews focused on the information sources that older adults were using, the ways in which information was understood, mechanisms for determining the credibility of information and the modalities through which trust in sources was established, changes in information behaviours generated by the pandemic, the experience of information overload, the impact of information on health behaviours, the sharing of information, and, finally, the information needs of older adults in relation to the pandemic at the time of the interview.

Analytic strategy

Interviews were transcribed and a thematic content analysis of the interviews was carried out using NVivo Pro software (version 1.7.1). This process consists of labelling a given corpus into defined themes that are representative of the analysed content and reflect the purpose of the research (Dhakal, 2022). It is important to note that, although the coding was guided by a theoretical framework of information behaviours, new themes could be added over the course of coding. Most sub-themes were developed inductively, such as the code for 'sensationalist' journalists. Statements could be associated with more than one theme. An initial coding was performed by a research assistant. Ambiguous extracts were discussed by team members M.V. and the research assistant to reach a consensus on their meaning and coding. A final coding was revised by V.R. and M.V. Following coding, thematic content analysis was conducted through an iterative process of constant comparison across interviews, during which coded extracts were examined, compared, and grouped to identify recurring patterns and relationships between themes.

The five main themes were: information source; appropriation of information understood as the ways individuals interpret, integrate, and make sense of information in relation to their personal experiences and knowledge; informational reflexivity defined as individuals' capacity to critically reflect on information, sources, and their own evaluative processes; impacts and consequences of the pandemic; and changes in informational behaviours. In this article, we focus primarily on the themes of appropriation of information (which includes the two sub-themes trust and mistrust of information sources and methods for establishing the credibility of information) and informational reflexivity. With regard to the sub-themes of trust and mistrust, these were identified through participants' statements and narrated practices concerning their information behaviours. Articulations of trust included explicit expressions of confidence, habitual reliance on specific sources, and references to perceived legitimacy, such as professional expertise, scientific training, or independence. Articulations of mistrust were identified through expressions of doubt, scepticism, distancing, or selective disengagement, including questioning inconsistencies in official discourse, political influence, media sensationalism, or the need to 'filter' information. Trust and mistrust were thus analysed as situated and dynamic processes rather than as fixed or binary attitudes. Quotes from participants were translated into English by the research team and the accuracy of translation was validated by a native English speaker, C.F., and by a professional English translator and reviser.

Results

Participant profiles

A total of 24 interviews were conducted, 12 with men and 12 with women. As presented in Table 1 (Participant sociodemographics), most participants (20) were between 70 and 79 years old, all but one had high school (9), college (7) or university (7) education and most lived in an urban area (18).

Sociodemographics		Number of Participants (n)
Gender	Women	12
	Men	12
Age	65-69 years old	2
	70-79 years old	20
	80 years old and older	2
Education level	Middle school	1
	High school	9
	College	7
	University	7
Residential environment	Urban	18
	Rural	6

Table 1. Participants Demographics.

Information source and trust

The social network

In general, participants reported not relying on their social circle to form opinions on health-related issues, unless the social circle included individuals qualified in the field. Many people had healthcare professionals among their close contacts (family, friends) who they turned to for information and who they trust. One participant (119) stated: 'We have two doctors in the family and two scientists […], so if there was any doubt about something, they were there to answer us. If we had questions, […] I knew who to turn to'.

Most participants who did not consider those in their social circle as information sources said that they did not necessarily share the opinions of those in their network, and that with respect to decisions surrounding vaccination, everyone was free to make their own choices. A participant (117) who had been vaccinated five times explained that he is 'sufficiently autonomous to choose his [my] sources of information', noting that his daughter 'did not find it appropriate to get vaccinated': 'my daughter, no, well, it's her choice, so I don't seek information from my family'. The divergence of opinion with a member of their social circle justified the decision not to consider that individual as an information source. However, this did not prevent some participants from attempting to provide information to those in their social circle who did not share the same views in order to make their perspectives understood.

Healthcare professionals, experts, and public health authorities

Healthcare professionals, such as doctors and pharmacists, were trusted sources of information for the participants. They were considered primary sources, especially for addressing doubts that might arise regarding specific health-related information: 'And when I'm not sure, I call my doctor. I trust him' (124). Similarly, scientists who spoke about the virus in the media were generally regarded as reliable sources due to their expertise: 'When we have someone who is an expert in microbiology or something else… I am inclined to listen to him. When we know that he has studied…'

The divergence of opinion among experts did not hold the same meaning for all participants. On one hand, some participants viewed disagreements among experts, or the diversity of opinions, as normal and expected. Debate among professionals was interpreted by participants as a reason to 'remain vigilant' (104) and to 'do even more thinking' (112). One participant (104) highlighted the difference between 'having a doubt' and 'rejecting everything outright'. In other words, when faced with divergent opinions among experts, remaining open-minded without necessarily questioning everything was the position adopted by the majority. On the other hand, some participants associated the presence of disagreements among experts with conspiracy theories or media sensationalism. 'Doctors who did not agree with the government's COVID-19 protection measures, I automatically categorise them as conspiracy theorists' (117), stated one participant. One

participant (109) mentioned listening 'with half an ear', meaning distractedly and with some scepticism, when an expert with a controversial opinion is invited by a media outlet that, according to her, seeks to share 'negative' content, sensationalise, or stir up debates (109). Regarding public health authorities, some participants questioned their independence from the government. In Québec, daily press conferences were held by the Premier of Québec, accompanied by the National Director of Public Health and the Minister of Health and were major features of the information landscape. For some, doubt developed over the course of the public appearances. Referring to Québec's former National Director of Public Health, one participant stated that he initially appreciated him before he became a 'spokesperson for the Premier', meaning before he 'started making the decisions suggested by the Premier' (114). The participant felt the same way about his successor: 'I found him to be independent at first, but now I realise he has become exactly like [the former one]. He gives exactly the same opinion the Premier expects him to give' (114). With regard to the issue of independence, one participant expressed a preference for Québec's former National Director of Public Health:

> I thought [Québec's former National Director of Public Health] was good at it and did research, and sometimes we had the feeling that he didn't agree with the Premier. But when the other doctor came… Not that he's a bad doctor, but it was almost as if the Premier was telling him what to say and I didn't like that. (112)

Even with the caveats above, the vast majority of participants said they trusted public health authorities.

The government

Overall, participants felt satisfied with the government's management of the pandemic and the role it played in providing information. The view that the government 'did its best' (123, 101), despite the difficult and uncertain situation, was frequently expressed. Participants explained their viewpoint by referring to the government's good intentions, 'the government wants the well-being of the population' (107), and to the idea that the opposition would not have done better. Nevertheless, the discourse of the different levels of government (federal, provincial and municipal), which was sometimes perceived as mutually inconsistent, created some confusion among participants. For example, regarding differences in regulations at the provincial level, one participant (115) stated:

> Ontario lifted the mask mandate before us, you had hockey games out West with 11,000 people and no one wearing masks, while for the Canadiens [the Montreal hockey team], there was no one in the stands… Come on, at some point, there needs to be some logic behind this.

Another participant highlighted the confusion caused by the statements of municipal politicians, which sometimes seemed to contradict those of provincial officials (119).

Conflicting information within the government in general was criticised by some participants. One participant (104) mentioned the change in the Premier's stance on mask-wearing: '[At first], he practically condemned the use of masks and then had to correct himself by saying "the mask is still something essential." By speaking too quickly, he may have also jeopardised his credibility' (104). Another participant (114) criticised the inconsistency of government decisions, upholding the right to celebrate holidays at one point and subsequently prohibiting them a few months later. These contradictions or inconsistencies suggest improvisation (115), or even an authoritative tone characterised by a failure to listen (104), which can lead to a decrease in trust in the information shared (114). This participant (114) also criticised what he considered to be 'decisions [… that were] too political', referring to those aimed at serving the party's 'own interests' (105) and seeking to gain political advantage from the situation. This strategic aspect of the government's pandemic management was reflected in a lack of transparency mentioned by two other participants. For

them, the government had 'hidden a few things' (102) regarding the seriousness of the situation to 'reassure people' (108) and to avoid 'scaring the population' (102). The strategic aspect of the government's management was, for another participant (106), reflected in a certain level of 'paternalism' and in a 'lack of nuance' in the information shared.

On another topic, the replacement of key figures (such as the National Director of Public Health), who spoke publicly during daily press conferences, was viewed negatively and criticised by some participants. This unexpected change created doubt about the reliability of the information shared by the replaced individual, according to one participant (119): 'But overnight, seeing someone else sitting in that chair [...] what happened? Does that mean what we were told wasn't true? Does that mean we didn't rely on accurate information? It makes us doubt the information we received'. While participants were saddened by the situation in the long-term care centres (known as CHSLDs in French) and criticised the treatment of older adults in these facilities, many traced the problem back to decades of mismanagement in the healthcare system, budget allocation and/or treatment of older adults: 'We know that our healthcare in Québec was severely neglected. You can't fix all the problems during a crisis' (113). In general, however, the outrage felt by many participants regarding this issue does not seem to have impacted their trust in the government.

Traditional media

Participants relied on traditional media, like television and radio, to inform themselves about the pandemic. Their information-seeking practices were part of well-established daily routines.

> For me, my sources of information are always the news. The news, from 6 to 7 PM on Radio-Canada, is very good. The news is a bit more in-depth than TVA [a French-language television network in Canada], but still, it's pretty good... I also like the 7 PM summary on TVA. With that, I get pretty much all the news I need. (114)

Participants trusted their preferred sources more, as these sources presented information in a way they appreciated and made them feel well-informed. The regional newspaper *Le Droit* was also among the preferred sources deemed reliable by several participants. Participants (102, 109) expressed their mistrust of journalists or certain types of journalists whom they found to be sensationalist or simply impudent. They felt that some of their questions during daily press conferences were not useful as regards the development of knowledge and were not worthy of attention. It seems that journalists' perceived arrogance or their criticisms of the government were unwelcome in the context of this global pandemic: 'You think, "What are you doing as a journalist asking such a question? "Asking [the Premier], "Are you proud of what you've done?" I'm sorry, but it seems to me that you could ask more intelligent questions than that' (102).

Social media

Few participants sought information through social media, which they used more to stay in touch with their social circle than for health information. Half of the participants claimed to be wary of the information shared on these platforms. The idea that one should not believe everything found there was frequently expressed: 'Sometimes, not everything we see on there is true' (107). It was necessary to 'filter a lot' (108) of the information coming from the Internet or social media.

Regarding the information sources considered during the pandemic, one participant said: 'I didn't trust it [social media]. I had read too many implausible things. When I saw the direction social media was taking, I ignored it. No, that's not where I was going to get my information, not at all' (119). Others mentioned that they consulted social media (Facebook, in particular) but took what they saw there 'lightly' (114), meaning they did not give too much importance to the information shared. Some noted that they connected online occasionally to read about current events, by clicking on links on Facebook or doing searches on Google (118).

One participant stated that they remained vigilant and appreciated the openness it provided her:

> Yes, I use social media to some extent, but I try to think critically and don't believe everything I read there, obviously. However, I want to stay in touch with people from different parts of Québec or who don't necessarily share my opinion on various topics. (106)

One participant who appreciated social media for the information it provided and integrated its use into her routine: 'I wake up early and often check the latest news on Facebook; it interests me a lot. I also like to share it' (121).

Discussion

Identifying, selecting, and prioritizing information sources

This study shows that older adults' engagement with information during the COVID-19 pandemic was characterised by active evaluation, reflexivity and a nuanced approach to trust. Far from being passive recipients of official messages, participants actively engaged with information, showing reflective and discerning information behaviours which is in line with another study (Robertson-Lang et al., 2011).

Participants' preference for traditional media over social media reveals an information appraisal strategy grounded in perceived reliability and mediated verification. Traditional media were valued not only for their familiar and structured format but also for their system of professional gatekeeping, which was viewed as ensuring informational coherence and factual accuracy role, echoing results from other studies (Pálsdóttir, 2023; Rosales et al., 2024; Shiroma et al., 2023; Weidmüller & Engesser, 2025). These mediations provided cognitive relief by filtering and structuring content, thereby reducing information overload and sustaining trust over time.

By contrast, most participants approached social media cautiously, using it primarily for social connection rather than as a source of information. Only a few integrated it into their routines for information purposes, and those who did applied selective strategies, such as critically evaluating posts or limiting their exposure to unverified content. Traditional and social media thus fulfilled distinct informational functions: the former operated as structured environments for verified information, while the latter served as social observatories for monitoring public opinion.

This pattern reflects two fundamental orientations in information evaluation: an accuracy goal (determining whether information is true or false) and a directional goal (assessing whether information aligns with one's existing beliefs or values) (Freiling & Waldherr, 2021). Traditional media tended to be mobilised for accuracy-based evaluations, while social media were approached through directional reasoning, often filtered through scepticism. Similarly, participants' reluctance to rely on their social networks for health-related information, unless members were perceived as qualified, illustrates a preference for accuracy-oriented evaluation over affective or relational trust (Metzger et al., 2010).

Criteria for constructing trust in information sources

Participants' critiques of sensationalism and perceived journalistic irrelevance highlight the need to reconsider the role of journalists as intermediaries within contemporary information ecosystems. From an information behaviours perspective, journalism serves not only as a channel for transmitting facts but also as a form of sense-making mediation. Yet many participants felt that journalistic practices had drifted toward dramatisation, undermining informational value.

This observation echoes calls to move beyond a purely pedagogical conception of journalism toward a facilitative model, where journalists act as *supports* rather than *guides* (Coutant & Rueff, 2024; Dewey, 2010). Such a model positions the public as co-constructors of meaning and acknowledges that trust emerges from interaction, not transmission. Strengthening trust, therefore, requires not only accuracy and transparency but also responsiveness and dialogical engagement, qualities that align with participatory approaches to information literacy and public

communication (Correia, 2024). In this perspective, trust is not merely an attitude or a static belief but an information practice: it functions as a cognitive and relational mechanism that orients information seeking, structures evaluation processes, and supports decision-making in situations of uncertainty and overload.

Participants' strong trust in experts within their personal networks aligns with Mihelj et al. (2022), who underline the role of perceived proximity in fostering trust in expertise. Yet this interpersonal dimension remains underexplored in the literature on information behaviours. From an information science perspective, these relationships can be seen as informal mediations bridging institutional knowledge and lived experience. Such relational trust operates as an alternative gatekeeping mechanism, reducing uncertainty and enabling individuals to integrate expert information into their personal sense-making processes.

Responding to conflicting or divergent expert information

An important finding concerns how participants interpreted the divergence of expert opinions during the pandemic. While inconsistent messages from authorities could generate confusion, most participants perceived scientific disagreement as normal, even as a sign of authenticity. This acceptance of uncertainty reflects a reflexive form of information literacy, characterised by an understanding that scientific knowledge is provisional and self-correcting (Frank & Seaman, 2023).

This result challenges common assumptions about older adults as risk-averse or overly deferential to authority. Instead, participants demonstrated adaptive information strategies that allowed them to navigate uncertainty without disengaging from expert knowledge. This aligns with Bromme et al. (2022), who found that exposure to scientific controversy can strengthen public engagement by emphasising the procedural nature of science. In this sense, trust was not eroded by disagreement but reconfigured through epistemic awareness, a recognition that pluralism in expertise can enhance, rather than diminish, informational credibility.

Trust in institutional sources over time

When discussing their trust in government, experts, and media, participants generally expressed satisfaction with how authorities managed the pandemic. However, upon deeper reflection, many described factors that weakened their trust: perceived political interference, inconsistent communication between federal and provincial authorities, unexplained changes in leadership, or sensationalist media coverage. These findings suggest that trust is processual and negotiated, emerging through ongoing interactions between citizens, institutions and mediating technologies. Information infrastructures thus rely on transparency, coherence and continuity to sustain credibility; when these conditions are disrupted, informational trust becomes unstable and contested (Reveilhac & Boomgaarden, 2025; Zhang et al., 2022).

The fragility and complexity of trust observed in this study do not necessarily signal a deficit. Rather, they point to a reflexive form of mistrust that supports critical engagement with information. Following Jennings et al. (2021), it is useful to distinguish between *mistrust*, a stance of critical scrutiny, and *distrust*, which denotes a settled belief that the other is untrustworthy (Citrin & Stoker, 2018). Most participants in our study exhibited *mistrust* rather than *distrust*: they questioned, verified and cross-referenced information, particularly from institutional and media sources. This attitude corresponds to what Jennings et al. describe as 'mistrusting citizens'—individuals who maintain a careful, questioning mindset and are most likely to adjust their behaviour in line with evidence and reasoned arguments.

By contrast, participants' approach to social media was marked by stronger distrust, reflecting perceptions of manipulation, lack of verification and information excess. Such reflexive mistrust should be understood as a form of information resilience—the capacity to sustain informed decision-making and epistemic agency under conditions of overload, contradiction and

uncertainty. Rather than undermining trust, this critical stance enables individuals to maintain control over their information environment, balancing openness to new data with protective scepticism.

This understanding reframes trust as a dynamic information relation rather than a static psychological disposition. Trust must be continuously earned and maintained through transparent communication, responsiveness to questions and acknowledgment of citizens' interpretive capacities (Kumagai & Iorio, 2020). In this view, effective information systems—whether governmental, journalistic, or digital — do not seek blind trust but cultivate *reciprocal accountability*: treating citizens as capable, critical agents within the information ecosystem.

Limitations

This study has several limitations. As with most qualitative research, a social desirability bias may have influenced participants' discourse, though this was mitigated through interviewer training. Recruitment conducted primarily online also excluded older adults with limited digital access or skills. Only one participant lived in a residential facility, a group often underrepresented in research due to accessibility challenges (Hunsaker & Hargittai, 2018). As a result, the findings may overrepresent more connected, autonomous individuals.

Conclusions

In summary, the results of our research show that older adults are far from passive receivers of information. They adopt a reflective and discerning stance, actively evaluating, questioning, and sometimes doubting the credibility of information sources and the quality of content. Trust emerged as a central and dynamic dimension of their information behaviours, shaped by experiences, source characteristics, and social context. Older adults distinguish between reliable and less reliable sources, rely on professional expertise and relational proximity, and apply selective strategies to manage uncertainty and information overload. These findings have important implications for public authorities. Firstly, they highlight the need for public authorities to strive for transparency and provide clear, fully justified explanations when there are changes in guidelines or information. By enhancing transparent communication and avoiding sensationalism, authorities can potentially strengthen public trust. Also, as trust is dynamic and never guaranteed, public health initiatives should include feedback mechanisms to clarify and address the concerns and doubts of the population. These could take the form of discussion forums, interactive information sessions and direct lines of communication with experts.

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assistance, the authors confirm that they are the sole authors of the article and take full responsibility for its content, in accordance with COPE recommendations.

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How catastrophic misinterpretation triggers health anxiety: health information seeking as a mediator in rural China's information-poor populations

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Abstract

Introduction. Amid the post-pandemic surge in health anxiety, this study investigates how catastrophic misinterpretation exacerbates health anxiety in Chinese rural populations through maladaptive health information seeking, under the boundary conditions of metacognitive beliefs and health risk perception.

Method. Employing a cross-sectional survey design, it collected data from 150 rural residents in Northern China. All were from townships characterized by significant information poverty.

Analysis. Structural equation modeling assessed the direct effect, the mediating role, and the moderated mediation within the proposed model.

Results. First, catastrophic misinterpretation exhibited a strong direct effect on health anxiety. Second, health information seeking behaviour mediated this relationship. Third, metacognitive factors demonstrated complex moderating influences: positive beliefs about worry weakened the association between catastrophic misinterpretation and information seeking, whereas perceived uncontrollability of worry intensified the impact of information seeking on anxiety. Contrary to expectations, heightened health risk perception reduced the anxiety-provoking effects of information seeking, suggesting a protective regulatory function in information-poor environments.

Conclusion. This study proposes the information poverty-amplified anxiety view, bridging health anxiety and information behaviour theory by positioning structural information deficits as catalytic contextual factors. It uniquely establishes maladaptive health information seeking behaviour as a critical mediator that transforms catastrophic misinterpretations into sustained health anxiety within information-poor contexts. It also identifies the paradoxical protective function of health risk perception in populations with low information literacy.

Introduction

Against the backdrop of China's vigorous implementation of the 'Healthy China 2030' national strategy, which emphasizes the dual improvement of physical and mental health across all population groups (State Council, 2016), public health awareness and healthcare demands have surged significantly. This top-down health promotion initiative has paradoxically coincided with rising health anxiety among citizens, a phenomenon markedly exacerbated by the COVID-19 pandemic and its protracted aftermath, as evidenced by longitudinal studies on population mental health. Longitudinal data from the National Health Insight Reports (National Health Commission, 2024) demonstrate pervasive health anxiety among the public, with the Dr. Clove's Data Research Institute (2023) survey indicating that 98% of respondents experienced health complaints within the past year.

Health anxiety manifests through heightened sensitivity to minor somatic sensations. This amplified bodily awareness frequently precipitates catastrophic misinterpretation of normal physiological changes and subsequently triggers compulsive health information-seeking behaviour. Compulsive health information seeking behaviour drives query escalation that precipitates information overload and confirmation bias, forming self-perpetuating cycles that exacerbate health anxiety through negative reinforcement (Powell et al., 2011). The health anxiety amplification mechanism exhibits pronounced socioeconomic disparities in China, with rural information-poor populations disproportionately affected due to intersecting structural and cognitive vulnerabilities. As a multidimensional deprivation phenomenon, information poverty in these rural communities manifests through structurally deficient health information literacy and impaired health knowledge assimilation, constrained access to credible health platforms, creating systematic disadvantages in navigating health information ecosystems (Luo and Cui, 2013). As reflected in national statistics, rural China's information poverty manifests through three measurable gaps: a 34.2-percentage-point disparity in digital health information access (CNNIC, 2024), nearly 10-point lower health literacy rates (Chinese Center for Health Education, 2023). Compromised information evaluation capacity, with rural residents disproportionately vulnerable to online misinformation (Yan & Schroeder, 2025) and low health information literacy concentrated among less educated, older rural populations (Li & Chen, 2023). Their compromised capacity to filter, evaluate, and contextualize health information establishes a pathological cascade: catastrophic misinterpretation of normal or ambiguous somatic sensations triggers a self-reinforcing cycle of compulsive reassurance-seeking that deepens anxiety, particularly in rural, information-poor communities requiring targeted interventions.

While existing psychological research has established health anxiety within cognitive-behavioural frameworks, critical gaps persist at the intersection of information behaviour and socio-cognitive mechanisms, particularly for marginalized populations. First, prior studies (Agarwal et al. 2023; Deng et al., 2023; Tang et al., 2009) predominantly focus on clinical or urban samples, neglecting the unique vulnerabilities of rural information-poor groups, whose health anxiety may be compounded by structural information poverty. Second, although health information seeking behaviour is recognized as a mediator, its role in sustaining (rather than alleviating) anxiety cycles remains underexplored in contexts of information poverty. Third, the interaction between metacognitive beliefs (e.g., positive worry beliefs) and maladaptive information behaviour lacks empirical validation in Indigenous settings. This study addresses these gaps by examining the following:

RQ1: The information-behavioural pathway: How does catastrophic misinterpretation trigger maladaptive health information seeking behaviour, and how do these behaviours mediate its impact on health anxiety in Chinese rural information-poor populations?

RQ2: The metacognitive-informational boundary conditions: Under what cognitive conditions—specifically, when individuals hold strong positive beliefs about worry, perceive worries as

uncontrollable, or have elevated health risk perceptions—does this mediation pathway become particularly pronounced?

By integrating cognitive psychology with information behaviour theories, this study extends the health anxiety models by incorporating information poverty as a contextual amplifier of catastrophic cognition and theorizing maladaptive information seeking behaviour as a critical mediator. It advances information behaviour theory by delineating how metacognitive beliefs interact with information processing in anxiety formation. It also informs global interventions for developing regions by highlighting how structural information disparities perpetuate health anxiety cycles—a framework applicable to other information-poor populations worldwide.

Literature review and research hypotheses

Catastrophic misinterpretation is a psychological mechanism wherein individuals misinterpret bodily sensations and emotional responses triggered by internal or external stimuli as indicative of health danger (Austin & Richards, 2001; Clark, 1986). Affected individuals tend to exaggerate and misattribute ordinary bodily sensations as signs of serious illness, thereby exacerbating health-related anxiety.

The centrality of threat interpretation in anxiety experiences is well-documented. Salkovskis and Warwick's (1986) well-known cognitive-behavioural model of health anxiety posits that catastrophic misinterpretation plays a pivotal role in both the development and perpetuation of health anxiety. Supporting this, Hadjistavropolos et al. (2012) identified core maladaptive cognitions—such as the perceived likelihood of illness, the perceived awfulness of illness, the perceived inability to cope, and the perceived inadequacy of medical services—as uniquely associated with health anxiety. Notably, most of these cognitions are intrinsically linked to catastrophic misinterpretation. Further empirical evidence by Weck et al. (2012) found that individuals with heightened health anxiety exhibit a stronger tendency to misinterpret bodily symptoms as indicators of catastrophic illness. Meta-analytic research by Ohst and Tuschen-Caffier (2018) corroborates these findings, demonstrating medium to large effect sizes in catastrophic misinterpretation between patients with panic disorder and both healthy controls and individuals with other anxiety disorders.

In the information society, developmental imbalances and inadequacies manifest as information poverty. Childer (1975) defined this concept as a state of impoverishment stemming from inadequate or inappropriate information practices. The formation of information poverty is not attributable to a single cause; rather, information-poor populations typically emerge from groups disadvantaged in terms of geographic distribution, economic standing, and socio-cultural resources (Chatman, 1996). Information poverty in rural China is operationally defined in this study using the information economy index. Following Zheng and Song (2019), areas with an index below 0.3—such as parts of Hengshui, Hebei—are classified as Level IV information-poor regions.

Crucially, Chinese rural information-poor populations may be particularly susceptible to catastrophic misinterpretation due to low critical information literacy and limited access to accurate health information (Zhang & Yang, 2023). Health information literacy evolved from the concept of ‘health literacy’ in US Healthy People 2030 (U.S. Department of Health and Human Services, 2025). It is defined as ‘the ability and skills needed for identifying health information needs, accessing health relevant information from reliable health resources, and using health information for making sound health decisions for living healthier lives’ (Kaur & Kaur, 2021). The physical, personal, and social barriers to health information access exacerbate both the prevalence and persistence of catastrophic misinterpretations. Such sense-unmaking, in turn, directly contributes to heightened health anxiety by preventing individuals from correcting maladaptive health beliefs.

Based on the above theoretical and empirical foundations, we propose:

H1: Catastrophic misinterpretation positively predicts health anxiety in Chinese rural information-poor populations.

H1a: The severity of catastrophic misinterpretation positively predicts health anxiety in this population.

H1b: The duration of catastrophic misinterpretation positively predicts health anxiety in this population.

Catastrophic misinterpretation serves as a maintenance mechanism for health-related anxiety over time (Gautreau et al., 2015). This sustained anxiety state establishes a vicious cycle by reinforcing distorted interpretations of bodily signals. Within this maladaptive cognitive loop, health-anxious individuals frequently engage in health information seeking behaviour, which Johnson (1997) defined as 'purposive acquisition of information from selected information carriers'. However, empirical evidence suggests that this coping strategy often proves counterproductive. Existing research consistently demonstrates the counterproductive effects of health information seeking behaviour. Multiple studies (Baumgartner & Hartmann, 2011; White & Horvitz, 2009) confirm that health information seeking behaviour elevates health anxiety levels, with online health seeking proving particularly ineffective at anxiety relief and often exacerbating distress. Muse et al. (2012) established a dose-response relationship showing that more frequent online health information seeking correlated with both prolonged duration and increased severity of health anxiety symptoms.

For Chinese rural information-poor populations, this mediation mechanism may be particularly pronounced due to several contextual factors (Mou & Xu, 2020; Zhang & Yang, 2023): limited access to authoritative health information sources increases reliance on unverified online content; low health literacy reduces the ability to evaluate obtained information critically; and geographic isolation prolongs the anxiety- health information seeking behaviour feedback loop by delaying professional consultation opportunities. Building on this evidence, we propose:

H2: Health information seeking behaviour mediates the positive relationship between catastrophic misinterpretation and health anxiety in Chinese rural information-poor populations.

Metacognition refers to higher-order cognitive activity that involves monitoring and regulating cognitive processes (Jausovec, 2018). Two specific metacognitions that may interact with health anxiety are positive beliefs about worry and perceived uncontrollability of worry (Wells & King, 2006; Wells & Matthews, 1994). Positive beliefs about worry refer to the conviction that worry and anxiety can serve as an effective strategy for dealing with perceived problems. For example, 'worrying helps me find solutions to problems' or 'worrying prevents bad things'. On the contrary, perceived uncontrollability of worry means negative metacognitive beliefs concerning the uncontrollable and dangerous worry, like 'worrying makes me mad'. When it comes to health anxiety, it is thought to develop from maladaptive metacognitive regulatory mechanisms. Ongoing negative thoughts about health-related dangers and dysfunctional coping patterns mark such regulation. These, in turn, strengthen such negative thoughts through what is known as the cognitive-attentional syndrome. Empirical evidence (Solem, 2010) robustly supports this framework. Metacognitive beliefs directly influence health anxiety severity. Catastrophic misinterpretation—a core feature of health anxiety—is exacerbated by negative metacognitive beliefs and paradoxically maintained by positive beliefs (Bailey & Wells, 2015). Luo et al. (2018) demonstrated that positive metacognitive beliefs buffer the impact of catastrophic interpretations on health anxiety. These metacognitive processes bias health information seeking behaviour. For example, Meppelink et al. (2019)'s study on confirmation bias in health information-seeking found that individuals prioritize information confirming their existing

perceptions, leading to misinterpretation. Results showed a tendency to select belief-consistent over belief-inconsistent information, with the former perceived as more credible, helpful, and convincing—exhibiting both biased information selection and biased perceptions of message convincingness. The above evidence logically predicts that:

> H3: For Chinese rural information-poor populations, positive beliefs about worry moderate the mediating effect of information-seeking behaviour in the relationship between catastrophic misinterpretation and health anxiety.
>
> H4: For Chinese rural information-poor populations, perceived uncontrollability of worry weakens this mediation.

Health risk perception is rooted in Slovic et al.'s (1982) risk concept, which is 'a multiplicative combination of the probability of a hazardous event occurring and the severity of the resulting negative consequences'. Therefore, health risk perception refers to an individual's subjective appraisal of both (a) perceived susceptibility to health threats and (b) perceived severity of potential consequences. This subjective appraisal process renders the perception distinct from objective risk assessment. Heightened risk perception is typically understood to amplify threat-related cognitions and maladaptive behavioural responses.

Contrary to the traditional "amplifier" perspective, we propose a protective role of health risk perception among Chinese rural information-poor populations. Rather than strengthening the mediation pathway, heightened health risk perception appears to attenuate the problematic relationship between catastrophic misinterpretation and maladaptive information behaviour. Specifically, in the first-stage attenuation, elevated health risk perception weakens the link between catastrophic misinterpretation and compulsive information seeking. while catastrophic thinkers typically engage in excessive health information seeking, this effect may become non-significant at high health risk perception levels. In the second-stage buffering, high health risk perception reduces the anxiety-provoking impact of information seeking behaviour.

This protective effect may stem from the dual nature of health risk perception. The cognitive component helps individuals recognize the futility of excessive information seeking in resource-limited environments. The affective component motivates more adaptive coping strategies beyond information seeking. In information-poor contexts, heightened health risk perception appears to trigger a protective 'behavioural avoidance' rather than the predicted amplification effect. It promotes more selective information engagement. This manifests in three ways: reduced emotional dependence on unverified information sources, increased scepticism toward anecdotal health information, and heightened awareness of information access limitations. Thus, we put forward H5:

> H5: For Chinese rural information-poor populations, health risk perception positively moderates the mediating effect of information-seeking behaviour in the relationship between catastrophic misinterpretation and health anxiety.

Our research model is illustrated in Figure 1.

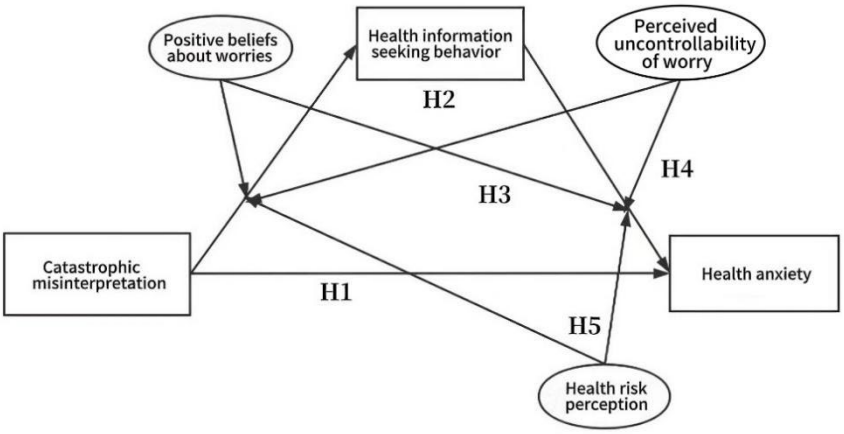


Figure 1. Association model of catastrophic misinterpretation and health anxiety

Questionnaire survey and data collection

Questionnaire design

This study utilized a structured questionnaire design. The questionnaire (see Table 1) utilized scales adapted from established Chinese and international instruments, including the Chinese Short Version Health Anxiety Scale and the Cognitions About Body and Health Questionnaire. The questionnaire comprises five parts: demographic characteristics, catastrophic misinterpretation, health information seeking behaviour, metacognitive beliefs, and health risk perception. All psychological constructs were measured using validated 5-point Likert scales, except for the demographic section, which employed categorical response formats.

The study employed rigorously validated measurement instruments through careful cross-cultural adaptation. All scales underwent standardized forward-backward translation and pilot testing, confirming adequate reliability (all $\alpha s > .75$), ensuring cultural and psychometric appropriateness for the target population.

Research variables	Sources
Health anxiety	Chinese Short Version Health Anxiety Scale (Yuan & Zhang, 2013)
Catastrophic misinterpretation	The Cognitions About Body and Health Questionnaire (CABAH) (Rief et al., 1998)
Health Information Seeking Behaviour	Search frequency index (Baumgartner & Hartmann, 2011)
Metacognitive beliefs	The Chinese version of the Metacognitive Questionnaire (MCQ-30) (Fan et al., 2017)
Health risk perception	The four-dimensional framework of likelihood, severity, controllability, and familiarity proposed (Lan, 2019)

Table 1. Scale Development and Questionnaire Design Reference

Ethical considerations

All procedures performed in this study involving human participants were in accordance with the ethical standards of the Ethics Committee of the university where the first author worked, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual adult participants included in the study. Each participant received a compensation of CNY 50 (approximately 7 USD).

Data collection

The data collection was conducted from February 25 to March 2, 2023 across four representative townships (Wugong, Liuchu, Guanting, and Yaozhuang) in Hengshui City, Hebei Province - a region characterized by significant information poverty (Information Economy Index = 0.29, classified as Tier-4 information poverty zone) (Zheng & Song, 2019). This site selection ensured the examination of populations with constrained health information access. Participants completed surveys through dual modalities: digital platform (QR code access） and traditional paper-based format. From the initial pool of 411 collected responses, rigorous quality control procedures were implemented. This yielded 150 valid questionnaires (36.5% validity rate) with a balanced gender distribution (1:1 ratio).

The study population comprised 77 males (51.3%) and 73 females (48.7%), demonstrating nearly equivalent gender representation. Age distribution followed a pyramidal pattern with a small youth cohort (12 participants, 8%), a moderate middle-aged group (31 participants, 20.7%), and a predominant elderly population (107 participants, 71.3%). This demographic composition reflects the aging population trends characteristic of rural Chinese communities while maintaining gender parity crucial for controlling sex-based confounding variables in health behaviour research. The substantial elderly representation (over two-thirds of respondents) is particularly noteworthy for health information behaviour research, given this group's documented challenges with health literacy and information poverty. The balanced gender ratio enhances the generalizability of findings across sexes, while the age distribution provides sufficient subsamples for potential stratified analyses.

Reliability and validity analysis

In order to assess the internal consistency of the scales of the questionnaire, we calculated Cronbach's alpha coefficients using SPSS. The entire scale demonstrated outstanding reliability, with a Cronbach's

alpha value of 0.972, which surpassed the commonly accepted threshold of 0.70. At the subscale level, all measures maintained robust internal consistency, with reliability coefficients consistently above 0.80, indicating highly stable measurement properties throughout the instrument.

Construct validity was examined using exploratory factor analysis with Kaiser-Meyer-Olkin and Bartlett's test of sphericity. The Kaiser-Meyer-Olkin value (0.827) indicated adequate sampling adequacy, while Bartlett's test confirmed the factorability of the correlation matrix. These results support the structural validity of the scales in measuring the intended constructs.

Common method deviation assessment

To avoid the problem of common method deviation caused by the self-report nature of data sources, we conducted Harman's single-factor test to evaluate potential common method variance. The unrotated factor analysis showed that the first factor accounted for only 37.871% of the variance, which is below the 40% threshold, suggesting that common method variance did not significantly distort the findings.

Correlation analysis

As presented in Table 2, the Pearson correlation analysis revealed statistically significant relationships among the key variables ($p < 0.01$), supporting the feasibility of further regression and mediation analyses.

	1	2	3	4	5	6
1.CM	1					
2.HISB	0.489**	1				
3.HA	0.727*	0.483**	1			
PBW	-0.413	-0.294**	-0.585**	1		
5.PUW	0.471	0.418**	0.697**	-0.708**	1	
6.HRP	-0.647**	-0.382**	-0.755**	0.733**	-0.798**	1

Note. CM = Catastrophic misinterpretation; HISB = Health information seeking behaviour; HA = Health Anxiety; PBW = Positive beliefs about worry; PUW = Perceived uncontrollability of worry; HRP = Health risk perception.

Table 2. Correlation analysis

Research results

The effect of catastrophic misinterpretation on health anxiety

To examine the predictive role of catastrophic misinterpretation on health anxiety, we conducted hierarchical regression analyses with two models (Aiken & West, 1991). The strength of this method lies in its ability to estimate the unique effects associated with each independent variable. This method enables unique partitioning of the total variance of the dependent variable accounted for by correlated independent variables (Wang & Guo, 2015). Model 1 (Control Model) included demographic covariates (gender, age, educational background). Model 2 (Predictive Model) added catastrophic misinterpretation as an independent variable. The results are shown in Table 3. As for Model 1 (Demographics Only), the control variables collectively explained 1.6% of the variance in health anxiety ($R^2 = 0.01$), but this model was not statistically significant ($F = 0.808$, $p > 0.05$). None of the demographic variables significantly predicted health anxiety. As for Model 2 (Adding Catastrophic Misinterpretation), the inclusion of catastrophic misinterpretation significantly improved model

fit ($\Delta R^2 = 0.525$, F-change = 165.71, $p < 0.001$), accounting for 54.1% of the variance in health anxiety ($R^2 = 0.541$, Adjusted $R^2 = 0.528$). catastrophic misinterpretation exhibited a strong positive effect on health anxiety (B = 0.745, t = 12.873, $p < 0.001$), indicating that higher levels of catastrophic misinterpretation predict greater health anxiety severity. These results support Hypothesis H1, confirming that is a robust predictor of health anxiety, with a substantial effect size.

	Model 1		Model 2	
	Health anxiety			
	B	t	B	t
Constant	3.607	10.821***	0.988	3.229
Gender	-0.141	-1.067	-0.084	-0.922
Age	-0.135	-1.473	-0.083	-1.307
EB	0.045	0.435	0.130	1.818
CM			0.745	12.873***
R^2	0.016		0.541	
Adjusted R^2	0.000		0.528	
F	0.808		42.714***	

Note. CM = Catastrophic misinterpretation; EB = Educational background.

Table 3. Regression analysis results

To further investigate catastrophic misinterpretation 's underlying mechanisms, we analysed its duration and severity as distinct predictors in a two-step hierarchical regression, as shown in Table 4. Model 1 examined the effect of catastrophic misinterpretation duration (controlling for demographics). Model 2 added catastrophic misinterpretation severity to assess incremental predictive power. In Model 1 (catastrophic misinterpretation duration only), catastrophic misinterpretation duration showed a significant but modest effect on health anxiety (B = 0.202, t = 4.237, $p < 0.001$), explaining 10.5% of the variance ($R^2 = 0.105$). This supports Hypothesis H1a, i.e., longer catastrophic misinterpretation duration is associated with elevated health anxiety. In Model 2 (adding catastrophic misinterpretation severity), catastrophic misinterpretation severity emerged as a stronger predictor (B = 0.723, t = 11.427, $p < 0.001$), increasing explained variance to 52.7% ($R^2 = 0.527$). catastrophic misinterpretation duration remained significant (B = 0.202, $p < 0.001$), but its effect was dwarfed by severity, supporting Hypothesis H1b. While both catastrophic misinterpretation duration and severity contribute to health anxiety, severity has a substantially larger impact, suggesting that interventions should prioritize mitigating exaggerated threat appraisals rather than merely addressing chronicity.

	Model 1		Model 2	
	Health anxiety			
	B	t	B	t
Constant	3.207	9.778	0.950	3.070**
Gender	-0.131	-1.049	-0.083	-0.915
Age	-0.140	-1.608	-0.080	-1.260
EB	0.041	0.417	0.134	1.868
DCM	0.202	4.327***	0.019	0.498
SCM			0.723	11.427***
R^2	0.129		0.543	
Adjusted R^2	0.105		0.527	
F	5.360***		34.236***	

Note. DCM = Duration of catastrophic misinterpretation; EB = Educational background; SCM = Severity of catastrophic misinterpretation.

Table 4. Regression analysis results

The mediation effect test

We conducted the mediation effect test in three sequential phases (Hayes, 2012). First, we examined the baseline relationship between catastrophic misinterpretation and health anxiety. This step establishes the existence of a significant effect to be mediated. Secondly, we tested (a) the association between catastrophic misinterpretation and the proposed mediator, and (b) the relationship between health information seeking behaviour and health anxiety while controlling for catastrophic misinterpretation. Thirdly, we employed a nonparametric bootstrapping approach with 5,000 resamples to generate bias-corrected confidence intervals for the indirect effect. It is a statistical method that randomly resamples the dataset with replacement to empirically approximate the sampling distribution, providing robust statistical evidence for mediation. The results are shown in Table 5.

The initial regression model (Model 1) demonstrated a highly significant total effect of catastrophic misinterpretation on health anxiety (β = 0.745, t = 12.873, $p < 0.001$), with catastrophic misinterpretation explaining a substantial 54.1% of the variance in health anxiety ($R^2 = 0.541$, $F(4,145) = 42.714$, $p < 0.001$). This large effect size (Cohen's $f^2=1.18$) suggests that individuals' tendencies toward catastrophic misinterpretation of bodily sensations strongly predict their levels of health anxiety. The demographic control variables collectively accounted for only 1.6% of the variance ($\Delta R^2 = 0.016$), with none reaching statistical significance (all ps > 0.05). Model 2 examined Path A (catastrophic misinterpretation → health information seeking behaviour) and revealed that catastrophic misinterpretation significantly predicted health information seeking behaviour (β = 0.422, t = 6.474, $p < 0.001$), accounting for 26.0% of the variance ($R^2 = 0.260$, $F(4,145) = 12.705$, $p < 0.001$). This medium-

to-large effect suggests that individuals with stronger tendencies towards catastrophic misinterpretation engage in more frequent health information seeking.

Model 3 examined Path B (health information seeking behaviour → health anxiety) and Path C (the direct effect of catastrophic misinterpretation). After controlling for catastrophic misinterpretation, health information seeking behaviour maintained a significant positive association with health anxiety (β = 0.230, t = 2.809, p = 0.006). The direct effect of catastrophic misinterpretation on health anxiety remained significant but was attenuated (β = 0.660 vs. original 0.745). The full model explained 56.5% of the variance in health anxiety (R^2 = 0.565, F(5,144) = 37.373, p < 0.001). The inclusion of health information seeking behaviour resulted in a statistically significant R^2 increase of 0.024 (F(1,144) = 7.891, p = 0.006).

To address limitations of traditional mediation tests (e.g., normality assumptions), we conducted a bias-corrected bootstrap analysis with 5,000 resamples. The results revealed a total effect of 0.745 (95% CI [0.631, 0.859]), a direct effect of 0.660 (95% CI [0.533, 0.787]), and an indirect effect of 0.085 (95% CI [0.011, 0.220]). It is shown in Table 6. The proportion of the total effect mediated by health information seeking behaviour was 11.41%, indicating partial mediation. This finding supports Hypothesis H2. it also suggests that while health information seeking behaviour explains a significant portion of the catastrophic misinterpretation-health anxiety relationship, catastrophic misinterpretation also influences health anxiety through other mechanisms not captured in this model.

	Model 1		**Model 2**		**Model 3**	
	Health anxiety		Health information seeking behaviour		Health anxiety	
	β	t	β	t	β	t
Constant	0.988	3.229**	2.489	7.231	0.484	1.387
Genders	-0.084	-0.922	-0.068	-0.664	-0.070	-0.788
Age	-0.083	-1.307	-0.054	-0.766	-0.072	-1.156
EB	0.130	0.071	-0.107	-1.336	0.152	2.159
CM	0.745	12.873***	0.422	6.474***	0.660	10.274***
HISB					0.230	2.809**
R	0.735		0.509		0.752	
R^2	0.541		0.260		0.565	
F	42.714***		12.705***		37.373***	

Note. CM = Catastrophic misinterpretation; EB = Educational background; HISB = Health information seeking behaviour.

Table 5. Multiple sequential regressions of the mediation effect

Effect relationship	Effect value	LLCI	ULCI	Effect proportion
Total effect	0.745	0.631	0.859	
Direct effect	0.660	0.533	0.787	88.59%
Indirect effect	0.085	0.011	0.220	11.41%

Table 6. Bootstrap mediation effect test results

Moderated mediation effects tests

The moderated mediation effect tests were conducted using Hayes' SPSS macro program. Controlling for gender and age, we used positive beliefs about worry, perceived uncontrollability of worry, and health risk perception as moderators. Model 58 (which assumes that both the first-stage and second-stage paths of the mediation model are moderated) was adopted for sequential testing, and the specific results are as follows.

The moderating role of positive beliefs about worry in mediation model

As shown in Table 7, Model 1 indicates that catastrophic misinterpretation can positively predict health information-seeking behaviour. The interaction term of catastrophic misinterpretation and positive beliefs about worry can negatively predict health information-seeking behaviour. Model 2 shows that health information seeking behaviour can positively predict health anxiety; both positive beliefs about worry and the interaction term of health information seeking behaviour and positive beliefs about worry can negatively predict health anxiety.

	Model 1		Model 2	
	Health information seeking behaviour		Health anxiety	
	β	t	β	t
Constant	0.206	0.769	2.974	15.001***
Genders	-0.034	-0.330	-0.026	-0.338
Age	-0.012	-0.164	-0.030	-0.554
EB	-0.097	-1.215	0.163	2.695*
CM	0.398	5.664***	0.524	8.973***
PBW	-0.022	-0.371	-0.193	-3.885***
CM ×PBW	-0.111	-2.086*		
HISB			0.182	2.907**
HISB×PBW			-0.166	-3.345**
R	0.537		0.826	
R^2	0.289		0.683	
F	9.664***		43.671***	

Note. CM = Catastrophic misinterpretation; EB = Educational background; HISB = Health information seeking behaviour; PBW = Positive beliefs about worry.

Table 7. Bootstrap mediated effects test results with moderation

Further simple slope analysis is presented in Figures 2 and 3. Figure 2 shows that for participants with low levels of positive beliefs about worry (M-1SD), catastrophic misinterpretation significantly and positively predicts health information seeking behaviour (effect = 0.496, 95%CI = (0.324, 0.669), $p < 0.001$); for participants with high levels of positive beliefs about worry, catastrophic misinterpretation also significantly and positively predicts health information seeking behaviour (effect = 0.300, 95%CI = (0.138, 0.461), $p < 0.001$), but the predictive effect is weaker. This indicates that as the level of positive beliefs about worry among information-poor individuals increases, the predictive effect of catastrophic misinterpretation on health information-seeking behaviour gradually decreases.

As shown in Figure 3, for participants with low levels of positive beliefs about worry, health information-seeking behaviour significantly predicts health anxiety (effect = 0.329, 95%CI = (0.172, 0.487), $p < 0.001$). In contrast, for participants with high levels of positive beliefs about worry, health information-seeking behaviour does not significantly predict health anxiety (effect = 0.034, 95%CI = (-0.110, 0.179), $p = 0.638$). It can be seen that health information seeking behaviour plays a stronger role in exacerbating health anxiety when the level of positive beliefs about worry is low.

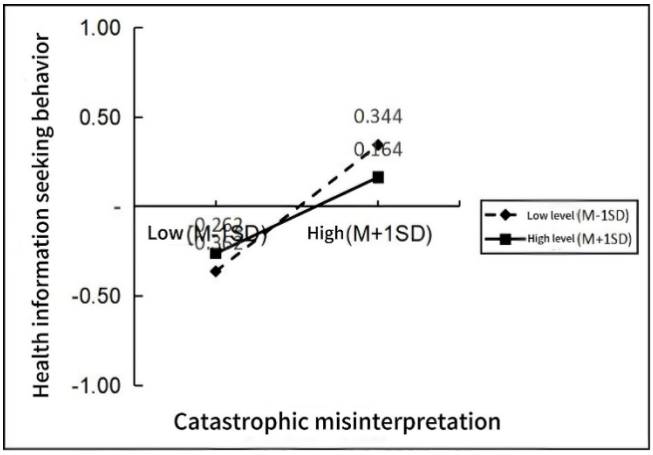


Figure 2. Moderating effect of positive beliefs about worry on the first stage of mediation

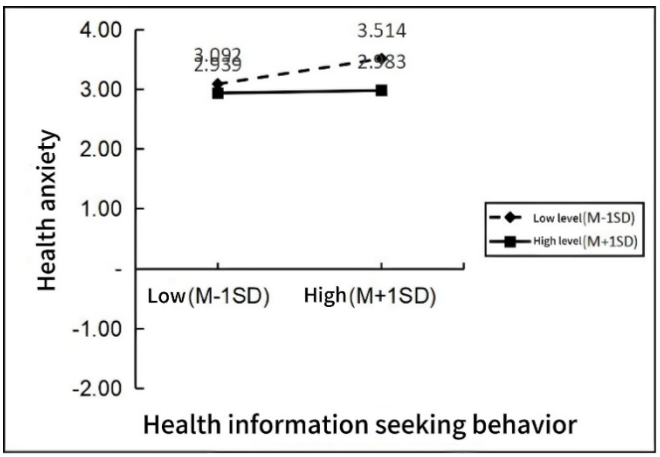


Figure 3. Moderating effect of positive beliefs about worry on the second stage of mediation

Table 8 presents the mediation effect sizes and their 95% bootstrap confidence intervals for health information seeking behaviour in the relationship between catastrophic misinterpretation and health anxiety. These effects are reported at three levels of positive beliefs about worry: mean minus one standard deviation (M-1SD), mean (M), and mean plus one standard deviation (M+1SD) (Edwards & Lambert, 2007). Therefore, the moderating effect of positive beliefs about worry varies across different levels. Hypothesis H3 is supported.

	Positive beliefs about worry	Effect value	Boot Standard error	LLCI	ULCI
The mediating role of positive beliefs about worry	M-1SD	0.163	0.051	0.078	0.274
	M	0.072	0.036	0.016	0.155
	M+1SD	0.010	0.029	-0.026	0.089

Table 8. Mediating effects of positive beliefs about worry at three levels

Moderating role of perceived uncontrollability of worry in the mediation model

As shown in Table 9, Model 1 indicates that catastrophic misinterpretation can significantly predict health information-seeking behaviour, whereas the perceived uncontrollability of worry and the interaction term of catastrophic misinterpretation and perceived uncontrollability of worry do not predict health information seeking behaviour. Model 2 shows that health information seeking behaviour, perceived uncontrollability of worry, and the interaction term of health information seeking behaviour and perceived uncontrollability of worry can positively predict health anxiety.

	Model 1		**Model 2**	
	Health information seeking behaviour		Health anxiety	
	β	t	β	t
Constant	0.156	0.587	2.893	15.358***
Genders	-0.014	-0.141	0.011	0.148
Age	-0.011	-0.158	-0.029	-0.578
EB	-0.083	-1.603	0.179	3.159
CM	0.336	4.724***	0.485	8.756***
PUW	0.125	1.938	0.311	5.724***
CM× PUW	0.091	1.768		
HISB			0.124	1.998*
HISB×PUW			0.110	2.252*
R	0.559		0.849	
R^2	0.313		0.721	
F	10.844***		52.493***	

Note. CM = Catastrophic misinterpretation; EB = Educational background; HISB = Health information seeking behaviour; PUW = Perceived uncontrollability of worry.

Table 9. Bootstrap mediated effects test results with moderation

Further simple slope analysis is presented in Figures 4 and 5. Figure 4 shows that for participants with high levels of perceived uncontrollability of worry, catastrophic misinterpretation significantly and positively predicts health information-seeking behaviour (effect = 0.413, 95%CI = (0.245, 0.582), $p < 0.001$). For participants with low levels of perceived uncontrollability of worry, catastrophic misinterpretation also significantly predicts health information-seeking behaviour (effect = 0.258, 95%CI = (0.096, 0.420), $p < 0.001$), but the predictive effect is weaker. This suggests that as the level of perceived uncontrollability of worry among information-poor individuals increases, the predictive effect of catastrophic misinterpretation on health information-seeking behaviour becomes increasingly stronger.

As shown in Figure 5, for participants with low levels of perceived uncontrollability of worry, health information seeking behaviour does not have a significant positive predictive effect on health anxiety (effect =0.030, 95%CI = (-0.098, 0.158), p = 0.642); for participants with high levels of perceived uncontrollability of worry, health information seeking behaviour significantly predicts health anxiety (effect = 0.218, 95%CI = (0.052, 0.384), p < 0.05). It can be seen that health information seeking behaviour plays a stronger role in exacerbating health anxiety when the level of perceived uncontrollability of worry is high.

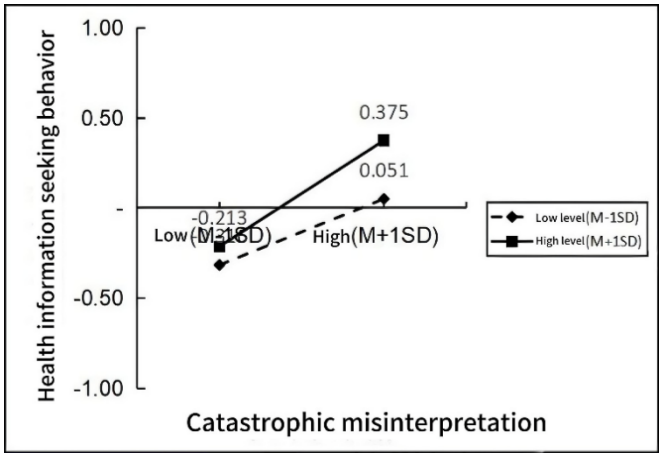


Figure 4. Moderating effect of perceived uncontrollability of worry on the first stage of mediation

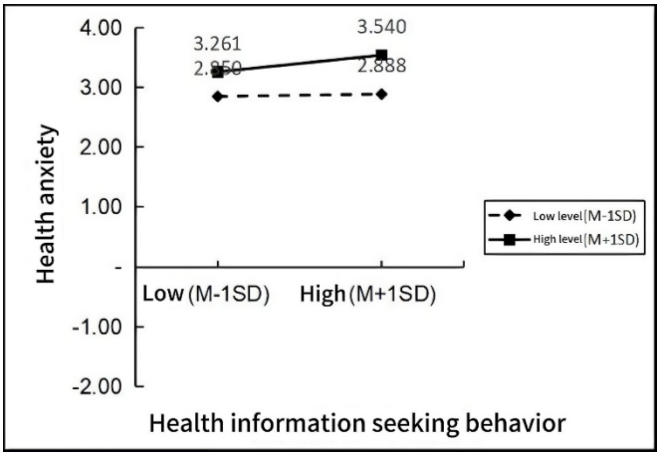


Figure 5. Moderating effect of perceived uncontrollability of worry on the second stage of mediation

Table 10 presents the mediation effect sizes and their 95% bootstrap confidence intervals for health information seeking behaviour in the relationship between catastrophic misinterpretation and health anxiety at three levels of perceived uncontrollability of worry: M-1SD, M, and M+1SD (Edwards & Lambert, 2007). In summary, the moderating effect of perceived uncontrollability of worry varies across different levels, and Hypothesis H4 is supported.

	Perceived uncontrollability of worry	Effect value	Boot Standard error	LLCI	ULCI
The mediating role of perceived uncontrollability of worry	M-1SD	0.008	0.023	-0.017	0.074
	M	0.042	0.029	0.003	0.111
	M+1SD	0.090	0.039	0.025	0.177

Table 10. Mediating effect of perceived uncontrollability of worry at three levels

Moderated mediation test: The role of health risk perception

We conducted a comprehensive moderated mediation analysis (Hayes, 2013) to examine whether health risk perception conditions the indirect relationship between catastrophic misinterpretation and health anxiety through health information seeking, while controlling for gender and age.

As presented in Table 11, Model 1 revealed three important findings regarding health information seeking behaviour: (1) catastrophic misinterpretation showed a strong positive predictive effect ($\beta = 0.388$, $t = 5.031$, $p < 0.001$), (2) health risk perception by itself did not significantly predict health information seeking behaviour ($\beta = 0.006$, $t = 0.087$, $p > 0.05$), while (3) the interaction between catastrophic misinterpretation and health risk perception negatively predicted health information seeking behaviour ($\beta = -0.300$, $t = -5.583$, $p < 0.001$). This pattern suggests that the relationship between catastrophic misinterpretation and health information seeking behaviour depends on individuals' levels of health risk perception.

Model 2 demonstrated that in predicting health anxiety: (1) both catastrophic misinterpretation ($\beta = 0.351$, $t = 5.321$, $p < 0.001$) and health information seeking behaviour ($\beta = 0.168$, $t = 2.762$, $p < 0.01$) were significant positive predictors, while (2) health risk perception showed a direct negative effect ($\beta = -0.394$, $t = -5.933$, $p < 0.001$). Importantly, (3) the interaction between health information seeking behaviour and health risk perception was marginally significant in the negative direction ($\beta = -0.104$, $t = -1.659$, $p < 0.10$), indicating that health risk perception may buffer the impact of information seeking on anxiety.

	Model 1		Model 2	
	Health information seeking behaviour		Health anxiety	
	β	t	β	t
Constant	-0.255	-0.972	3.002	15.094***
Genders	0.055	0.581	-0.018	-0.242
Age	0.064	0.942	-0.042	-0.794
EB	-0.049	-0.660	0.161	2.737**
CM	0.388	5.031***	0.351	5.321***
HRP	0.006	0.087	-0.394	-5.933***
CM× HRP	-0.300	-5.583***		
HISB			0.168	2.762**
HISB×HRP			-0.104	1.659*
R	0.630		0.837	
R^2	0.397		0.701	
F	15.694***		47.528***	

Note. CM = Catastrophic misinterpretation; EB = Educational background; HISB = Health information seeking behaviour; HRP = Health risk perception.

Table 11. Bootstrap mediated effects test results with moderation

Figure 6 illustrates the nature of the first-stage moderation. For individuals with low health risk perception (M-1SD), catastrophic misinterpretation strongly predicted health information seeking behaviour (effect = 0.619, 95% CI [0.411, 0.796], $p < 0.001$). In contrast, for those with high health risk perception (M+1SD), this relationship became non-significant (effect = 0.158, 95% CI [-0.010, 0.327], $p = 0.065$), indicating that elevated health risk perception attenuates the link between catastrophic thinking and information seeking.

Figure 7 reveals the second-stage moderation pattern. Among participants with low health risk perception, health information seeking behaviour significantly predicted health anxiety (effect = 0.247, 95% CI [0.089, 0.406], $p < 0.01$). However, for individuals with high health risk perception, this relationship was non-significant (effect = 0.088, 95% CI [-0.060, 0.235], $p = 0.176$), suggesting that heightened risk perception weakens the association between information seeking and subsequent anxiety.

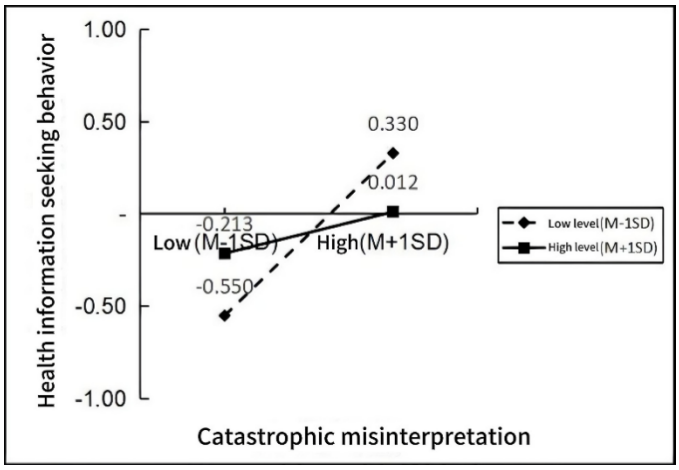


Figure 6. Moderating effect of health risk perception on the first stage of mediation

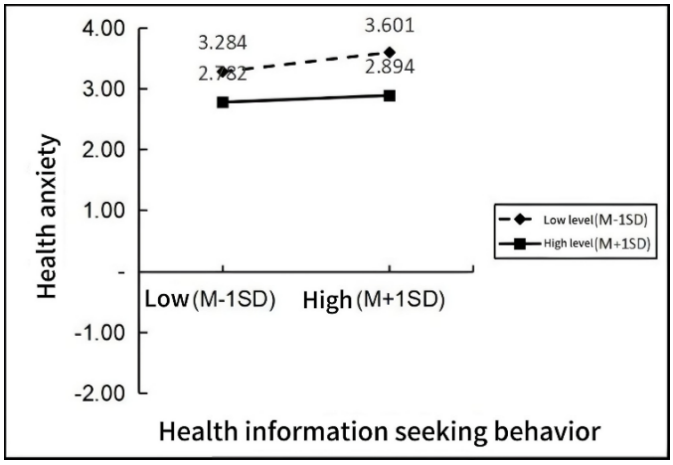


Figure 7. Moderating effect of health risk perception on the second stage of mediation

Table 12 presents the mediation effects at different levels of health risk perception (Edwards & Lambert, 2007): Low health risk perception (M-1SD): Effect = 0.153, 95% CI [0.073, 0.252] ; Mean health risk perception: Effect = 0.065, 95% CI [0.021, 0.131]; High health risk perception (M+1SD): Effect = 0.014, 95% CI [-0.016, 0.070]. The mediation effect systematically decreased from 0.153 (low health risk perception) to 0.014 (high health risk perception), with the effect becoming non-significant at high health risk perception levels.

These results clearly demonstrate that the indirect effect of catastrophic misinterpretation on health anxiety through health information seeking behaviour diminishes as health risk perception increases. Health risk perception acts as a negative moderator (buffering factor) in the mediation pathway, reducing the strength of the indirect relationship between catastrophic misinterpretation and health anxiety through health information-seeking behaviour. Therefore, Hypothesis H5 is not supported.

	Health risk perception	Effect value	Boot Standard error	LLCI	ULCI
The mediating role of health risk perception	M-1SD	0.046	0.023	0.073	0.525
	M	0.028	0.029	0.021	0.131
	M+1SD	0.021	0.039	-0.016	0.070

Table 12. Bootstrap mediated effects test results with moderation

Discussion

Support for Hypothesis H1 substantiates core tenets of contemporary health anxiety models (Weck et al., 2012), clearly demonstrating that catastrophic misinterpretation of benign bodily sensations significantly exacerbates health anxiety. This finding aligns well with the fear-avoidance model (Gautreau et al., 2014), which posits that catastrophic appraisals trigger a maladaptive cycle of hypervigilance and anxiety amplification. In our rural sample, this process appears particularly pronounced due to low health information literacy, which closely correlates with the area's poor standing on the aforementioned information economy index. It potentially creates an ecological niche where ambiguous somatic signals are more likely to be misinterpreted as threatening (Berrocal et al., 2007). The persistent attentional bias toward threat-relevant information among these individuals may represent an adaptive response that has gone awry in an environment where genuine health threats exist but are difficult to discern accurately.

The mediation effect supporting Hypothesis H2 offers essential insights into the behavioural mechanisms through which catastrophic misinterpretation translates into heightened health anxiety. Our results suggest that Chinese rural information-poor individuals engage in what might be termed 'compensatory information seeking' – a persistent search for health information driven by the inability to reconcile ambiguous somatic experiences with limited health knowledge. This finding extends previous work on health anxiety by demonstrating how structural information poverty interacts with cognitive factors to maintain health anxiety. The physiological nature of these misinterpreted sensations (Marcus et al., 2007) creates a self-perpetuating cycle where normal bodily fluctuations sustain information-seeking behaviour like query escalation that paradoxically increase anxiety rather than alleviate it.

Hypothesis H3 findings regarding positive beliefs about worry reveal an important protective mechanism in this population. The observed buffering effects at both stages of the mediation pathway (catastrophic misinterpretation → health information seeking behaviour and health information seeking behaviour → health anxiety) suggest that positive metacognitive beliefs may facilitate more adaptive information processing in several ways: (1) by promoting cognitive flexibility that allows reappraisal of threatening information (White & Horvitz, 2019), (2) by reducing the affective charge of ambiguous health information, and (3) by enabling individuals to disengage from unproductive information seeking loops. This aligns with recent work (Wells et al., 2021; Callesen et al., 2020) on metacognitive therapy and suggests potential intervention targets for this population.

The support for Hypothesis H4 highlights the detrimental role of perceived uncontrollability of worry in exacerbating health anxiety. Our results provide empirical support for the self-regulatory executive function model (Reinholdt-Dunne et al., 2019) in rural contexts, demonstrating how negative metacognitive beliefs exacerbate emotional responses to misinterpreted sensations and how these beliefs perpetuate health anxiety through increased information monitoring and impaired

disengagement from threat-related information. The finding that uncontrollability beliefs strengthen both stages of the mediation pathway suggests that these beliefs may create a 'double vulnerability'. This vulnerability, simultaneously driving compulsive information seeking while undermining critical evaluation of obtained information (Singh & Brown, 2016), represents a particularly pernicious maintenance factor for health anxiety.

Hypothesis H5 results present a more complex picture of the role of health risk perception. Contrary to some previous findings (Renner et al., 2015; Zhang et al., 2022), our study suggests that in information-poor contexts, heightened health risk perception may serve an adaptive function by (1) promoting more selective information engagement, (2) reducing emotional dependence on unverified sources, and (3) increasing recognition of information limitations. This finding highlights the context-dependent nature of risk perception's effects. It suggests that in information-poor context, some degree of health risk perception may paradoxically protect against anxiety by preventing counterproductive information-seeking behaviour.

The revised model is shown in Figure 8.

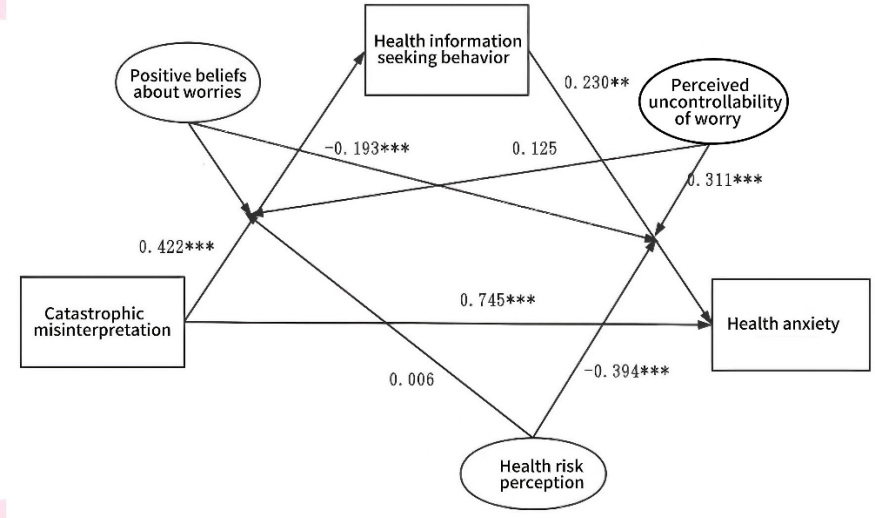


Figure. 8. The revised catastrophic misinterpretation-anxiety pathway model

Implications and recommendations

Targeted cognitive-behavioural interventions addressing core mechanisms

The correction of catastrophic misinterpretations should be prioritized through evidence-based interventions. In order to counteract the health anxiety amplification caused by misinterpretation, we recommend implementing tiered cognitive restructuring programs. These interventions should employ scenario-based cognitive reframing exercises that systematically challenge catastrophic appraisals of bodily sensations (Olatunji et al., 2014). The regulation of maladaptive information seeking requires comprehensive behavioural interventions. The compensatory information-seeking cycle can be disrupted through structured information validation training. Such training could be delivered by health information professionals, such as health librarians or information specialists, to equip users with systematic source evaluation skills, which would replace anxiety-driven search and query escalation patterns. Behavioural activation protocols should incorporate deliberate practice of information disengagement strategies to mitigate compulsive information seeking behaviour.

The strengthening of adaptive metacognition represents a crucial intervention target. The protective effects of positive beliefs about worry can be enhanced through dedicated metacognitive training modules. These interventions, ideally facilitated by professionals skilled in cognitive-behavioural approaches (e.g., psychologists or counsellors), should cultivate cognitive flexibility through guided reappraisal exercises that broaden symptom interpretation frameworks. Narrative-based techniques should reinforce existing success stories of adaptive coping within the community.

The reduction of uncontrollability beliefs necessitates targeted therapeutic components (Tillfors et al., 2015). The dual vulnerability created by negative metacognitive beliefs requires targeted intervention components. Problem-solving training should build concrete self-efficacy in health threat management. Psychoeducational modules should reframe maladaptive beliefs about worry's uncontrollability. This training and the accompanying psychoeducational modules to reframe maladaptive beliefs could be implemented by mental health practitioners. Mindfulness-based practices should be integrated to decrease emotional reactivity to ambiguous somatic signals.

Structural support systems for digital inclusion

The enhancement of health literacy should be achieved through community-embedded programs. Community-based health education initiatives should be developed with embedded literacy supports (Batterham et al., 2016). They should translate complex medical concepts into culturally relevant frameworks that align with local explanatory models of health. Information dissemination hubs should utilize multimodal formats to accommodate varying information literacy levels.

Reliable information access points should be established. Integrated mental health service points should establish clear pathways to authoritative health information. Frontline staff require training in guiding symptom conceptualization to reduce vague health concerns.

The development of protective social networks should leverage existing community structures. Community platforms should facilitate peer modelling of adaptive health information management (Obaremi & Olatokun, 2022). Structured group discussions should normalize healthy uncertainty tolerance and cognitive flexibility. Metacognitive principles should be subtly reinforced through existing community communication channels.

Systemic health information governance

A health misinformation governance system should be established. Combining local knowledge with medical expertise, the system should rapidly identify and correct prevalent catastrophic misinterpretations circulating in the community. Contextualized clarification campaigns should pre-emptively address common somatic misinterpretation triggers by employing the system (Southwell et al., 2019).

The optimization of information ecosystems should incorporate anxiety-reduction principles. Specially designed health information platforms should incorporate content filtering algorithms that prioritize solution-focused information architecture. Structured navigation tools should guide users toward actionable health management steps rather than diagnostic speculation. Platform design elements should consistently reinforce messages of controllability and adaptive coping.

Conclusion and limitations

This study theorizes a novel cognitive-informational behavioural pathway to explain health anxiety formation among information-poor populations in rural China. It illuminates the vicious cycle wherein catastrophic misinterpretation, amplified by maladaptive information behaviour and metacognitive

beliefs, fuels health anxiety among rural China's information-poor populations. Our findings confirm that catastrophic misinterpretation directly exacerbates health anxiety. More critically, we identify maladaptive health information-seeking behaviour as a partial mediator, revealing how structural information poverty transforms compensatory information seeking into an anxiety-amplifying loop. This extends the health anxiety model by incorporating information behaviour as a maintenance mechanism in low information literacy contexts.

The moderating effects of metacognitive beliefs further refine the theoretical framework. Positive beliefs about worry attenuated the mediation pathway. However, perceived uncontrollability of worry intensified the link between catastrophic misinterpretation and health information seeking behaviour. Surprisingly, health risk perception exhibited a protective role, suggesting contextual adaptation where heightened risk awareness may curb compulsive information seeking in resource-scarce environments—an innovative contribution to risk perception literature. It underscores the need for multilevel interventions.

While this study provides robust evidence, three limitations warrant attention. First, the cross-sectional design is lacking in the current study. The moderated mediation analyses, though theoretically grounded, cannot establish causality. Longitudinal or experimental designs (e.g., diary studies that track real-time information seeking and anxiety fluctuations) are necessary to validate temporal relationships. The second is related to sample representativeness. Participants were recruited from selected rural regions in Northern China. Therefore, the findings may not be generalized to other populations or other cultural contexts. Future work should extend this model to other marginalized populations globally, where similar intersections of low literacy and digital inequality may perpetuate health anxiety.

Acknowledgements

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The impact of information encountering on the health literacy of older adults in health science short videos

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Abstract

Introduction. This study investigates the role of information encountering through health science short videos in the development of health literacy among older adults. It aims to provide empirical evidence on whether and how passive information exposure influences older adults' health literacy.

Method. An offline survey was conducted in China, yielding 306 valid questionnaires. The analysis employed ordinary least squares regression combined with propensity score matching to identify the effect of information encountering on health literacy.

Analysis. Quantitative analysis of the survey data was performed, focusing on comparing health literacy outcomes between older adults who experienced information encountering and those who did not, while controlling for relevant demographic and behavioural variables.

Results. The results show that 71.24% of respondents have experienced information encountering in health science short videos. These individuals demonstrated a higher level of health literacy than those who did not. Furthermore, gender, higher education, social media use, and active health information seeking were associated with higher health literacy, while these same factors, along with residing in rural areas, retirement, chronic diseases, and poorer health status, predicted a higher likelihood of information encountering.

Conclusion. Information encountering represents a significant mechanism for improving health literacy among older adults. These findings emphasise the importance of passive information channels in health promotion and offer both theoretical insights and practical implications for enhancing health literacy in aging populations.

Introduction

Health literacy is very important for individuals to access health information and manage their health status. However, older adults aged 60 years and above usually have limited health literacy. For example, an Israeli survey revealed that health literacy among older adults is slightly inadequate (Hochhauser et al., 2019). Furthermore, findings from the European Health Literacy Survey indicated that individuals over 66 years of age scored lower in health literacy assessments (Sørensen et al., 2015). Limited health literacy in older adults can lead to risky habits and a lack of effective coping and management skills when facing health problems (Hochhauser et al., 2019; Liu et al., 2015), which in turn affects their health status. Thus, it becomes imperative to explore how to improve older adults' health literacy.

With the rapid development of information technology, new media products such as short videos are becoming one of the most important ways for health information acquisition (Xu et al., 2025). Older adults are also increasingly influenced by short videos in shaping their health literacy levels. Compared to text or images, short videos have become an important medium for the elderly to learn about health information due to their brevity, entertainment, vividness, and engaging visuals. Consequently, health science short videos have the potential to enhance the health literacy of older adults. Health science short videos have not developed a uniform terminology. For example, they are also referred to as health outreach short videos or health communication short videos (Zhu et al., 2023). However, scholars generally agree that health science short videos disseminate health information about healthy eating and lifestyle, disease prevention, and other topics to the public in a simple and understandable way (Xiao et al., 2023). As a result, older adults are likely to encounter health science information through short videos. This phenomenon aligns with the concept of information encountering, which is a form of opportunistic acquisition of information characterised by the serendipitous discovery of interesting and useful information without a specific search intent (Erdelez, 2004).

The existing literature exhibits the following research gaps. First, research on outcomes of information encountering in the health domain has not attracted considerable scholarly attention. While some literature has begun to examine the outcomes (Chen et al., 2024; Erdelez et al., 2024), the literature remains limited and does not specifically address health information. This gap impedes a mechanistic understanding of how information encountering fosters improvements in health literacy and health behaviours. Therefore, investigating the outcomes of information encountering through health science short videos is necessary. Second, there remains a lack of research exploring the effect of health information encountering on health literacy among older adults. Previous studies on health literacy and information behaviours have predominantly focused on proactive health information seeking (Kim & Utz, 2018; Yi et al., 2021). Although some literature suggests that incidental exposure to health information may have an impact on health-related behaviours (Liu et al., 2023; Shim et al., 2006), the impact of this encountering on health literacy among older adults has not been explored. The health literacy level of older adults has a direct impact on their mortality rates, making it a critical characteristic that demands attention. As there may be a correlation between the explanatory variables and the error term in the regression equation, it may potentially lead to endogeneity issues (Zaefarian et al., 2017). Hence, we used the propensity score matching method to reduce the impact of potential endogeneity problem in the regression model.

This study used a survey method to collect data and employed a propensity score matching technique based on traditional ordinary least squares regression to examine the effect of health science short video information encountering on health literacy among older adults. The findings not only address the research gap regarding the impact of health-related information encountering on older adults' health literacy but also provide new insights to enhance the health literacy level of the elderly.

Literature review

Health literacy and health information behaviour

Health literacy is broadly defined as an individual's ability to access, understand, and use information for the health of individuals, families, and communities (World Health Organization, 2024). It suggests that health literacy is related to an individual's health-informed behaviour. Based on Wilson's definition of information behaviour, it can be classified into two forms of information behaviour: purposeful information seeking and serendipitous information discovery and exposure (Montazeri, 2025; Wilson, 2000). The existing literature has investigated the relationship between health literacy and health information seeking. For instance, Kim and Utz (2018) confirmed the important role of health literacy in fostering health information seeking among older adults. Yi et al. (2021) employed the rapid estimate of adult literacy in medicine to measure individuals' health literacy, and found that literacy played an important role in individuals' health information seeking, especially their choice of the information sources. A systematic literature review on the online health information seeking behaviours of older adults reported that health literacy is one of the 12 individual-related characteristics, and it has a significant impact on older adults' online health information seeking behaviours (Zhao et al., 2022). Online health information seeking can also affect health literacy. Through a cross-sectional study, Zhao et al. (2024) reported that seeking behaviour was positively associated with an individual's digital health literacy. Afifi et al. (2025) focused on the health information behaviour of Generation Z females and explored its relationship with e-health literacy.

The proliferation of the internet has led to an increased frequency of incidental information encounters. Liu et al. (2023) pointed out that the food-and-nutrition information encountering can influence an individual's choice of healthier foods and make them healthier. Bigsby and Hovick (2018) investigated the effect of health information scanning on risky health behaviours. Zhang et al. (2024) discovered that health information scanning was positively associated with lung cancer screening among smokers, with e-health literacy serving as a moderating variable. Lai et al. (2025) empirically validated that online cancer information scanning behaviour has a positive impact on individuals' willingness to receive human papillomavirus vaccines. Based on the existing literature, we can infer that health-related information encountering may influence health behaviour, but its positive impact on health literacy is unverified. Meanwhile, research has demonstrated that health literacy has an impact on both physical and mental health (Rikard et al., 2016). In fact, researchers have used health literacy as an antecedent to explore its impact on health information behaviours (Fleary et al., 2018; Kim et al., 2023; Kim & Utz, 2018), while neglecting that health information behaviours can also affect health literacy. Given the importance of health literacy, it is necessary to study the impact of health information encountering on health literacy.

Online information encountering

Information encountering, first coined by Erdelez, is regarded as a form of unplanned or unanticipated access to information, which can occur during both information seeking and browsing (Erdelez, 1999; Erdelez & Makri, 2020). Simultaneously, the frequent use of social media makes it common to experience information encountering (Jiang et al., 2015). Most of these studies mainly examined either the influencing factors of information encountering or its process model.

The influencing factors of information encountering experience have been discussed. Erdelez (1999) summarised four fundamental factors, which are: information user, environment, information encountered and information needs. Jiang et al. (2015) further employed the critical incident technique based on the grounded theory approach to extract three overarching influencing factors, including users, information and environment. Makri and Buckley (2020) identified factors that interrupt or impede the process of information encountering behaviour. Sun et al. (2022) discussed the influence of emotions, highlighting that positive emotions can enhance information encountering experience. In addition to influencing factors, scholars have extensively

examined its process. Erdelez (1999) proposed the framework of the information encountering process, which includes noticing, stopping, examining, storing and returning. Jiang et al. (2022) developed an integrated model of information encountering by considering the stage before, during and after encountering, and they discussed the detailed behaviour of users at each stage. Awan et al. (2020) introduced an extended model incorporating general browsing as a significant facilitator of information encountering process. Kim et al. (2025) operationalised individuals' online information encountering tendency based on five core dimensions of the Erdelez's process model of information encountering. While information encountering as an outcome variable is well established in literature, research on the consequences of pervasive information encountering remains an emerging area of study.

The literature review reveals that existing studies have primarily investigated the relationship between active health information behaviours and health literacy, failing to examine the relationship between health science information encountering and health literacy. Furthermore, quantitative investigations into the impacts and outcomes of health science information encountering remain scarce. Given that older adults represent a crucial population exposed to online health information, this study proposes the following hypothesis:

Health science short video information encountering has a positive impact on the health literacy of older adults.

Methods

Data sources

The data were collected using an offline survey. This survey used a mixed sampling strategy, integrating both random sampling and snowball sampling techniques. Specifically, questionnaires were randomly distributed to eligible elderly individuals across all communities within the study area. At the same time, the snowball sampling method was utilised, whereby participants were encouraged to refer additional potential respondents to increase the sample size.

The questionnaire was divided into four parts. The first part outlined the research purpose, data confidentiality statement, and voluntary participation principle. The second part focused on cognitive testing, utilising inquiries about the date and weather of the current day to conduct a cognitive evaluation of older adults. The third part was the measurement items of all control variables. The fourth part included the measurement of health science short video information encountering and the health literacy scale. In this part, we also added an embedded attention detection question (please choose 'very easy') to ask respondents to choose the item as requested.

Participants were recruited through several communities in China, and they were required to meet the following criteria: 1) participants aged ≥ 60 years old (Federman et al., 2009); 2) participants voluntarily participated in the research study; and 3) participants had experience in short videos. Furthermore, we promised to provide a gift as an incentive for valid responses. The survey was conducted in two stages. The first stage was the pre-test stage, in which the questionnaire was sent to 20 elderly people to complete. The language and design of the questionnaire were modified based on their feedback to reduce comprehension difficulties for older adults. The second stage was the formal survey stage. Participants were required to complete the questionnaire independently. For those who could not complete the questionnaire on their own, we read the questions for them and helped them fill out the questionnaire without interfering with their choice. The survey was conducted from February 1, 2024 to February 20, 2024. A total of 347 responses were collected. As the pilot test showed that this questionnaire required more than 120 seconds to complete, we eliminated questionnaires with response times of less than 120 seconds. Additionally, this study also removed questionnaires from respondents who did not choose the required item in the attention detection question. After excluding invalid questionnaires and those with a repetition rate of more than 95% of the answers, we finally obtained 306 valid responses.

Variables measurement

Dependent variable

The dependent variable is the health literacy of older adults. Health literacy was measured by the European health literacy survey questionnaire short form (Finbråten et al., 2018; Imeri et al., 2024). The questionnaire consists of one question item for each of the 12 dimensions, which cover the three health environments (health care, disease prevention and health promotion) and the four cognitive domains (access, understand, appraise and apply). It reflects the conceptual framework of health literacy well. In addition, a 12-item questionnaire can reduce the cognitive load on older adults and improve both participation and the quality of questionnaire responses. Therefore, the scale was chosen to measure health literacy among older adults in this study.

Independent variable

Individuals' experiences of health science short video information encountering were measured with a single dichotomous item to serve as the treatment variable for propensity score matching. The question was formulated to capture the core elements of Erdelez's (1999) conceptualisation: 'When you are routinely browsing short video platforms, and not actively searching for health knowledge, have you ever unexpectedly come across short videos about physical health, disease prevention, or nutrition that you found interesting or useful?' (Yes=1, No=0) (Erdelez, 1999; Kim et al. 2025; Lu et al., 2023).

Control variables

The following variables were chosen as control variables based on prior studies: 1) Demographic variables, which include gender, age, area, educational level, employment status, marriage status, living style, chronic diseases, and medical insurance (Chiu et al., 2020; Estacio et al., 2019; Jiang et al., 2015). 2) Frequency of social media use and online health information seeking experience may affect health literacy (Ghaddar et al., 2012; Paek et al., 2011). At the same time, internet use and information searching will affect individual information encountering behaviour (Awan et al., 2019; Jiang et al., 2015). Social media use was measured by asking respondents how much time they spent daily on social media live streaming, short videos, and image-text posts. This item used a five-point Likert scale (1=less than 30 minutes, 2=30-60 minutes, 3=60-90 minutes, 4=90-120 minutes, 5=greater than 120 minutes). Frequency of health information seeking was evaluated using the same scale (1=0 times, 2=1-2 times, 3=3-4 times, 4=5-7 times, 5=8 or more times) to quantify how often participants searched for online health-related content in the last seven days. 3) Self-assessed health status has been shown in several studies to influence an individual's health literacy (Cutilli et al., 2018; Federman et al., 2009; Liu et al., 2015). Self-assessment of health is measured by asking respondents to rate their overall health as good, fair, or poor.

This study also tests the reliability and validity of the measurement items for social media use and health literacy variables. Firstly, the model demonstrates a good fit to the data, as evidenced by the following statistics: $\chi^2/df = 2.589$, comparative fit index (CFI) = 0.939, root mean square error of approximation (RMSEA) = 0.072, normed fit index (NFI) = 0.905, tucker-lewis index (TLI) = 0.926. Secondly, the health literacy scale is a short version tool of the European Health Literacy Survey and its reliability has been validated in multiple studies (Finbråten et al., 2018; Zanini et al., 2023). Furthermore, Table 1 shows the reliability and validity of the instrument. The results showed that all items loaded high on their respective constructs (> 0.6) and the composite reliability (CR) for each construct was greater than 0.7. The values of average variance extracted (AVE) for health literacy was 0.482, which approximated the threshold of 0.50 (Li et al., 2018; Maruf, 2021; Yin, 2018; Zhang & Zheng, 2021). As the instrument of health literacy is a mature one and has been validated in prior studies, we believe that 0.482 is acceptable. Hence, the validity was acceptable.

Construct	Item	Standard loading	Cronbach's α	AVE	CR
Social media use	USE1	0.726	0.802	0.589	0.809
	USE2	0.674			

	USE3	0.886			
Health literacy	HL1	0.774	0.919	0.482	0.918
	HL2	0.698			
	HL3	0.692			
	HL4	0.676			
	HL5	0.742			
	HL6	0.648			
	HL7	0.682			
	HL8	0.669			
	HL9	0.741			
	HL10	0.719			
	HL11	0.627			
	HL12	0.651			

Table 1. Reliability and validity testing.

Research design

The research design consisted of several stages. Stage 1 involved a benchmark regression. The benchmark regression used the ordinary least squares regression model to test the relationship between health science short video information encountering and health literacy among older adults. Stage 2 used propensity score matching method to verify the effect of information encountering on health literacy and reduce the effects of self-selectivity bias and confounding variables. It is a matching method proposed by Rosenbaum and Rubin (1984). It is used to estimate the effect of the independent variable on the dependent variable when it is made consistent by controlling for other variables. This method controls the treatment and control groups in a balanced way by calculating propensity scores of observable confounding variables. Two samples are comparable if their propensity scores are equal or similar (Dong et al., 2023). Stage 3 involved a regression after matching to test the robustness of the results from the baseline regression analysis and propensity score matching analysis. The research process is shown in Figure 1.

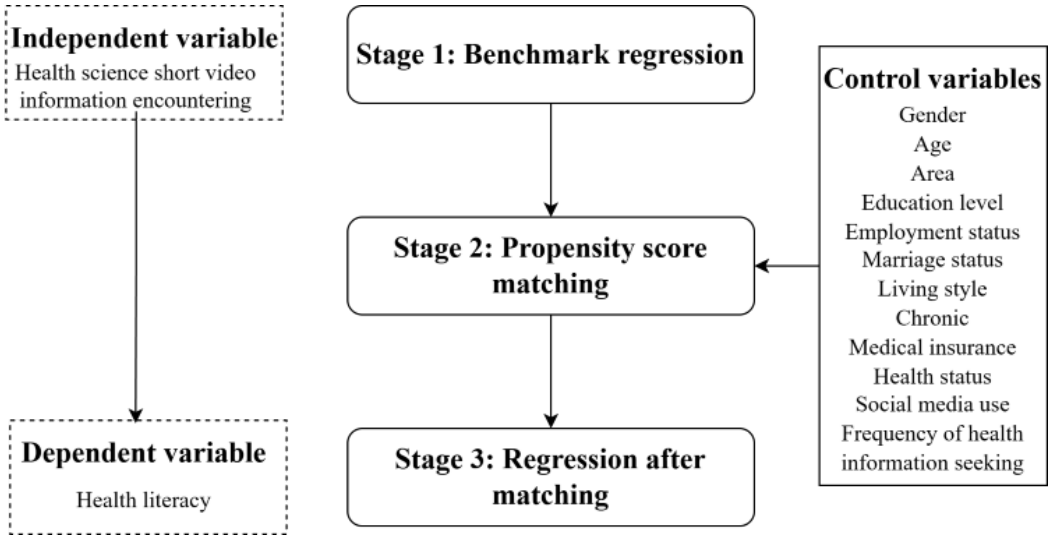


Figure 1. Research process.

Results

Analysis of sample characteristics

This study investigated the impact of information encountering through health science short videos on the health literacy of older adults. This analysis began with descriptive statistics of the sample, followed by a benchmark regression analysis and a robustness test using propensity score

matching technology. Finally, another regression analysis based on the matched sample was conducted.

Table 2 presents the results of the descriptive statistical analyses of the demographic variables. The average age of participants was 68.13 years old, with the oldest being 93 years old and the youngest being 60 years old. The proportion of women among the respondents is 50.65%, indicating a relatively balanced ratio between males and females. Among the sample, 55.23% of households lived in urban areas. The respondents generally had a low level of education, with 71.89% possessing only a high school or lower educational level. Most respondents were retired, accounting for 81.37%, while only 18.63% were still working. Additionally, 71.24% respondents reported that they had experienced health science short video information encountering (71.24%). They demonstrated a relatively high level of health literacy, with a mean score of 38.28 out of a possible 60 (12 items, 5 points each). The high self-assessment score may be due to participants' tendencies to embellish their health status or overestimate their level of health literacy when completing the questionnaire.

Variables	Levels	N (%)
Gender	Female	155 (50.65%)
	Male	151 (49.35%)
Age	60-69	201 (65.69%)
	70-79	75 (24.51%)
	≥80	30 (9.80%)
Area	Urban	169 (55.23%)
	Rural	137 (44.77%)
Education level	High school and below	220 (71.89%)
	Junior college and above	86 (28.11%)
Employment status	Retired	249 (81.37%)
	Still working	57 (18.63%)
Marriage status	Married	243 (79.41%)
	Unmarried or divorced	63 (20.59%)
Living style	Alone	70 (22.88%)
	With family	236 (77.12%)
Chronic	Yes	153 (50.00%)
	No	153 (50.00%)
Medical insurance	Yes	243 (79.41%)
	No	63 (20.59%)

Table 2. Descriptive statistical results of all samples (N = 306).

Benchmark regression analysis

The first step is to conduct correlation analysis. The results in the form of a matrix diagram are shown in Figure 2. The size of the circles and the shade of the colours in Figure 2 reflect the differences in the strength of the correlation. The numbers in the lower half of Figure 2 are correlation coefficients. The rightmost axis explains the meaning of the legend, with darker blue colours in the circle representing stronger positive correlations, and darker red colours indicating stronger negative correlations. health science short video information encountering is positively correlated with health literacy and can be used for further regression analysis. The result of the correlation analysis shows that the correlation coefficients between the variables are less than 0.7, indicating that there is no multicollinearity (Senthilnathan, 2019).

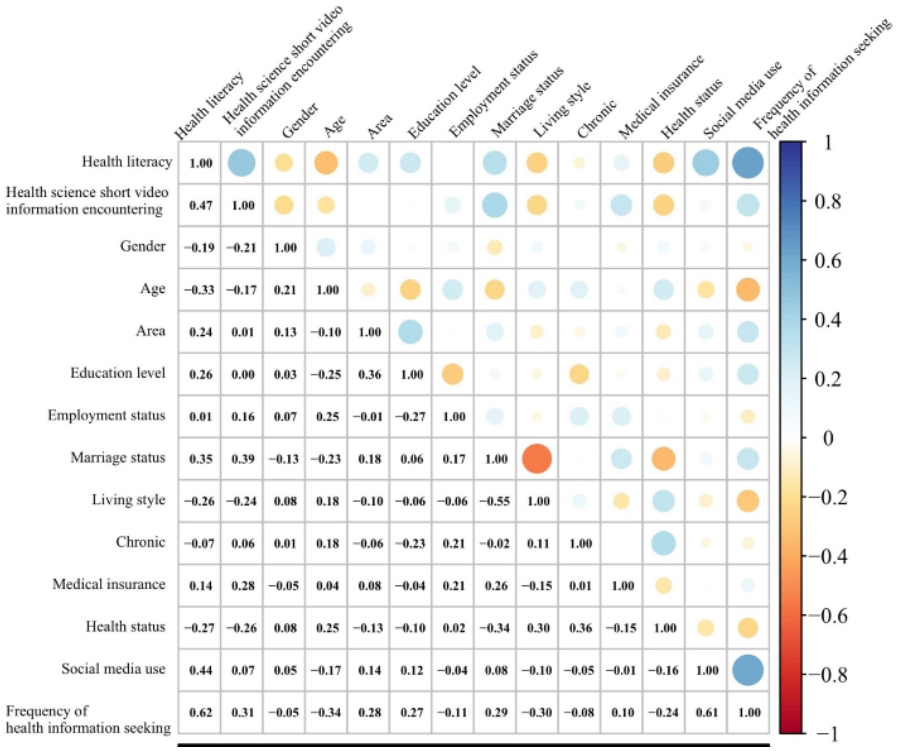


Figure 2. Correlation of variables.

The second step is to use the ordinary least squares regression model to conduct benchmark regression analysis on the whole sample. The results of the benchmark regression model are shown in Table 3. It can be seen that health science short video information encountering is positively and significantly associated with health literacy and the hypothesis is supported (β=0.283, P＜0.01). This indicates that older adults with health science short video information encountering experience have higher health literacy. In demographic variables, gender and education level significantly affect health literacy. Specifically, older adults who are female (β=-0.119, P＜0.01) or have high education levels (β=0.117, P＜0.01) demonstrate significantly higher health literacy. The results further show that increased social media usage time is positively associated with higher health literacy levels among older adults (β=0.197, P＜0.01). Additionally, the frequency of health information seeking is positively and significantly associated with older adults' health literacy (β =0.317, P＜0.01).

Variables	Health literacy			
	Beta	Robust std. err	t value	P value
HSSV-information encountering	0.283	1.038	5.68	0.000
Gender	-0.119	0.821	-2.74	0.007
Age	-0.070	0.061	-1.50	0.134
Area	0.067	0.939	1.36	0.176
Education level	0.117	0.383	2.72	0.007
Employment status	0.062	0.968	1.55	0.121
Marriage status	0.078	1.318	1.39	0.167
Living style	0.016	1.069	0.33	0.739
Chronic	-0.018	0.865	-0.39	0.697
Medical insurance	-0.011	0.958	-0.26	0.795
Health status	-0.017	0.637	-0.36	0.717
Social media use	0.197	0.655	3.67	0.000
Frequency of health information seeking	0.317	0.524	5.14	0.000
Constant	21.518			
Observations	306			
R-squared	0.537			
F test	0			
r2_a	0.516			
F	29.40			

Table 3. The results of the benchmark regression model (N=306).

Propensity score matching analysis

Following the benchmark regression, we used propensity score matching technique for random sample matching to reduce the effects of omitted and confounding variables and to test the benchmark regression results. As the observed variable is dichotomous, a binary logit model was constructed to calculate the propensity scores.

In the first step, we calculated the propensity score. The results of the logit model are displayed in Table 4. According to Table 4, gender had a significant influence on health science short video information encountering. Females were more likely to encounter health science short videos than males ($P < 0.01$). Rural residents tended to have a higher tendency to experience health science short video information encountering ($P < 0.05$). Retired older adults were more likely to experience health information encountering in short videos than respondents who were still working ($P < 0.05$). Also, married respondents had health science short video information encountering experience more often than unmarried or divorced respondents ($P < 0.05$). Those who had a chronic disease ($P < 0.05$) and poorer health status ($P < 0.01$) were more likely to experience health science information encountering in short videos. Respondents who had purchased medical insurance also reported more health science short video information encountering ($P < 0.01$). Frequency of health information seeking was positively and significantly associated with health science short video information encountering ($P < 0.01$), whereas social media use demonstrated a negative and significant impact ($P < 0.05$).

Variables	Coefficient	Std. err.	z	P value
Gender	-0.908	0.327	-2.77	0.006
Age	-0.008	0.025	-0.32	0.752
Area	-0.709	0.360	-1.97	0.049
Education level	-0.020	0.176	-0.11	0.911
Employment status	0.992	0.428	2.32	0.021
Marriage status	1.106	0.437	2.53	0.011
Living style	0.129	0.432	0.30	0.765
Chronic	0.753	0.363	2.08	0.038
Medical insurance	1.012	0.370	2.73	0.006
Health status	-0.708	0.252	-2.81	0.005
Social media use	-0.686	0.290	-2.37	0.018
Frequency of health information seeking	0.960	0.217	4.43	0.000
_cons	0.040	1.990	0.02	0.984

Table 4. Logistic regression of control variables

In the second step, we matched the samples of the treatment and control groups. Based on the sample size and subgroups, a combination of one to two nearest-neighbour matching and caliper matching was chosen in this study. The caliper threshold was set at 0.02.

In the third step, we conducted a balance check to check the matching quality. In this study, absolute standardised bias was used to assess match quality. The results of the balance test are displayed in Table 5. According to Stuart (2010), the absolute standardised bias should be less than 0.25. The results in Table 5 showed that the standardised bias of both the treatment and control groups after matching was controlled below 20%. Meanwhile, the t-test results of all variables after matching were not significant, indicating that the matching effectively balanced the differences between the treatment and control groups. In addition, Figure 3 illustrates the distribution of propensity scores for the treatment and control groups before and after matching. As shown in the figure, the samples before matching have overlapping common support regions. After matching, the overlapping region of propensity scores expands, and the kernel density curves of the treatment and control groups become more consistent. Therefore, we believe that the matching passes the balance test well.

Variables	Unmatched Matched	Mean		%bias	%reduct |bias|	t-test	
		Treated	Control			t	P value
Gender	U	0.427	0.659	-47.8	76.0	-3.75	0.000
	M	0.508	0.564	-11.5		-1.06	0.291
Age	U	67.367	70.023	-34.8	57.1	-2.97	0.003
	M	67.402	66.263	14.9		1.64	0.101
Area	U	0.555	0.545	1.9	-162.1	0.15	0.879
	M	0.592	0.617	-5.0		-0.49	0.628
Education level	U	1.986	1.977	0.9	-273.9	0.07	0.947
	M	2.089	2.056	3.2		0.32	0.750
Employment status	U	0.853	0.716	33.7	61.3	2.82	0.005
	M	0.821	0.768	13		1.24	0.215
Marriage status	U	0.895	0.545	84	92.0	7.40	0.000
	M	0.871	0.899	-6.7		-0.83	0.408
Living style	U	0.165	0.386	-50.9	98.7	-4.28	0.000
	M	0.190	0.187	0.6		0.07	0.946
Chronic	U	0.518	0.455	12.7	-5.1	1.01	0.314
	M	0.475	0.408	13.4		1.28	0.203
Medical insurance	U	0.867	0.614	60.1	89.0	5.16	0.000
	M	0.844	0.871	-6.6		-0.75	0.451
Health status	U	1.670	2.080	-56.4	81.6	-4.61	0.000
	M	1.749	1.673	10.4		0.95	0.344
Social media use	U	2.896	2.784	14.6	87.2	1.14	0.254
	M	2.927	3.005	-10.1		-0.87	0.387
Frequency of health information encountering	U	3.298	2.534	67.1	31.0	5.71	0.000
	M	3.196	3.293	-8.6		-0.76	0.447

Table 5. The results of the balance test.

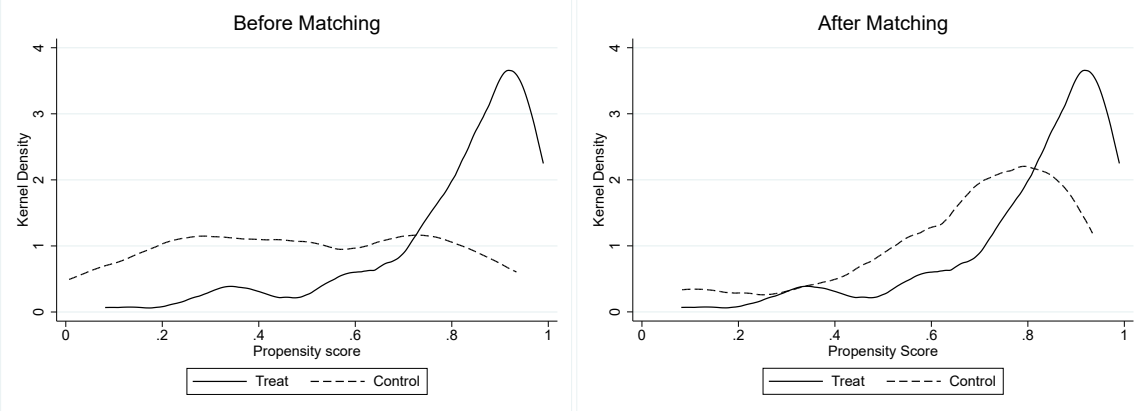


Figure 3. Distribution of propensity scores before and after matching.

Finally, Table 6 shows the results of the estimated average treatment effect on the treated (ATT) of health literacy among older adults resulting from health science short video information encountering. The average treatment effect on the treated results demonstrate that the pre-

matching effect of health science short video information encountering on health literacy among older adults is significant at the 1% level (T-stat= 9.26＞2.56). After propensity score matching, a reduction in the mean difference between the eigenvalues of the treatment and control groups is observed. The T-value of 2.31 indicates that the effect of health science short video information encountering on the health literacy of the elderly is significant at the 5% level.

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Health literacy	Unmatched	41.095	31.303	9.792	1.058	9.26***
	ATT	40.916	35.829	5.088	2.207	2.31**

Table 6. The results of the average treatment effect on the treated

Regression analysis after matching

Propensity score matching technique was used to eliminate potential selection bias between the treatment and control groups and to test the effect of health science short video information encountering on health literacy. Therefore, regression analysis using the matched data was performed in this section to verify the robustness of the baseline regression and propensity score matching results. Table 7 shows the demographic characteristics of the matched samples. The results of the regression analysis are presented in Table 8. According to the regression results, it can be found that health science short video information encountering still has a positive, significant and robust association with health literacy of the elderly (β=0.297, P＜0.001). This means that older adults who have health information encountering related experience may have a higher level of health literacy than those who do not have such experience. The regression results for the three models are validated in both the baseline regression model and the propensity score matching method.

Variables	**Levels**	**N (%)**
Gender	Female	114 (46.53%)
	Male	131 (53.47%)
Age	60-69	162 (66.12%)
	70-79	59 (24.08%)
	≥80	24 (9.80%)
Area	Urban	142 (57.96%)
	Rural	103 (42.04%)
Education level	High school and below	211 (86.12%)
	Junior college and above	34 (13.88%)
Employment status	Retired	197 (80.41%)
	Still working	48 (19.59%)
Marriage status	Married	201 (82.04%)
	Unmarried or divorced	44 (17.96%)
Living style	Alone	52 (21.22%)
	With family	193 (78.78%)
Chronic	Yes	114 (46.53%)
	No	131 (53.47%)
Medical insurance	Yes	196 (80.00%)
	No	49 (20.00%)

Table 7. Descriptive statistical results of matched samples (N = 245).

Variables	Health literacy			
	Beta	Robust std. err	T value	P value
HSSV-information encountering	0.297	1.093	5.59	0.000
Gender	-0.181	0.925	-3.59	0.000
Age	-0.008	0.064	-0.17	0.866
Area	0.051	1.044	0.90	0.368
Education level	0.124	0.422	2.50	0.013
Employment status	0.063	1.079	1.33	0.183
Marriage status	0.092	1.368	1.60	0.111
Living style	-0.024	1.147	-0.47	0.638
Chronic	0.015	0.947	0.28	0.779
Medical insurance	0.026	1.007	0.58	0.564
Health status	-0.020	0.664	-0.38	0.707
Social media use	0.175	0.782	2.68	0.008
Frequency of health information seeking	0.382	0.629	5.14	0.000
Constant	14.806			
Observations	245			
R-squared	0.551			
F test	0			
r2_a	0.526			
F	22.95			

Table 8. The results of regression analyses based on matched data.

Discussion

Principal findings

Our findings support the hypothesis that health science short video information encountering has a positive association with the health literacy of older adults. Specifically, older adults who have engaged with such content exhibited higher health literacy than non-engagers. The clues in previous studies indicate that the health-related information encountering and scanning can have an impact on an individual's health behaviour (Liu et al., 2023; Zhang et al., 2024). This study focuses on health information encountering in short videos and verifies this through empirical analysis. Consistent with previous research, health science short videos are particularly effective in facilitating health information access for individuals with lower health literacy (Xiao et al., 2023). Therefore, these results support the hypothesis that health science short video information encountering is linked to improved health literacy in older adults. Moreover, the propensity score matching analysis yielded results consistent with the baseline regression model.

Additionally, this study reveals that older adults frequently experience health science short video information encountering. Short video platforms have emerged as a major health information source for older adults. In our sample, 71.24% (218/306) of respondents reported health science short video information encountering experience. These platforms now serve as powerful tools for health information dissemination and health knowledge popularisation. Through these channels, health-related information encountering enhances older adults' health knowledge, deepens their health understanding, and ultimately improves their health literacy.

This study also finds that female older adults have higher health literacy than the male. This gender difference may stem from traditional family roles in China, where women are typically responsible for caregiving and health-related matters, making them more attentive to health information. Furthermore, education level also has positively and significantly relationship with health literacy among older adults. Additionally, both social media use and health information seeking frequency positively influence health literacy levels. Potential reasons lie in that frequent social media use and health information seeking increase older adults' exposure to health-related content, thereby enhancing their health knowledge and literacy. The non-significant relationship between

traditional health variables (such as employment status, living style and medical insurance) and older adults' health literacy indicates that the experiential learning paradigm of health science short video information encountering maybe dissolves the inherent influence of some biomedical and institutional safeguards factors. It is also worth noting that compared with frequency of health information seeking, health science short video information encountering may have a greater impact on health literacy.

Meanwhile, we found that older adults who are female, in rural areas, retired, married, and have chronic diseases, poorer health, medical insurance, and high health information seeking frequency are more likely to experience health science short video information encountering. This may be attributed to the fact that older women tend to act as health leaders in their families (Ramirez, 2015). Therefore, the platform may recommend more health science short videos to older women based on algorithmic recommendations. As well, the combination of close-knit social networks, limited access to formal information sources, and context-dependent information needs makes rural elderly more likely to experience information encounters (Chilimo et al., 2011). Retired older adults may be much more likely to encounter health information because they have more time to spend on social media platforms. Similarly, older people with chronic illnesses and poorer health are more likely to focus on health information. Additionally, older adults with lower social media usage frequency are more likely to experience health science short video information encountering. Older adults with these traits represent a high-frequency group of people searching for health information as well as paying attention to health information, which makes them experience more health science short video information encountering. In addition, elderly adults with limited social media usage may typically acquire health information through passive scanning rather than active seeking behaviours.

Implications

By investigating the impact of health science short video information encountering on the health literacy of older adults, this study has several theoretical implications. First, this study extends the literature on information encountering by examining its impact in health area. Prior research mainly focuses on its influencing factors and process modelling, ignoring the potential outcomes of information encountering (Chen et al., 2024). Considering information encountering as a primary source of older adults' health information (Erdelez & Makri, 2020), it is essential to examine its impact. Our findings confirm the positive impact of health science short video information encountering on the health literacy of older adults and clarify the effects of health information encountering, making a complement to the existing work.

Secondly, this study enriches the theoretical understanding of information encountering in the context of the elderly's digital experience. Previous research has largely overlooked older adults as a digital immigrant group, with studies predominantly focusing on younger internet users as research subjects (Awan et al., 2019; Jiang et al., 2019). However, the penetration of the Internet has a particularly pronounced impact on older adults. By demonstrating the positive effect of health science short video information encountering on health literacy, this study reveals that the adults, despite potential digital barriers, can still benefit from unplanned information discovery.

Finally, this study contributes to health literacy research by highlighting the important role of health information encountering in driving the development of health literacy. This study tests the robustness of the benchmark regression results based on the propensity score matching approach to reduce the effect of confounding variables and sample selection bias. This technique thus reveals a crucial causal mechanism between the frequency of health information seeking and health science short video information encountering. Furthermore, this study highlights the importance of passive health information encountering for improving health literacy. While health information seeking remains crucial, the finding that health science short video information encountering exerts a stronger impact on health literacy (β=0.317, $P < 0.001$; β=0.283, $P < 0.001$)

reveals the significant role of passive information acquisition channels in the contemporary media landscape, particularly algorithm-driven short video platforms. Therefore, this study provides a theoretical foundation to understand health information seeking, health science short video information encountering and health literacy for future research among older adults.

This study has practical implications as well. First, this study emphasises that short videos are an important platform for conducting health education and disseminating health information for older adults. The health-related information that older adults encountering on short videos can have a positive impact on their health literacy. Health science short videos have unique potential as an alternative communication channel for this group. Therefore, practitioners need to acknowledge the importance of short video platforms in disseminating health information and health scientific knowledge.

What's more, content creators can produce more high-quality health science videos targeting diverse audiences, including personalised content catering to users' demand for comprehensive health information and enhancing the accessibility of health information encountering. For example, medical professionals should create authoritative health short videos to disseminate knowledge on disease prevention and clarify prevalent health misinformation. Ordinary people can also share their personal illness stories and treatment processes on short video platforms. Platforms can further enhance the serendipitous discovery experience by refining recommendation algorithms, ensuring that health-related videos are more likely to surface in the feeds of elderly users. This helps reduce the risk of disease and improve the quality of life of older adults, contributing to a healthier and more active aging environment in society.

Limitations and directions for future research

This study has several limitations that merit future studies. Firstly, this study collected 306 valid samples to test the relationship between health science short video information encountering and health literacy. Given the challenges of data collection from elderly populations, we recommend future studies employ larger samples to validate these findings. Second, the exclusive reliance on offline survey methods presents another limitation. Future research could incorporate mixed-method approaches, such as in-depth interviews or analysis of secondary data, to provide more comprehensive validation of our hypotheses.

Conclusion

With the rapid evolution of social media platforms and the proliferation of online socialisation, users' frequency of information encountering has increased substantially. Within this digital landscape, health science content has emerged as a significant component of information encountering. Therefore, this study uses ordinary least squares regression and propensity score matching method to verify the effect of health science short video information encountering on the health literacy of older adults. The findings show that health science short video information encountering plays an important role in promoting health literacy among older adults. This study not only enriches the theoretical research on the relevant content but also supports the work of health science staff and social media platforms.

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Information behaviour as a mediator of the influence of e-health literacy on counselling decisions among Universitas Indonesia students

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Abstract

Introduction.
Universities promote digital mental health support; however, how literacy translates into actual help-seeking remains unclear. This study examined whether health information-seeking behaviour functions as a potential mediating pathway between mental e-health literacy and counselling uptake among Universitas Indonesia students, extending Wilson's (1999) and Savolainen's (1995) models of information behaviour.

Method.
A mixed-methods design was used, combining surveys of 99 counselling users (2022–2025) with four follow-up interviews with experts. Quantitative data were analysed using partial least squares structural equation modelling, and qualitative interviews explored behavioural mechanisms and contextual experiences.

Analysis.
The quantitative analysis examined the direct and indirect effects of mental e-health literacy, health information seeking behaviour, and counselling decisions. Qualitative data were thematically coded to identify patterns related to digital trust, confusion, and social influence in students' online information practice.

Results.
Mental e-health literacy predicted health information seeking behaviour ($\beta = 0.399$, $p < 0.001$) and counselling decisions ($\beta = 0.342$, $p = 0.007$), and health information seeking behaviour predicted counselling decisions ($\beta = 0.295$, $p = 0.016$). The indirect effect was marginal ($\beta = 0.118$, $p = 0.057$), indicating a positive but statistically unsupported mediating effect. The model explained 28.4% of the variance in the counselling decision-making.

Conclusion.
The findings suggest that health information seeking behaviour supports the relationship between literacy and counselling decision-making but highlights its limited mediating role. Universities should integrate mental e-health literacy training into credible and navigable online ecosystems. The limitations of this study include its single-site focus, small sample size, and potential self-selection bias.

Introduction

Mental health problems among university students are increasingly recognized as a global issue worldwide. Studies have shown that psychological distress, anxiety, and academic pressure are prevalent in higher education institutions (Liverpool et al., 2024). These concerns are evident in Indonesia. The Ministry of Health (Kementerian Kesehatan Republik Indonesia, 2023) reported that young people, including university students, face high levels of mental health problems but remain reluctant to seek professional help. Local studies similarly highlight that academic demands and stress contribute significantly to students' psychological burdens (Faradiba & Rahmatullah, 2023).

Despite these challenges, the use of professional counselling services in the country remains limited. Although many universities provide counselling centres, the actual utilization rate tends to be low, often due to stigma, lack of awareness, or uncertainty about the benefits of counselling (Fitriana, 2024). This gap between need and actual service use underscores the importance of understanding the factors that influence students' counselling decisions.

One crucial factor is how students engage with information before making decisions. From an information behaviour perspective, counselling-related decisions are often preceded by information engagement, evaluation, and interpretation processes rather than immediate service utilization. In practice, many students rely on digital platforms to address mental health concerns. They browse websites, social media, or online forums to find initial explanations, self-diagnoses, or seek peer testimonies (Balqis, 2023). This behaviour reflects the growing role of information practices in health-related decision making. However, while digital platforms provide accessibility, they also present risks; information may be fragmented, contradictory, or of questionable credibility (Saputri & Manggalani, 2024).

Thus, e-health literacy is a critical skill for patients. Defined by Norman and Skinner (2006) as the ability to find, understand, and apply online health information, e-health literacy has been further specified in recent years as mental e-health literacy, which refers to the skills required to evaluate and use digital mental health resources effectively (Xu et al. 2024). Empirical studies suggest that higher health literacy is associated with more informed help-seeking orientations and decision-related confidence (Di Novi et al., 2024; Yuen et al., 2024). However, how mental e-health literacy operates in relation to students' everyday information practices remains underexplored in Southeast Asia.

Health information-seeking behaviour is an important construct. Health information seeking behaviour refers to the ways in which individuals actively search for health-related information, the strategies they use, and the motivations behind their searches (Seboka et al., 2022; Zimmerman & Shaw, 2020). Among students, health information seeking behaviour typically occurs in digital environments, often involving searches for symptoms, coping methods, and peer advice. While health information seeking behaviour can empower individuals and encourage help-seeking, it can also produce confusion due to information overload, especially when evaluative skills are lacking. Despite its prominence in health research, the extent to which health information seeking behaviour functions as a mediating mechanism between literacy and decision-making remains unclear.

Against this background, the current study investigates the role of health information seeking behaviour as a potential mediating pathway between mental e-health literacy and counselling decisions. Specifically, it asks whether health information seeking behaviour explains how mental e-health literacy influences students' decisions to seek counselling. This question is theoretically relevant because it examines whether literacy translates into action through the use of everyday

information practices. This is also practically significant, as it can inform interventions aimed at increasing counselling uptake in Indonesian universities.

This study is based on established models of information behaviour. Wilson's (1999) model of information seeking emphasizes that information needs, barriers, and contextual factors shape individuals' behaviours. Savolainen's (1995) everyday life information-seeking framework further highlights that information activities are embedded in cultural and social contexts. By integrating these classical theories with contemporary perspectives on digital literacy, this study seeks to refine our understanding of how information behaviour influences health-related decisions in higher education.

In the Indonesian context, this contribution is particularly significant. Access to digital platforms is high, but counselling services remain underutilized due to stigma, lack of trust, and information uncertainties (Fitriana, 2024). By examining the interplay between mental e-health literacy, health information seeking behaviour, and counselling decisions, this study provides locally relevant and globally significant empirical evidence.

Literature review & hypotheses development

Information behaviour theories

Research on information behaviour provides useful frameworks for understanding how individuals identify needs, seek information, and use it to support their decision-making. Wilson's (1999) model of information behaviour emphasizes that information needs arise from contextual and personal factors and are shaped by intervening variables such as barriers, resources, and motivation. Similarly, Savolainen (1995) in his theory of everyday life information seeking highlights how information practices are embedded in individuals' cultural, social, and situational contexts. Together, these theories suggest that information seeking is not a linear process but one shaped by cognitive evaluations, social influences, and available resources.

In health contexts, these models have been widely applied to understand how individuals seek health information, manage uncertainty, and make decisions about treatment and professional support (Zimmerman & Shaw, 2020). Applying these frameworks to university students allows us to explore how digital information practices intersect with counselling decision-making.

Mental e-health literacy

E-health literacy, as defined by Norman and Skinner (2006), refers to the ability to locate, evaluate, and use health information from electronic sources. Recently, Xu et al. (2024) refined this concept to mental e-health literacy, which specifically relates to the evaluation and application of digital information about mental health. Students with higher mental e-health literacy levels are better equipped to distinguish credible resources from misinformation and apply this knowledge to make informed decisions.

Several studies have suggested that mental e-health literacy is associated with help-seeking behaviour. Di Novi et al. (2024) found that students with stronger digital health competencies were more likely to engage with counselling services. Similarly, Yuen et al. (2024) emphasized that digital literacy enhances the likelihood of translating information access into professional help-seeking. In the Indonesian context, Fitriana (2024) highlighted that a lack of evaluative skills contributes to hesitancy in accessing counselling despite high exposure to online information.

Based on this, the first hypothesis is formulated as follows:

H1: Mental e-health literacy positively influences counselling decisions.

Health information seeking behaviour

Health information seeking behaviour refers to the actions and strategies that individuals use to seek health-related information (Seboka et al., 2022). Zimmerman and Shaw (2020) conceptualized health information seeking behaviour as multidimensional, involving not only frequency and sources but also motivation and evaluation. For students, health information seeking behaviour typically involves searching online for symptoms, coping strategies, and shared peer experiences.

While health information seeking behaviour can empower students by expanding their knowledge and supporting self-reflection, it can also generate confusion when the information is contradictory or overwhelming (Saputri & Manggalani, 2024). Balqis (2023) showed that Indonesian students actively use digital platforms as their first source of information about mental health but often struggle to evaluate the quality of the information they find.

Empirical studies indicate that health information seeking behaviour contributes to decision-making. Chauhan and Sagar (2023) found that active information seeking was associated with stronger intentions to pursue professional counselling. However, these associations do not necessarily imply that information seeking functions as a mediating mechanism in all contexts. Thus, we propose:

H2: Mental e-health literacy positively influences health information-seeking behaviours.

H3: Health information-seeking behaviour positively influences the counselling decisions.

The mediating role of health information seeking behaviour

A key question is whether health information seeking behaviour functions as a mediator between mental e-health literacy and counselling decisions. Theoretically, a higher Mental e-health literacy may enable students to search more effectively, which, in turn, may increase their confidence in seeking professional counselling. This perspective aligns with Wilson's (1999) view that literacy and resources shape subsequent information behaviours, which may influence the outcomes.

However, the mediating role of health information seeking behaviour is not straightforward. Faradiba and Rahmatullah (2023) note that while students experience high academic stress, they do not always translate information searching into counselling. Lancia et al. (2023) similarly reported that even when counselling services are available, utilization remains low due to doubts, stigma, and limited ability to process information. This suggests that while health information seeking behaviour may contribute, evaluative literacy may have a more direct influence on decisions.

Therefore, the final hypothesis is as follows:

H4: Health information-seeking behaviour mediates the relationship between mental e-health literacy and counselling decision-making.

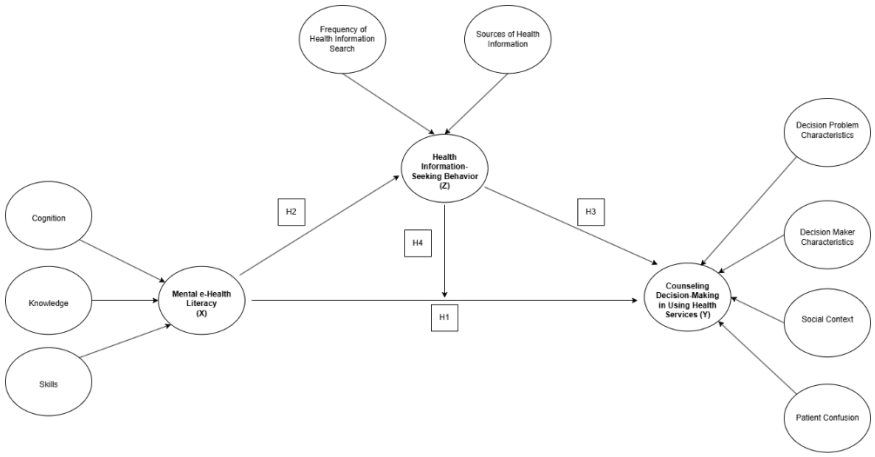


Figure 1. Conceptual model of the study

The proposed model illustrates the hypothesized relationships between mental e-health literacy, health information-seeking behaviour, and counselling decisions. Health information seeking behaviour mediated the relationship between mental e-health literacy and counselling decisions, as tested using the partial least squares structural equation modelling approach.

Methodology

Research design

This study employed a mixed-methods approach with an explanatory sequential design. A quantitative survey was first conducted to test the causal relationships between mental e-health literacy, health information-seeking behaviour, and counselling decisions, followed by qualitative interviews to enrich the interpretation of the statistical findings (Adhikari & Timsina, 2024; Ömercïoğlu & Erman, 2023).

Participants and sampling

The population of this study consisted of clients who accessed counselling services at Klinik Satelit Makara, Universitas Indonesia, between 2022 and 2025. According to records from the Kantor Kesehatan Universitas Indonesia (2025), this population comprised 11,729 individuals, including current students and alumni of Universitas Indonesia.

A simple random sampling technique was applied to select respondents from a list of clients who met the study's inclusion criteria. The criteria included: (1) being a student or alumnus of Universitas Indonesia who had utilized counselling services during the specified period, (2) providing informed consent to participate in the study, and (3) completing the questionnaire in full. Based on Cochran's formula for finite populations with a 95% confidence level and a 10% margin of error (Yamane, 1967), a minimum sample size of 89 respondents was required. After data screening and exclusion of incomplete responses, 99 valid questionnaires were included in the final analysis.

For the qualitative phase, four participants were purposively selected to reflect variations in gender and educational background. This selection aimed to capture diverse perspectives on counselling experiences and information practices.

Measures

Three main constructs were measured using established instruments.

1. Mental e-health literacy: 23 items adapted from Xu et al. (2024) covering cognition, knowledge, and skills.
2. Health information seeking behaviour: Adapted from Seboka et al. (2022), focusing on the frequency and preferred sources of online health information.
3. Counselling Decisions: Adapted from Chauhan and Sagar (2023), covering decision complexity, individual capacity, social influence, and patient confusion.

All items were measured on a five-point Likert scale. Demographic data (age, gender, faculty, level of study, and counselling frequency) were also collected (Green et al., 2023).

Data collection

Data were collected between February 25 and March 15, 2025, using online and offline approaches. The questionnaire was distributed online through social media platforms commonly used by students, including Instagram, X, and WhatsApp, and through direct outreach. Offline distribution was also conducted to reach participants who preferred face-to-face engagement. The use of online questionnaires was intended to enhance accessibility and flexibility for respondents, allowing participation without geographical constraints and time limitations.

Content validity was ensured through expert judgement, and internal consistency reliability was confirmed using Cronbach's alpha values of 0.70 or higher (Hair et al., 2021).

Data analysis

Quantitative analysis involved descriptive statistics, measurement testing (AVE ≥ 0.50; Cronbach's alpha ≥ 0.70), and structural modelling using partial least squares structural equation modelling (PLS-SEM) with SmartPLS 3.0 (Bentler & Chou, 1987; Hair et al., 2021). Mediation analysis of health information seeking behaviour between mental e-health literacy and counselling decisions was performed using bootstrapping with 2,000 resamples (Kostanek et al., 2024).

Qualitative data were analysed through thematic coding to identify recurring patterns, including information overload, reliance on peers, and confidence shifts post-counselling (Lee, 2024; Thomas & Earthy, 2023; Elhami & Khoshnevisan, 2022).

Ethical considerations

The participants provided informed consent prior to the data collection. Anonymity and confidentiality were guaranteed, and all procedures complied with ethical standards for social science and health research (Mahmoodi et al., 2022).

Results

Descriptive analysis

After data screening and exclusion of incomplete questionnaires, 99 valid responses were included in the analysis. The respondents were students and alumni who accessed the counselling services at Klinik Satelit Makara, Universitas Indonesia, between 2022 and 2025. The sample included variations in gender, age, faculty affiliation, and educational levels. Most respondents were female (76.8%) and fell within the early adulthood age category (82.8%), reflecting the dominant demographic profile of counselling service users in the university context (Green et al., 2023).

Variable	Category	Frequency (f)	Percentage (%)
Gender	Female	76	76.8
	Male	23	23.2
Age category	Early adulthood	82	82.8
	Adolescence	17	17.2
Faculty	Faculty of Cultural Sciences (FIB)	31	31.3
	Other faculties	68	68.7

Source: Primary data processed (2025).

Table 1. Respondent characteristics

The descriptive results indicated that the respondents generally exhibited moderate-to-high levels of mental e-health literacy, frequent engagement in health information-seeking behaviours, and positive attitudes toward counselling decisions. This pattern suggests a potentially strong link between literacy and decision-making behaviour in a digital context.

Measurement model

The measurement model was assessed for reliability and validity following Hair et al. (2021). All outer loadings exceeded 0.70, while the average variance extracted (AVE) values were above 0.50, confirming convergent validity. Furthermore, all constructs achieved satisfactory levels of composite reliability (CR ≥ 0.70) and Cronbach's alpha (α ≥ 0.70), demonstrating internal consistency.

Construct	Indicator Range (Loading)	Cronbach's α	CR	AVE	Remarks
Mental e-health literacy (MeHL)	0.755–0.847	0.881	0.909	0.625	Valid & reliable
Health Information Seeking Behaviour (HISB)	0.707–0.779	0.850	0.889	0.572	Valid & reliable
Counselling Decision	0.742–0.891	0.899	0.926	0.715	Valid & reliable

Source: PLS-SEM output (SmartPLS 4.0).

Table 2. Measurement model results

All constructs demonstrated good internal consistency and discriminant validity, satisfying the Fornell–Larcker criteria (Fornell & Larcker, 1981).

Structural model

The structural model examined the hypothesized relationships among the three constructs: *mental e-health literacy*, *health information seeking behaviour*, and *counselling decisions*. Bootstrapping with 2,000 subsamples revealed that all direct paths were significant ($p < 0.05$).

Hypothesis	Relationship	Path coefficient (β)	t-value	p-value	Result
H1	MeHL → Counselling decision	0.342	2.723	0.007	Supported
H2	MeHL → HISB	0.399	4.212	0.000	Supported
H3	HISB → Counselling decision	0.295	2.424	0.016	Supported

Source: PLS-SEM output (SmartPLS 4.0).

Table 3. Structural Model Results

The R^2 values indicate that mental e-health literacy explains 15.9% of the variance in health information seeking behaviour (R^2 = 0.159), whereas mental e-health literacy and health information seeking behaviour together explain 28.4% of the variance in counselling decisions (R^2 = 0.284). The Q^2 value of 0.312 confirms the model's satisfactory predictive relevance.

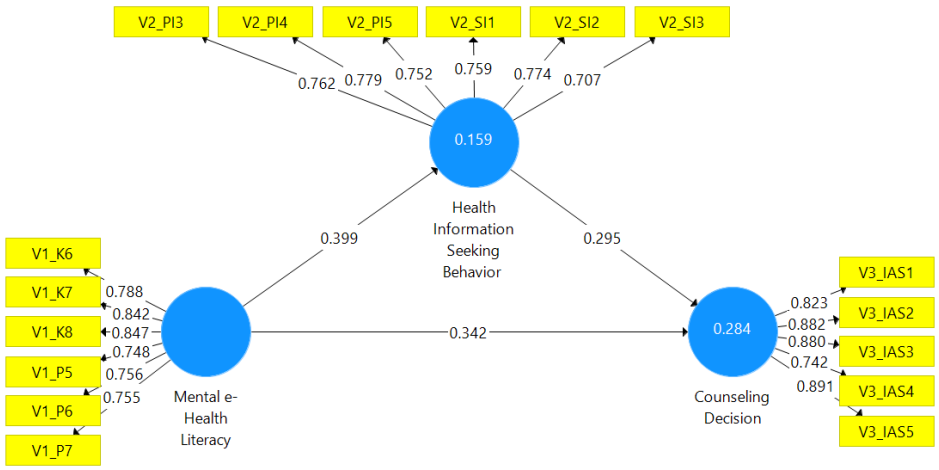


Figure 2. Structural model results (PLS-SEM)

The figure presents the results of the partial least squares structural equation Modelling analysis, including standardized path coefficients and R^2 values for each endogenous construct.

Mediation analysis

A mediation analysis was conducted to examine the potential indirect effect of mental e-health literacy on counselling decision-making through health information-seeking behaviour. The indirect effect yielded a coefficient of β = 0.118, with a t-value of 1.904 and a p-value of 0.057. As this effect did not reach statistical significance at the 0.05 level, health information-seeking behaviour cannot be considered a statistically significant mediator in the relationship between mental health and counselling decision-making.

Relationship	Direct Effect (β)	Indirect Effect (β)	t-value	p-value	Mediation Type
MeHL → HISB → Counselling Decision	0.342	0.118	1.904	0.057	Not significant

Source: PLS-SEM output (SmartPLS 4.0).

Table 4. Mediation Results

The results indicate that mental e-health literacy has a statistically significant direct association with counselling decision-making, whereas the indirect effect through health information-seeking behaviour did not reach statistical significance.

Qualitative findings

The qualitative phase involved semi-structured interviews with four participants and was analysed using thematic coding. Three recurring themes were identified in the interviews. First, participants emphasized the importance of digital trust and source credibility, reporting a preference for official institutional websites and mental health professionals' online content over user-generated sources. Second, participants described experiences of information overload and confusion when encountering conflicting or excessive mental health information online. Third, social influences, including encouragement from family members and discussions with peers, were frequently mentioned as part of the decision-making context related to counselling. These themes provided descriptive insights into the participants' information practices and experiences surrounding mental health and counselling services.

Discussion

Overview of key findings

This study examined the relationships between mental e-health literacy, health information-seeking behaviour, and counselling decision-making among Indonesian university students and alumni. The findings indicate that mental e-health literacy is directly associated with both health information-seeking behaviour and counselling decision-making, while health information-seeking behaviour is also associated with counselling decision-making. However, the indirect pathway through information-seeking behaviour was not statistically supported, indicating that health information seeking behaviour does not function as a mediating mechanism between mental e-health literacy and counselling decision-making. This pattern suggests that counselling-related decisions are more closely linked to individuals' mental e-health literacy than to their information-seeking activities alone.

The role of mental e-health literacy

The findings highlight mental e-health literacy as a central capability in counselling-related decision-making. Individuals with higher mental e-health literacy levels appear better equipped to evaluate mental health information, assess service options, and make informed judgements regarding counselling use. This interpretation is consistent with previous studies showing that mental e-health literacy is associated with greater self-efficacy and autonomy in health-related decision-making processes (Xu et al., 2024; Yuen et al., 2024).

From an information behaviour perspective, these findings align with Wilson's (1999) model, which conceptualizes literacy as a cognitive and contextual resource that enables individuals to engage with

their information environments. Rather than functioning as a direct determinant of behaviour, literacy shapes how individuals interpret information and assess the available options within broader emotional and situational contexts.

Health information-seeking behaviour as a mediator

Health information-seeking behaviour was positively associated with counselling decision-making, indicating that engagement with mental health information is part of the decision-making process. However, health information seeking behaviour did not mediate the relationship between mental e-health literacy and counselling decisions. This suggests that while information seeking plays a meaningful role, it does not fully explain how literacy translates into actions.

This finding partially contrasts with Savolainen's (1995) everyday life information seeking framework, which emphasizes information seeking as a bridge between knowledge and everyday decision making. In the present study, the mediation pathway appears incomplete, possibly because individuals with higher mental e-health literacy already possess sufficient evaluative confidence and understanding to make counselling-related decisions without extensive additional information searching.

The social and cognitive context of decision-making

The qualitative findings provide further insight into the limited mediating role of information-seeking behaviour. Participants frequently described experiences of information overload, uncertainty regarding source credibility, and emotional hesitation when engaging with mental health information online, consistent with prior findings on digital health information challenges (Elhami & Khoshnevisan, 2022).

Social influence has also emerged as an important contextual factor. Encouragement from peers and family members, as well as trust in institutional counselling services, shaped counselling-related decisions. This aligns with Chauhan and Sagar's (2023) argument that health decision-making involves not only cognitive evaluation but also emotional reassurance and social validation.

Integration of quantitative and qualitative insights

The mixed-methods design enabled a more nuanced understanding of how mental health e-literacy and information behaviour interact. While the quantitative results establish direct associations among the key constructs, the qualitative findings illuminate how emotional readiness, perceived credibility, and social support shape the ways in which information is used in counselling-related decision-making. This integrated perspective is consistent with Wilson's (1999) view of information behaviour as a dynamic response to perceived barriers, stressors, and situational demands.

Implications for practice

The findings suggest that initiatives aimed at supporting counselling engagement among university populations should move beyond increasing access to information. Efforts to strengthen mental e-health literacy may enhance individuals' capacity to evaluate information and make informed judgements. Simultaneously, counselling services and information providers should attend to the emotional and social dimensions of decision-making by offering credible resources, supportive communication, and reassurance within trusted institutional contexts. Collaboration among universities, counselling services, and public health institutions may further strengthen the reliability and accessibility of mental health information for adolescents.

Theoretical contribution

This study contributes to information behaviour research by refining the conceptual relationship between literacy, information seeking, and decision making. The findings suggest that health information-seeking behaviour functions as a behavioural complement rather than a mediating mechanism in the relationship between health literacy and decision-making. By situating health information seeking behaviour as a flexible and context-dependent expression of mental e-health literacy, this study extends Wilson's (1999) and Savolainen's (1995) frameworks and highlights the importance of emotional and social influences in digital mental health.

Conclusion

This study investigated the potential mediating role of health information-seeking behaviour in the relationship between mental e-health literacy and counselling decision-making among students and alumni of Universitas Indonesia who have used counselling services. The results demonstrated a positive association between mental e-health literacy and both counselling decision-making and health information seeking behaviour, as well as a positive relationship between health information seeking behaviour and counselling decision-making. However, the indirect pathway (mental e-health literacy → health information seeking behaviour → counselling decision-making) did not reach conventional levels of statistical significance, indicating that health information seeking behaviour did not function as a mediator within this sample. Overall, it appears that counselling decisions are more directly influenced by individuals' mental e-health literacy, with information-seeking behaviour serving as a supportive but non-essential pathway.

Future research should test this model using larger and more diverse samples across multiple universities and include both counselling users and non-users to reduce self-selection bias. Longitudinal or experimental designs are needed to examine whether improvements in mental e-health literacy lead to subsequent changes in health information seeking behaviour and actual counselling uptake over time. Studies may also incorporate additional mechanisms or moderators that were salient in the qualitative insights, such as trust in information sources and services, stigma, social support, emotional readiness, and information overload. Finally, objective behavioural indicators (e.g., platform usage traces or analytics) could complement self-reported measures, and emerging AI-mediated mental health information environments should be examined as contextual factors shaping mental e-health literacy, health information seeking behaviour, and help-seeking decisions.

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Information behaviour as a framework for exploring STEM participation of Black women

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Abstract

Introduction. The underrepresentation of minority groups in STEM fields has generated substantial research aimed at increasing participation across diverse populations. However, limited attention has been given to the information practices of Black women in STEM fields. This short paper introduces a framework for examining the experiences of Black women in Science, Technology, Engineering, and Mathematics (STEM) fields through the lens of information behaviour.

Method. Elements of Wilson's 1981 model of information behaviour, intersectionality theory, and critical race theory are integrated in developing a research model.

Result. The conceptual framework illustrates the intersection of information behaviour with key variables of race and gender studies and describes the relationship among them.

Conclusion. Integrating an information behaviour framework with critical race and intersectionality theories enables a holistic inquiry into the lived experiences of the marginalised by revealing hidden inequities and biases in social structures and information systems.

Introduction

Black women remain grossly underrepresented in Science, Technology, Engineering, and Mathematics (STEM) fields (Alfred, Ray & Johnson, 2019; Ferguson & Martin-Dunlop, 2021). Prior research has explored various dimensions of this marginalization in the context of the influence of intersecting identities (Charleston, Adserias, Lang & Jackson, 2014; Allen, Dancy, Stearns, Mickelson & Bottia, 2022), role of mentors (Dickens, Ellis & Hall, 2021), resilience (Dickens & Hall, 2024), and structural and institutional inequalities (Casad, Franks, Garasky, Kittleman, Roesler, Hall, & Petzel, 2021). Despite these insights, limited attention has been given to Black women's information behaviour, that is, how they access, retrieve, use, and transfer information across traditional contexts (e.g., digital platforms, libraries) and non-traditional spaces (e.g., friends, families, communities).

Early work by Chatman (1996) on *outsiders* highlights how information-poor individuals adapt information practices within small worlds. Advancing this perspective, Gibson and Martin (2019) shift focus from these individuals' behaviour to the social and institutional systems that produce information marginalization through intersecting identities of race and gender. Black women in STEM are crucial information users who experience exclusion and marginalisation at multiple levels due to their intersecting race and gender identities. This necessitates a need to examine how their information practices shape participation and representation in STEM fields within social, institutional, and digital systems.

Information behaviour, often interchangeably used with information practices or information seeking, examines how people interact with the world and engage with information across technologies and media (Given et al., 2023). It is any form of communication with people through different information sources and the receiving of information in diverse formats (Wilson, 2022). By focusing on everyday practices, information behaviour illuminates how people make sense of their environments, satisfy needs, and navigate challenges (Bates, 2010; Ocepek, 2018). As a marginalized group, Black women in STEM (along with other underrepresented groups) constitute an important population whose participation is vital for enhancing STEM representation and promoting economic advancement in the United States and globally (Morton & Parsons, 2018; Ferguson & Martin-Dunlop, 2021). Much of the research focused on increasing STEM representation does not adequately address the everyday information lives of Black women, especially as these are shaped by the intersection of their race and gender identities. Although literature largely documents racialized and gendered challenges, it overlooks their information environments, patterns of information behaviour, and everyday information needs that are essential for their survival and success. Thus, incorporating information behaviour research into studies of Black women in STEM is necessary to wholly capture their lived experiences at the nexus of race and gender, and for understanding other factors influencing their participation and STEM advancement.

To address this gap, this article proposes a research framework that integrates information behaviour with race and feminist theories. While each of these theories cannot singly analyse information practices or everyday experiences, combining these perspectives enables a holistic inquiry into the lived realities of Black women in STEM (Savolainen, 1995). This framework aims to unravel hidden inequities and racial discrimination in information systems and illustrate how intersecting racial and gendered identities shape information practices under constrained circumstances (Savolainen, 2009). Drawing on existing literature, the study applies this framework to explore the participation of Black women in STEM.

This work contributes to knowledge on closing the racial and gender gaps in STEM, advancing equity, and expanding information behaviour research to underexplored contexts in the field of information science and studies of race and gender. Integrating information behaviour with race

and feminist theories offers a novel analytical approach to addressing systemic inequality and marginalization in STEM fields.

Theoretical discourse

Theories provide conceptual frameworks for understanding phenomena and the relationships among them without necessarily predicting change (Given et al., 2023; Labaree, 2025; Wilson, 2022). Information behaviour theories and models, including social cognitive theory, activity theory, Dervin's sense-making theory, Wilson's model, and Savolainen's model, offer foundational perspectives on how people engage with information in their everyday life. Dervin's (1992) sense-making theory and Savolainen's (1995) everyday life information seeking model are useful for understanding how the intersections of race and gender shape information practices. Dervin's theory explains how people make sense of their experiences during problematic situations through information seeking and use (Dervin, 1992), while Savolainen emphasizes how information practices are shaped by one's way of life and everyday activities, including the use of diverse information sources and systems (Savolainen, 1995, 2009). However, these frameworks focus primarily on information seeking, whereas Wilson's model of information behaviour encompasses a broader range of information behaviour.

For this study, Wilson's model of information behaviour is integrated with intersectionality theory and critical race theory to develop a single conceptual framework for examining the lived experiences of Black women in STEM fields. This integrated framework enables analysis of how information needs are shaped by intersecting identities, processes taken to satisfy these needs, the barriers encountered, and structural conditions within information systems that create uneven outcomes.

Wilson's 1981 model of information behaviour

Wilson's model was developed to describe the processes underlying human information behaviour, from the initial recognition of an information need to the steps aimed at satisfying that need. It posits that information behaviour begins when a user perceives a need and engages in active information search through information systems or other sources. This process may result in success or failure (Wilson, 1981, 1999). When information needs are unmet, the search process is reiterated till the need is met. Black women in STEM frequently experience structural challenges that limits their academic and professional success. Wilson's model provides a framework for examining how Black women in STEM navigate information systems and sources in their quest for not only success but also survival within inequitable STEM environments.

Intersectionality theory

The intersecting identities of race and gender shape the distinctive lived experiences of Black women and must be examined jointly rather than as separate categories to fully understand how they navigate information seeking and meet their unique needs. Crenshaw's (1991) theory of intersectionality argues that the experiences of women of colour emerge from intersecting and interdependent systems of racism and sexism, making it difficult to capture these experiences when race and gender are analysed separately. The intersection of these identities is therefore the key to understanding Black women's everyday experiences. Intersectionality has been widely applied to examine how multiple identities influence perception, treatment, and lived experiences across social and professional contexts (Charleston et al., 2014; Morton & Parsons, 2018; Dickens et al., 2021). For Black women, the intersections of race and gender create uncommon stereotypes and biases that cannot otherwise be experienced singly (Eaton et al., 2020). The identities of Black women as being doubly marginalized provides a critical lens for examining the social, institutional, and organizational structures that shape their information practices.

Critical race theory

Critical race theory gives a lens for understanding the relationship among race, racism, and power. It is built on the principle that, firstly, race is ordinary, and embedded in everyday practices; secondly, race is difficult to address because it is often unacknowledged particularly within colour-blind conceptions of equality; thirdly, race is socially constructed, arising from social relations and perceptions rather than biological difference (Delgado & Stefancic, 2023). Critical race theory is closely aligned with intersectionality in its emphasis on how race interacts with other identities, such as gender, to shape lived experiences and structural inequities (Dixson & Anderson, 2018).

Conceptual framework: information behaviour and STEM participation of Black women

Responding to the call for the application of information science theories to address the underrepresentation of Black women in STEM (Adewunmi & Ocepek, 2025), this study presents an information behaviour framework that offers a holistic inquiry into Black women's everyday lives as shaped by intersecting racial and gender identities and experiences of discrimination. Drawing on Wilson's information behaviour model, critical race theory, and intersectionality theory, the framework integrates these perspectives to examine the relationship among information practices, intersectional identities, and structural inequities. Although specific information sources are not examined, the framework provides insight into Black women's participation in STEM through the lens of information behaviour.

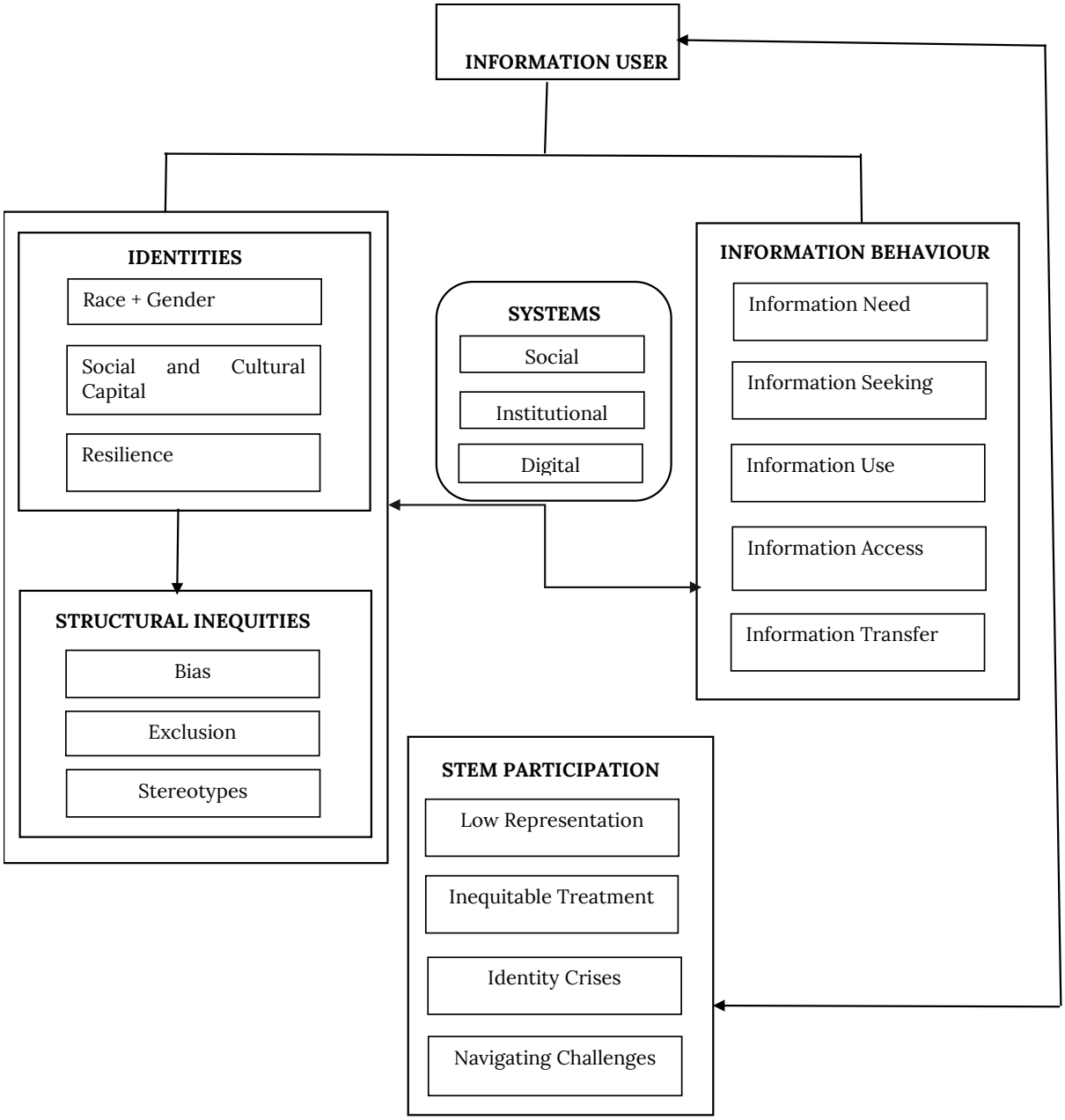


Figure 1: Information behaviour and STEM participation of Black women

As Wilson notes, the purpose of models is to provide a framework for thinking about complex problems (Wilson, 2022). Accordingly, the research framework presented here is designed to account for the lived experiences of Black women in STEM as they navigate information needs within environments where they remain a minority population. The framework foregrounds core elements of information behaviour while explicitly incorporating the identities of information users, their experiences as STEM participants, and the social, institutional, and digital systems that structure the relationship between identity and information practice, functioning as both points of access and sources of constraints. In doing so, it advances an information-science-oriented approach aimed at identifying interventions and informing the design of more equitable systems that support Black women's persistence and success in STEM spaces.

This model conceptualises Black women in STEM as information users whose experiences are shaped by intersecting identities and structural inequities that directly influence their information behaviour, and consequently their representation in STEM fields. Existing literature documents persistent underrepresentation (Dickens et al., 2021; Ferguson & Martin-Dunlop, 2021; Morton & Parsons, 2018), inequitable treatment (McGee & Bentley, 2017), identity crises (Ireland et al., 2018), and ongoing structural challenges that limits success (Charleston et al, 2014). Within STEM environment, race and gender are often the most salient identity-markers shaping how Black women are perceived and treated. However, these identities are accompanied by other forms of identity developments such as, social and cultural capital, and resilience, which emerge through sustained engagement with STEM spaces and play a significant role in shaping lived experiences (Ferguson &and Martin-Dunlop, 2021).

Structural inequities, including bias, exclusion, and stereotypes, are institutional responses to these intersecting identities and exert cumulative effects on information behaviour. These effects are evident within information practices which involves the articulation of information needs, active information seeking, and access to information. The study extends existing models by incorporating information access as a key variable that highlights the persistent divide between those who can successfully obtain and use information and those who cannot. Successful information use often leads to information sharing among peers, a practice that strengthens social capital and supports collective survival and advancement within STEM contexts (Alfred et al., 2019; Ferguson & Martin-Dunlop, 2021).

Importantly, Black women's information behaviour is situated within social, institutional, and digital systems that structure access to information in inequitable ways. Social networks, institutional policies and practices, and digital platforms may either recognize intersecting identities and support information use or alternatively, be designed for a generalized user population without attention to diverse needs. These systems can therefore function as facilitators or barriers to information satisfaction, shaping both access and STEM outcomes.

This model contributes to STEM and information behaviour research by positioning information practices as central to understanding STEM participation and representation. It focuses attention to the ways identities intersect with information behaviour across STEM contexts and suggests questions that links systems design to lived experience. This model highlights how repeated failures to satisfy an information need may reflect systemic barriers within information systems rather than individual's limitations.

Implications for research, policy, and practice

A range of information behaviour models has explored human information practices across diverse contexts. In studies of race and gender in STEM, frameworks such as Black feminist thought, critical race theory, intersectionality theory, and resiliency theory highlight structural inequities and identity formation but often overlook how Black women engage with information in everyday academic, professional, and digital spaces (Charleston et al., 2014; Dickens et al., 2021, Ferguson & Martin-Dunlop, 2021).

Human behaviour is constantly shaped by changing environments (Wilson, 2022) and experiences of racism and sexism influence information needs and practices over time. The intersection of race and gender produce distinct everyday information needs linked to individuals' pursuits, roles, and responsibilities (Gibson & Martin, 2019). Studying the information behaviour of Black women provides insights that can inform research, policy, and practice, particularly in the design of equitable and inclusive information systems and technologies that support meaningful STEM participation (Chung & Yoon, 2015).

Directions for future studies

The application of this framework will be extended to explore specific information sources consulted by Black women in STEM, such as human sources, as well as digital information environments, such as social media and online chat groups. Future research would examine what occurs when a user repeatedly fails to satisfy information needs, not because of a lack of effort, but because systemic barriers within information systems consistently prevent successful information retrieval.

Conclusion

By situating this work within information behaviour, this study offers a novel lens for understanding how Black women in STEM navigate challenges and cultural differences, access support, and build resilience in spaces where they are often excluded. Developing equitable systems and inclusive policies requires holistic inquiry into the lived experiences of those most affected. This will inform more effective and relevant decision-making that addresses marginalization and supports the creation of a more equitable society.

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Rethinking information practices to embrace avoidance: everything old is new again

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Abstract

Introduction. We respond to Hicks et al.'s (2025) call to reconceptualise information avoidance free from the assumption that avoiding information is necessarily negative, denialist, or non-compliant. This allows us to consider what people actually do with information and why they act the way they do.

Method. We purposively selected cases from published literature that illustrate the interplay between what library and information science researchers have previously dichotomised as 'seeking' and 'avoidance' practices.

Analysis. Through secondary analysis, we reinterpreted these exemplars using Hicks et al.'s (2025) new perspective on information avoidance as practices that moderate information.

Results. We identified four complex intertwinings of information practices that moderate information flow and access through both expansion and contraction: taking control of information flow; encountering, managing, or using information on one's own terms, at time and place of their choosing; keeping secrets: revealing or sharing information on one's own terms, at a time and place of one's own choosing; and protecting privacy and resisting surveillance.

Conclusion. Reframing information practices allows us to understand how people may engage in deliberate, active, and effortful practices to moderate and regulate information flow and access. These practices coexist and are both expansive and contractive.

Introduction

The conceptual language of information practices says much about the research being undertaken in our field. The dominant concepts of information seeking, sharing, and use emphasise active, intentional, and formal information interactions over passive, accidental, serendipitous or informal ones.

This assumption arises from the historical antecedents of information research, which has traditionally been informed by studies of information production and dissemination. However, as we integrate more humanistic accounts of information practices, this premise, and the way it encourages certain ways of thinking about information practices, requires constant attention. In this paper we use information avoidance (Hicks et al., 2025) as a case study to show how new conceptual vocabularies can alter how information practices are seen and understood.

Literature Review

What we call things matters. This is not a new claim, with Dervin, for example, spending considerable time and effort in the 1990s emphasising verb-ing as a practice over noun-ing (e.g., Dervin, 1993).

A particular reason to care about how we label practices is that conceptual labels may carry elements of judgment and bias. For example, in our review (Hicks et al., 2025), we proposed that information avoidance, as a conceptual term (Ruthven et al., 2025), has been treated negatively as an information practice.

We proposed two reasons for this: Firstly, there is a tacit assumption in the avoidance literature that information is associated with extractive value (Costello & Floegel, 2020) and is therefore automatically useful, of long-term benefit, deriving from knowledgeable authorities, and capable of resolving problems. Avoiding information is therefore to avoid the benefits that it brings. Secondly, people who avoid information are thereby engaging in irrational or emotionally-led thinking as opposed to more logical approaches to information seeking and use. Famously described as a pathology (Bawden & Robinson, 2009), avoidance is therefore associated with disordered thinking and with behaviours such as denial or non-compliance, themselves terms which are negatively loaded and from the perspective of the information provider.

As we (Hicks et al., 2025) have argued, however, this view of information avoidance fails to consider what people actually do with information and why they behave in such ways; that avoidance is embedded in a complex set of information practices; that those avoiding information may be making considered judgments about what information to accept; that avoidance may be shaped by systemic marginalisation and stigmatisation; and that avoidance may arise from prosocial and/or self-care motives.

From our review, we proposed a new perspective on information avoidance that sees it as ‘practices that moderate interaction with information by 1) reducing the intensity (amount and/or flow) across multiple levels of granularity; 2) restricting engagement with or control over information, whether actively, passively, or receptively, and/or 3) excluding information based on relevance, quality, and timeliness criteria’.

Method and Analysis

In this short paper, we build on and apply our earlier work (Hicks et al., 2025) in a proof-of-concept demonstration. We returned to the published information practices literature to seek a small set of cases that illustrate the interplay between what library and information science (LIS) researchers have previously dichotomised as ‘seeking’ and ‘avoidance’ practices. We looked back on the dimensions we identified in our ARIST review and identified candidate exemplars that we felt offered interesting insights into the complex interplay between practices considered ‘avoidant’

and those considered 'seeking'. From this candidate list, we selected four cases that together illustrate the diversity of this interplay. We sought to represent a variety of populations and a variety of forms of information practice (e.g., seeking, sharing, use) and we sampled purposively to achieve this goal.

Through secondary analysis, we reinterpreted these exemplars to reveal the complex interplay of information practices that moderate information flow and access, through both expansion and contraction. Our analysis of our selected cases therefore offers an example of how we might think holistically about information practices as comprising moderating strategies that both increase and reduce the intensity of information, permit and restrict engagement with or control over information, and include and exclude information based on relevance, quality, and timeliness. This is the first step in an ongoing and more systematic analysis.

Results

Taking control of information flow

People may engage in safeguarding information practices to control and mitigate risks in complex information environments. In their study of information literacy during the COVID-19 pandemic, Lloyd and Hicks (2021, 2022) found that many participants reacted to the overwhelming intensity of information distributed across platforms, media, institutions and social networks. Information overload and resistance against the accelerated and continuous exposure to information and viewpoints led many to slow down information updates, for example, by checking news only at specific times of the day or turning to local news only. Other strategies helped to limit 'noise', for example, deleting apps or inventing rules to limit media consumption and information exchange with friends, here mirroring the information holiday behaviour identified by Brashers et al. (2000). Participants ignored information and government recommendations, like downloading a test and trace app, that went against their beliefs or emotional and health-related needs. They disengaged from knowing by not looking up potentially relevant information if the result would restrict their independence and freedom. This enabled them to focus on engaging with information that was worth the attention and relevant:

> I became overwhelmed… what I decided to do was [to] focus on the information that I need to know, I just started to compartmentalise stuff and only look at stuff that was particularly relevant to me, which was how to keep safe (Lloyd and Hicks, 2022).

As the case shows, the long-term mode of crisis and accelerated information dissemination during the pandemic fostered new and agentic forms of safeguarding information practices that helped to actively limit, moderate, and control the flow of information.

Encountering, managing, or using information on one's own terms, at time and place of their choosing

People regulate or manage their interaction with information when facing prolonged periods of stress, for example related to health issues. Caregivers of chronically ill loved ones such as people with dementia demonstrate another distinctive form of information avoidance. In a study exploring the information practices of caregivers of older adults and the role that information plays in the care process, Shaked (2022) found that caregivers regulate their exposure to information as a mechanism of emotional regulation and uncertainty management. Knowing that the disease will inevitably worsen, they acknowledge but compartmentalise this information, opting to 'save it for later' when the next phase of the illness arrives.

> I try not to think too far ahead. I know the information [about future stages of dementia] is there, but I sort of don't want to know what lays ahead of us. I try to deal with one thing at a time, like in stages (Shaked, 2022).

Postponing the interaction with stressful information that might become relevant in the future is a coping mechanism that enables caregivers to maintain a sense of control and focus on immediate needs. Caregivers are aware that the information exists but engage in 'deal with that when we get there' when confronted with future care decisions, aiming to find a balance between awareness and psychological preservation (Taylor et al., 2023). This example illustrates timeliness-based information avoidance (Hyldegård et al., 2024), a decision to postpone engagement with future-oriented information. Rather than a lack of awareness, this strategy represents a strategic moderation of interaction with information over time, whereby caregivers actively manage when and how to interact with information depending on its timeliness: its relevance to the progression of the illness.

Keeping secrets: Revealing or sharing information on one's own terms, at a time and place of one's own choosing

People may keep secrets for the benefit of the person from whom the secret is being kept; for example, when planning a surprise party. A secret-keeper may perceive a secret to be protective, such as when a parent delays telling a child about a stressful appointment until shortly before it occurs. Chatman (1990, 1992) showed how keeping secrets also benefits the secret-keeper, allowing them to curate how they are seen by others and maintain some control over their own lives. This is a particularly relevant strategy for people facing systemic marginalisation, such as those Chatman studied, whose ways of knowing are not treated as authoritative; whose information and information spaces can be lost or erased (e.g., Wagner & Kitzie, 2025); who encounter systemic barriers when seeking to access the authoritative information they want; who may be the recipients of unwanted information, advice, and direction; and whose lives and activities are frequently surveilled, resulting in increased risk of unwanted intervention (e.g., Gibson et al., 2023). The older female residents of the Garden Towers apartments took care not to disclose any physical symptoms to their children to support their wish to avoid being moved to a nursing home (Chatman, 1992). Physically shielding their lunches from their colleagues' view allowed janitors to hide the fact that their sandwiches contained no filling and to keep their poverty 'to themselves' (Chatman, 1990). Secret-keeping is illustrated by Fulton's (2019) account of how a gambler routinely intercepted incoming bills so his partner would not discover the consequences of his gambling problem:

> We owed some money on the mortgage and she was under the illusion, or I had put her under the illusion, that we had lots of money and we were putting more money away than the mortgage needed and we were going to borrow for the wedding. That was the intention, so as she got the [mortgage] statement, as she was entitled to, but I just didn't intercept the postman that day, and yes, she called me out, and she said what's going on? And I said, we have no money. I have a problem with gambling. So she left (Fulton, 2019).

The participant engaged in a regular monthly cycle of information practices. Since the bill arrived reasonably predictably, he actively monitored the post during the period it was likely to arrive. For the rest of the month, there was no need to monitor. On the day the statement arrived, he engaged in active and specific information practices: he intercepted and hid only the mortgage statements. So long as he caught the day's post before his partner did, he was able to prevent her from accessing information that would negatively impact her perception of him. He engaged in these concealment practices over a long period of time, stopping only when he was discovered.

Protecting privacy and resisting surveillance

The actions that people take to protect their privacy forms yet another intriguing example of the need to reconsider our conceptualisation and understanding of information avoidance. In the following example (Haider, 2017), Person 1 defends their decision to employ the DuckDuckGo

search engine, despite its perceived inferior technical capacity, due to the company's commitment to user privacy. Originally quoted to illustrate the normalisation of Google as a default search tool, this extract can also be interpreted as a form of information avoidance as Person 1 purposefully refrains from sharing information with a search engine that they do not trust. Providing the means through which they protect their privacy, the elimination of documentary traces is also seen to be a way to resist unnecessary surveillance. A similar situation might involve choosing to discuss a sensitive topic through a face-to-face conversation rather than via email.

> Person 1: If I use a different search tool [Note: different from Google] then mainly those that anonymise, like [inaudible] and so on?
>
> Person 2: Duck Duck Go?
>
> Person 3: It has maybe improved by now, but this is a catastrophically bad search engine.
>
> Person 4: But why does one want to be anonymous?
>
> Person 1: Because we live in a society which is incredibly unpleasant.
>
> [Several lines deleted]
>
> Person 4: And why do you think you are less surveilled if you use a different search engine?
>
> Person 1: Because they are dedicated to anonymising and all that (Haider, 2017).

In centring privacy management strategies, Person 1's actions evidence several key dimensions of information avoidance, including a high level of engagement and control over information. Their comprehensive sidelining of other search tools further illustrates their attention to avoidance at the stage of identifying the information source, well before engaging with the content returned by the source, an approach that is noted as increasingly important in technological environments (Hicks et al., 2025, p.336). Providing a further illustration of how information avoidance cannot always be seen as a passive act (Hicks et al., 2025), characterising their actions as a form of avoidance draws attention to how research has typically centred the avoidance of seeking rather than other information activities such as sharing or using. At the same time, the emphasis that Person 1 places on the potential future consequences of their actions also points to how their actions introduce additional temporal and spatial considerations to understandings of information avoidance, including in relation to the risks of time and context collapse.

Conclusion

Our secondary analysis of these four cases demonstrates how information scholars might reframe practices beyond a seeking/avoidance dichotomy. This reframing acknowledges that people may engage in deliberate, active, and effortful practices to moderate and regulate information flow and access. They may do so for legitimate reasons such as taking steps to mitigate the intensity of information overload, maintaining control of the information they disclose to others, or filtering information based on quality, relevance, or timeliness criteria that are relevant to them. Reframing such practices as active and deliberate frees them from the stigma that has long been associated with information avoidance. More than that, this reframing shows how practices of seeking and avoidance may coexist in a single informational episode (Link et al., 2023). Going beyond dichotomising seeking and avoidance practices as all-or-nothing allows us to see the interplay between and among practices, adding more nuance to our discipline's thinking about information practices.

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Information is a gun: recognising information facilitated interpersonal harms

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Abstract

Introduction. With the growing popularity of smart technologies, sensitive and personal information has never been more abundant or accessible, but this information can be readily abused to perpetrate interpersonal harms. However, discussion of the role of information in these harms is largely absent from the Library and Information Science (LIS) literature. We argue that a disciplinary belief that '*information wants to be free*' has created a gap in LIS research about the ways in which information can be weaponised to facilitate interpersonal harm.

Method and analysis. We summarise research from privacy, cybersecurity, and other computing disciplines that examine cases of information facilitated interpersonal harm and demonstrate that access to information was an enabling factor in each case. We also performed keyword searches in the LISA database for terms relating to interpersonal harm and found few results relating to the role of information collection and access in interpersonal violence and abuses.

Conclusion. The LIS community could contribute vital expertise to the study of information facilitated interpersonal harms if we reconsider our assumption that greater access to information is a social and public good.

Introduction

'*oh, better to be anything than America as a gun.*'

~ Brian Bilston

In February of 2016, the pseudonymous British poet Brian Bilston posted a poem entitled *America is a gun* to Twitter (Bilston, 2016). In it, Bilston lists symbols of various countries in simple rhyming quatrains, starting with '*England is a cup of tea,*' but always ending with the rhyme-breaking refrain: '*America is a gun.*' The inspiration for the poem, according to Bilston, was a tweet by then-Florida governor Jeb Bush—a photo of a handgun engraved with his name and the caption: '*America*' (McKernan, 2016). Just days later, there was a mass shooting in Kansas. Just months later, the Pulse nightclub shooting in Florida became the deadliest mass shooting in US history.

In the years since, Bilston's poem has been shared countless times on social media to mark the occurrence of mass shootings in the United States and as commentary on that nation's firearm obsession. Some have criticised the poem for being overly simplistic, pointing out the many positive symbols that could also represent America and the fact that other countries have shameful aspects of their cultures, too. But, of course, the purpose of Bilston's poem is not to make a comprehensive representation of all a country's virtues and vices, but to forcefully draw our focus to one urgent problem: the danger of gun violence in the United States. Similarly, our purpose in this paper is not to claim that information is literally a gun, but to draw focus to an urgent problem that has, thus far, received little attention in Library and Information Science (LIS): how information systems, specifically the unprecedented access to information they provide, can be used to enact interpersonal harms.

The second amendment to the United States constitution has been interpreted by many American firearms advocates as codifying a nigh-unlimited natural right to gun ownership (Barr, 2021). To draw a parallel, the *second amendment* of LIS may as well be Stewart Brand's aphorism that '*information wants to be free*' (Levy, 2014). In much the same way that many Americans feel entitled to their guns because they consider themselves responsible users, people often feel that they are entitled to access and use information because they consider themselves to be responsible users. The LIS discipline tends to implicitly consider the free access to information as an unalloyed good; our intent, in comparing information to firearms, is to argue that it is not.

What does it mean for information to be a gun?

Advocates for the National Rifle Association and gun rights activists hold that guns are tools; that '*guns don't kill people*; *people kill people*'. This is, of course, a banal truism, but its purpose is to obscure the fact that it is the interaction between guns and people that causes harm. Furthermore, certain design features of firearms, including semi-automatic firing and high-capacity magazines, enable faster delivery of more bullets and therefore amplify the capacity for serious harm (Koper, 2020). Similarly, we argue that the design of consumer information technology, including social media platforms, mobile apps, and smart home devices, enables greater collection and delivery of data, which then facilitates and even encourages abuse. We detail some of these information abuse cases below, demonstrating that interpersonal harm is perpetrated through information access and misuse.

Information facilitated interpersonal harm

In their review of sociotechnical harms in the Human Computer Interaction literature, Shelby et al. defined *interpersonal harms* in this context as those which 'adversely shape relations between people or communities' (2023), such as instances of technology facilitated violence and invasions of privacy. Indeed, technology facilitated violence and abuse has increasingly been recognised as a growing social problem (Gupta et al., 2024), but we contend that it is the information collected, processed, and surfaced through these technologies that facilitates the ability for one person to

enact harm upon another. It is this direct, intentional, and often individualised nature of information facilitated interpersonal harms that distinguish them from other types of informational harms, which may be unintentional, such as misinformation, or broadly directed, such as mass media propaganda and malinformation.

Privacy experts have noted that instances of interpersonal harm are often situated in a narrative of care (Levy & Schneier, 2020) and feminist cybersecurity scholars raised similar concerns about intimate threats (Slupska, 2019). Justice scholars have looked at the normalization of extensive information sharing practices (Butler et al., 2024) and health scholars have examined the harm caused by abuse of these technologies (Brown & Hegarty, 2024; Brown et al., 2021). Human computer interaction and design scholars have also suggested *safety by design* as a potential remedy (McKay & Miller, 2021; Sambasivan et al., 2019). Numerous interpersonal informational threats have been identified through this research; we focus here on three: stalkerware, parental monitoring technologies, and weaponization of internet of things.

Stalkerware

A comprehensive 2019 report by Parsons et al. (2019) examined the capabilities and marketing of so-called '*stalkerware*' apps, which have become incredibly prevalent tools in the perpetration of intimate partner violence. Notably, this report found that many of the companies involved in this industry actively promoted their software as covert surveillance tools but failed to make clear what recourse might be available to victims of their products. More recent research has unfortunately confirmed that these products remain readily available and abusable (Bonam et al., 2025). Literature on social media also shows that even software not specifically marketed as stalkerware is regularly leveraged for stalking (Fiolet et al., 2021; Zuboff, 2019).

Parental monitoring technologies

Parents are increasingly using location-tracking apps like Life360 to monitor their children's activities. While this practice is usually borne out of genuine concern for their children's safety, studies have raised serious concerns about privacy and security, as well as tensions in the parent-child relationship arising from the availability of tracking data (Mavoa et al., 2023). On the one hand, parents may be anxious about their children moving toward independence, and on the other hand, the mere existence of location information imposes social obligations on parents to know more about their children's lives (Lupton, 2020).

Weaponization of internet of things

The potential for information available from smart homes built from consumer electronics to facilitate coercive control has previously been raised by McKay and Miller (2021). Work by Stephenson et al. (2023) identified common abuse vectors for internet of things and more recently, Brown et al. (2025), analysed the abusability of 13 consumer internet of things devices available in Australia, including smart doorbells, fitness trackers, and an air conditioner. The authors identified seven types of internet of things design features that could facilitate misuse, including weak user profile protections, limited recording of access logs, and lack of clear activity indicators, and noted that a *safety by design* approach could significantly curb potential abusability.

In each of these examples, access to and exploitation of information provided by devices and apps was the enabling factor that facilitated the perpetration of interpersonal harms. However, much of this work has focused solely on technology and technological solutions to this problem, rather than on the information itself.

A blind spot within LIS

The LIS literature has traditionally paid significant attention to information needs, with some authors even arguing that information needs should be included as a primary need in Maslow's hierarchy—on the same level as food and shelter (Cole, 2025). However, there has been little

discussion about when information should be withheld, except in the context of privacy. Even so, this discourse is generally framed around preventing the misuse of sensitive data by institutions (Cervone, 2016), rather than on interpersonal harm. This oversight may be because feminist conceptions of interpersonal privacy are considered niche, rather than normative (Slupska, 2019). By contrast, computing disciplines like cybersecurity and human-computer interaction have been concerned with the use of information technology in perpetrating intimate threats or domestic and family violence for over a decade (Dimond et al., 2011). There is also the concept variously known as *safety by design* or *prevention through design*, which emphasises anticipating and proactively mitigating potential technological threats during development, rather than as an afterthought (Brown et al., 2025).

Searches conducted in the LIS database *Library & Information Science Abstracts* (LISA) for peer-reviewed articles using the keywords '*intimate threats*' (0 hits), '*safety by design*' (1 hit), and '*interpersonal violence*' (9 hits) in their abstract and summary text reveal that these terms are all but non-existent in the LIS literature. While related terms like '*intimate partner violence*' (44 hits) do appear, much of this literature is focused on supporting the information needs of survivors of violence and technology-based interventions rather than on investigating the role of information in facilitating interpersonal violence. Despite the demonstrable role that information access plays in the perpetration of interpersonal harms, LIS researchers do not seem to have substantively engaged with this topic yet. Perhaps, like second amendment gun rights advocates, could the discipline's preoccupation with information access have led us to turn a blind eye to legitimate reasons why information needs ought to be denied?

Conclusion

LIS has long concerned itself with how people gain access to information and, as a discipline, we have predominantly considered greater access to information a social and public good. In this paper, we demonstrate that information ought to be treated with more care, showing it to be strongly implicated in digital interpersonal harms. Previous attempts to address such harms in other disciplines have predominantly focused on perpetrators or technologies, rather than examining the information flows as a possible mechanism for intervention. Surprisingly, information science has largely been absent from these discussions. The understanding of information flows, uses, and impacts that LIS could bring might be key to solving this problem, but we will need to reconsider our position that more access to information is necessarily better. It is time for us, as a field, to recognise the myriad ways in which information in the wrong hands is, indeed, a gun, and work towards a solution.

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Passing the vibe check: initial findings from an investigation into the health information behaviours of LGBTQ+ individuals with disabilities

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Abstract

Introduction. We report on initial findings from an exploratory investigation into the health information seeking behaviours of LGBTQ+ people with disabilities. Previous research has shown that these groups individually have specific health information needs, but few investigations have focused on individuals with both identities.

Method. Semi-structured interviews were conducted with five participants via Zoom. These interviews were recorded and transcripts were used for analysis.

Analysis. Qualitative analysis was carried out using both deductive and inductive techniques through the Atlas.ti program.

Results. Most sought information regarding their disability, their LGBTQ+ identity, and the intersection of both. They used information sources such as healthcare providers, online searches, and their peers. Barriers were encountered and included a lack of relevant information, invalidation, misinformation, stigma, and information overload. When seeking LGBTQ+ and disability-friendly healthcare providers, intuition ('vibes') were used when information was lacking.

Conclusion. Interviews are ongoing. Initial findings show that intuition and social support are necessary to meet information needs when other sources are unavailable or irrelevant. It also underscores the need for knowledgeable and empathetic healthcare providers that understand and respect the intersection of their identities.

Introduction

The disabled population and LGBTQ+ (lesbian, gay, bisexual, transgender, queer and other identities) population in the United States are larger than often imagined. Around 13.4% of Americans have a disability and 7.6% of American adults identify as LGBTQ+ (Brown, 2023; Jones, 2024; United States Census Bureau, 2024). These two communities overlap significantly – Surfus found that 'disability as a whole in the LGBT community was 156% more prevalent than non-LGBT people' (2023, p. 2).

Research has shown that LGBTQ+ people and people with disabilities as separate groups face unique challenges and experiences with health information seeking. However, there is little research on people with both identities in that area. Intersectionality theory suggests that there may be unique experiences in the intersection of two marginalized identities, like these (Collins, 1990; Crenshaw, 1989). Additionally, previous research has shown that both LGBTQ+ people and disabled people face unique barriers to seeking health information (Delmonaco & Haimson, 2023; Hughes et al., 2022). This research gap and the possibility of unique experiences at the intersectionality of these identities motivate our research. Our secondary focus is on healthcare providers because previous work shows that LGBTQ+ people often seek out LGBTQ+ friendly healthcare providers (Hudak & Bates, 2019). This study is exploratory and aims to provide preliminary insights rather than comprehensive or generalisable findings.

Our research questions are as follows:

1. What factors support or impede the seeking of actionable and useful disability-related information by LGBTQ+ individuals with disabilities when they need it?

2. How do LGBTQ+ individuals with disabilities seek information about healthcare providers and what factors impact their selection?

For this paper we define an LGBTQ+ person as anyone who self identifies as LGBTQ+ via our screening survey. Disability was intentionally defined in broad and inclusive terms. Rather than imposing criteria, participants self-identified, allowing for the inclusion of disabilities and recognizing disability as a lived experience rather than solely a medical classification.

Literature review

Although the health information behaviours of LGBTQ+ individuals and people with disabilities are well documented, there is a notable gap in the literature examining these populations together. Here we define health information behaviours as a term that includes people's health-related information needs and the ways they seek, manage, and use such information (St. Jean et al., 2021).

Health information behaviour of disabled people

Across disability types, individuals often rely on the internet as a primary source of health information (Aref-Adib et al., 2016; Conell et al., 2016; French-Lawyer et al., 2021; Hughes et al., 2022; Robinson-Whelen et al., 2023; Tlach et al., 2015), alongside healthcare providers (Kerner et al., 2019; Maguire et al., 2011). Common needs include information about conditions, medications, side effects, coping strategies, and others' experiences (Aref-Adib et al., 2016; Conell et al., 2016; Tlach et al., 2015; Villani & Kovess-Masfety, 2017). While some individuals share this information with providers to support collaborative care (Conell et al., 2016; Kerner et al., 2019; Villani & Kovess-Masfety, 2017), others avoid doing so due to fears about challenging medical authority (Aref-Adib et al., 2016).

Information seeking is also closely tied to healthcare provider selection. Individuals with disabilities report searching for provider reviews, particularly when seeking mental health care (Villani & Kovess-Masfety, 2017). Peer networks are frequently consulted for experiential knowledge, though some are concerned about the credibility of online information (French-

Lawyer et al., 2021; Hughes et al., 2022; Robinson-Whelen et al., 2023). Limited access to relevant sexual and reproductive health information, frustration over needing to educate providers, and challenges accessing or understanding online information act as significant barriers to using and acting upon health information (Hughes et al., 2022; Robinson-Whelen et al., 2023).

Health information behaviour of LGBTQ+ people

LGBTQ+ individuals frequently rely on the internet as a primary source of health information (Jia et al., 2022). Online seeking is often driven by necessity, including limited in-person resources (DeHaan et al., 2013; Mitchell et al., 2014), experiences of discrimination (Steinke et al., 2017), and heteronormative assumptions by healthcare providers (Flanders et al., 2017). In addition to the internet, peers and community networks offer lived experiences and guidance, though misinformation can be a concern (DeHaan et al., 2013; Delmonaco & Haimson, 2023; Steinke et al., 2017). Healthcare providers are seen as reliable sources by those who use them, but negative experiences and limited provider knowledge can discourage engagement and influence decisions about identity disclosure (Jia et al., 2022).

Jia et al. (2022) also found that sexual health (including STIs, safer sex, general facts, and gender-affirming care) was the most commonly reported topic in studies of LGBTQ+ health information seeking and non-sexual health concerns (such as physical health, mental health, and general wellness) were reported less frequently. Intersectional factors, including age and regional context, further shape information-seeking practices (Kitzie, 2026).

Health information behaviour of people that are LGBTQ+ and disabled

Research at the intersection of LGBTQ+ and disability identities remains scarce, though existing studies suggest a significant overlap in health disparities. LGBTQ+ individuals with disabilities are significantly more likely to delay or forgo care (Lamba et al., 2023), experience higher rates of comorbidities (Kushalnagar & Miller, 2019; Sanfacon et al., 2021) and face high rates of discrimination and educational barriers related to their identities (Jowett & Peel, 2009; Bachmann & Gooch, 2018).

Such disparities are reflected in healthcare interactions. Mulcahy et al. (2025) found that LGBTQ+ individuals with disabilities avoid discussing their sexual or gender identities with healthcare providers due to fear, distrust, or prior negative experiences. O'Shea et al. (2020) highlight the added complexity of repeatedly negotiating multiple identities within healthcare systems, with participants often sceptical of services claiming inclusivity without meaningful practice.

The lack of research in this area and the high potential for experiences of marginalization suggest that our research may start to fill a gap in the literature.

Methods

Recruitment

Outreach to recruit participants was conducted by word of mouth, flyers, emails through listservs, and snowball sampling. Flyers were posted around our university campus and in businesses in the surrounding metropolitan area.

Participants

To be eligible, participants needed to meet the following criteria: 18 years of age or older; reside in the United States; have at least one disability; and identify as LGBTQ+. We required participants to reside in the United States due to the uniqueness of the American healthcare system and allowed them to self-identify as disabled and LGBTQ+.

Thus far there have been five participants. Their relevant demographics are reported below (**Table 1**). Average age of participants is 27.2 years, with all participants between 19 and 35. Three identified as white, one described themselves as Black, and the last described themselves as Asian. Psychological disabilities were more prevalent than physical disabilities. Participants were well educated, with all having at least some college education.

Age	Race/Ethnicity	Education	LGBTQ+ Identity	Disability
29	White	Master's degree	Biromantic asexual	Spinal disc disorder, knee dysplasia, migraines; ADHD
35	Black/African American	PhD	Queer/gay	Schizophrenia
27	White	Bachelor's degree	Bisexual/pansexual	Bipolar
19	Asian	Some college	Non-binary bisexual	ADHD, autism
26	White	Master's degree	Queer	Depression, anxiety; epilepsy, arthritis

Table 1. Participant demographics.

Data collection

Following IRB approval, we began interviews via Zoom in November 2024. Each interview lasted approximately one hour. Recordings were taken to assist in cleaning transcripts. Questions fell within four categories: (1) LGBTQ+ health information seeking; (2) disability health information seeking; (3) LGBTQ+ and disability related health information seeking; and (4) healthcare providers information seeking and selection process. The full interview guide is available in Appendix 1.

Data analysis

Data analysis was conducted using both an inductive and deductive qualitative process. The inductive process involved iterative thematic analysis of the interview transcripts (Braun & Clarke, 2006). The deductive codes were created by translating each interview question into a code. Following each iteration of solo thematic coding, the researchers came together to discuss codes and themes and synchronize codebooks. Our codebook is structured around the four interview sections and the themes our interview questions brought to surface. All interviews were coded using Atlas.ti software.

Findings

Disability related information seeking

All participants sought health-related information, though the extent, frequency, and usefulness of information seeking varied. Sources for disability-related information include family, friends, healthcare providers, scholarly articles, ChatGPT, Google, and social media.

Misinformation was a concern for several participants. Some struggled to find information about their uncommon health conditions, while others experienced information overload. Having the vocabulary (i.e., a diagnosis) helped identify useful resources, though they often faced confusing jargon and outdated information, particularly in more scholarly sources.

LGBTQ+ health related information seeking

Similarly, LGBTQ+ specific information related to sexual, reproductive, and mental health was sought. Information sources included online forums, friends, Google searches, YouTube, healthcare providers, and local queer spaces.

Several participants discussed negative experiences and barriers to finding satisfactory information, including feeling that doctors 'shut down' after mentioning their sexuality. Another spoke about frustration with their own education due to the lack of information about their LGBTQ+ identity. Similarly, the lack of education among healthcare providers about their LGBTQ+ identity led to feelings of invalidation. Lack of knowledge about where to look for LGBTQ+ specific health information was also noted as a barrier. However, one participant found information on an online forum dedicated to their specific LGBTQ+ identity helpful in decision making.

Intersection of LGBTQ+ and disabled identities

Participants sought information related to the intersection of their identities and discussed the impact of their disability/LGBTQ+ identity on information seeking for the other identity. In general, few positive experiences were reported. Participants discussed barriers faced when seeking health information at the intersection of identities, such as feeling uneasy when disclosing their sexuality to get information from healthcare providers and frustration with finding someone LGBTQ+ friendly who specialized in their disability.

Healthcare provider information seeking

When asked about the most important things they must consider when choosing a healthcare provider, being in network for insurance was mentioned by most participants. Distance, being LGBTQ+ or an ally, and open minded were also important factors. Some participants spoke about the necessity of good reviews. Several also said the provider had to have good 'vibes'. Feeling that their experiences were validated as well as having their identity and disability recognized were also important considerations.

About half of participants noted some positive experiences with healthcare providers. Acknowledging their LGBTQ+ identity was mentioned, as were providers that were open minded. However, negative experiences, such as needing to educate providers on their diagnoses and LGBTQ+ identity was a common frustration as was feeling that certain providers 'won't listen', particularly with subjects such as reproductive health.

Discussion

A major theme that emerged is using the 'vibes' of potential healthcare providers as a screening tool to decide whether to continue with a provider. Three participants specifically used the term 'vibes' to describe what they look for in a healthcare provider. When asked how their LGBTQ+ identity impacts their healthcare providers seeking process, one participant (I5) said:

> ...it was based on the vibes, and I was prepared to find a new one if when I went to my first appointment it was wrong... there are especially a lot of older doctors that you know, aren't... Like, they're not outwardly homophobic, per se, but homophobic through the structure of society.

Participants also noted difficulty in finding information about whether healthcare providers are LGBTQ+ friendly, suggesting that LGBTQ+ people may rely on such intuition to make decisions due to a lack of more reliable information. This reflects findings from O'Shea et al. (2020) and McNeil et al. (2023), who found that even with visible markers of inclusivity, participants were

sometimes wary of such claims, emphasizing that true reassurance depended on demonstrated knowledge and respectful care.

These experiences can be understood through Johnson's Comprehensive Model of Information Seeking (1997), which emphasizes how personal characteristics, perceived source credibility, and social context shape information seeking. In this case, participants' reliance on 'vibes' reflects a way of assessing provider trustworthiness and relevance when formal information is limited, guiding decisions about disclosure and engagement.

A related theme that emerged from participants was the lack of LGBTQ+ specific health information and limited healthcare provider knowledge. Social networks and community resources were frequently used information sources, reflecting prior findings that online and peer-based sources are essential for LGBTQ+ health information (DeHaan et al., 2013; Delmonaco & Haimson, 2023; Steinke et al., 2017).

Several phenomena could explain these experiences. LGBTQ+ specific information might be more difficult to find in traditional health information. Bias may also impact how health information is communicated as well as the discussion of LGBTQ+ health.

All participants stated that they would like a healthcare provider that is LGBTQ+ themselves or LGBTQ+ friendly. Yet some participants were frustrated with healthcare providers' LGBTQ+ friendliness, noting a lack of LGBTQ+ specific education and lack of discussions about LGBTQ+-related health.

Conclusion

While several interesting themes emerged in this study of the health information seeking behaviours of people with disabilities who identify as LGBTQ+, the small sample size means it is difficult to draw comprehensive conclusions. Additionally, the sample was not demographically representative of LGBTQ+ and disabled individuals.

In the future, we will expand this study until we reach data saturation. We are expanding recruitment methods to reach people outside of academia.

However, initial findings suggest that a barrier to LGBTQ+ related health information seeking is that information on those topics online and education among healthcare providers are lacking. Participants want providers that understand their LGBTQ+ identities and their disabilities and they cope with a lack of information about healthcare providers' attitudes towards LGBTQ+ people by judging them based on 'vibes'. As more interviews are conducted, we hope to deepen our understanding of these experiences and the factors that shape their information seeking, needs, and intuition.

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Appendix 1: Interview protocol

Hello, my name is _____ and I am a PhD student at the University of Maryland College of Information. We're interested in learning more about the health information seeking behaviour of people that have a disability and identify as LGBTQ+.

This interview will take approximately 1 hour. I would like to video record today's session, or if you prefer simply audio record it, to help me to write up the results of this interview. As part of that, the Zoom autogenerated transcripts will also be recorded and saved. Would that be ok with you? [*If only okay to audio record, then ask participant to turn off camera.*]

Before we begin, I would like to remind you that your participation is voluntary and that you may stop your participation at any time. Additionally, please note that research team members will store and share anonymized study data only on our own personal password-protected computers and/or our University repository, UMD Box.

Do you have any questions for me before we begin?

Section 1: Demographics & Background Information

We'll start off with some basic demographic and background information.

1. What is your age?
2. Can you briefly describe your highest level of education?
3. For this next question, we'll give you a list of potential answers and we'd like you to choose the ones that describe you best. How would you describe your ethnicity or race?
    a. White
    b. Hispanic or Latino
    c. Black or African American
    d. American Indian or Alaska Native
    e. Asian
4. Can you briefly describe your disability?
    a. Probe: Can you tell me the ways it affects you on a daily basis?
5. How do you identify on the LGBTQ+ spectrum?

Section 2: Information Seeking

In the next part of the interview, we'd like to ask you some questions about the ways you find information about your health.

1. Do you seek information related to your disability(s)?
2. Are there any specific people or resources you prefer? Why?
    a. Probe (if social media was mentioned): What has been your experience with health information on social media?
3. Do you seek health information specifically related to your LGBTQ+ identity?
    a. Probe: If not, why?
    b. Probe: Are there any specific people or resources you prefer? Why?
4. Have you ever had any particularly positive or negative experiences with information resources?
    a. Probe: Can you tell me a bit about those experiences?
5. Have you faced any barriers in finding relevant information about your disability?
6. What kind of barriers have you faced in finding relevant health information related to your LGBTQ+ identity?

7. Do you find that your disability has an impact when you are seeking health information related to your LGBTQ+ identity or vice versa?
8. Overall, are you satisfied with the information you find regarding your disability and your LGBTQ+ identity?

Section 3: Healthcare Providers

Thank you for your answers. In this last section, we'll be asking you about your experiences with seeking information regarding healthcare providers.

1. If you needed a new healthcare provider, where or to whom would you go to find information?
    a. Probe: Ask about any technologies or websites they may use, experiences (positive or negative)
2. If you were looking for a new healthcare provider, can you walk me through your process of how you'd go about finding one?
3. What factors are most important in helping you to select healthcare providers?
4. How does your identity as LGBTQ+ impact your decisions around what healthcare provider to choose and how you seek them out?
5. How does your disability impact your decisions around what healthcare provider to choose and how you seek them out?
6. Is there anything else you'd like us to know about your interactions with healthcare providers as they relate to your disability or LGBTQ+ identity?

Section 4: Wrap Up

That's all I have to add – is there anything else you'd like to share?

Do you have any questions that you would like to ask me?

Thank you very much for sharing your experiences with me today.

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Supporting a new generation of informed voters: an interdisciplinary literature review pairing informed voting and current events information behaviours

Nancy Ross Dribin

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Abstract

Introduction. This interdisciplinary literature review pairs research on Generation Z current events information behaviour with informed voting behaviour research to identify areas of overlap, gaps, and appropriate theories to frame further study.

Method. Relevant journals and scholarly databases for information behaviour, information studies, political science, history, and sociology were searched for recent work on the identified topics. Studies were cross-checked for demographic relevance and applicability to the identified topics.

Analysis. Key characteristics for Generation Z current events information behaviour and voting behaviour were identified across articles. These behaviour characteristics were then compared between the two areas of focus to identify where one might be applied to support the other.

Results. The review of literature identifies strong potential for current events information behaviour research to support informed voting behaviour for emergent voters. Commonly occurring information behaviour theories are identified to frame future work.

Conclusions. Literature on current events information behaviour is gaining strength, and research related to the impact of informed voting is robust. Where those two areas meet, however, remains a largely untapped vein to explore. Based on current literature, further study in this direction would help information science practitioners better support young adult information needs related to civic engagement.

Introduction

In the United States, Generation Z will continue to be the youngest demographic of voters for the next five years, and their civic engagement, or lack thereof, has the potential to shape the future of American democracy. As youth voter participation drops, it may be time to change the political issues information environment to re-engage and support Generation Z in voting. To that end, this investigation reviews recent research on young adult current events information behaviour in conjunction with informed voting behaviour to identify areas of overlap, research gaps, and appropriate theories to frame further study. This literature review seeks to identify key characteristics of information behaviour in Generation Z that impact their understanding of current events. It also examines how information science practitioners can work within those constraints to support informed voting.

Background

Generation Z is defined as those born between 1997 and 2012 (Dimock, 2019) and is differentiated from prior generations of young adults largely due to the exponential growth of omnipresent internet access beginning in the 1990s (Katz et al., 2021). They are the most ethnically and racially diverse generation of voters and lean toward progressive values, although this is not uniform (Katz et al., 2021; Della Volpe, 2022). More universally, issues are key motivators for voting, and they hold diverse priorities (Medina et al., 2025). However, they are also disenfranchised and feel left out of discussions related to traditional politics (Medina et al., 2025). As youth voter participation drops, it may be time to change the political issues information environment to re-engage Generation Z in voting.

Impacts and benefits

Research has shown that increased participation in voting strengthens social cohesion, which in turn supports effective collective action, improves community health, and drives community-wide economic growth and resiliency (Castrucci et al., 2024; Lloyd & Lewis, 2024; Prewitt et al., 2014). Additionally, positive early voting experiences impact future voting participation (Dinas et al., 2024). Because informed voting supports increased civic engagement and a positive voting experience (Bernhard & Freeder, 2020; Lassen, 2004), understanding young adult information behaviour and supporting informed voting will have long-term positive societal impacts.

Methodology

A literature review was conducted to identify areas of overlap, research gaps, and appropriate theories between Generation Z current events information behaviour and informed voting behaviour. Searches were conducted of relevant databases and journals, including the Association for Information Science and Technology journals database, ScienceDirect database, JSTOR, the Child Development and Adolescent Studies section of the EBSCO database, *Library & Information Science Research*, *The Library Quarterly*, *Political Behaviour*, and *Political Science Research and Methods*, for example. Key queries used in the search process included Generation Z, Gen Z, young adults, adolescents, teens, students, youth, information behaviour, current events, news, politics, elections, voting, and informed voting. Any articles not specifically referencing Generation Z were date-verified to ensure that the research subjects' ages fell within the 1997-2012 birth year range. As articles of interest were found, they were added to the artificial intelligence (AI) research tool ResearchRabbit to retrieve reference list information, citing articles, and their keywords and abstracts. The results were then reviewed to find further articles of interest. Pew Research was used to supplement demographic and quantitative information unavailable from other resources.

Over 100 articles from well-regarded journals and sources were identified during this search, and two primary criteria were used to determine which would be used for this review. As outlined above, the first criteria looked at generational parameters. While some articles on young adult behaviour provided interesting results in a different context, this review was specifically looking

at participants falling into the Generation Z birth years to ensure the current events and life impacts were similar. Additionally, work originating in the United States was prioritized, though not exclusively, as the goal is to support young adult American voters. Research related to Western democracies was included if the results were transferrable to common events in the United States, such as the act of moving out of parental household as studied by Bhatti and Hansen (2012). These two criteria narrowed the articles considerably. A final review for relevance to the question of how to work within young adult information behaviours to support informed voting completed the selection process.

Current events information behaviour

Generation Z information-seeking behaviour is typically centred on social and digital networks for all content areas, including current events (Buzzetto-Hollywood et al., 2024). Whether the research is centred on behaviours in a formal education setting or tracking general experience, the findings remain true. For example, Agosto and Hughes-Hassell (2005), like Buzzetto-Hollywood et al., found that people and social networks were teen participants' preferred information sources, with electronic sources as their preferred media. This is despite the shift from a university setting for Buzzetto-Hollywood et al. to an informal after-school setting for Agosto and Hughes-Hassell. With a broader range of information-seeking topics, Agosto and Hughes-Hassell concurred that participants used social networking sites to engage with differing points of view on current issues and to share their issue and cause-related support with others.

This trend follows the conclusions of research related to information beliefs driving information behaviour. In a 2018 study by Anderson and Jiang on behalf of the Pew Research Center, roughly two-thirds of teen respondents believed social media helps teens become more civically minded. Respondents also indicated that social media broadened their views by exposing them to different viewpoints and expanding diversity in their social interactions.

However, surveys with 63 undergraduate students conducted by Leeder (2019) showed that participants demonstrated mixed skills in identifying misinformation and an unfortunate lack of ability to evaluate their own skill level in this area. Additionally, there was no connection between the evaluation of trustworthiness and participants' willingness to share information; they were willing to share news items regardless of an inability to verify. Combined with a propensity for satisficing (Dahlen & Hanson, 2023), the unfortunate result is that Generation Z voters often enter the voting booth without accurate information on current events and issues needed to make informed decisions.

Study findings offer guidance on supporting information behaviour within existing Generation Z behaviour characteristics to enhance the accuracy of the information gathered. Agosto and Hughes-Hassell (2005) focus on building stronger relations with trustworthy information sources, primarily libraries. They suggest working with classroom educators, who are noted as a strong influence, and engaging directly with teen audiences to improve the image of libraries as a welcoming and viable resource. As they conclude, '[t]he impact of such research efforts on urban library practices could lead to a badly needed image boost for urban libraries and help to make everyday life information-seeking easier, more pleasant, and more meaningful for urban teens' (pp. 162-163). Likewise, Buzzetto-Hollywood et al. noted the importance of classroom educators building social connections with libraries and librarians to improve their visibility as a reliable source and a go-to option for obtaining information.

Leeder (2019) and Dahlen and Hanson (2023) offer information behaviour strategies and technological solutions that work together to improve the quality of information gathered. Leeder focuses on encouraging and enhancing observed behaviour to improve the effective evaluation of news stories. These behaviours include examining the whole page for a source of information, using multiple sources, allowing time to review sources, and looking deeper than the top search

results. Unfortunately, with satisficing being a challenging behaviour to break, that last strategy is difficult to implement with fidelity. Dahlen and Hanson suggest looking to technical solutions in addition to improving information literacy. They recommend ensuring that search algorithms are accurate and provide needed results at the top of the list.

Informed voting behaviour

Informed voting strives to ensure that each voter heads to the voting booth credibly informed on the issues and people for whom they vote. As young adults leave home, influences on voting participation are increasingly centred on social networks (Bhatti & Hansen, 2012). As outlined above, this tracks with the centring of social networks in information-seeking behaviour related to current events (Agosto & Hughes-Hassell, 2005; Buzzetto-Hollywood et al., 2024). Unfortunately, poor information behaviour habits, such as relying on the top results of a single search results list and selecting information that reinforces preconceived opinions (Leeder, 2019), combine with social information sharing behaviour to move away from informed voting.

It is critical to work within pre-existing behaviours to shift voters to an informed state. For example, issues are key motivators for voting for Generation Z; however, there are diverse priorities instead of clear, leading issues (Medina et al., 2025). Providing accurate, easy-to-share information on an issue-by-issue basis for multiple issues is critical. Additionally, recognising that Generation Z voters feel left out of traditional political discussions (Medina et al., 2025) suggests that reaching out via alternative media avenues and formats would be more effective. Della Volpe (2022) notes that the historical events shaping collective experiences for Generation Z voters have been motivating factors in voting, particularly those impacting members of their generation most profoundly, such as school gun violence. He adds that politicians who address concerns directly and seriously are the most impactful in conveying information to Generation Z voters.

Politicians' information, however, is not always accurate. The miasma of misinformation and disinformation related to current events circulated and recirculated in Generation Z social networks negatively impacts informed voting. It requires looking at information in its current context and role and providing information systems that support effective access and exploration. As Kranich (2024) delves into the threats to American democracy related to citizen participation in this highly polarised era, each issue ties back to roadblocks in accessing and evaluating relevant information. She proposes a central role for libraries in addressing these roadblocks by fostering civic literacy, which significantly overlaps with information literacy. Likewise, Bigger (2024) ties literacy equity with civic fluency, a term he and colleagues coined to represent 'a person's ability to navigate the various components of adult life in community with competence' (p. 89) and is inclusive of, though not limited to, an individual's role as a citizen. Research and implementation projects by both Kranich and Bigger are at the forefront of integrating information behaviour with the needs of informed voting. Expanding the scope beyond libraries into the larger infosphere could build significant research knowledge and support improved implementation projects.

Applicable information behaviour theories for future research

Several theories offer examples of practical frameworks for studying and addressing Generation Z's information behaviour in specific contexts, including informed voting and civic engagement. Most prominently, these theories include satisficing, everyday life information seeking, social network analysis, and sense-making. Brief connections to noted contexts are outlined in Table 1.

Information Behaviour Theory	Connection
Satisficing	Centres on the behaviour of selecting the first acceptable answer instead of continuing to search for the best information (Zoellner, 2010)
Everyday life information seeking	Includes a more specific, contextualised form of satisficing that frames the behaviour as necessary to efficiently manage daily information needs and includes the relevancy of social environment and personal information seeking experience (Savolainen, 2017)
Social network analysis	Centres on the impact of social connections on the flow of information (Jeong et al., 2024)
Sense-making	Specifically, Dervin's ten information assumptions, provide a framework for examining misinformation and excessive information (Cole et al., 2015; Dervin, 1976)

Table 1. Theories relevant to information behaviour crossed with voting behaviour and civic literacy.

These theories rose to the top based on prior use, such as the work of Agosto and Hughes-Hassell (2005) for everyday life information seeking, and specific relevance to behaviour. For example, social network analysis supports the examination of information flow through the social networks critical to Generation Z's information seeking and sharing. When used in conjunction with the other theories, it becomes a powerful tool to visualise and better understand the information flow over networks (Schultz-Jones, 2009). As Schultz-Jones states, '[b]y mapping the structure of interactions, a researcher can identify the channels through which information flows from one node to another and the potential for a corresponding influence of one over another.' Combined with Dervin's (1976) ten information assumptions, this framework is powerful for studying and addressing the flow of misinformation, as well as the sources and impacts of information overflow.

Similarly, given the relationship between satisficing and social information behaviour for Generation Z, the two together provide a powerful lens for research on and addressing concerns related to information quality and validity. Anderson & Jiang (2018) note the extensive participation of teens on social media networks, at almost two-thirds of teens. While this is a boon to diversifying viewpoints, it is also an efficient means to spread misinformation rapidly, especially when information seekers are following satisficing behaviour. Shultz-Jones's (2009) mapping of information flow through Generation Z's social networks highlights the potential for misinformation cascades, where misinformation spreads rapidly through a network, and echo chambers. Social influence on voting operates via these same networks, impacting informed voting (Bhatti & Hansen, 2012). Use of everyday life information seeking's more nuanced view of satisficing to investigate the shape of young adult information behaviour, as demonstrated by Agosto & Hughes-Hassell (2005), can provide critical insight into current events information behaviours. Understanding the nuances of information behaviour in a field-specific theoretical framework supports identification of moments where interventions and resources related to informed voting can have the most impact.

Interventions and future directions

The extensive, practice-based work of Bigger (2024) and Kranich (2024) offer preliminary interventions and directions, centred in their background as information science professionals. The focal point of each is to ensure robust, inviting civic literacy and information literacy programmes and supports. Building on the concept of civic fluency offers an opening to young adults who care more about issues than they understand about how policy and government impact those issues. For these ideas to grow in implementation, however, it is also important to consider the importance of involving Generation Z directly in the work (Agosto & Hughes-Hassell, 2005). Moreover, research exploring current events information behaviour in

conjunction with informed voting could provide more rigorous scaffolding for these interventions.

Given the digital fluency and proclivities of Generation Z, it is also worth exploring technical tools and resources to support these same efforts in a similar framework. Dahlen & Hanson's (2023) work offers top-level suggestions; again, this includes improved search interfaces and instruction in best practices in digital information seeking and sharing. However, given the significant relationship between Generation Z and the digital world, further study of effective means to offer resources and supports directly in the digital realm is a rich vein to explore. Given that teens are seeking easier access to more reliable but also more informal sources of information (Blocksidge & Primeau, 2023), this holds promise as future area of investigation.

Conclusions

While gaps related to demographic divergence remain, research on Generation Z's information-seeking, technology use, and social behaviour related to current events has increased in recent years. Additionally, a robust body of research has looked at the impacts of informed voting on voting behaviour, civic engagement, and societal impacts. It is time to examine these two areas of interest in concert to help information science practitioners best support young adult information needs related to civic engagement, employing robust information behaviour theory frameworks.

Civic literacy research and implementation efforts by Kranich (2024) and Bigger (2024) are examples of work headed in this direction, but combining these areas of research remains largely unexplored. A gap exists in the research literature where young adult information and informed voting behaviours are crossed. Based on the current literature, studying these two areas of interest together has significant potential to help information science practitioners better support young adult information needs related to civic engagement. Furthermore, it supports the hypothesis that understanding young adult information behaviour and supporting informed voting will have long-term positive societal impacts and is a worthwhile direction to explore.

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A literature review of the information needs and behaviours of Black adults and the predominance of studies on health information

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Abstract

Introduction. This is a review of the existing literature on the information needs and seeking behaviours of Black adults as part of a larger dissertation study that discusses the need for information behaviour research of Black adults within the context of traditional knowledge centres.

Results. The results are in progress as this review represents a portion of the overarching information behaviour dissertation study.

Conclusion. While the literature reflects an abundance of information behaviour studies within the health information field, it also reveals gaps in the literature that show an absence of studies that examine other types of information needs of Black adults.

Introduction

Very little literature exists about the information needs and behaviours of Black people within the context of information seeking in cultural heritage institutions. As part of a broader dissertation study, this literature review will examine the existing information behaviour research on Black adults, most of which centres on health information seeking, and discuss the subsequent gaps in the literature and lack of studies outside of the health information realm. An analysis of the existing literature is taken from an intersectional lens (Crenshaw, 1991) that highlights the intersecting oppressions of age, gender, and class alongside race. Cultural heritage institutions have 'an acknowledged mission to engage in the conservation, interpretation and dissemination of cultural, scientific, and environmental knowledge, and promote activities meant to inform and educate citizens on associated aspects of culture, history, science and the environment' (RICHES Resources, 2014, para. 1). For the purpose of this study, cultural heritage institutions are used interchangeably with 'traditional knowledge centres' or 'libraries, archives, and museums'. The study centers on adults who racially identify as Black and are either descendants of enslaved persons in America and/or have cultural backgrounds rooted in Africa or the Caribbean.

Black people and health information needs

The primary area of research regarding the information needs of Black people, and arguably the largest area, lies within health information. Gollop (1997) explored the health information needs of Black women over the age of 65 living in urban areas to determine which socio-economic factors contributed to their health information seeking behaviour. She found that lack of access to health information was not a factor, with many respondents referring to all forms of media, particularly television and magazines, as sources of information. Particularly telling were the results regarding the role of the library in the acquisition of health information. While 98% of participants indicated that the public library was 'likely' or 'highly likely' to provide health information, over 75% of them also indicated that they 'hardly ever' visit the library, and only 13% revealed that they visit the library more than once a year. The study's specific focus on women aged 65 and over must be taken into account as that demographic is only a small proportion of the diverse Black population that this study will address.

Black female college students were the subject of a study by Payton, Kvasny, and Kiwanuka-Tondo (2014) which sought to reveal their information sources and information seeking behaviours in terms of online HIV information. The study indicated that there were several barriers to health information seeking, specifically HIV information and sex education, including denial, misconceptions, and fear of the unknown. Other barriers that hindered their ability to find information included mistrust of health information as well as religious beliefs. The most typical source of information was online searching, but the women also used print media and television for supplemental health information, in addition to traditional sources such as high school, church, family members, female peers, and physicians. A fear of being judged was another contributing factor to what information sources were sought and had a direct impact on whether or not women sought out active resources versus passive resources.

In order to explore stroke education needs for Black women, the Beal (2015) study sought to examine their health information seeking practices. Women ranging in age from 38 to 88 were first surveyed and then participated in focus groups. The study revealed that the women knew very little about stroke and its symptoms, and the general lack of awareness was attributed to various factors such as minimal stroke education provided by health providers, although they did find that television programs were a popular source for health information.

In the Morey (2007) study on the health information seeking behaviour of a particular African American community in Buffalo, New York, residents were surveyed to explore how they seek and obtain consumer health information and to determine what social networks the participants

interacted with to find the health information. In assessing those social networks, the researcher placed emphasis on whether participants had strong or weak ties to the people in their social network who they regularly exchanged health information with. The study found that health service professionals play a major role in providing consumer health information to African Americans and that the Internet, despite its heavy use, has not displaced traditional sources of health information including family and friends.

Assessing the information needs about cancer care for African Americans and Hispanics was one of the objectives of the research study by Muñoz-Antonia et al. (2015) who determined that participants preferred receiving health care and cancer care information from various forms of media including television, the radio, billboards, the Internet, and print media. Moreover, participants indicated that they wanted to receive cancer care information pertaining to education about cancer, treatment options and process, and statistics and general information of specific institutions.

Race and socioeconomic status or class

Spink et al. (1997) investigated the information behaviour of African American low-income households from the Parks at Wynnewood residential housing in Dallas, Texas. As part of a larger urban revitalization and community development project, this study was a needs assessment conducted for the purpose of gathering information about the types of information these households 'need and seek in everyday life to resolve personal or family problems or to reduce the barriers of social isolation' (Spink & Cole, 2001, p. 46). With a particular emphasis on the intersection of class, the study found that the information needs of low-income households were primarily dominated by problems, in other words, residents sought information to aid in the mitigation of day-to-day challenges such as finding money to pay for food or rent, or maintaining the safety and security of their households. Spink and Cole's (p. 57) findings confirm that the 'poor may process information differently than middle-class people due to the environment in which they were raised as children', and therefore, are not always able to perceive information channels or access and process the information that is derived from those channels, resulting in information isolation. The Spink study is conceivably a precursor to this dissertation study in that it is a needs assessment with an intersectional emphasis on everyday life information behaviour. Warren et al. (2010a) make a connection between class and ethnicity in a study of African Americans and online information seeking that found 'class-based and ethnic identities are important predictors of information seeking and web self-efficacy' (p. 692), and that class-based identity seems to take precedence ahead of ethnic identity as a predictor of online information behaviour. Furthermore, the study highlights the importance of class-based identity as a factor in using the web for information seeking and finding. Each of these studies discovers different findings in regard to class, but one underlying aspect that connects them is the idea that class cannot be disregarded when studying information behaviour because it has a significant impact on the perception, access, seeking, and finding of information.

Race and gender

Research at the intersection of race and gender is predominant in the literature with most of the articles highlighting some aspect of health information behaviour that primarily affect African American women. Jones et al. (2018a) conducted a study on cell phone information seeking and blood pressure which found that African American women are actively using mobile technology for the purpose of managing blood pressure. A subsequent study by Jones et al. (2018b) studying the predictors of information use for the purpose of managing blood pressure in hypertensive African American women discovered that information sharing is a significant predictor of information use, and that women who reported sharing were more likely to also use the information being shared. In a successive article on the aforementioned Payton et al. study on online HIV prevention information seeking in Black female college students, authors Kvasny and

Payton (2018) further discuss the hypervisibility of Black women that was a significant barrier to women looking for safe information sources when searching for private or sensitive information. Both articles point to findings, echoed throughout many of these studies, which indicate that the women often mistrusted health information, traditional and religious values shaped their information behaviour, and fear, denial, and misconceptions acted as barriers to information seeking. They deemed the most promising finding to be Black women's need and desire to find information for themselves. Warren et al. (2010b) reveal in their study of barriers to health information seeking that Black women find some health information to be untrustworthy and that they believe information is often withheld from them by health care providers, creating a seemingly insurmountable barrier to health information seeking. Many of the same issues in the aforementioned studies were voiced in the Sanders Thompson et al. (2009) study of health information seeking of African American men where participants also dealt with mistrust, untrustworthy medical sources, values and cultural norms, and other similar barriers to information. The study ultimately confirmed that the participants were highly concerned with access to health information and expressed a need for accessibility issues to be addressed. Issues at the intersection of gender appear to expose the many vulnerabilities of both Black women and men that come with health information seeking.

Race and age

In Gollop's (1997) study about older African American women, age is identified as a significant factor influencing health information behaviour. More specifically, Gollop states that health information and its availability is very important to this population, and like any heterogenous group, they seek information in a variety of ways and from different sources. The rationale for this study reveals that older African American women represent another neglected population which could benefit from further research around health information. Conversely, the information seeking practices of African American young men who have sex with men (AAYMSM) was explored in a study by Rose et al. (2016). This population is often seeking health information about sensitive topics like HIV/AIDS and other sexually transmitted infections, and receives much of their information from peers as well as others in their social networks and the Internet. While their peers play a vital role in their health information seeking behaviours and are their most frequent health information resource, Rose et al. (2016) discovered that African American young men who have sex with men would rather discuss health issues with their parents because of the general belief that parents are responsible for educating their children about their personal health. The study shows 'that parents are still the most preferred source of health information among AAYMSM' (p. 359) and are still vital in the lives of youth, including LGBT youth. While it also features aspects of intersectional oppressions pertaining to gender and sexuality, the findings did not reveal much that illuminated these issues. What we can take away from these studies is that age very much affects the kind of information that is sought and the channels from which it is obtained, and while older adults seem to be confident in finding sources of information through various channels, young adults still have a strong desire to seek information from their parents.

Conclusion

As is evident from this review, the studies do not further identify other information needs that Black people possess. In fact, they succeed in highlighting small segments of the population catering to a niche area instead of providing a broader overview of the needs and behaviours of Black adults. It is clear that obtaining health information has become important for Black people, but these studies do not explore other information needs that this population might have.

While these studies do posit various ways in which Black people seek out information, only one of the studies referred to libraries and their ability to meet information needs. None of the studies addressed other institutions such as archives and museums. Additionally, many of the studies solely examined factors such as low-income or the desire to seek and obtain health information,

but no study examined the information needs of Black people from a broader scope. Many of the studies were successful at identifying information needs and behaviours of Black people, yet they narrowly defined those needs as confined to those with low incomes and socioeconomic backgrounds. This proposed study will address the gaps in research about the broad information needs of Black people beyond health information, making connections between those needs and the ability of cultural heritage institutions to meet them. It will differ from previous studies by broadly assessing the needs of Black people with various intersecting identities. By doing so, the study will possibly allow for a broader discovery and deeper analysis of the information needs and behaviours of Black adult populations through an intersectional lens.

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Non-events and nothings: the potential of negatively defined phenomena for information science

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Abstract

Introduction. We tend to research things that are visible and marked rather than those that are not. Unsurprisingly, 'nothings'—non-things, non-identification, non-presence, non-events, and other 'negatively defined phenomena' (Scott, 2018)—are less prevalent in research undertakings and findings. This exploratory conceptual paper examines negatively defined phenomena and how identifying what is 'nothing' can expand our understanding of the difference that makes a difference (Bateson, 1973). We suggest examining negatively defined phenomena provide an opportunity to broaden our perspective of norms and assumptions and what is given priority as a research topic in the information studies context.

Method + Analysis. Using the case study of Skooliepalooza, a nomadic *un*gathering, we explore non-events as meaningful in their own right. Building on work from Scott (2018, 2019), we consider non-events, dimensions of nothing, with a specific focus on non-identity, and the acts of commission (doing/being non-something) and omission (non-doing/not-being something) that contribute to the 'reverse marking negative space' (Scott, 2018, p. 5).

Conclusion. In this short exploratory conceptual paper, we invite thinking about negatively defined phenomena as sites worthy of research in their own right, not necessarily needing the phenomena to be the opposite of the activity or behaviour, but rather that researching things that are 'non' are valuable.

Introduction

It is always easier to research things (e.g., ideas, objects, processes, structures, systems, concepts, etc.) that *are*: things that are visible, actions that are taken, that can be followed, traced, identified, and broken down into their component parts. It is unsurprising, then, that 'nothings'—non-things, non-identification, non-presence, non-events, and other 'negatively defined phenomena' (Scott, 2018)—are less prevalent in research undertakings and findings. In this paper, we are interested in exploring the power of identifying what is *nothing* in research phenomena (e.g., transience, invisibility, failure, absence, etc.), and how that informs our understanding of the difference that makes a difference (Bateson, 1973). We suggest that examining negatively defined phenomena provide an opportunity to broaden our perspective of norms and assumptions and what is given priority as a research topic in the information studies context.

The following exploratory paper examines the negatively defined phenomena (meaning phenomena that are negatively marked or stated) of *non-events*, considers the various ways to describe and define them, and what that offers information studies research. We apply this to the case study of a nomadic gathering—Skooliepalooza—to examine how non-events are informative and how approaching them as negatively defined phenomena resists pressure to treat 'non' phenomena merely as the inverse of an action or behaviour, and instead pay attention to meaningful nothings.

In an article exploring the prefix that connotes the opposite of the term, we find it important to state what this article is *not*: i.e., philosophies of events (e.g., Deleuze, 1993), nothingness (Sartre, 2018), or other non-theories (e.g., non-representational theory, Thrift, 2007). In addition to not feeling equipped to speak to or with these concepts in particular, this is also just an exploratory, short paper meant to plant a seed rather than describe a tree.

Why non-events

Based on an initial literature review, descriptions of non-events, informed by phenomenological conceptualizations of nothing (e.g., absence, lack) or by other time-space considerations (e.g., voids, gaps), fall into three broad categories: 1) something that did not occur: used to identify when 'anticipated events that either do not materialize or turn into anticlimax' (Löfgren & Ehn, 2010, p. 5) (e.g., Y2K, Crawford, 2001; Adams, 2001); 2) something mundane, can refer to the repeated, the routine—something so familiar becomes invisible (Löfgren & Ehn, 2010); or 3) something counter to, defined or described in negation of something else.

We are particularly interested in the third category, *something counter to*, because it offers an opportunity to challenge norms and assumptions of identifying information phenomena. Our primary interest is exploring a way to research the non-event, which has not happened but was or is believed to be possible, while still honouring that the lack of something happening. We are influenced by the environmental concept of 'leave no trace', holding its significance in what is intentionally absent rather than what is present. Here, 'nothing is a form of social action' (Scott, 2019, p. 161); by restoring environments to their original state and minimizing visible impact, humans engage in a form of environmental 'non-event'. This concept provided the grounding on which the paper is based.

Additionally, considering non-events as negatively defined phenomena could build resistance to framings or impulses to fill gaps and voids. Information studies has tended to describe gaps as voids or nothings that need to be filled or traversed (Belkin et al., 1982; Dervin, 1998). This can lead to extractive framings where information is considered as having commodified value to fill in the gap (cf., Costello & Floegel, 2021; Floegel & Costello, 2022). However, we hope to contribute to recent literature countering this extractive and deficit framing (Gray, 2022; Patin et al., 2020) by taking seriously the possibilities and potential of nothings.

Negatively defined phenomena and non-events in information studies

There is relatively little literature exploring negatively defined phenomena in IS (e.g., avoidance in Soroya et al., 2021), usually integrating them into other descriptions of existing phenomena (e.g., non-use, as in Talja & Maula, 2003). In the context of the academic research community, Talja (2002) describes nonsharing as a phenomenon that involves something that does not exist. More recently, literature has examined non-information, which the authors describe as information that does not exist or the non-existence of information (Huvila et al., 2023, p. 794). They identify gaps as potentially productive, suggesting that 'sometimes … non-information can make an equally great or even greater difference' (Huvila et al., 2023, p. 793). Non-information and information gaps are considered in many contexts, including archaeological documentation, health care, gambling, etc. It is interesting to note that since the Huvila et al., conference publication was of a panel description, the conversation that occurred is only available to those who attended.

Unsurprisingly, the entry point to non-events in information studies is through the topic of events. In the context of information storage and retrieval systems, Buckland and Larson (2007) consider events as having received little attention. In the write up for their poster presentation, events are defined as 'activities or changes occurring over time' (Buckland & Larson, 2007, n.p.). Non-events are defined as the antithesis: 'if there were no change, we would say that it was a non-event' (Buckland & Larson, 2007, n.p). The authors discuss encoding and markup of events in general, biographical records, and describe various dualities between events, time, agents, topics, place, and space. Events in this way become marked occurrences transpiring in a particular time and space. In a later work slightly expanding on the poster's ideas, lack of change is once again used to identify a non-event, 'and for this reason events cannot be preserved, only described, represented or reenacted' (Buckland et al., 2009, n.p). Though Buckland et al. (2009) do not specify the positive or negative aspects of change, expanding non-event to include when it is not necessarily a positive happening (e.g., not trying, not finding out, etc.) could augment understanding (Scott, 2019).

To enrich our understanding of negatively defined phenomena, we turn to examples from sociology and symbolic interactionalism (Scott, 2018, 2019). They describe four dimensions of nothing: 'non-identity; inactivity; absence; and silence' (Scott, 2018, p. 3). As a full exploration of these dimensions is beyond the scope of this paper, we focus specifically on non-identity, which is described as 'self-identities that are based on not doing or being certain things' (Scott, 2018, p. 7). In their paper, Scott and Lockwood (2024) connect non-identity to how we talk about becoming: 'identities can also be negatively defined by things that we miss, lose, choose against or events that never happened' (p. 472). Scott offers ways of thinking of these dimensions through the social acts of commission (choosing to avoid doing/being something) and omission (passively neglecting or failing to act) (Scott, 2018, 2019).

In what follows, we have two main objectives: 1) Consider the case study of Skooliepalooza as a non-event as a counter to an 'official' event; 2) Examine non-identity and acts of commission and omission to bolster our understanding of a non-event as information science phenomena.

Case study: Skooliepalooza

To exemplify the concept of a non-event, we draw on an ethnographic case study exploring vehicle residents' information practices. While the larger project encompassed multiple field sites throughout California and Arizona, this excerpt focuses on one field site in particular—the 2024 Skooliepalooza, located in the desert on Bureau of Land Management land, near the California and Arizona border. Data was collected during the event while Author 2 lived in her own vehicle from January 20-27, 2024 through several means, including through participant observation (Lareau, 2021), information horizon interviews (Sonnenwald et al., 2001), guided tours (Thomson, 2018), and photographs of participant's vehicles and their immediate information spaces (Duneier, 1999; Hartel & Thomson, 2011).

Skooliepalooza is an annual nomadic gathering bringing together the Skoolie (converted school bus) community and other nomadic travellers, including vehicle residents. For long-time Skooliepalooza attendees, the gathering is less a festival than a living neighbourhood, a homecoming where nomads reconnect with chosen family and community and share knowledge, skills, and support. Skoolie is an information sharing event. Topics range from Skoolie conversion tips, solar power systems, and plumbing, to budget travel and off-grid living. Experienced nomads and builders share insights into overcoming challenges in the conversion process and life on the road. The event encourages collaboration, with attendees often helping each other with projects or repairs. Their ethos centres decentralization, mutual aid, and DIY culture—values that resist commodification and see the community itself as the organizer.

However, Skooliepalooza 2024 highlighted a growing rift between an 'official' trademarked version of the event—with attempts at permitting, mapped zones, and some centralized oversight—and an 'unofficial' or grassroots tradition, where nomads show up and self-organize around a spirit of spontaneity. To bridge this tension, the original community branded the 2024 gathering as an 'Ungathering', signalling that it was not a commercial festival, or an event to be commodified or owned by a singular person or entity, but a community-driven convergence meant to preserve the ethos of freedom, autonomy, and shared responsibility. This framing implies a blatant contradiction. While the Ungathering rejects strict hierarchy and ownership, its very name acknowledges that questions of control, legitimacy, and structure are unavoidable as the event and its community grow.

For the organic Skooliepalooza community, they view attempts to trademark or brand Skooliepalooza as a betrayal of its spirit, reducing what was an organic, peer-driven convergence into a curated, identifiable event run by a single, unelected monarch from outside the community who 'purchased' the trademark to a community gathering they never attended or experienced. Skooliepalooza is not about hashtags, social media attention, official programming, or commodification, but about veteran community members passing down survival skills, newcomers learning to build their buses, and the collective experiment of self-governing a temporary city in the desert (see Figure 1). This perspective insists that the heart of the gathering lies in its anarchic freedom and non-identity, based on not doing or being a specific thing, where authority is diffuse and openly rejected, creativity is communal, and belonging comes from participation rather than purchase.



Figure 1. Depicts a temporary camp or 'neighbourhood' at Skooliepalooza.

The ethic of *Leave No Trace*—or 'leave it how you found it'—is central to the gathering's (non)identity. Rooted in environmental stewardship and nomadic respect for shared spaces, this ethos means treating the desert not as a disposable backdrop for a party but as a fragile ecosystem that sustains the community. The philosophy carries a moral weight because nomads depend on access to these wild places and any damage risks stricter enforcement or closures by land managers. *Leave No Trace* functions as both a practical survival strategy and a cultural marker: an ethic that distinguishes Skooliepalooza's communal, intentional culture from commercial festivals where clean-up is outsourced. Holding each other accountable to this standard affirms the community's belief that the gathering is not just an event but a collective experiment in living in solidarity with the land. When the annual gathering diffuses, and vehicle residents go their separate ways, what was once a temporary city in the middle of the desert ceases to exist, returning to its nothingness state.

Non-event	Dimensions of nothing	Commission choosing to avoid doing/being something	Omission passively neglect fail to act
counter to actively chosen enaction of agency and autonomy branded + trademark	non-identity not doing or being certain things	choosing to be non something or counter to something: Calling it an Ungathering being ex something: former Skoolie participants constructed never identities-deciding not to do: rejection of the gathering as branded and commodified and of strict hierarchy and ownership	non-identification rather than dis-identification: learning what not to do, how not to do

Table 1. Negatively defined phenomena of Skooliepalooza

Skooliepalooza provides an opportunity to think with negatively defined phenomena. Here (see Table 1), the non-event is considered through various dimensions of nothing, as well as acts of commission and omission. The ungathering is a non-event that is counter to the 'official' gathering—it is an enaction of agency and autonomy to counter branded and trademarked aspects of Skoolie. Though it is defined negatively (*un*gathering), it is actively chosen (Scott, 2018). The dimension of nothing particularly relevant is non-identity enacted through acts of commission and omission. Skoolie involved not doing or being certain things or choosing to be a 'non-' of something. For instance, framing an event as an ungathering or identifying as former Skoolie participants. Such positions reflect the construction of 'never-identities,' where individuals or groups define themselves through rejection. For example, countering the commodified or branded forms of gathering, of hierarchies, or of ownership structures. There may also be acts of omission involving non-identification rather than a dis-identification focusing on a process of learning what not to do and how not to do it. It is important to note that negatively defined phenomena were not the focus of the described ethnographic research. We are imposing these dimensions of nothing on the case study to suggest that the exploration of negatively defined phenomena is present even when not specifically sought. We suggest that future ethnographic work could be further enriched by specific focus on non-things, non-identification, non-presence, non-events.

Conclusion

If we were only looking at marks made, we would miss out on 'leave no trace'. By turning our information studies gaze to the unmarked, the non-things, non-identification, and non-events, we can 'study the negative space around marked social objects' (Scott, 2018, p. 6)—what Scott refers to as 'reverse-marking negative space' (Scott, 2018, p. 5). Future research may consider other negatively defined phenomena in IS (such as nonsharing or non-use) and their implications for information needs, seeking, use, as well as broadening the exploration to include other dimensions of nothing (i.e., inactivity, absence, and silence). The authors also see great potential connection between the non-event as mundane, and everyday information behaviour (Savolainen, 2023; Ocepek, 2017).

By taking seriously and paying attention to 'non,' we can also develop capacities, such as patience and noticing, by emphasizing the understanding that events can change or morph through time and space to hold disparate or multiple definitions or descriptions. This can have implications for counterfactual considerations such as misinformation (i.e., the rhetorical device of proving a negative).

In this short paper, we invite thinking about negatively defined phenomena as a site worthy of research in their own right, not necessarily needing it to be the opposite of the activity or behaviour, but rather that researching things that are 'non' are valuable.

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'Bonnetheads' fandom: information experiences of *Little House on the Prairie* cast members

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Abstract

Introduction. Fandom has been explored extensively in LIS research, but a gap exists in the study of information behaviour from the perspectives of fandom subjects. This research explored what motivates former cast members of the *Little House on the Prairie* television series to engage with their fans, as well as the extent to which nostalgia serves as a catalyst for information sharing within the within the *Little House on the Prairie* fandom community.

Method. Using a qualitative approach, six former *Little House on the Prairie* cast members were selected through purposive sampling for a survey with both open- and closed-ended questions.

Analysis. Survey responses were organized and coded inductively, line-by-line, using NVivo 12.

Results. Initial results revealed the prevalence of nostalgia for both fans and cast members. Loyalty, gratitude, and community also emerged as motivators for engagement with members of the fandom.

Conclusion. The study of cast members' information behaviour within fandom may provide insight into the affective dimensions of reliving the past through media and shared experience.

Introduction

The rise of social media has boosted participation in both virtual and in-person fan communities, where shared interests, nostalgia, and parasocial relationships build strong bonds. This phenomenon reflects a broader one in which fandom has become dominant in all areas of entertainment. Through these fandom communities, enthusiasts receive support and admiration, perpetuating a comfort in expressing these interests in public. As a result, 'Geek' culture is growing, and often fans are involved in many different fandoms (Peeples et al., 2018). While current research focuses on information behaviour from fans' perspectives, a gap exists regarding fandom subjects. This research explored motivations for *Little House on the Prairie* cast members' engagement with fans and how nostalgia may prompt fans to engage within fandom communities. The guiding research questions were:

R1: What motivates *Little House on the Prairie* cast members to interact with their fan communities?

R2: How does nostalgia shape the shared information experience between cast and fans?

Theoretical framework

This study explores the intersection of information behaviour and information experience. While LIS research has traditionally addressed utilitarian information-sharing, this study explores the affective dimensions of information–specifically, how emotions like nostalgia drive engagement within fandom.

To analyse these interactions, the study utilized Nora's (1996) concept of lieux de mémoire (places of memory). Although typically applicable to physical places like museums, landmarks, or archives, this study presents the notion that in legacy fandoms, the cast members themselves function as living sites of memory who serve as human archives that enable a shared collective imagining of a world that no longer exists.

Background

From books to television

For generations, children worldwide have read the *Little House* book series by Laura Ingalls Wilder. What began as a literary phenomenon became a long-running television drama (1974–1983) and several movies, ultimately evolving into a 'transmedial world' (The Editors of Encyclopaedia Britannica, 2024; Reagin, 2024, p. 155). As Fatzinger (2015) notes, 'few source texts … evoke such strong memories' as Wilder's novels (p. 39).

This combined legacy earned a devoted fanbase known as 'bonnetheads,' who are 'nearly as loyal as Wilder's readers' (Fatzinger, 2015, p. 39). Set in Walnut Grove, Minnesota, the show explored the Ingalls family's lives, emphasizing themes of respect, forgiveness, empathy, and family values. *Little House on the Prairie* remains a global, top-ranked program in syndication. This enduring popularity establishes *Little House on the Prairie* as a significant site for studying long-term information practices.

Information behaviour in leisure contexts

A more focused study of quotidian (everyday) information behaviour highlights a need for further research into practices surrounding leisure activities, and fandoms have become an increasingly important area of leisure research. While fans are traditionally seen as passionate, enthusiastic followers of something or someone, Price and Robinson (2016) suggested they exist on a continuum, from casual to dedicated, who may produce cultural products relating to a fandom. Understanding these fan practices necessitates looking at information experience, or how individuals sense and feel information rather than how they seek it.

The affective role of nostalgia

Prior studies of fans and fandom have explored information behaviour and information seeking, sharing, and creation practices. The role of affect and emotions has been studied in various contexts in library and information studies (LIS). Ouaknine & Aharony (2020) noted a lack of LIS research on the role of nostalgia, particularly within information-sharing. While Kizhakkethil (2020) connected memory and documentation to fan communities through a diaspora lens and Stahlman (2022) explored nostalgia in data life cycles, further research is needed on the affective dimensions of nostalgia in information behaviour, both generally and in the fandom context. We address this gap using Nora's (1996) lieux de mémoire as a framework to investigate whether cast members themselves act as these affective 'places of memory' for the *Little House on the Prairie* fandom community.

Methods

This exploratory study employed serendipitous and snowball sampling to capture the information experience of fandom subjects. The study originated when a former *Little House on the Prairie* cast member overheard the researchers discussing *Little House on the Prairie* fandom in a conference hotel lobby. We then used purposive sampling to recruit additional *Little House on the Prairie* cast members, or participants 'most likely to yield appropriate and useful information' (Kelly, 2010, p. 317). Recruitment emails sent to eight cast members resulted in six completed surveys.

Data was collected through an online survey with 10 open-ended and 4 closed-ended questions addressing cast/fan interaction motivations (R1) and the role of nostalgia within these interactions (R2). At this exploratory stage, web surveys were suitable because they enable reach within a geographically dispersed, well-defined audience (Hank et al., 2017).

Of the six respondents, all participate in fandom but only one identified as a social media influencer. While a small sample size often necessitates more in-depth qualitative methods like interviews, we first employed a survey to identify the breadth of thematic motivators across a geographically dispersed group. This first phase was necessary to understand cast members' perspectives before moving into more intense qualitative study.

Quantitative data from closed-ended questions were analysed deductively to provide descriptive context, while open-ended responses were analysed inductively using thematic analysis to identify patterns within the data (Braun & Clarke, 2006). Analysis was conducted using NVivo12.

Results

A three-tiered conceptual model was developed from survey responses to categorize how cast members engage within fandom (Figure 1), distinguishing between the broad group of cast members, the subset of fandom participants who attend physical events, and social media influencers who maintain regular online engagement. This represents a range of perspectives from private nostalgia to professional online information-sharing.

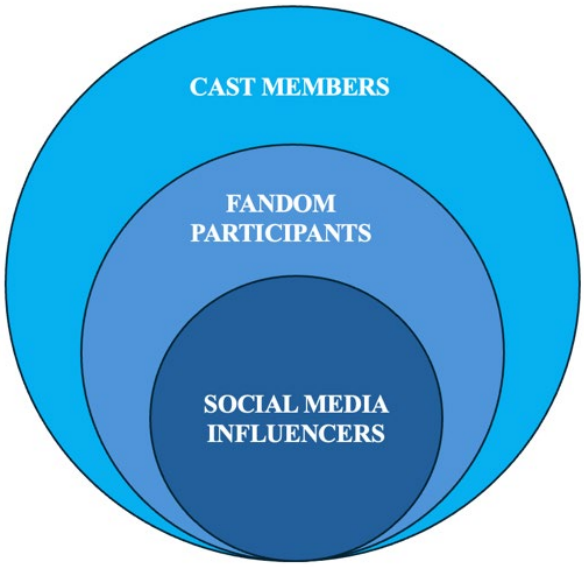


Figure 1. Categorization of cast members according to degree of interaction within fandom.

An inductive data analysis of survey responses yielded four primary themes that directly address the research questions: loyalty and gratitude (addressing R1), and community and nostalgia (addressing R2). Some themes could be further divided into subthemes, as indicated below.

Loyalty

The data reveal a sense of loyalty toward the *Little House on the Prairie* books and television series, serving as a motivator for participation in the fandom for both *Little House on the Prairie* fans and former cast members.

Fan loyalty

Participants emphasized fan loyalty, referencing '*a loyalty and dedication to the books and TV show*,' and '*this incredibly loyal group of people who love Little House*'. Fan loyalty was further described as follows:

> *They are one of the most grateful gatherings of people who are appreciative of what the series meant to them at some point in their lives, what it means to them now, and why they share it with their families. They drive for miles for the chance to meet cast members, and they often dress in costumes, sometimes identical, to the characters in the series.*

Cast member loyalty

Participants also expressed their own loyalty, noting their own fandom of the *Little House on the Prairie* books and television series prior to being cast in the show:

> *Because I loved the books, I watched and loved the series, and I daydreamed of being a part of the show, I honor the responsibility I believe all cast members have to the memory of Laura Ingalls Wilder, to the vision of Michael Landon, and to the fans around the world who continue to support the series and keep it on the air.*

Gratitude

Cast members expressed gratitude for both the experiences of their engagement within the *Little House on the Prairie* fandom community and the financial gain it provides.

Gratitude for the experience

Participants appreciated their experiences both as a cast member within the fan community. One found it '*gratifying to be adored, admired and respected*' and was '*flattered to have been a part of something so impactful*'. Another focused on '*living in gratitude and graciousness having been given the honor of being a cast member*' and feeling 'fortunate to have experienced something very special and rare.' A third participant stated, '*I feel that I owe it to the fans to show my appreciation for their loyalty in making the show what it is*.'

Gratitude for financial gain

Participants also mentioned gratitude for the financial benefits they gain from their role as cast members. One appreciated the '*chance to give back to the people that keep us relevant and employed*'. Another noted, '*It's super fun. And it has become a source of income for me*'.

Community

Participants mentioned the strong sense of community present in the fandom: '*People attend these events because of a like-minded community. This sentiment is common all over the world*'. Another said, '*They want to thank us. They want to be part of the community. They want to know us and be our friends*'.

Meeting fans is rewarding for cast members too. According to one participant, '*Meeting people and hearing their stories of how any particular episode helped them navigate a challenge in their life...it's incredibly inspiring...and again, traveling with my castmates is terrific*'. Also noted in the data was a strong sense of community among the cast members themselves: '*Mostly, I love hanging out with my fellow cast members. This happens at events where we are meeting fans*'.

Nostalgia

The theme of nostalgia, specifically mentioned in the survey and present in the data, was important for both cast members and fans.

Nostalgia of cast members

One participant stated, '*It was a very big part of my childhood that shaped a lot of who I am now*'. Another spoke about their love for the show, the historical era it represented, and their experience within it:

> *I love this time period and I love the idea of it living on forever through film and video.... I always feel like I left one foot back in the past, and my forward moving foot is never eager to march into what seems a cold, techno-future where we spend more time pushing buttons and looking at monitors than we do talking to people and hugging them.*

A participant articulated, '*I think we are all proud of being part of such an iconic, nostalgic show. It makes me want to represent what we created for generations to enjoy*'.

Nostalgia of fans

Participants agreed nostalgia drives fan participation. One noted how the fandom gives them '*a sense of family, of virtues, a return to a time and a way of life gone by, and a feeling of safety*'. Another said, '*We were an integral part of their lives. People had the show on in the background on a loop without having to worry about anything inappropriate. They feel like we were their family*'. Another stated, '[*Little House on the Prairie*] *fans are grounded, salt-of-the-earth, devoted people who represent a variety of occupations, religions, political groups, ethnicities, and age groups. They walk the walk of the characters and stories represented in Michael Landon's Little House on the Prairie TV series*'.

Discussion

The data reveals that cast members are linked by a shared information experience rooted in loyalty, gratitude, and community. Regarding R1, cast members are motivated by a reciprocal desire to '*give back*' to a loyal community through events that facilitate connection among fans and former colleagues alike.

In response to R2, nostalgia functions as a catalyst for engagement rather than just a sentiment. This shared imagined past serves as a bridge where the affective bond transforms traditional information-sharing into a lived information experience. Figure 1 enhances these findings by visualizing how different degrees of engagement—specifically within the Participant and Influencer tiers—contribute to fandom preservation.

Reagin (2024) identified Wilder homeplaces as lieux de mémoire, and this study proves that cast members function as '*living archives*', expanding traditional LIS perspectives by demonstrating that human actors embody the '*emotional touchstone*' more meaningfully than print or digital media (McKechnie et al., 2007, p. 190). These human archives facilitate '*memorable events*' that help fans navigate a '*cold, techno-future*'. These interactions demonstrate how emotion yields insights into how legacy fandoms preserve cultural heritage in the digital age.

Conclusion

This research explored motivations for cast members' engagement and the role of nostalgia within *Little House on the Prairie* fandom. The analysis of data clearly shows that affective dimensions of nostalgia drive participation for both cast and fans. This is supported by motivators like loyalty, gratitude, and a strong sense of community, suggesting that for the broader entertainment industry, the cultivation of affective, nostalgic bonds shows that human connection within fandom endures beyond just the content itself.

The study's small sample size, limited by the age of the series and deaths of most of the adult cast, relied largely on former child actors. The sample, though small, provided vital insights into how nostalgia motivates cast/fan interactions. Phase two of this research will include an online focus group with cast members.

Future studies may investigate how *Little House on the Prairie* fandom acknowledges modern societal issues like racism and feminism. Further research may also investigate the intersections of social computing and online fandoms–specifically, how fandom subjects' use of online platforms might transform parasocial relationships into mediated social computing encounters.

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Hiding in plain sight: the linguistic and behavioural challenges of second language learners in academic search

Tim Leigh and Frances Johnson

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Abstract

Introduction. This study examines the influence of language proficiency on academic online searching, a critical skill in UK higher education. Language has been suggested as a factor shaping search success, particularly for second language English speakers. The investigation explores links between proficiency and search task performance.

Method. Twenty Manchester Metropolitan University students completed a screen-recorded academic search task. Participants included ten first language English (L1) and ten second language English (L2) speakers. Each was asked to locate, evaluate, and record sources for a mock academic assessment.

Analysis. Data were examined through quantitative and qualitative approaches. This involved linguistic and structural coding of search queries, analysis of search engine use, and assessment of collected sources using the CRAAP test for credibility and relevance.

Results. L2 participants demonstrated weaker linguistic control, with limited lexical range, domain mismatches, and semantic errors compared to L1 peers. They also relied less on academic sites and produced lower-scoring sources under the CRAAP criteria.

Conclusion. The study reveals clear disparities in online search between L1 and L2 students, despite shared induction and academic support. Language proficiency appears central to these differences, suggesting that applied linguistics can inform strategies to enhance search practices in higher education.

Introduction

UK higher education (HE) has experienced exponential growth in two areas in recent years. The first is internationalisation: more than 750,000 international students are enrolled in UK HE, accounting for almost 25% of the student population (HESA, 2025). The second is digitalisation: institutions continue to invest heavily in organisational, technical, and pedagogical aspects of a digital campus (Skelton, 2023). With the emergence of these trends comes potential inequality. For those students whose first language is English (L1) and have attained UK secondary and further education qualifications, many will enrol into degree programmes with English language qualifications demonstrating an ability 'to understand literary and linguistic concepts, write fluently and coherently, and demonstrate excellent analytical and critical thinking skills' (gov.uk, 2025). For learners who speak English as their second language (L2), a minimum requirement for enrolment is often a proficiency level defined as the ability to 'function in a variety of environments…with a limited range of nuance and precision' (CEFR, 2025). Potential inequity regarding digitalisation commences upon enrolment, in which HE providers do not ordinarily assess or evaluate a student's level of digital literacy, whilst training of university-led technology is neither mandatory nor part of a student's academic degree programme.

Such disparities may contribute to 'the awarding gap' (OfS, 2025): a statistically significant difference in the classification of degrees awarded to students from different demographic groups. Data consistently shows UK domiciled students as more likely to achieve an upper second-class (2:1) degree than their international peers (HESA, 2025), with literature suggesting the gap is a result of systemic UK HE issues, including pedagogical practices, academic support, and assessment design. UK universities ordinarily assess and grade learners through coursework and with predetermined marking criteria. A key criterion for institutions is the use of secondary sources. To achieve a first-class degree (70% or higher) at our university undergraduates must use deep, broad, and wide-ranging sources. From professional and personal experiences leading a range of undergraduate programmes, our small-scale empirical study aimed to interrogate whether academic online search amongst L2 learners was an added obstacle. To address this question, two research objectives were formulated: to identify the linguistic control and choices of L1 and L2 HE students in query formulation for online searching (RO1), and to identify L1 and L2 HE students' information search behaviour in online searching (RO2).

Literature review

Upon enrolment, UK HE students enters a new 'information landscape' (Lloyd, 2010, p. 9). An environment in which a learner must understand, connect, and utilise a range of social, academic, and operational networks, sources, and systems. For past generations, this ecology existed primarily on campus and developed through human interaction, but for students in the digital age 'an information ecology is often developed through online interactions' (Chang, et al. 2020, p. 3). Within university libraries, sessions and information are frequently delivered on information search strategies to navigate students through this landscape. Yet despite these provisions, much of the literature on online search suggests HE students present a lack of understanding and a range of inefficiencies in search (e.g. Georgas, 2014, Dahlen et al., 2020), with frequent examples of 'rudimentary search strategies and deficits in search behaviour' (Zlatkin-Troitschanskaia et al., 2021, p. 1997). Limitations include the use of unaccredited sources in assessment submissions (Judd and Kennedy, 2011), the inability to recognise issues with search results (Salehi et al., 2018), and the longstanding phenomenon of 'Google dependence' (Bloom and Deyrup, 2015, p. 597). Literature across both library and information studies and applied linguistics has sought to analyse and recommend support for international students, centring on library instruction, English language tuition, and digital skills training. Details on the specific content of library workshops are limited in the literature, however studies such as Sapa (2024) identify common themes across institutions. These tend to include the development of students' information literacy, the use of source

evaluation tools, and the importance of academic integrity. English language tuition for international students is often optional for students, with attendance excluded from a student's academic progression. Digital skills training appears the least consistent of the three areas of support, with universities exhibiting differences in the quantity and mode of training provision.

Yet, decades of search as learning research describes a critical and fundamental context in which the student searches for information to learn about a topic. As identified by Marchionini (1989) such searching would be recognised as a part of exploratory search. Three decades ago, Kuhlthau's (1991) modelling of the exploratory stage recognised the students' somewhat unfocused articulation of their query as driving a need to explore and interact with information retrieved. More recently Urgo and Arguello (2022) describe searching to learn as an iterative process with the searcher acquiring new knowledge by interacting with multiple sources, assessing, and judging the information. Further recognising the cognitive processing in learning searches, they refer to constructivism theory of learning to describe the student searcher as an 'active participant in their own learning process' (Urgo and Arguello, 2025, p. 372). As such, search as learning research aims to characterise search behaviour in learning environments and to explore the factors that may impact on individual's search activities (such as query formulation). For example, the impact of the searchers' expert domain knowledge on search activities (such as number of queries, length of query, pages visited) may be compared as in Zhang et al. (2015). In this study, we explore the possibility that the language attainment of L2 students may be a factor impacting search activities during learning. Drawing on studies within applied linguistics that posit the deep, often invisible academic literacies, such as expected argumentation structures in written assignments, that can be taken for granted but which many L2 students may be challenged to understand (e.g. Baker-Bell, 2020). It may be that L2 students face similar conscious and unconscious challenges when required to search for active learning, and as such, may be 'hiding in plain sight' (Margolis et al. 2002, p. 6) from staff and institutions. Identifying the ways in which language proficiency impacts students' search as learning presents an opportunity to understand the challenges faced and the language needed for students' learning to search.

Method

Data was collected from students on a foundation year BA Honours Business Management undergraduate degree programme, who volunteered to participate in a screen-recorded academic search task. The task rubric asked participants (ten L1 and ten L2) to search and collate relevant academic sources for a draft summative assessment related to the role of Snapchat in business marketing and advertising. To address RO1, a structural-linguistic analysis of participants' search terms was conducted via a computer-based linguistic programme WordSmith Tools (Scott, 2008). This software was able to identify and organise each participant's search language into frequency, cluster length, and part of speech, allowing query (re)formulations to be analysed, coded, and duplicated into a search process flowchart. To investigate RO2, screen recordings were analysed for search engine preference and participant source collation. Analysis commenced with the identification and coding of academic and non-academic sites, with anonymised collated sources then graded by two academics using the CRAAP test (Blakeslee, 2004). By reworking information literacy standards into five criteria the test provides a checklist to evaluate source currency, relevance, authority, accuracy and purpose, and each source was allocated a score (0 (poor), 1 (Fair), 2 (Good), 3 (Excellent)) for each criterion and combined to give an overall score. Although not universally applied across UK HE institutions, this evaluative tool has been regarded as a useful quantifier for students to evaluate sources (e.g. Lewis, 2018) and has been used in similar studies focused on L1 and L2 university students (e.g. Sendurur and Gabriel, 2023). Data triangulation from RO1 and RO2 enabled the development of a holistic search process for each participant, presenting search stages, query formulations, search engine use, and recorded sources (see Figure 1). This representation of each search session enabled analysis of the development of search language, its impact on search outcomes, and comparison between L1 and L2 participants. It also provided an

opportunity to identify recurrent, rhetorical linguistic and behavioural actions, a lens commonly adopted in applied linguistics, specifically within digital genre analysis (e.g. Swales, 1990, Hafner and Pun, 2020).

Participant X	Search move 1	Search move 2	Search move 3	Search move 4	Search move 5
Search language	Is snapchat good for business?	Snapchat business	Snapchat business UK	Social media UK business	Social media marking business
Search engine	Google	Google Scholar	Google Scholar	Google Scholar	University Library
Recorded source CRAAP score	No source	No source	4	8	8

Figure 1. Example of a participant search process.

Findings

In response to RO1, a structural-linguistic analysis of search terms identified differences between L1 and L2 participants' linguistic choice and control. Data from L1 students' search (example shown in Figure 2 below), included the use of the interrogative form. Coded as detrimental to the search task (QRF-), question forms accounted for almost one fifth of L1 search language. Beyond this structure, much of the L1 search language was coded as beneficial to the task (QRF+), with the effective use of hypernyms, fixed expressions, and synonyms related to the search task. Conversely, L2 query formulations revealed a limited range of lexis and a multitude of detrimental linguistic choices, including domain mismatches, lexical divergence, and semantic incompatibility. Figure 3 (below) shows an example L2 participant's search language, with search moves coded as detrimental (QRF-) to successful task completion. In Figure 3, for example, the L2 participant misplaces snapchat as the subject (rather than the object) of the query in search moves 1 and 3 due to the misuse of the preposition 'for'.

Search stage	Search move 1	Search move 2	Search move 3	Search move 4
L1 participant	Is snapchat an effective tool for marking and advertising	Social media marketing campaign	Endorser definition	Snapchat for marketing disadvantages
QRF code	QRF-	QRF+	QRF+	QRF-

Figure 2. Example L1 participant's search language.

Search stage	Search move 1	Search move 2	Search move 3	Search move 4
L2 participant	Points of good marketing for snapchat	Snapchat response to online marketing	Marketing for snapchat	Snapchat news stories
QRF code	QRF-	QRF-	QRF-	QRF-

Figure 3. Example of L2 participant's search language.

Regarding RO2, two key findings emerged from the analysis of search behaviour. First, search engine preference differed between groups. Most L1 participants began on Google, with seven later moving to the academic sites of the university library, Google Scholar, and Science Direct. Their overall visits were balanced across academic (9) and non-academic (9) sites (see Table 1). In contrast, L2 participants commenced searches on a wider range of engines, with Google used in only 4 of 10 first visits and the university library being their sole academic resource. L2 participants also shifted to non-academic sites more often. Whilst only one L1 participant moved to such a site after the first search, four L2 participants did so, turning to Google and Yahoo in later visits (see Table 2). Overall, L2 participants visited academic sites less frequently and relied more heavily on non-academic sources than their L1 peers.

Search engine	Search engine category	Search visit 1	Search visit 2	Search visit 3	Overall visits	Academic vs Non-academic visits
Google	Non-academic search engines	8	0	1	9	9
Microsoft Edge		0	0	0	0	
Yahoo		0	0	0	0	
University Library	Academic search engines	2	4	0	6	9
Science direct		0	1	0	1	
Google scholar		0	2	0	2	

Table 1. L1 search engine visits (academic vs non-academic search engine).

Search engine	Search engine category	Search visit 1	Search visit 2	Search visit 3	Overall visits	Academic vs Non-academic visits
Google	Non-academic search engines	4	2	1	7	10
Microsoft Edge		2	0	0	2	
Yahoo		0	1	0	1	
University Library	Academic search engines	4	2	1	7	7
Science direct		0	0	0	0	
Google scholar		0	0	0	0	

Table 2. L2 search engine visits (academic vs non-academic search engine).

The second key finding concerns search efficacy and task performance. Comparative analysis of CRAAP results highlights clear differences in performance. L1 students demonstrated stronger search skills and collated more appropriate sources. Seventeen of their sources scored 8 or above (defined as good to use and cite), compared with only six for L2 participants. The average CRAAP score further reflects this gap: L1 participants achieved 9.5 (good to cite), whilst L2 participants averaged 5.2 (adequate but not recommended for citation). An additional factor was the distribution of low-quality sources. Amongst L1 participants, 7 of 24 sources (29%) fell into the 3–4 CRAAP score range. By contrast, 70% of L2 sources scored at this low level, including 30 graded as very questionable, with a CRAAP score of 3.

Conclusion

This study highlights how disparities in academic search practices exist between L1 and L2 UK HE students. Whilst a range of institutional support mechanisms are available, including library workshops, English language classes, and digital skills sessions, these interventions are typically generic in content and optional in attendance. The case of a single student cohort, all of whom are enrolled onto the same degree programme, provides a telling example. Despite equal exposure to university introductory support and provision, significant variation emerged in the students' ability to identify and retrieve deep, broad and wide-ranging sources to meet university assessment criteria. These findings suggest academic online search may form part of a hidden curriculum within UK HE. A widely cited definition of this phenomenon is the 'unstated norms, values and beliefs transmitted to students' through formal curricular content and classroom social relations' (Giroux and Penna, 1979, p. 22). In practice, research has translated this definition into a number of HE contexts, including assessment feedback (Johnson, 2020), student disabilities (Van Hees, et al. 2018), and the student profile (Speirs, 2020). In this study, institutional level information and guidance related to finding and evaluating online sources can be found on the university's library website, and explicit reference to the use of sources is intergraded into the institution's assessment marking criteria. Nonetheless, this study implies the disparate practices of online academic student search are potentially hidden from academics, particularly with reference to linguistic control and choice. This raises some concern that university guidance may not be effective in addressing the hidden curriculum. Library guides typically encourage the student to consider their topic and identify key terms. Use of Boolean operators may be explained to encourage thinking about how to express the query. The findings from this study suggest linguistic choices and control of the L2 UK students impacted on search efficacy. Although library instruction seems to suggest that a level of language proficiency and flexibility is necessary to identify the key terms and their relationships within a search.

Future exploration of the data aims to investigate how applied linguistics, specifically digital genre analysis, can contribute to search as learning research. To develop broader academic literacies amongst L2 UK HE students, a frequently adopted approach within applied linguistics is genre-based pedagogy. Described as a practice providing 'students explicit and systematic explanations of the ways language functions in [specific] contexts' (Hyland, 2003, p.18), the integration of a linguistic intervention could play a positive role in search as learning. Grounded in the principle that language is shaped by the communicative purposes of specific discourse communities, genre-based pedagogy provides a structured approach to developing students' awareness of genre and often follows a three-stage teaching and learning cycle: deconstruction, joint construction, and active/independent construction. These stages are pivotal in demystifying the conventions of specific genres and making implicit knowledge explicit for novice learners (e.g. Fenwick and Herrington, 2022). In this study, it was evident L2 participants were limited in their ability to be active in their own learning as they lacked not just the language, but the metalanguage of search. Teaching search as a genre aims to address this challenge by learning from clear explanations how language use achieves effective searches and demonstrating that search can be learnt. Learners analysing search are encouraged to think about the information need and how it is expressed as a query. Further analysis of differences in the queries would help learners recognise reasons for these and the impact on the results. Furthermore, learning to search involves assessing and learning from the retrieved information. In conclusion, this study highlights the need to practise search meta/language to minimise the risk of learners hiding in plain sight. The proposed approach to teach search as a genre strives to reveal search can be learnt and practiced for students to become competent in their search as learning journey.

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Exploring fandom as information practices: a phenomenographic pilot study of Chinese K-pop music fans

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Abstract

Introduction. This paper reports a pilot study exploring how Chinese K-pop music fans experience information practices across multiple digital platforms. The study forms part of a doctoral project that adopts a phenomenographic approach to examine fandom as an information-rich phenomenon situated within constrained socio-technical contexts.

Method. Six participants were investigated through online observation, solicited diaries, and semi-structured interviews.

Results. Analysis revealed four qualitatively different ways in which participants experienced information practices, ranging from non-recognition of informational engagement to purposeful, meaning-laden, cross-platform navigation.

Conclusion. The findings advance the theoretical development of the information practice perspective by extending its application to leisure domains. This study also lays the groundwork for future research to develop a comprehensive outcome space that captures fans' varied ways of experiencing information practices and to explore how socio-technical and regulatory constraints shape their information practices.

Introduction

South Korean popular music (K-pop) has become one of the most significant global cultural flows within the broader Korean Wave (Hallyu). In mainland China, however, K-pop fandom operates within distinctive social and technical constraints. The 'Great Firewall' blocks access to most international platforms (Zhang & Fung, 2017); the unofficial 'Korean Ban' of 2016 limited the exposure of the Korean Wave (Zhang & Fung, 2017; Zhang & Negus, 2020; Sun, 2022); and the 2021 '"Clean and Bright" Fandom Chaos Regulation' introduced further regulations on online fan activities (Cyberspace Administration of China, 2021). Despite these restrictions, over 100 million K-pop fans remain active in China (Ministry of Foreign Affairs of the Republic of Korea, 2023), forming sophisticated fan communities through local platforms such as Weibo and WeChat.

While studies have examined Chinese K-pop music fans as transcultural consumers or K-pop products consumers (Zhang & Fung, 2017; Park & Yoo, 2019), platform users (Zhang & Negus, 2020), a multilingual community (Song & Feng, 2022), and fan labourers (Sun, 2022), little attention has been given to how they experience fandom as information practices—how they seek, interpret, and share information within constrained environments. Consequently, this pilot study aims to explore the qualitatively different ways in which Chinese K-pop music fans experience information practices as part of a larger phenomenographic project.

Theoretical background

Information practice, epistemologically rooted in social constructionism, explores how people engage with information in socially and contextually situated ways (Savolainen, 2007; Given et al., 2023). Within leisure, much of this work has been framed through Stebbins' (2007) serious leisure perspective (Demasson et al., 2016; Cox et al., 2017; Price, 2017; Vesga Vinchira, 2019; Mansourian, 2020). While this framing offers valuable insights, it risks reinforcing a bias that legitimises leisure only when it resembles work. Leisure, whether casual or serious, should be understood as an experience in its own right (Gallant et al., 2013; Kizhakkethil, 2020). Any leisure activity can be approached in different styles, and most activities offer varying levels of skill or behavioural involvement for participants (Shen & Yarnal, 2010). In fact, Stebbins (2007) does not explicitly categorise fans as serious leisure practitioners.

Fandom, as distinct from serious leisure, encompasses a range of activities including language translation (Song & Feng, 2022), data manipulation on digital platforms (Zhang & Negus, 2020), tactical information interpretation (Forcier, 2022), intentional promotional content creation (Guo, 2022), playing platformized language games (Yin & Xie, 2024), and informal learning (Wu et al., 2024). These intricate actions deserve scholarly attention that goes beyond viewing fandom as merely playful or hedonic.

Methodology

This study employs phenomenography (Marton, 1981, 1986; Åkerlind, 2025) to map the variation in how Chinese fans experience information practices. The second-order perspective of phenomenography, which centres on participants' own conceptions, is well-suited to identifying how information is differently understood and enacted across fandom experiences.

Marton and Säljö originated phenomenography as a research approach in the 1970s (Marton & Säljö, 1976; Marton, 1981, 1986). Its contemporary iteration has evolved into a qualitative methodology for investigating both variation and commonality in how people experience phenomena (Åkerlind, 2025). Here, meaning refers to the holistic way a phenomenon is understood or experienced, while structure refers to the structure of awareness that shapes such understanding or experience. Generally, by comparing participants' experiences at a collective level, phenomenographers identify a set of categories that represent the different ways of experiencing (or understanding) the same phenomenon. These categories are then organised into an outcome space that provides

a structured representation of the range of possible ways a phenomenon can be experienced. However, as shown in Figure 1, phenomenographers vary considerably in how they analyse the structure, meaning, and relationships among different ways of experiencing (Yu, 2019; Åkerlind, 2025). Consequently, there is no single standardised procedure for analysing phenomenographic data.

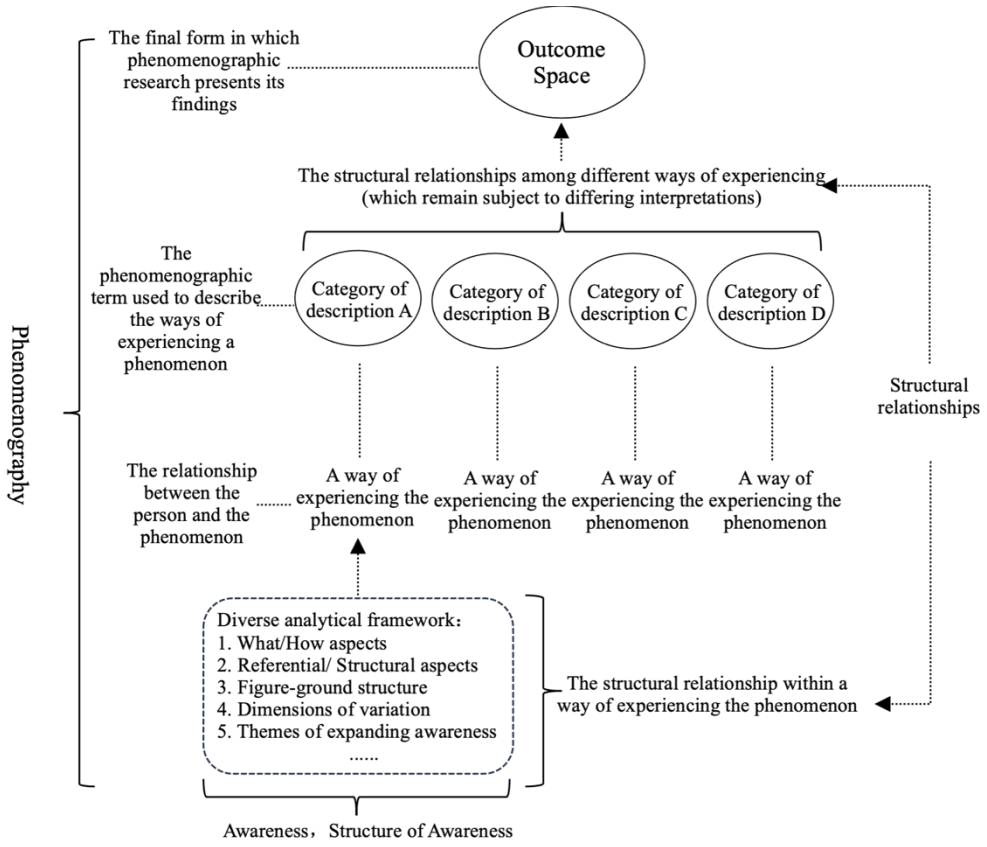


Figure 1. Phenomenography and Its Analysis

Research design

The research project received ethical approval from Chulalongkorn University (COA No. 261/68). Six Chinese K-pop music fans were recruited through purposive sampling. All participants resided in mainland China and were actively engaged in K-pop fandom communities. Data were collected over three weeks using three complementary methods:

- Online observation was conducted over two weeks to examine fans' visible information practices on digital platforms to which the researcher had been granted access. The researcher followed fans' personal accounts on platforms including Xiaohongshu, Weibo, Douban, Bilibili, Douyin, QQ Music, Kugou, Xianyu, Instagram, and X. Additionally, by adding participants as friends, the researcher observed the fans' WeChat Moments. Visible digital traces related to information practice were recorded via screenshots.
- Solicited diaries were used, in which participants described daily fandom activities, platforms used, and reflections on 'information' during the observation period.
- Semi-structured interviews lasting 45–60 minutes were conducted to investigate participants' conceptions of information and associated activities.

Research analysis

Observational data were excluded from the analysis as the researcher recognised that they reflect the researcher's perspective rather than participants' perspectives, which is inconsistent with the phenomenographic second-order perspective.

Phenomenographic analysis is fundamentally inductive and iterative (Voutsina & Stott, 2023). Accordingly, the interview and diary data were analysed through an iterative process of condensing and comparing until a set of preliminary categories of description was identified. As a pilot study, the analysis was limited to presenting these preliminary categories and did not extend to the further development of an outcome space.

Preliminary findings

Analysis revealed four qualitatively distinct ways in which Chinese K-pop music fans experienced information practice:

Category 1: Experiencing no engagement with information

In this way of experiencing, participants perceived their activities, scrolling through feeds on Xiaohongshu or watching videos made by fans on YouTube, as pure entertainment. Information was invisible within their awareness. Fandom was a leisure space centred on affective enjoyment rather than engagement with information, as recorded by participant P01 in her diary (see Table 1).

Solicited Questions	Diary entries of Participant P01 (July 06)
Recall and describe: Which platforms do you use today? What activities do you perform related to the K-pop fandom?	I used Xiaohongshu and YouTube to engage in fandom.
Briefly describe: your thoughts and feelings about why you did it or how you understand these activities.	Today, Natty [a K-pop idol] injured her foot and did not attend the Waterbomb Music Festival. I felt very desperate, and then I spent some time on YouTube watching fan-cams [fan-recorded videos].
Briefly describe: any activities or aspects that you consider related to the term 'information'.	I don't really have any thoughts today.

Table 1. Diary excerpts from Participant P01 illustrating Category 1

Category 2: Experiencing information attributes

In this way of experiencing, participants recognised certain fandom content (e.g., posts, updates, statistics) as information, distinguishing between official and unofficial sources, as reported in participant P02's diary (Table 2).

Solicited questions	Diary entries of participant P02 (July 08)
Recall and describe: Which platforms do you use today? What activities do you perform related to the K-pop fandom?	I listened to music on QQ Music and watched performance stages on Bilibili.
Briefly describe: your thoughts and feelings about why you did it or how you understand these activities.	I suddenly heard a nice song, so I went to watch the performance stage [of this song].
Briefly describe: any activities or aspects that you consider related to the term 'information'.	The video content was related to 'information'.

Table 2. Diary excerpt from Participant P02 illustrating Category 2

Category 3: Experiencing information as embedded actions

Participants perceived their activities related to information, including translation, reuploading [□ □], data compilation, communication with other fans, trading photocards of idols, and sharing videos. In the interview, participant P04 further elaborated on her diary reflections, explaining how she regarded her translation from Korean or Japanese into Chinese and reuploading activities (which means downloading content from international platforms and then reuploading it to local platforms) as information-related practices, as follows:

> *In your diary, you mentioned that you think reuploading, translating, and chatting with other fans who support the same idol [□ □] are all information-related. Can you explain more about that?* (*Researcher*)
>
> *Well, when I saw that question, I thought about which of my daily activities are related to information. First of all, I thought about my identity. I'm basically a blogger who does translation and reuploading. So that definitely includes things like reposting videos, photos, and updates from international platforms. Those are kinds of things related to information. And also, for things like translating variety shows from Korean to Chinese or from Japanese to Chinese, I'd say that's a kind of information integration. Like, every time I post about Eunhyuk and Donghae's schedules, like when they go to or leave work, I don't just repost updates from a single fan site. I usually compile several fan sites, and I don't post just one person either. I always include both of them together.*
>
> *As for translation, it's more evident. It always involves gathering and integrating information, especially recently, with all the comeback activities going on. For example, when a variety show airs, I start cutting the clips, translating them, and then quickly check and polish the translation before uploading it again. So yeah, I really think that's all related to information.*
>
> *And also, chatting with fans who support the same idol feels related to information too. The reason I wrote that part in my diary is that, through talking with them, I get a sense of what's happening in the fandom. Because if I'm always busy reuploading and translating, I will not usually pay attention to what's going on in the fandom. But after chatting with them, I kind of catch up on what's happening. Sometimes, when I'm not in a good mood, I also talk to them a bit. It's a way to vent my feelings, I guess. So, for me, I think these kinds of things are closely related to information.* (P04)

Category 4: Experiencing engagement with information as meaningful action through navigating multiple platforms

In this way of experiencing, participants deliberately navigated multiple platforms to collect, verify, and synthesise information, which suggested a socially situated form of information literacy. At the same time, this way of experiencing imbued their fandom activities with personal and social meaning. Evidence for this way of experiencing information practice comes from the diary entries of participant P03:

> *Recall and describe: Which platforms do you use today? What activities do you perform related to the K-pop fandom? (Solicited questions in Instructions for Participants Recording Diaries)*
>
> *This morning, in the proxy-purchasing [□ □] group I run, one fan saw a post on Xiaohongshu. It was reposted from Olive Young Korea and Instagram, saying that SEVENTEEN's Vernon had just been announced as a new brand ambassador for a skincare product and that the brand would launch an online promotion on Olive Young starting July 1. After seeing it, I first searched for more related posts on Xiaohongshu to check the purchase details, then I went on Instagram to check the brand's official account, and finally, since the announcement was quite recent, I also checked Vernon's big fan site on Weibo to confirm the repost source and details. Based on the official information from Olive Young, I determined the approximate prices and products, categorised them, and reported the details to the proxy-purchasing group. (Diary entries of participant P03, June 30)*
>
> *Briefly describe: your thoughts and feelings about why you did it or how you understand these activities. (Solicited questions in instructions for participants recording diaries)*
>
> *I did this because I feel that each platform has its own advantage: Xiaohongshu is usually the entry point, Instagram gives you the brand's first-hand updates, and the Weibo fan site organises idol-related news in a more timely and accurate way. Cross-checking across multiple platforms not only ensures the information is reliable but also prevents me from missing details that Xiaohongshu posts might omit. It also helps me plan the group members' purchases more efficiently. (Diary entries of participant P03, June 30)*
>
> Briefly describe: *any activities or aspects that you consider related to the term 'information'? (Solicited questions in instructions for participants recording diaries)*
>
> *Basically, the whole process of collecting information on Vernon's endorsed products, checking the brand event date, and comparing details across different platforms is all about 'information'. It's really about gathering, verifying, and integrating advertising- and event-related information. (Diary entries of participant P03, June 30)*

Together, these categories illustrate a spectrum ranging from non-recognition of information to purposeful, meaning-laden engagement.

Discussion

Fandom as socially situated information practices

This study demonstrates vary ways that fans experience information practices. The variation, particularly category 1, supports Cox's (2012) argument that while information is embedded in all social practices, not all are inherently information orientated. Category 2 provides empirical backing for Davis (2015)'s view that, within social media contexts, the terms 'information' and 'content' can be used interchangeably.

In Category 3, fans perceived translation activities as information related. This finding adds a new dimension to the study of fans as information users, which has not been reported in previous research (Vesga Vinchira, 2019; Forcier, 2022). It also demonstrates the methodological contribution of the phenomenographic second-order perspective, which requires researchers to bracket assumptions and approach the phenomenon from participants' viewpoints.

In Category 4, fans enacted a sophisticated way of experiencing information practices by leveraging an entire platform ecosystem to locate and validate information for sustained engagement with transcultural fandom. This way of experiencing can be situated in relation to Lloyd's (2011, 2024) view of information literacy as a social practice enacted within socio-cultural settings. Fans' information practices involve navigating multiple platforms, which supports Waugh's (2018) observation that such practices are not confined to a single platform. However, most prior studies have focused on a single platform, such as Weibo (Guo, 2022) or Twitter (Forcier, 2022), potentially resulting in a limited understanding of fans' information practices. This approach may not adequately reflect today's reality, in which, from fans' perspectives, any single platform functions merely as one of many tools for fans engaging with information. Consequently, such studies may overlook how platforms situated within socio-cultural settings further shape these practices.

This pilot study maps four distinct ways in which Chinese K-pop fans engage with information, ranging from affective enjoyment to purposeful, meaning-laden cross-platform practices. These findings contribute to the theoretical development of information practice by extending its application to leisure domains shaped by socio-technical and regulatory constraints. Future work will involve a larger group of participants to develop a comprehensive outcome space that captures the full range and structural relationships of fans' ways of experiencing information practices and to elucidate how social and technological constraints, including digital platforms and cyberspace governance, shape these practices.

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'The industry will tell you what you're good for:' theatrical typecasting, information embodiment, and body capital

Julia Anne Maxwell

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Abstract

Introduction. Theatrical typecasting is a commonly used practice in the entertainment industry. Job-seeking performers are influenced by the appearance-based culture surrounding role *types*. Typecasting practices categorise according to physical characteristics such as body size, race, or gender. The industry standard structure of typecasting offers an opportunity to understand the information embodiment of performers as they navigate a precarious labor market. This information embodiment amid typecasting can be further understood via the critical-sociological notion of body capital (Shilling, 1991).

Method. Ten pilot unstructured interviews (Rinaldo & Guhin, 2022; Swain & King, 2022) were conducted with professional musical theatre performers in New York City. The conversations held with performers detail the overall information behaviour of theatre performers as they sustain careers in the arts and grow their creative skills.

Analysis. Three of ten interviews (those that were held within the timeframe of this writing) were analysed deductively within the framings of information embodiment and body capital.

Results. Preliminary results show that participants are aware of their embodiment of information as it conveys both type and subjectively desirable physical characteristics. They make strategic role-seeking decisions based on information about type as it is conveyed via industry members such as other actors or casting directors. Bourdieu's (1986) theory of cultural capital along with library and information scholars' work on information embodiment (Olsson & Lloyd, 2017), can be leveraged to understand the aesthetic and social processes influencing the information behaviour of musical theatre performers.

Conclusion. Future research directions, including ethnography or participatory observation, are discussed.

Introduction

Theatrical typecasting (typecasting) is the common theatrical entertainment industry practice of casting according to physical characteristics, such as race, ethnicity, age, gender, or body size, or according to performance skill sets (such as vocal ranges or dance training). These physical characteristics are overtly connected to traditional archetypal roles (types) in musical theatre, such the young ingenue, leading man, motherly older woman, comedic sidekick, or the villain. In tandem with the common practice of typecasting in professional theatre contexts, theatrical contracts are more often offered to white, thin, young, cisgender, able-bodied, and conventionally attractive performers (Actors' Equity Association, 2020; Donovan, 2023). I argue that the process of typecasting, and the labor conditions that compel actors to embody information according to typecasting and classification practices, provide a unique opportunity to study performance artists' information behaviour in the face of embodied classification practices.

Theories from both inside and outside of the library and information science (LIS) canon may provide useful lenses by which to view the information behaviour of actors. Information embodiment, which has been explored in the theatrical context (Olsson 2010a, 2010b, 2012, 2013), offers an opportunity to connect the inherent physicality of performance with the traditional conceptualisations of information behaviour. The underlying political-economic impetus for typecasting, which is deeply rooted in neoliberal conceptualisations of attractiveness (Donovan, 2023), adds additional opportunities for understanding the embodied information of performers who seek roles within industry structures that emphasise type. The sociological construct of body capital, stemming from Bourdieu's (1986) theories of cultural capital, can shed light on actors' information embodiments as they navigate the image-based entertainment industry.

This short paper first details the framings of information embodiment, classification, and body capital as they relate to theatre performers' information behaviour. It then shares preliminary findings on typecasting and information embodiment, which were produced via interviews on the wider information behaviour and information practices of ten theatre performers.

Conceptual framing

Information embodiment can be viewed as a 'corporeal expression' (Bates, 2018, p. 242) of information. Olsson (2010a, 2010b, 2012, 2013) has explored theatrical communities' information behaviour in order to more deeply understand information embodiment, focusing primarily on theatre professionals' practices as they made sense of Shakespeare's works. Character-driven and onstage information embodiment studies demonstrate great promise for the study of theatre performers in the LIS context, and show that theatrical communities are uniquely using, seeking, and making sense of information in both textual and corporeal ways in order to realise a character. However, less is known about how industry pressures in neoliberal labour environments (such as the American professional theatre industry) might influence theatre performers' information behaviour. Specifically, no information science research has explored performers' information embodiment as it relates to appearance-based casting.

Bourdieu's (1986) theory of cultural capital posits that capital is accrued outside of pure economic assets. Capital can be present in dispositions, abilities, qualifications, and traits that allow for ease of navigation in particular social worlds. Bourdieu's cultural capital splits into three forms, including embodied cultural capital, which can manifest through qualities such as accents, shared vocabulary, or 'artistic taste' (Bourdieu, 1990). For performers, embodied capital may be artistic skill or physical traits. By extension, in the case of musical theatre performers, the embodiment of their type via both extrinsic (cultivated traits such as dress style) and intrinsic (inherent traits such as race or ethnicity) physical qualities can be considered forms of capital. Bourdieu's work has been explicitly extended into the realm of physical capital, with scholars examining how human aesthetics and appearance can be leveraged as capital in various social settings (Kukkonen, 2021; Loesberg, 1993).

The sociological notion of body capital has emerged from Bourdieu's theorisation of cultural capital. The notion of body capital holds that physical characteristics such as race, body size, gender, sexuality, or conventional attractiveness contribute to ease of social navigation or experience of social inequality (Shilling, 1991) and are inherently connected to both economic and cultural mobilities in the Bourdieusian sense. In their review of their collective information embodiment research, Olsson and Lloyd (2017) directly connect LIS research to Shilling's (1991, 2012) work on the body as viewed through critical social theory. Olsson and Lloyd conclude that LIS researchers must view the body as '...central to knowledge construction and not just an absent or silenced presence'.

Kuric Kardelis (2023) applies this body capital lens directly to the experience of working actors and establishes that body capital is accrued via the possession of desirable embodied traits. Actors modify their bodies to better suit neoliberal beauty standards that beget greater body capital and, therefore, more desirable roles. In this way, they embody information about physical desirability originally conveyed by the theatrical entertainment industry.

Performers are also forced to be deeply aware of their own physical capital and the embodied information projected to theatrical casting. Actors are frequently encouraged to remove themselves from audition opportunities where pre-published role breakdowns do not fit their *type*. Actors' Equity, the theatrical performers' union, has gone so far as to encourage actors to 'type themselves' in order to streamline the casting process (Actors' Equity Association, 2023). Donovan (2023) also notes that actors that meet these neoliberal appearance standards of whiteness, thinness, ability, or cisgender characteristics are often called upon to don marginalised identities which are not their own, all while talented actors that are fat, trans, older, disabled, or racialised are routinely 'typed out' or excluded from auditions altogether.

As 'people and categories converge', (Bowker and Star, 1999, p. 225), type-based classifications are set by institutions and organisations (the theatrical entertainment industry), maintained by individual bureaucrats (casting directors along with actors' self-typing), and affect individuals (in this case, performance artists). I contend that actors are operating within classification systems that are based around body capital accrual. These systems of classification link desirable physical characteristics to capital in the form of performance opportunities. By modifying their physical bodies, exemplifying type via performance choices, dress, and job-seeking habits, and simply by existing with specific physical identities and traits, performers are embodying information that is interpreted within the confines of industry typecasting.

Preliminary research

A pilot study was designed to explore the information behaviours of US-based theatre actors as they sustain their careers and develop and support their creative practices. The study was approved by the Rutgers University Institutional Review Board.

Unstructured ethnographic interviews were conducted (Rinaldo & Guhin, 2022; Swain & King, 2022). These conversations occurred with professional musical theatre artists based in New York City. Interviews were held in public locations of the participants' choosing. Following an unstructured approach that allows the researcher to be a 'knowledge-producing participant in the process itself' (Brinkmann, 2015, p. 286), a list of conversational prompts took the place of a strict interview guide. Performers were recruited via snowball sampling through the researcher's community ties, and through an advertisement on Playbill.com, a popular theatrical job-seeking website. Professional musical theatre performers with varying levels of experience, from Broadway veterans to recent conservatory graduates, are included in the sample, although the three interviewees whose responses are discussed below skewed toward being fairly experienced and familiar with the New York theatre industry.

At the time of this writing, ten in-depth unstructured interviews were conducted, and three have been analyzed and reported on. Interviews lasted about 75 minutes on average. Perceived type and the practice of typecasting were discussed, along with the wider embodied, affective, material, and situational information behaviours of performance-related labour, such as intuition or emotion, both onstage (Olsson, 2010b) and during job or role-seeking (Medaille, 2010).

Results

Preliminary deductive analysis shows that industry standards and type-based categorisations are upheld by both those being categorised and by those individually enforcing type-based casting (most often casting directors or casting assistants). Theatre performers are consuming information about types desired for particular shows or roles, *and* what traits those types possess. Embodiment occurs when performers develop specific physical characteristics or skill sets, or recognize specific types in their inherent physical traits. Participant 2 discussed the importance of consistently embodying information about ascribed type: '*if [casting directors] don't know who you are or where to place you, they say no. A confused mind says no. Specificity is key*'.

Out of necessity, typecasting was widely accepted and ascribed to by the three performers, although they regularly critiqued its rigidity. Participant 7, a self-described '*white, straight-passing man*,' reflected on similar experiences of being typecast via advantageous embodied characteristics that are imbued with information about role suitability: '*...[casting directors] say 'oh, he should be the lead of our musical because of [those characteristics]*'. Participant 7 also demonstrated a distinct awareness of the embodied information of his '*castability*' as a white man, disclosing:

> *casting will recognize [me] across a spectrum of roles, because people that look like me have played every [expletive] role in the book. I don't have to pave a new path. I could cut my hair tomorrow and play totally different roles.*

These statements by Participant 7 are a distinct acknowledgement of the cultural capital and advantageous embodied information that is imbued in both his whiteness and perceived heterosexuality. Theatrical casting structures historically have privileged whiteness, thinness, ability, heterosexuality, and cisgender characteristics as a 'blank canvas' upon which theatrical stories of marginalisation can be applied (Donovan, 2023). Participant 7's remarks point to another casting reality; the inherent baseline for *leading* roles are white actors with characteristics that are perceived as traditionally *masculine* in western contexts. This casting-related (or self-imposed) exclusion due to embodied characteristics that do not fit pre-conceived archetypes echoes Bowker and Star's (1999) observations of classification as 'political and ethical texturing' (p. 322).

The internal decision to *type oneself* out or exclude oneself from auditioning for certain roles is also based on information projected by other actors in their embodied manifestation of type. Participant 6, an experienced musical theatre performer in her early 30s, discusses her experience with self-exclusion and self-typing:

> *It was just socialised in me that ingenues were tall and skinny...I really struggled with knowing if I could play an ingenue, because ingenues are really beautiful women. Which is sad to say, because I am a beautiful woman. But I didn't know if I had the right look. So, I think I typecast myself...I think I had an internal pressure when I first started, seeing the other kinds of young actresses around me.*

Kuric Kardelis' (2023) findings surrounding the body capital of theatre performers demonstrated that information between the industry and the body of the performer manifests in a two-way exchange. Theatre performers, in many cases, strive for conventionally attractive and appealing bodies in order to accrue the body capital that grants a greater chance at roles. In the same way,

theatrical casting ascribes information onto the bodies of performers, placing them into role categories based on age, gender, skin color, size, ability, and other near-immediate embodied characteristics.

The three interview participants similarly demonstrate a deep awareness of the information they embody, either via inherent identities (such as race or gender) or via body modification (such as weight loss, facial hair growth, or a hair colour change), in order to meet the typological expectations of an appearance-based industry. They also show a deep knowledge of their inherently embodied information to strategically seek roles that fit their 'type.' As Participant 2 notes, '*the industry will tell you what you're good for*'.

Conclusion

Three of ten interviews were analysed, and future analysis of the full dataset may point to other theoretical frames or perspectives on physical embodiment of information in typecasting. Additionally, all three participants discussed here are fairly experienced theatre professionals. When responses of individuals newer to the field are analysed, different perspectives on type and embodiment of type may arise. Other theoretical lenses not explored here may also be useful frames.

Future research beyond unstructured interviews may involve deeper methods, such as critical ethnography in moments of 'critical incident' (Flanagan, 1954), such as audition scenarios. As the researcher is a performing artist with a musical theatre degree, participant observation may also be a way to deeper understand the embodied information of theatre performers.

The physical work undertaken by theatre artists combined with the appearance-based typing system present in the American theatre industry provides a unique setting within which to socio-politically examine information embodiment. These preliminary findings demonstrate that the information behaviour of theatre performers is of interest to the LIS field, especially as these behaviours relate to theoretical framings both within and outside of LIS. In detailing some preliminary qualitative research with this population, embodied information can be clearly linked to notions of body capital within a classification-based, neoliberal typecasting system.

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‘Get rid of the unimportant so that the important can shine’: an exploration of vehicle residents’ personal collections and information practices

Kaitlin E. Montague and Helene Hellmich

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Abstract

Introduction. For vehicle residents—people who live in vehicles—reduction and minimalism are byproducts of living in a small space. Their physical personal collections, and practices around managing these collections, illustrate how information practices can be sustainable.

Method. This multi-method study used ethnographic and visual methods. Data was collected using participant observations, information horizon interviews, guided tours and photographs of participants’ immediate information spaces.

Analysis. For the current study, 25 guided tours and ~125 photographs of participants’ immediate information space were analysed, using abductive analysis and, additionally, visual analysis for the photographs.

Results. Vehicle residents highlighted aspects of reduction, minimalism, and reuse in their engagement with their personal, physical collections. We propose a model of components for sustainable information practices, including each of the three aspects: reduction, minimalism and reuse, placing physical personal collections at the centre of an ongoing (recycling) process.

Conclusion. By looking at vehicle residents’ physical personal collections (and the practices involved in selecting and maintaining them), this study expands previous definitions of sustainable information practices. By pointing to possible components of these practices and focusing on (more tangible) physical aspects, vehicle residents’ information practices are highlighted as an example to further explore sustainable information practices in future research.

Introduction

Conscious and intentional decision-making is an integral part of engaging with information or personal collections sustainably. Vehicle residents—people who live in vehicles—live an information intensive lifestyle, making decisions about information to maintain their daily lives and the physical items, or collections, with which they fill their spaces (i.e., their vehicles) (Montague, 2025). This paper explores how vehicle residents curate their physical personal collections, resulting in sustainable information practices. The concept of sustainable information practices was introduced from human computer interaction (HCI), highlighting the social behaviours through which we can '*create*, *change*, *share*, *and store information*' sustainably (Nathan, 2012, p. 2267). Research in sustainable HCI focuses on the longevity and design of technological systems and tools, while also focusing on how humans interact with these technologies (Laurell Thorslund & Leifler, 2025; Prost et al., 2023). Scholars in Library and Information Science (LIS) have shown an increasing interest in sustainability; although sustainability is not a nascent concept for LIS, its focus has been limited to libraries (i.e., green library buildings, sustainable development of libraries and digital services) and the environmental impact of information and communication technologies (Du, 2022; Kamińska et al., 2021).

The aim of this paper is to take sustainability into consideration in studying personal information management (PIM) and information practices ithout foregrounding technologies as the primary focus. Exploring vehicle residents' PIM and information practices are particularly suitable as they include the physical aspects of their personal collections. Aside from sustainable food practices, sustainability has been understudied in information behaviour and practices research (Du, 2022; Du & Costello, 2025). Combining perspectives from information practices and PIM literature, the authors address physical aspects of sustainable information practices. Using ethnographic and visual methods, findings highlight three themes: reduction, minimalism, and reuse, creating a process model expanding sustainable information practices.

Background

Personal collections

Personal collections, in PIM, are defined as '*documents and items created or collected, intentionally or accidently, by an individual for their personal use in various life contexts, that is held and curated within their personal physical or digital space*', including intangible aspects such as values, making items meaningful beyond their functionality (Krtalić and Dinneen, 2024, p.189; Krtalić & Ihejirika, 2023). Personal collections have been studied in information behaviour as *immediate information spaces* (Hartel & Thomson, 2011). Individuals gradually create personal collections by acquiring, organising and selecting which information items to keep long term (Cushing, 2023; Krtalić & Dinneen, 2024), with behaviours varying widely between minimalism and hoarding (Vitale et al., 2018).

Reduction

Discarding is an inevitable part of personal collection management (Krtalić et al., 2021) and the deletion within digital personal collections has received growing attention (Hellmich & Dinneen, 2025, Vitale et al., 2018), but the reduction of physical personal collections has been omitted. The availability of (physical) space affects collection size and organization, particularly in migration contexts (Krtalić & Ihejirika, 2023) and motivates decluttering (Jones & Ackerman, 2016). Smaller collections can be more inspiring, enjoyable, and easier to maintain and thus, more sustainable, compared to larger collections (Jones & Ackerman, 2016; Krtalić et al., 2021; Petrelli & Whittaker, 2010). However, discarding decisions are difficult for individuals, as they require assessing an item's future use and value (Whittaker, 2011).

Minimalism

Minimalism places '*a high value on living with less*' (Pollak, 2016, p.1229) and improves emotional well-being (Hook et al., 2023). Minimalist lifestyles may be adopted for aesthetic or sustainability and environmental reasons, studied in consumer behaviour as voluntary simplicity, sustainable consumption and anti-consumerism (Muster et al., 2022; Uggla, 2019; Vlieger De Oliveira et al., 2024). Pollak (2016) distinguishes between the adoption of minimalism by choice or by chance/circumstance, highlighting social injustices and societal prejudices. Marginalised populations in particular may fall into the second category, including residents of remote rural areas with limited access to material goods and resources, leading to practices such as repurposing items (Pollak, 2016).

Reuse

Reuse is considered a creative act or repurposing of physical materials and resources. Reuse is a fundamental principle of making, implying a direct relationship with creating and (re-)using resources (Anderson, 2012; Brahms & Crawley, 2016). Makers are resourceful, creating new things from reclaimed and reused materials (Hemmig, 2009). Their resourcefulness and innate open-mindedness allow them to use everyday, accessible materials to create innovative, functional items to meet their needs (Einarsson & Hertzum, 2021; Mace & Ward, 2002). These materials are reused thoughtfully and deliberately, becoming part of their personal collections. The aforementioned reuse practices echo Cushing's (2023) assertion that managing personal information is a deeply intentional, caring process.

Research questions

The following research question guided this study's design and implementation:

How are vehicle residents adapting information practices involving their personal, physical collections that are sustainable?

Methods

Field sites

Fieldwork took place from June 2023-February 2025 in two rounds: 1) in Santa Cruz, California and 2) along the Arizona/California border. For the purposes of this paper, findings will focus on round 2 where the first author lived in their vehicle and volunteered with the National Vehicle Residency Collective, a human rights advocacy organization to attend four nomadic gathering events—the Women's Rubber Tramp Rendezvous, the Rubber Tramp Rendezvous, Skooliepalooza, and Van Aid.

Data collection and analysis

This multi-method ethnographic study utilised participant observation (Lareau, 2021), information horizon interviews (Sonnenwald et al., 2001), 25 guided tours of participants' vehicles (Thomson, 2018), and ~125 photographs of participants' immediate information spaces (Hartel & Thomson, 2011). During data collection, the first author obtained participants' consent for the use of images and quotations in publications and presentations. Findings emphasize photographs and think-aloud transcripts of the guided tours. During the guided tour, participants led Author 1 through their vehicles, describing and explaining its features aloud (e.g., how they built different parts of the interior), while Author 1 took photographs of participants' immediate information spaces. Transcripts were analysed using abductive analysis identifying themes and illuminating quotations (Tavory & Timmermans, 2014). Abductive analysis was used to conduct equal engagement with empirical data and extant theoretical understanding (Thompson, 2022), while visual and inductive analysis were used for photographs and information horizon interview maps (Corbin & Strauss, 2014; Rose, 2012). Three major themes emerged through the analysis: reduction, minimalism and reuse. The following section is organised by these themes.

Findings and discussion

Reduction

Availability, size, and type of space are crucial in shaping vehicle residents' personal collections, making the downsizing of former possessions an essential aspect of vehicle residents' collection management. Participants carefully curate their physical, personal collections housed in their vehicles (i.e., bare necessities to survive such as sleeping space, food and water storage, kitchen equipment, clothes and gear, books, etc., see Figure 1).



Figure 1. Jim's personal collection.

Discarding is a critical practice due to the limitation of physical space. Mo explained, '*I think it just depends on your need for space*', implying a subjective experience of space. Some participants, such as Robyn, shared, '*You're looking at everything I own. Everything is in here.*' Figure 2 depicts Robyn's van, housing all of her belongings.



Figure 2. Robyn's home on wheels housing everything she owns.

Others, such as Bernice, discussed discarding and storing possessions due to having limited space in her van. '*I have a set of skis, snowshoes, flippers and a mask and snorkel. I mean, I really did clear out my home…I have a few boxes of stuff at my parents' house. But really, I just really wanted this to be where I lived, and it is. So, I have all of this stuff*'. In contrast, Jim emphasized the importance of simplicity while on the road:

> *The key is simplicity. Simplicity. And being an ultralight backpacker, you have multiple things that do the same purpose…I've had my life before where it became chaos…I had too much stuff. It didn't bring any happiness…Get rid of the unimportant so that the important can shine. [Otherwise], it's like a picture with too many things in it.*

Reduced collection sizes are one important aspect of sustainable information collections resulting in increased emotional well-being and a sense of freedom and simplicity, echoing previous findings about the advantages of smaller collections such as easier management and greater enjoyment (Hellmich & Dinneen, 2025; Jones & Ackerman, 2016; Petrelli & Whittaker, 2010).

Minimalism

Placing a high value on living with less, vehicle residents are minimalists by choice, chance and/or circumstance due to economic, social or geographical marginalisation. For instance, parking in the desert leads to a minimalistic lifestyle as access to resources, infrastructures, and services is limited. Many participants discussed conserving their resources during long stints in remote places. Brain explained:

> *I got rid of the hot water heater because there was a leak in it. I rarely wanted to heat up five gallons of water. It uses a ton of propane and is very wasteful. Part of the reason I love my lifestyle is that it's a much lesser impact on the environment. Because I have solar, I'm not wasting things. I'm very miserly with my energy usage. And so, I don't like using resources.*

Vehicle residents are constantly making decisions about discarding possessions. Because space and minimising resources are integral aspects of vehicle residency, necessity overrides desire. '*There's things I would like to have, that I'd like to bring, but I don't. Like a kayak because I don't need*

a kayak, but it's fun and I do love that, but you do have to make choices in this life' Jim explained. During the guided tour, Sheila walked through the daily routines she carries out in her minivan, where every item has a purpose and designated place to accommodate all her needs (see Figure 3.). She shared:

> *I transitioned to no shampoo. Less to carry. And so, I just put hot water, you know, as warm as I can take it, and it goes into this (points to bowl)... I feel like I can make such a little impact on the environment. Being humans, we do actually need few resources.*



Figure 3. Sheila's small space with minimal resources.

Minimalism emphasises vehicle residents' environmentally sustainable lifestyles, minimizing use of natural resources and consumption—most often at the cost of comfort—presenting an extreme example of what humans truly need. This extends research about sustainability in information practices (Du & Costello, 2024) and minimalism (Pollak, 2016). research rarely discusses the environmental sustainability of collections (Hellmich & Dinneen, 2022; Hogan, 2018).

Reuse

Living closely with their surroundings, many participants creatively reuse and repurpose materials in their vehicles, engaging in reuse as a key aspect of their sustainable living practices. They utilise inexpensive materials to create and maintain their home spaces (see Figure 4). For instance, Laffrey explained their use of refurbished and recycled materials when building out their box truck:

> *My build is, as much as possible, made out of recycled and reclaimed materials… there's only one brand new two-by-four in the entire build. I also added the door… I pulled the door out of an old UPS truck and installed it. It's one of my favourite pieces. It's all covered with wine foil, just a little bit that covers the cork. My mom had been collecting it for years… I was trying to*

figure out what to cover it with, and she came up with the wine foil. It's just spray adhesive glued on and hammered with a ball-peen hammer. And I made a little window.



Figure 4. Laffrey's box truck created almost entirely of recycled materials.

Another participant, Aidan, the community librarian who runs and owns 'Lucy the Library Bus', shared how he collected and recycled old resources such as wood for his bookshelves inside of the bus. He explained, '*See these lockers? They were originally one giant locker. Like the kind from an elementary school… I liked the vibe because this is the library bus*'.

Reuse stems from the extreme reduction of possessions and the maker perspective including the recycling of materials (environmental sustainability) (Anderson, 2012; Brams & Crawley, 2016; Hemmig, 2009). Creative interactions with personal collections generate additional non-material value and can be considered an intentional creation, adding an aspect of social sustainability to vehicle residents' practices. Reuse parallels the conceptualisation of PIM as care (Cushing, 2023).

Sustainable information practices

Synthesizing the findings and discussion, we propose a 'recycle model of components for sustainable information practices' (see Figure 5), including the three aspects: reduction, minimalism and reuse. The model not only shows the three components as independent from each other but highlights their permeability and the interconnectedness of the practices involved. The personal, physical collections are simultaneously a starting point and result of the ongoing (recycling) process.

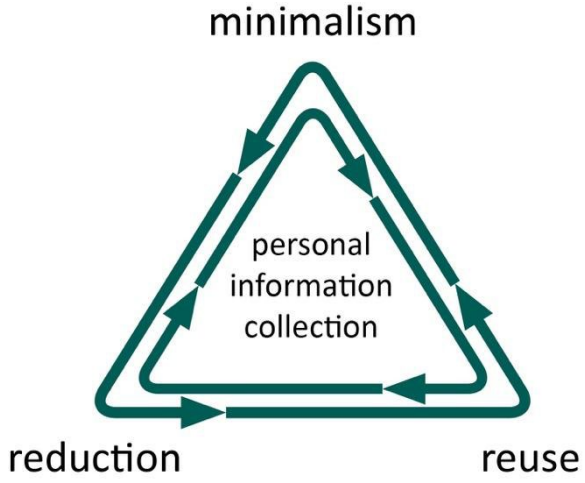


Figure 5. Recycle model of components for sustainable information practices in the personal physical collections of vehicle residents.

Conclusion

Vehicle residents highlight aspects of reduction, minimalism, and reuse in their engagement with their personal, physical collections. Nathan (2012), focusing on digital information practices (e.g. electronic communication), sought to broaden the meaning of sustainable information practices by bringing a social perspective through information practices to sustainable HCI, which has been more concerned with the sustainability of technological devices.

Our study expands this view of sustainable information practices by pointing to possible components of these practices and focusing on their physical aspects. Choosing to look at sustainable information practices from a physical collection perspective adds a tangible layer to the discussion that can serve as a starting point for future investigations on less tangible aspects of sustainable information practices (e.g. in the digital realm). Thus, we highlight vehicle residents' practices as an example to further explore how sustainable information practices are lived and experienced in this community and others with the aim of delving deeper into this area in future research.

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Information as compost: decentring humans in information practices research

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Abstract

Introduction. Information practices research remains largely focused on human activities and interactions, separate from broader environments. Although some approaches emphasise contextual, sociotechnical aspects, the agencies and affordances of other nonhuman beings, objects, and/or environments remain underexplored.

Analysis. Seeking different approaches in order to attend to the entirety and complexities of environments and relationships involved in information practices, two studies where such needs arose are presented as examples: explorations of the information practices of environmental sound recordists and of vehicle residents.

Results. Through engaging with theoretical approaches from other disciplines, the study examples highlight the importance of recognising information and related practices as always in states of decay and renewal, reliant on and in relation with all components of a particular environment.

Conclusion. Preliminary theoretical implications focus on the importance of considering relationships with nonhuman elements and actors alongside sociotechnical perspectives through the concept of information composting. Practical implications ask researchers to further attend to implicated environments and constituent actors/elements when seeking holistic and situated understandings of interactions with information.

Introduction

Despite attention toward a broadening range of constituent elements (e.g., social, cultural, economic), information behaviour and practices research often remains focused on individual human (inter)actions with/through external things (Buckland, 1991; Savolainen & Thomson, 2022), within 'contexts', and rooted in individual goals and desires. Several approaches do emphasise an increasing variety of contextual and sociotechnical aspects of information practices, with resultant (often metaphoric) concepts including information landscapes (Lloyd et al., 2013), information horizons (Sonnenwald, 2005), and information worlds (e.g., Ndumu, 2019). Additionally, affordances and agencies of technologies and systems in the constitution of information practices have been acknowledged (e.g., Huvila, 2021), and there has been an increasing attention devoted to sensory and embodied information experiences, incorporating more environmental factors (e.g., Keilty, 2018; Ocepek, 2018). However, the agencies and affordances of nonhuman actors (e.g., other animals, plants), other elements (e.g., geographic or atmospheric features), and/or broader environments, and how these relate to information practices, remain underexplored.

Minimising the roles and agencies of nonhuman actors/elements in information research may create epistemological limitations through artificial distinctions and binaries between elements and actors (Costello & Floegel, 2021), reinforce existing approaches to understanding and interacting with environments which view nonhuman beings/materials as resources for human use and consumption (Alaimo, 1994; Plumwood, 1991), and perpetuate perceptions of technologies as neutral tools (Noble, 2012). Increased recognition of human and nonhuman actors' and elements' ontological and epistemological hybridity may encourage further moves away from objective research ideals, suggest new critical approaches to understanding information interactions, and support shifts toward holistic information practices research (Nam, 2024; Polkinghorne & Given, 2021). Seeking to broaden attention to the entirety of terrains where information practices are constituted and enacted, we discuss two studies where participants' practices appear as overtly intertwined with nonhuman actors and elements. In this paper, we refer to situated places, including their actors (human and nonhuman inhabitants), and elements (natural and technological) as environments.

Background

Physical space, or a person's environment, has often been considered as a context or setting for information behaviour/practices research (Agarwal, 2017). This perspective suggests how place enables or constrains information access (Gibson & Kaplan, 2017) and how place and information influence, and are influenced by, human behaviour (Sonnenwald, 1999). Temporality and the social nature of human interactions in specific locations or environments shape information flow (Fisher & Naumer, 2006), and social practices construct meanings attached to places and environments (Cox & Fulton, 2021). Yet, far from static (Demeritt, 1994), environments, information activities, and meaning-making emerge through evolving relations and everyday interactions (e.g., snapping the perfect nature photograph or seeking safe parking) (Corbett & Loukissas, 2019).

Information practices literature, when highlighting nature and environments, has primarily addressed information related to environmental concerns. Practices such as recycling, composting, and energy efficient product use (Haider, 2011), climate change communication (Graminius, 2020), sustainable information practices and technology use (Nathan, 2012), and environmentally-friendly living (Haider, 2016) have been considered. Researching biodiversity citizen science, Ekström (2022) highlighted the variability of information practices involved in engaging with environmental information, systems, desires, and material objects. Additionally, information research involving multispecies family living (Solhjoo, 2022) suggests the importance of looking to a broader range of nonhuman actors/elements. However, direct interactions with

environments are rarely discussed in information practices literature. To deepen conceptualisations of the environment in information practices, we thus turn to other theoretical perspectives foregrounding the co-constitution of humans and nonhumans.

Perspectives from other disciplines

Several theoretical/methodological standpoints look beyond human-focused understandings of meaning-making and knowledge production, emphasising the entwinement of all actors/elements in any situation. These include: situated and embodied approaches, highlighting agencies of all objects, technological, biological, or otherwise (e.g., Haraway, 1988); ecological perspectives which understand broader networks or infrastructures as inseparable from people/groups, related actions, technologies, and surrounding environments (e.g., Puig de la Bellacasa, 2016; Star, 1999); and, standpoints which decentre human control and exceptionalism to attend to interspecies relations, dependencies, and productivities inherent to human being, knowing, and doing (e.g., Tsing, 2012). Haraway's conceptualisations of cyborgs (2016a) and composting (2016b) also suggest new ways of understanding and knowing through the hybridity of natures, cultures, and technologies (Huvila, 2021; Wilson, 2009).

In this paper, we specifically draw from the ways soil and compost have been explored, highlighting how all (healthy) life and related activities necessarily exist in states of interdependence, care, and obligation (e.g., Puig de la Bellacasa, 2019). Cycles of composting, living and dying, growth and renewal, can be crucial metaphors for reframing human-nonhuman relationships and for more holistic perspectives on the nature of and contributing factors to human activities. This broad conceptualisation of composting may suggest new approaches to understanding information practices and experiences.

Case study examples

To further explore processes of decay and renewal and the decentring of humans in information practices research, we present examples from two studies: qualitative explorations of the information practices of environmental sound recordists (Stewart-Robertson, 2025) and vehicle residents (Montague, 2025). Particularly, this paper asks: in what ways do the two example studies highlight the interrelatedness of all actors and elements in shaping environments and related information practices? We then examine how positioning humans as always in relation with/to the many active and agentic components of any situation might broaden conceptualisations of information practices.

Case study 1

Uses of environmental sound recording in producing scientific/ecological knowledge have expanded dramatically (Ritts & Bakker, 2021), and rapid shifts in related technologies (Gibb et al., 2019) have increased access to environments and created possibilities for massive data collection and automated analysis. While providing crucial information for understanding, monitoring, and documenting environments and their inhabitants, related information practices and knowledge production activities remain little understood.

To build understanding of the complex situations and information activities involved, Stewart-Robertson conducted in-depth interviews (31) and ethnographic observations (8) with 31 researchers from a range of approaches (e.g., bioacoustics, ecoacoustics, acoustic ecology) and collected a variety of related discourse materials (e.g., recordings, technical manuals, webinar videos). Analysis was done using situational analysis mapping (Clarke et al., 2022; Friese et al., 2021) and grounded theory coding (Charmaz, 2014). Through mapping techniques, all actors (e.g., people, organisations, other animals) and elements (e.g., environmental features, technologies) were assessed non-hierarchically, helping build understandings of constituent relationships (see Figure 1).

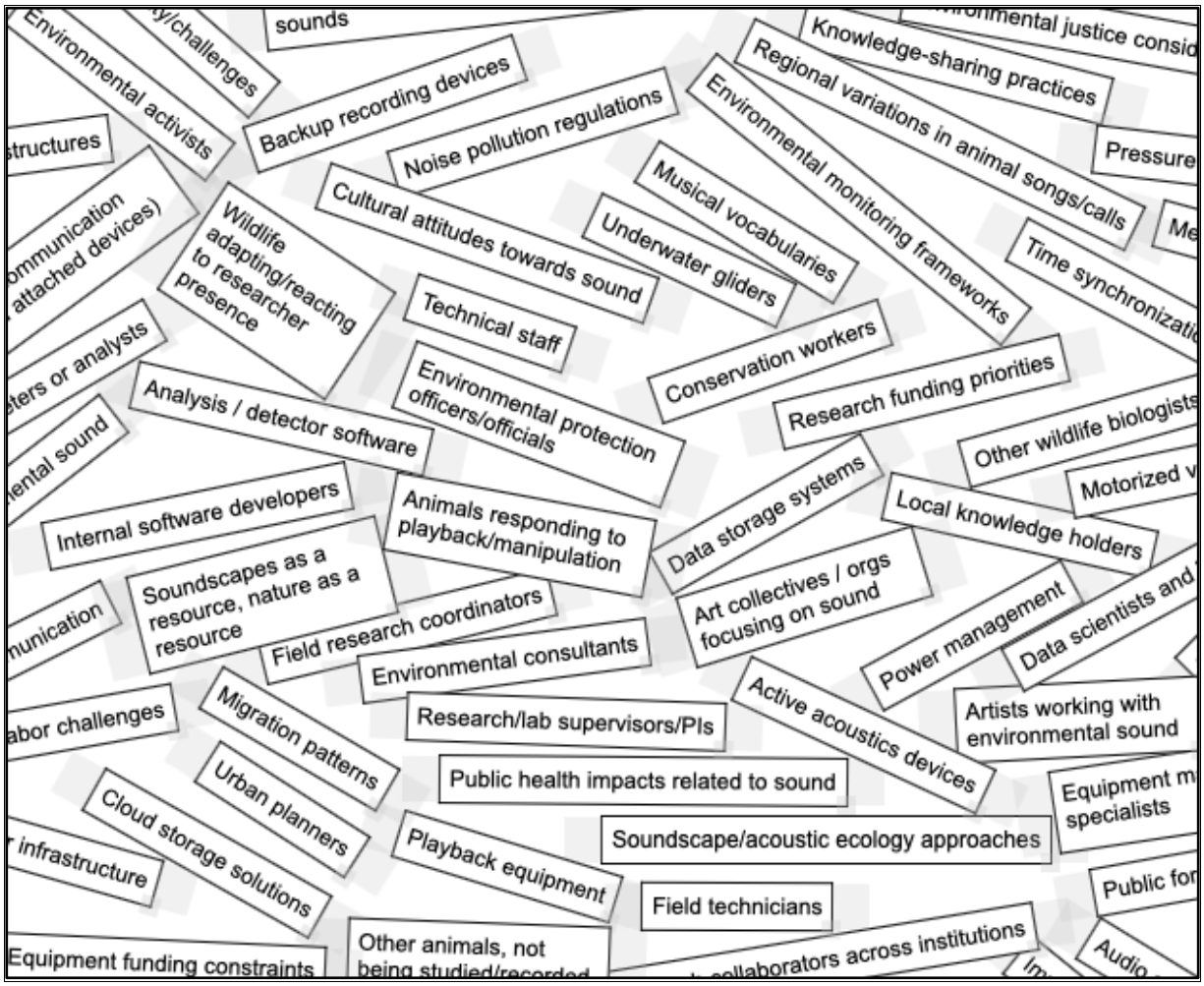


Figure 1. Portion of messy situational map of environmental sound recording practices, displaying related people, organisations, discourses, technologies, and nonhuman animals.

Preliminary findings highlighted how participants' specific skills and literacies for seeking and identifying information from environmental sounds emerged through, and were inseparable from, the complex relationships involved. These relationships comprised actors, elements, and discourses drawn from surrounding environments and geographies, animal behaviours, embodied knowledges, local communities, government regulations, technological affordances, and aesthetic/affective affinities (among others). For example, 'Jazmin', using sound technologies to seek information related to the movement of underwater sediment, described making research decisions, such as choosing recording sites, based on a range of variable environmental and logistical features. By highlighting the roles of such aspects as convenient water access, cable lengths, mooring portability, sand composition, and tidal dynamics, 'Jazmin's' account illustrated some of the ways environments—including features and inhabitants, together with sociotechnical aspects—are involved in the evolving reconstitution of information activities. The diverse elements that either exist within or are required to interact with those environments, combined with the overtly shifting character of many of the environmental components themselves, reveal information practices as continuously forming, reforming, decaying, and renewing through those evolving inter-element relationships.

By bringing themselves into relation with the complexity and variability of various habitats, participants' information experiences and practices, the environments themselves, and the

resulting knowledge produced were also constantly reshaped. For instance, several participants shared information through playback techniques (e.g., reproducing pre-recorded sounds), to seek information from elicited responses of animals and/or to assess human impacts on animal behaviours. Participants also described shifting microphones, based on technological specifications and environmental characteristics, to highlight certain sounds, choosing locations based on anthropogenic sound sources, and making decisions through their own physical abilities and interactions with environments (e.g., their own height and reach relative to surrounding flora). In such situations, lines between seeking, sharing, using, and creating information become especially opaque, and the ways in which information and related practices shift, fracture, and renew through present relations is highlighted.

Case study 2

Montague conducted mixed methods, ethnographic research exploring vehicle residents' information practices. The aim was to understand the relationships among vehicle residents, their most utilised resources, and how their geographic mobility and immediate environments—often based on law enforcement and the disputed legality of vehicle residency (Giamarino et al., 2022; Pruss, 2023)—impact information access.

Data were collected in two rounds, through ethnographic fieldwork, in Santa Cruz, California, and near the California-Arizona border. Methods included information horizon interviews (Sonnenwald et al., 2001), guided tours of participants' vehicles (Thomson, 2018), and photographs of participants' vehicles and immediate information spaces (Hartel & Thomson, 2011). Information horizon interview maps and photographs were analysed using inductive analysis (Corbin & Strauss, 2015), and audio transcripts of information horizon interviews and guided tours were analysed using abductive analysis: a back-and-forth process between research evidence and theory (Tavory & Timmermans, 2014, Thompson, 2022).

Round two included 25 participants, all from various backgrounds. Results pointed to participants' information resources, access, and activities as directly tied to their environments (Montague, 2025). Figure 2 depicts 'Bernice's' information horizon interview map. During the information horizon interview, she referred to the desert's beauty while situating herself within the actual landscape (see stick figure), surrounded by natural elements also representative of information resources. Illustrating a landscape inspired by *The Lord of the Rings* and drawing the foundations of information access, mountains represent information resources about safe parking places, with iOverlander, the highest peak, as the most valuable. 'Bernice' highlighted some of the overt ways in which interactions with environments constitute information practices. For instance, barriers to information access in remote areas explained why paper maps were a necessary information source, always kept in her vehicle.

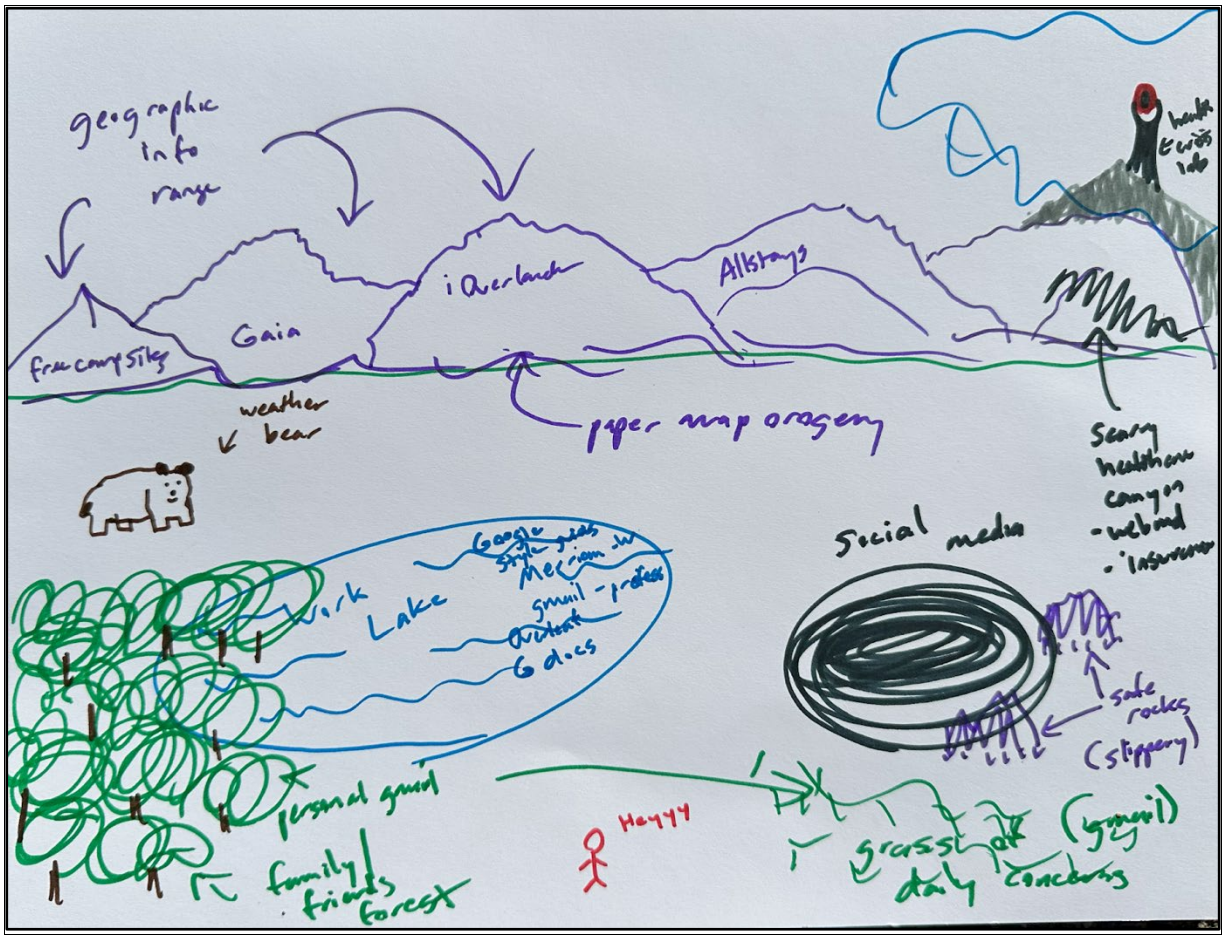


Figure 2. Depicts 'Bernice's' information horizon interview map, illustrating how she considers her environment when assessing available information resources.

Round two findings corroborated those from round one: social factors and parking policies force vehicle residents to the margins (e.g., public land depicted in Bernice's map in Figure 2) (Montague, 2024), while also pointing to more in-depth understandings of the processes and relations unfolding throughout vehicle residents' information practices. Vehicle residents access and require place-based resources for their continued survival (e.g., parking laws), yet shifting locations, environments, and related actors/elements complicate access and use. For instance, parking and parking laws appear as both information activities and resources existing through specific environments. However, environments, as information sources, are continually reconfigured through vehicle residents' mobility, hindering or affording access throughout these environments. Technological affordances also shift through combinations of discursive and environmental elements (e.g., parking laws push vehicle residents out of cellular/Wi-Fi connectivity), reshaping vehicle residents' environments and hindering access. Thus, vehicle residents' information needs and access influence their geographic movements, their environments shape their information practices, and those information practices impact their relationships with various actors and elements, reconfiguring their environments. Such processes highlight the relational interdependence of vehicle residents' information practices with environments and their constituent components; the decomposition and renewal of vehicle residents' information practices occur with/though their environments, echoing the cyclical, relational, multi-actor dynamics of soil fertilisation and conditioning.

Discussion and conclusions

Both examples–seeking and creating information through sound across shifting environments and iterative processes of reforming information landscapes through mobility–highlight the situatedness and fragility of information and related practices. Building from these findings and inspired by Haraway (2016b) and Tsing (2015), we conceptualise information composting to describe activities and interactions within information practices and experiences. For Haraway (2016b), compost-composting emphasises the becoming-with of humans with other interconnected actors/elements, processes of transformation, decay, and renewal inherent in all life/matter. Composting, always active, involving and reliant upon multiple relations, in ongoing states of de- and recomposition, may be understood as an apt analogy for the complexity, non-linearity, and contingency of those information activities understood as comprising information practices. The overtly environment-entangled information practices present in both case studies foreground the interrelatedness of all actors, elements, and activities in a situation. Information composting therefore suggests a direction for moving beyond understandings of information and related activities as static, linear, or discrete, and toward recognising them as always linked to dynamic and local assemblages. Table 1 elaborates on some of the processes highlighted through an information composting-practices perspective.

Decomposing	Existing information practices break down under changing environmental-sociotechnical conditions
Mixing	Heterogeneous actors/elements (e.g., soundscapes, sensor outputs, embodied knowledges, information resources, institutional norms) combine in unpredictable ways
Re-aggregating	New information, understandings, and practices emerge from novel aggregations/assemblages
Renewing	Practices continually (re)cycle, forming or recreating as people and activities move through/with different information environments, tools, and networks

Table 1. Terms and explanations for processes of information composting.

A composting lens foregrounds the inseparability of human activities from interconnected more-than-human communities/environments, where social, technical, and natural are inextricably intertwined. Thus, we suggest information practices, viewed as sociotechnical practices (e.g., Tuominen et al., 2005), must also be socionatural. Understanding doings and sayings with information, as in explorations of everyday life practices (Savolainen, 2008), should ask how those activities also exist through/with other life practices and their socionatural surroundings. Human information interactions are never only human.

Derived from the above case study examples, Figure 3 diagrammatically presents the various processes through which information sources and practices are always reconfigured with and across environments. Preliminary theoretical implications suggest information composting as a way of thinking through the importance of considering environments holistically, alongside sociotechnical perspectives, while simultaneously emphasising the precarity of and processes of decay-transition-renewal always present within information experiences/practices (Stewart-Robertson, 2022). In presenting this concept, we ponder how such attention might lead to new understandings of information practices and new research avenues.

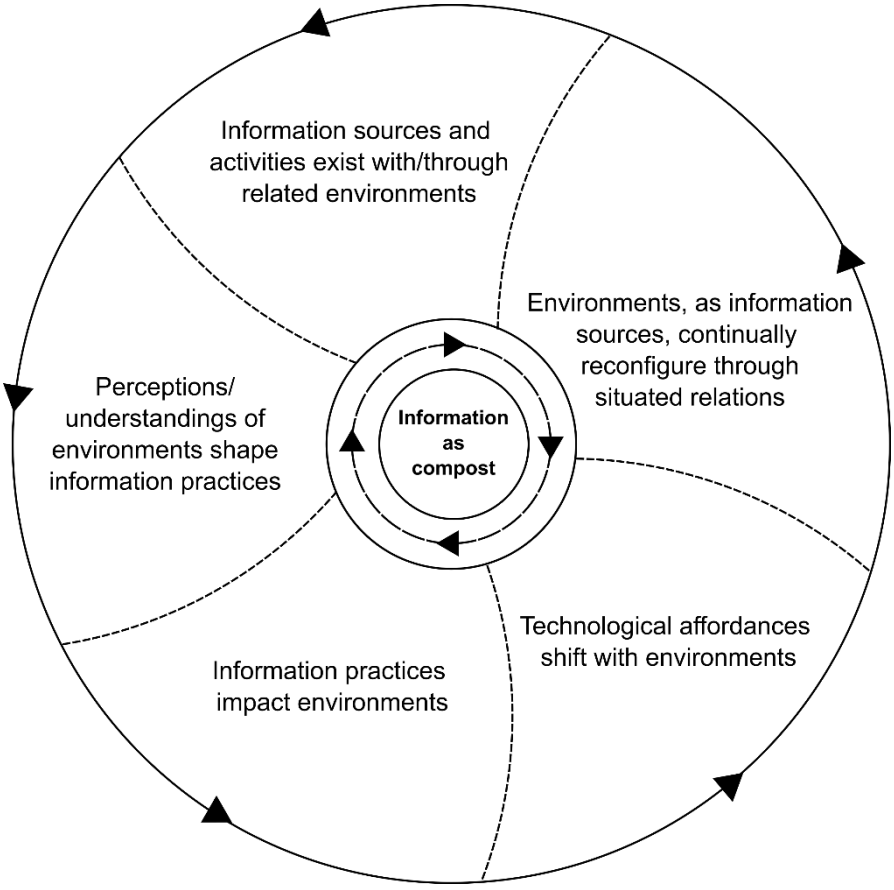


Figure 3. Visual representation of information as compost, through interconnected elements and processes in constant states of decomposition and renewal.

Practical implications suggest researchers attend to all actors/elements, including those of the 'natural' world, in information practices studies, system analyses, and design. Related research might build on existing work related to information transitions (Montague, 2025; Ruthven, 2022; Willson, 2019) and fractured information landscapes (Lloyd, 2017) to explore processes of decay and regeneration as constant and embedded in every information activity (albeit differentially). Future work will expand on information composting, building deeper understandings of how information practices decay and renew across situations. In doing so, we aim to engage other perspectives on relationships to and with land/place/environments absent from normative approaches to information practices and the environment.

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Mapping information uncertainty in hospital wayfinding through patient journey maps

Ladislava Zbiejczuk Suchá

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Abstract

Introduction. This study proposes a replicable framework to detect, code, and visualise information uncertainty during hospital wayfinding across digital and physical touchpoints, treating wayfinding as a distributed information behaviour.

Method. A seven-stage patient journey model (pre-arrival to exit) structures data collection. The unit of analysis is a stage-bounded interaction with a touchpoint.

Analysis. Events are coded with a codebook. Coded units are aggregated into a Stage–Touchpoint–Uncertainty matrix and transformed into heatmaps and patient journeys that display uncertainty peaks.

Results. The framework operationalises uncertainty with observable, time-stamped indicators and supports triangulation.

Conclusion. Journey-based, behaviour-proximal coding makes information uncertainty measurable and comparable across sites. The approach enables evidence-based prioritisation of wayfinding interventions while accommodating variability in hospital contexts and patient needs.

Introduction

Wayfinding is a key part of the patient experience. It is twofold in nature, representing both a design element and a medical problem. Well-designed wayfinding systems in hospitals offer numerous benefits, including reduced stress and anxiety for patients and visitors (Morag et al., 2016; Petermans & Mattiello, 2022). Effective wayfinding can save costs by decreasing missed appointments, minimising staff time spent giving directions, improving overall efficiency (Morag et al., 2016; Potter, 2017), and reducing complaints (Kaya et al., 2016). Implementing clear signage with symbols and pictograms can enhance patient outcomes and staff satisfaction (Potter, 2017). Digital wayfinding systems can further improve user experience by providing interactive guidance and reducing task complexity (Harper et al., 2018; Morag & Pintelon, 2020). A holistic approach to wayfinding design, incorporating multiple communication channels, and considering the broader healthcare journey can empower health seekers and improve their overall experience (Short et al., 2017; Giraldi et al., 2018). Ultimately, well-designed wayfinding systems contribute to a more comfortable and user-friendly hospital environment (Mackenzie & Krusberg, 1996). Studies point out that part of supporting wayfinding also involves paying attention to digital tools such as information on hospital websites, digital navigation systems, and other specialised applications (Geng et al., 2024; Lo et al., 2017; Short et al., 2019; Morag & Pintelon, 2020). Similar to information seeking, healthcare wayfinding involves patients' adoption of adaptive behavioural strategies including the use of environmental cues and the development of coping mechanisms that accord with information-seeking frameworks.

Information uncertainty in wayfinding

Previous studies conceptualised wayfinding as spatial problem-solving, involving information processing, decision-making, and plan execution (Passini, 1981). Uncertainty in wayfinding can arise from multiple factors, such as environmental complexity, the legibility and effectiveness of navigational aids, and individual differences in spatial cognition. Information uncertainty may result from the information gap that patients experience in a hospital setting (Gualandi et al., 2019). Uncertainty significantly influences wayfinding by impacting both cognitive processes and navigational behaviours (Chien et al., 2016; Yang & Kalantari, 2022). A thorough understanding of information uncertainty sources and how they influence both cognitive and behavioural navigation aspects is essential for designing effective wayfinding systems and built environments.

Patient journeys as a method for mapping patients' experience

Patient journey mapping is an emerging method for understanding and improving patient experiences in healthcare systems (Bulto et al., 2024). It provides valuable insights into wayfinding challenges in complex hospital environments (Short et al., 2019). This approach can inform clinic placement, signage design, and resource allocation to enhance patient experience and operational efficiency (Cheng & White, 2018) and optimise signage placement (Guo & He, 2022). Studies have shown that when experiencing wayfinding tasks, patients benefit from simple building structures, nature projections during diagnostics, and varied social spaces during treatments (Zijlstra et al., 2020).

The aim of the article is to *provide a replicable method framework to detect, code, and visualise information uncertainty during hospital wayfinding across digital and physical touchpoints, using patient journey mapping as the integrating frame.*

Various patient journey mapping projects use qualitative, quantitative, and mixed methods. Some rely on traditional data collection like interviews, focus groups, and observations, while others use specialised journey mapping tools (Bulto et al., 2024). Patient journey mapping often involves visual, narrative, and descriptive maps or tables (Davies et al., 2021). However, the traditional methods, such as surveys and static observations, may not be sufficient to fully understand the patient experience (Gualandi et al., 2019). On the contrary, behavioural methods, such as mobile eye-

tracking, has proven effective in evaluating and improving wayfinding systems. The methodological framework is designed for wayfinding research that combines various research techniques within mixed research, allowing for the selection of appropriate indicators and metrics for analysing patient journeys.

Patient journeys provide a structured analytic lens for examining wayfinding as a temporally and cross-channel distributed information behaviour process rather than as an isolated interaction at a single point in space. Within complex hospital environments, breakdowns rarely stem from one touchpoint (e.g., a lobby directory) in isolation; instead, they accumulate through sequences of actions, decisions, and information cues across digital and physical contexts (Short et al., 2019; Gualandi et al., 2019, Kynoch et al., 2019). To keep analysis explicit and reproducible, the researcher operationalised a seven-stage journey model that spans digital and physical contexts:

1. **Pre-arrival (digital orientation):** hospital website, department page, route planning tools.
2. **Arrival (site entry):** transport drop-off/parking, approach paths, entrances.
3. **Entry and initial orientation:** vestibule/lobby, reception/volunteer desk, first decision node.
4. **En-route navigation:** corridors, junctions, vertical circulation (stairs/elevators), confirmation cues.
5. **Destination interface:** department front-of-house (doors, counters, check-in).
6. **In-visit circulation:** sub-routes to diagnostics, temporary wayfinding during tests.
7. **Exit & post-visit:** return path, payment/administration, discharge paperwork, follow-up info.

This seven-stage model serves as an analytical scaffold rather than a prescriptive sequence. In practice, patient journeys exhibit considerable variability: stages may be truncated, reordered, or omitted entirely (Rosenbaum et al., 2023) depending on visit type, patient familiarity, and care pathway. For instance, emergency department patients typically bypass the pre-arrival digital orientation stage altogether, while patients attending follow-up appointments may skip initial orientation if they have developed cognitive maps from prior visits (Hölscher et al., 2006). Conversely, patients undergoing complex diagnostic sequences often experience recursive loops through the in-visit circulation stage, returning multiple times to waiting areas between tests (Gualandi et al., 2019).

The model accommodates this variability by treating stages as analytical categories that structure data collection and comparison rather than as mandatory sequential steps. This approach aligns with journey mapping methodologies in service design where idealised models function as heuristic frameworks against which actual user experiences can be mapped and deviations identified as potential intervention points (Stickdorn et al., 2018). Documenting which stages are emphasised, abbreviated, or absent in specific patient cohorts can itself yield actionable insights—for example, revealing that repeat visitors encounter wayfinding difficulties primarily at the en-route navigation stage rather than at initial orientation, suggesting different design priorities for signage placement.

For each stage, the analysis enumerates possible touchpoint classes: digital (e.g. web pages, map widgets, PDF maps, contact info, accessibility notes), physical (exterior totems, building identifiers, colour/number zoning, directories, directional signs, confirmation signs, landmarks, floor graphics, elevator call panels, door labels), and social and organisational touchpoints (reception desks, ad-hoc staff guidance).

Proposal for a research framework for investigating information uncertainty in hospital wayfinding

The proposed framework integrates three complementary theoretical perspectives. First, it draws on Passini's (1981) conceptualisation of wayfinding as spatial problem-solving, which frames navigation as an iterative cycle of information uptake, decision-making, and plan execution. This perspective foregrounds the cognitive demands of wayfinding and provides the basis for the task state coding (orient → decide → move → confirm).

Second, the framework incorporates Dervin's sense-making methodology (Dervin & Foreman-Wernet, 2003), particularly the concept of 'micro-moments' in which individuals encounter gaps between their current situation and desired outcome. In wayfinding contexts, these gaps manifest as *information uncertainty moments* when available cues prove insufficient for confident navigation. The uncertainty markers in the codebook (hesitation, backtracking, help seeking) operationalise these gap-bridging behaviours as observable indicators.

Third, the framework adopts a distributed cognition perspective (Hutchins, 1995), treating wayfinding as an activity distributed across persons, artefacts, and environments. This lens aligns with journey mapping methodologies, which similarly trace how experience flows across channels and moments rather than analysing isolated touchpoints (Kalbach, 2016). The Stage–Touchpoint–Uncertainty matrix operationalises this perspective by making visible the temporal and cross-channel distribution of breakdowns.

Together, these perspectives position information uncertainty as a systemic property emerging from the interaction between navigating individuals and their information environment—consistent with ecological approaches to human-information interaction (Fidel, 2012).

The unit of analysis is defined as a stage-bounded interaction with a wayfinding touchpoint, that is, an observable episode in which a participant engages with a digital, physical, or social cue during a specific patient-journey stage (e.g., *Entry & Initial Orientation*: 'reads lobby directory for 18 s and selects elevator A'). Conceptualising wayfinding as a procedural problem-solving activity (information uptake → decision → action → feedback) aligns with established models of navigational cognition (Passini, 1981) and supports process-oriented analysis of breakdowns across stages (Short et al., 2019; Morag & Pintelon, 2020).

Each unit can be coded along five indicator families to enable triangulation across data sources (video, mobile eye-tracking, think-aloud/interviews, artefact review):

1. **Task state** (*orient → decide → move → confirm*).
   Inspired by Dervins' micro/moments (Dervin & Foreman-Wernet, 2003), this sequence operationalises the micro-process of wayfinding and anchors events to journey stages, allowing temporal localisation of error and recovery (Passini, 1981; Short et al., 2019).

2. **Uncertainty markers** (e.g., hesitation, backtracking, verbalised doubt, repeated scanning, asking for help). These behavioural signatures are theoretically tied to information uncertainty and degraded navigational performance and are directly observable and time-stampable in ET/video streams (Chien et al., 2016; Yang & Kalantari, 2022).

3. **Touchpoints qualities** (*visibility*, *legibility*, *consistency*, *redundancy*, *semantic clarity*).
   These properties translate environmental communication principles into codable variables affecting discoverability and decoding of signage and digital content (Potter, 2017; Guo & He, 2022; Morag & Pintelon, 2020).

4. **Accessibility factors** (*screen-reader compatibility*, *tactile availability*, *language/symbol comprehensibility*). Because journeys bridge digital and physical channels, upstream accessibility barriers propagate to on-site breakdowns; coding these factors surfaces equity-relevant issues for users with specific needs (Lo et al., 2017; Jeamwatthanachai et al., 2019; Short et al., 2019; Geng et al., 2024).

5. **Context modifiers** (*noise/crowding*, *lighting*, *competing signage*, *temporary signs*). Contextual conditions systematically modulate cue effectiveness and search cost; coding them reduces attribution error when failures are driven by the environment rather than by the cue itself (Mackenzie & Krusberg, 1996; Kaya et al., 2016; Harper et al., 2018; Morag & Pintelon, 2020).

Family	Definition	Include when… (examples)	Examples of measures
Task state	Participant scans environment to form an initial mental model	First entry to lobby; first view of department page	ET shows wide/regressive saccades; think-aloud: 'Where is radiology?'
Task state	Participant commits to a route/choice	Points to elevator A; clicks 'Parking' link	Hand/foot turn; click; verbal 'Let's go left'
Task state	Physical relocation toward goal	Walks corridor toward sign	Footfall movement; ET focused ahead
Task state	Checks that choice was correct	Checks room number	ET dwell on confirmation signage; verbal 'This is it'.
Uncertainty	Pause with continued scanning	Stops at junction scanning multiple cues	Timer on video ≥2 s; ET oscillates across cues
Uncertainty	Retraces or returns to prior node	Returns to last junction	Path trace; verbal 'Wrong way'.
Uncertainty	Repeated sequential scans of ≥2 cues	Alternates between map and signs	ET shows alternates
Uncertainty	Initiates help-seeking, describes doubts	Asks for directions	Audio captures request
Touchpoint quality	View of cue unobstructed at task distance	Directory readable at 5 m	Photo shows obstructed line of sight
Touchpoint quality	Text/icon meets size/contrast norms	Pictogram ≥ recommended size	Measured size vs. viewing distance
Touchpoint quality	Style/terminology matches prior cues	'Radiology' vs. 'Imaging'	Terminology table check
Context	Illumination impairs visibility	Backlit glare on directory	Lux reading/observer note
Context	Temporary or competing signage	Construction detour	Photo of temporary A-frame
Accessibility	Screen-reader compatibility verified	Proper labels on page	Screen-reader output log
Accessibility	Meets contrast ratios	Text/background clarity	Measurement/screenshot
Accessibility	Pictogram/text comprehensibility	Cross-language clarity	Focus-group confusion noted

Table 1. Codebook and units of analysis.

Steps of analysis

For each participant and route, coded units are organised into a Stage-Touchpoint-Uncertainty matrix that overlays task states with evidence summaries (e.g., time-to-first-fixation on target cue,

doubts expressions, reaching wrong destination). Aggregation proceeds by stage to identify uncertainty "peaks" and recurrent breakdown patterns, supporting requirement derivation and cross-site comparison (Guo & He, 2022).

ID	Stage	Touchpoints	State	Markers	Quality	Context modifiers	Access	Evidence
P01	2	Directory (interior → lobby)	Orient → Decide	Hesitate; Re_scan	Legibility↓; Semantics ↓	Lightning↑	—	ET dwell 6s; 'Where's X?'
P01	3	Directional sign (interior → corridor)	Move → Confirm	—	Visibility↓	Temp Sign detour	—	Video shows blurred sign

Table 2. Stage-Touchpoint-Uncertainty matrix.

Visualisation

As a first step of visualisation, the Table 3 (filled with test data) functions as a compact specification for wayfinding issues across the patient journey: each cell encodes the frequency of uncertainty events for a qualities of touchpoints (e.g., visibility, legibility, consistency, accessibility) within a journey phase, enabling construction of a heatmap in which colour intensity reflects either counts or exposure-normalised rates (per participant or per touchpoint). Context modifiers (notes) should be coded to discrete tags and overlaid as annotations to qualify hotspots (e.g., 'temporary signage present', 'helpful staff'), thereby separating situational from systemic problems. Interpreted together, the heatmap, composition, and contextual overlays provide an evidence-based visual narrative that prioritises design interventions without overextending inference.

Touchpoint qualities	Pre-arrival	Arrival	Entry	En-route	Destination	In-visit	Exit
VISIBILITY issues	1	0	3	2	0	1	0
LEGIBILITY issues	0	0	4	1	0	0	0
CONSISTENCY issues	1	0	3	2	1	2	0
ACCESSIBILITY gaps	2	0	2	1	0	1	0
Counts	4	0	12	6	1	4	0
CONTEXT modifiers	(notes)	(notes)	(notes)	(notes)	(notes)	(notes)	(notes)

Table 3. Example of quantitative analysis and visualisation of wayfinding issues.

A pilot application of the framework was conducted at [anonymised hospital] with 12 participants navigating to specific departments. Preliminary findings indicated that uncertainty markers clustered at the Entry and En-route stages, with semantic inconsistency and missing signage emerging as primary quality issues. Full results will be reported separately.

Experience mapping in practice

Experience cannot be evaluated solely on the basis of objective indicators. Referring to Dervin's theory of sense-making, the experience of any information behavior is also created individually as a combination of achieving goals, overcoming information barriers, and making sense of reality (Dervin & Foreman-Wernet, 2003). In practice, customer experience and user experience maps are used today in the areas of user experience and customer experience, which are often based primarily on users' evaluations of a journey through a selected information service (Lallemand et al., 2022; Pumpurs, 2022; Shang & Shao, 2023). Using the research framework presented here could help to better describe the objective difficulties and challenges involved in wayfinding. And vice versa—when describing and evaluating wayfinding, it is necessary to carefully interpret all context modifiers and the individual experience of the patient. Figure 1 shows a form of a patient journey

map that will convey findings from wayfinding research in a specific hospital environment to interested stakeholders.

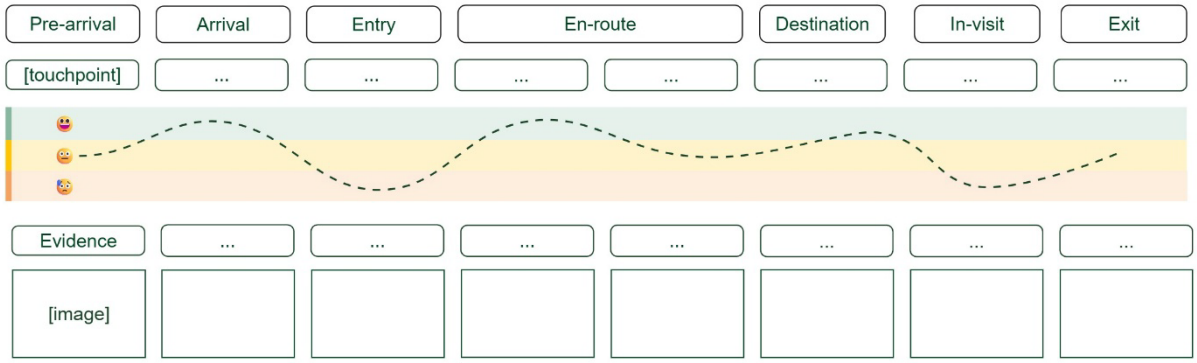


Figure 1. Patient Journey Map.

Discussion

The mapping method provides a structured, behaviour-proximal way to locate and characterise wayfinding uncertainty across the patient journey. Its main strengths are triangulation, temporal localisation of uncertainty issues, and an explicit codebook. One of the major challenges in implementing the method in practice will likely be the variability of contexts in different hospital environments and patient types, and in particular balancing behavioural and attitudinal indicators when evaluating the quality of individual touchpoints and the whole patient journey.

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Information behaviour concepts in the reference service research

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Abstract

Introduction. Information behaviour is an important conceptual foundation for reference service research. This study examines whether and how reference service research draws on information behaviour theories, models, and concepts.

Method. A content analysis of the published English-language research with the database classifications 'reference service' and 'reference work' from 2010-2019 were analysed for key information behaviour theories, models, and concepts.

Analysis. Abstracts of bibliographic database records were coded to identify empirical studies. Lexical searches with qualitative analysis software were used to identify use of information behaviour concepts and references to specific information behaviour theories, models, and concepts.

Results. More than half of the empirical papers (316 or 54%) on reference service mentioned information behaviour concepts. Nearly a quarter of these papers used information behaviour in a substantial way. Thirty (5%) of the papers explicitly used key information behaviour theories, models, or concepts, including Kuhlthau's (2004) information search process and Taylor's (1968) levels of information need.

Conclusion. These findings suggest that information behaviour is being used as a conceptual and theoretical knowledge base for reference services research.

Introduction

Reference service is complex work that draws on a wide range of knowledge and skills (e.g., Saunders, 2012; VanScoy & Bright, 2017). Key models of reference service, such as the educator's model of the reference and information service process (Agosto et al., 2011) and the content/relational model (Radford & Connaway, 2009; Radford & Radford, 2017) include a strong focus on the user, suggesting that understanding users' information behaviours, information practices, and information experiences are important for reference service. Given this importance, this study explores the extent to which reference service research draws on key information behaviour theories, models, and concepts or mentions the idea of information behaviour at all. Specific research questions for this study are:

- To what extent are key information behaviour theories, models, and concepts informing reference service research?
- To what extent are general information behaviour terms and concepts mentioned in the reference service research literature?

Literature review

Several studies have explored the use of information behaviour research, including Lund's (2019) study of the most highly cited information behaviour theories, Lund's (2021) study of the theories used in information behaviour dissertations, and McKechnie et al.'s (2005) study of the citation of information behaviour research. These studies provide some guidance as to the specific theories, models, and concepts that are most important in information behaviour research, as well as library and information science research, more broadly.

Building on this work, VanScoy, Julien, and Harding (2022, 2024) identified the information behaviour theories, models and concepts that are most important for reference service education. VanScoy et al. (2024) studied which of these theories, models, and concepts are relevant for reference service practice. While these studies are focused on education and practice, they provide a useful starting point for determining which information behaviour theories, models, and concepts that might be useful for reference service research.

Kingrey's (2002) study of five American trade publications (*American Libraries*, *Public Libraries*, *Library Journal*, *Texas Library Journal*, and *Louisiana Libraries*) from 1999-2001 is the only study to date of information behaviour concepts in the library practice literature. Kingrey argued for the importance of information behaviour content knowledge for librarians who provide reference and information service, writing '*without an underlying appreciation for theory, one finds it very difficult to understand, accept, or enact principles of practice*' (2002, Conclusions). Kingrey attempted to identify papers that '*critically explicated the dynamics of the individual's search for information, offered a model of information seeking based on research and formal hypotheses, or discussed the relationship between understanding the information search process and improving library practice*' (2002, Results). However, Kingrey found no papers in her sample that met these criteria. Rather, Kingrey found numerous uses of information behaviour terms used in the context of '*statistics of library use, patron satisfaction measures, issues of electronic access, or the logistics of reference service*' (2002, Results).

Method

This content analysis examined the English-language empirical research literature related to reference service for the decade 2010-2019. In contrast to Kingrey's (2002) journal specific study of five library trade publications, this study took a topical approach, searching the reference services literature for the decade, regardless of publication.

First, the thesauri for two comprehensive library and information science databases were consulted to identify the appropriate subject heading for papers about reference service. The term 'reference service' was used to search Library Literature and Information Science, and the term 'reference work' was used to search Library and Information Science Abstracts. Citations and abstracts for the resulting papers were downloaded from the database. Non-English language papers, as well as book reviews and editorials, were removed from the dataset, resulting in 1,888 papers.

Next, titles and abstracts were used to determine whether the papers reported empirical research. The coders followed a process similar to that described in previous content analyses (Julien, 1996; Julien & Duggan, 2000; Julien et al., 2011; VanScoy & Fontana, 2016). Two coders worked together to code 20 papers as 'empirical research' or 'not empirical research' (the latter combining 'commentary' and 'reports of service' from the earlier studies). They then coded 50 papers independently. Interrater reliability was 98%, after which the remaining papers were coded separately. When abstracts were missing or insufficient to determine a paper's empirical status, the coders examined the full text. 586 papers were coded as empirical research. Copies of these papers were obtained online or via interlibrary loan and uploaded into qualitative analysis software. Once the dataset of reference service-related empirical research papers was created, the papers were analysed in two phases.

Phase 1

This study used the list of key information behaviour theories, models, and concepts found by VanScoy et al. (2024) to be most important for reference service education. The list of specific theories, models, and concepts appears in Table 1. The full text of the 586 empirical research papers were searched for the names of these theories, models, and concepts; their abbreviations and the scholars that developed them (e.g., 'anomalous state of knowledge', 'Belkin', and 'ASK').

The resulting list of papers included some uses of these names and abbreviations that were not relevant. For example, the search for '*Wilson*' resulted in papers not about Wilson's information behaviour models, but rather other authors with the surname Wilson. These non-relevant results were removed.

Phase 2

Next, the dataset was searched for general instances of information behaviour content. Lexical searches were conducted with the following keyword phrases: information behavio*r*, information practice*, information experience*, information use*, use of information, information need*, need for information, information sharing, sharing of information, information seeking, information-seeking, information search*, information avoidance, avoidance of information, information selection and selection of information. As with Phase 1, the searches resulted in some papers that were not relevant. For example, there were numerous examples of everyday use of some of the expressions as in this phrase from one paper '*…information used to determine participant demographics…*' which is clearly not referring to the information behaviour concept of information use. Another example of non-relevant results was use of a search term in a paper's references list. These non-relevant results were removed.

The relevant papers were furthered examined to determine if the information behaviour content was *substantial* (evidenced by information behaviour keyword phrases appearing in the paper title, abstract or keyword list, or by sustained discussion throughout the paper) or *mentioned* (defined as a study in which an information behaviour theory, model or concept merely appears in the text of the paper).

Results

Phase 1: Specific theories, models, and concepts

The first phase revealed that some key information behaviour theories and theorists appear in the reference related empirical research (see Table 1). Kuhlthau's (2004) information search process model was mentioned most frequently (in eight papers), and Taylor's (1968) levels of need was mentioned the second most frequently (in six papers). Some papers included more than one key theory, model, or concept.

Some information behaviour concepts were mentioned without the inclusion of a citation: everyday life information seeking (Savolainen, 1995), satisficing (Simon, 1955), and imposed query (Gross, 1995). These instances were included in the results. Notably, a specific theory searched that did not appear in the dataset was Chatman's (1996) information poverty.

Information behaviour theory	Number of papers	Examples of contexts studied
Kuhlthau's (2004) information search process model	8	Student use of virtual reference service Effect of students' epistemological beliefs
Taylor's (1968) levels of need	6	Assessment of school libraries Elicitation behaviours of intermediaries
Savolainen's (1995) everyday life information seeking	5	Intimate partner violence Use of websites
Dervin's (1992) sense-making	4	Use of library e-resources
Wilson's (1999) model of information seeking	3	Searching online databases
Belkin's (1982) anomalous state of knowledge	3	Modelling of user behaviour by intermediaries
Ellis' (1989) information seeking model	3	Doctoral student research
Simon's (1955) bounded rationality/satisficing	2	Fake news
Bates' (1989) berrypicking	1	Use of library e-resources;
Chatman's (1991) gratification theory	1	Importance of convenience in virtual reference service
Gross' (1995) imposed query	1	Teens' use of text reference service
Chatman's (1996) information poverty	0	

Table 1. The number of papers that included key information behaviour models in the reference research and the contexts studied

Phase 2: General information behaviour content

Relevant uses of general information behaviour related search terms were found in 54% (316) of the empirical papers. Table 2 shows the number of documents in the dataset containing relevant uses of the terms. Some documents contained more than one phrase. *Substantial* information

behaviour content was found in 23% or 73 of the 586 empirical papers. All the documents that resulted from the Phase 1 search were included in the results for Phase 2.

The papers appeared in a variety of journals, both those aimed toward scholars, such as *JASIST* and *Journal of Documentation*, and those aimed toward practitioners, such as the *Journal of Academic Librarianship* and the *Journal of Library Administration*. Some papers were published in reference service focused journals, such as *Reference Services Review* (five papers) and *Reference & User Services Quarterly* (six papers). One paper appeared in *Information Research*, the primary information behaviour journal.

Discussion

Overall, more than half of the empirical research on reference service from the years 2010-2019 incorporated some form of information behaviour content. These proportions are noteworthy given the range of disciplines from which reference service research may draw conceptual grounding, such as communication, education, and organizational science.

Contrary to Kingrey's (2002) findings, the current study suggests that librarians and researcher–practitioners may now have substantial exposure to information behaviour theories, models, and concepts, provided they read beyond the professional trade literature. Papers with substantial information behaviour content appeared in scholarly journals that focus on reference service, as well as journals aimed toward practice-focused research.

The frequent appearance of Kuhlthau's (2004) *information search process* and Taylor's (1968) *levels of need* aligns with earlier research identifying these as key theories for reference service education (VanScoy et al., 2022, 2024) and practice (VanScoy, et al., 2024). This alignment suggests some continuity between the theories taught in library and information science education, those applied in practice, and those used in the scholarly literature. However, the fact that such a small number of papers referenced a specific theory highlights a potential concern: librarians interested in reference service may find it difficult to stay informed about the evolution of new theories and concepts in information behaviour that may affect reference service if these frameworks are not reflected in the research they encounter.

A limitation to the study is the limited list of specific information behaviour theories, models, and concepts. Because this list is not exhaustive, some papers drawing on other information behaviour theories, models, and concepts may have been excluded. As Lund (2019) cautions, any attempt to identify a set of key theories inevitably privileges older theories. Moreover, information behaviour research draws on a wide range of important theories, models and concepts borrowed from other disciplines, such as practice theory and activity theory (Given et al., 2023), which Phase 1 of this study did not explicitly examine. At the same time, it is likely that papers drawing on such theories were nonetheless captured through the use of general information behaviour terms. For example, Cavanagh's (2013) paper, which draws on practice theory to inform reference service, was identified through the general information behaviour concepts search.

Further work could explore the other disciplines from which reference service draws conceptual framing. A similar study could identify reference service research in which theories, models, and concepts from disciplines like communication, education, and organizational science appear.

Given the high number of non-relevant results (in the specific theory search), it might be more effective to perform a citation study, examining reference lists of the empirical research papers for citations to the key papers where information behaviour theories, models, and concepts were published. A challenge for such a study would be the lack of a comprehensive list of information behaviour theories, models, and concepts to use for search terms.

Conclusion

It is encouraging that general information behaviour concepts were incorporated into a substantial portion of reference service research between 2010 and 2019. Contrary to Kingrey's (2002) concern that information behaviour content was largely absent from the reference service literature, such perspectives now appear to be meaningfully present. However, the explicit use of classic information behaviour theories, models, and concepts remains relatively limited. Given that practicing librarians constitute the majority of authors of reference service research (VanScoy & Fontana, 2016), continued efforts are needed to make developments in information behaviour scholarship more visible and accessible to this scholarly community.

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Decolonising information: comparing Western conceptions of information to Indigenous Knowledge and Indigenous Knowledge Systems

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Abstract

Introduction. This paper investigates how Western and Indigenous epistemologies conceptualise information, with a focus on the contrast between cognitive-oriented and relational understandings. Western information science has historically defined information as a measurable 'thing', while Indigenous Knowledge and Indigenous Knowledge Systems view information as relational, embodied, and inseparable from land, community, and spirit.

Method. The study undertakes a comparative analysis of theoretical frameworks, drawing on Bates's (2017) typology of information concepts and Indigenous epistemological literature, including works by McGregor (2021), Wilson (2008), and Absolon (2010).

Analysis. Key themes were identified through interpretive textual analysis of these sources, emphasising both differing and similar assumptions about the definition of information in either context.

Results. Findings reveal that dominant Western definitions privilege rationalism, subjectivity and control, whereas Indigenous frameworks define knowledge as reciprocal, lived, and land based. The analysis also identifies emerging models of reconciliation, such as Two-Eyed Seeing and Knowledge Co-production, which promote respectful coexistence of knowledge systems.

Conclusion. Reconciliation in information science requires recognizing Indigenous Knowledge Systems as self-determining epistemologies and shifting from managing information as an object to sustaining it as a living relationship grounded in reciprocity and respect.

Introduction

One of the most debated subjects in the field of information science is the very concept of information. As information scholars often come from various disciplines, each with its own understandings and definitions of what is (or is not) information, the meaning of the term remains highly contested. While there is currently no universally-adopted definition of information, over the years, several scholars have attempted to define this term and the different concepts of information which have evolved out of the information disciplines themselves (Buckland, 1991; Rowley, 1998; Bates, 2017). While many of these definitions remain valid and important contributions to the field of information science, the majority reflect Western, Euro-centric, and colonial conceptions and understandings of information.

This paper addresses the Western bias embedded in widely used, dominant definitions of information within the information sciences by comparing Western definitions of information with those of Indigenous Knowledge and Indigenous Knowledge Systems. It begins by summarising the main conceptions of information outlined by Bates (2017) in her chapter 'Information' in the *Encyclopedia of Library and Information Sciences* (4th ed.). While not exhaustive, this chapter highlights the definitions most commonly adopted by information scholars and educators and which have significantly shaped the discipline's intellectual foundations. The paper then examines Indigenous Knowledge and Indigenous Knowledge Systems, exploring how these relational and lived understandings of knowledge differ from dominant Western, cognitive-oriented models of information while acknowledging similarities between Indigenous Knowledge, Indigenous Knowledge Systems, and recent Western scholarship promoting social-oriented, embodied and qualitative interpretations of information. In doing so, this paper contributes a comparative analysis of the definition of information by making explicit the distinct assumptions that underpin Western object-based and Indigenous relational perspectives. Finally, it proposes possible paths toward reconciliation, resurgence, and the inclusion of non-Western, and particularly Indigenous, epistemologies within information science in order to advance a relational understanding of information that emphasises respectful co-existence and self-determination rather than integration.

The author recognises that Western information scholarship is internally diverse and has increasingly challenged purely rationalist and objectivist paradigms, most notably through constructivist and embodied approaches to information (Savolainen, 2008; Cox, Griffin & Hartel, 2017; Kitzie et al., 2022). That said, this paper focuses on critiquing those rationalist and objectivist conceptions that continue to play a foundational role in shaping mainstream understandings of information within the discipline. Likewise, although understandings of Indigenous Knowledge and Indigenous Knowledge Systems vary across Indigenous nations and knowledge traditions, this research situates its discussion within the context of Indigenous communities from the Great Lakes region, such as the Anishinaabe, the Mississaugas of the Credit, the Seneca, and the Huron-Wendat, recognising these perspectives as place-based and non-universal.

Defining information

In the *Encyclopedia of Library and Information Sciences*, Bates (2017) identifies seven categories for the various conceptions of information which have been central to the understanding of this term in the information sciences: 1) communicatory or semiotic, 2) activity-based, 3) propositional, 4) structural, 5) social, 6) multi-type, and 7) deconstructionist. Communicatory or semiotic information is rooted in semiotics, cybernetics, and communication theories with a focus on the rational transmission of signals and meaning through processes, outputs, and meaning making. Activity-based information, also described as event-based information, emphasises the event by which a person becomes informed and draws on phenomenology, psychology, and individual cognition. Propositional conceptions of information are adopted from the fields of analytic philosophy and logic which define information as propositions or claims about the world, often

requiring truth to count as information. Structural understandings of information claim that it does not have a meaning unto itself, but rather, that information lies in the way data is patterned and organised. Information is also seen as socially constructed and embedded in practices, contexts and power relations which shape information and an individual's understanding of it. Multi-type definitions group the previous conceptions of information in order to create a broad, integrative view of information in an interdisciplinary context which recognises that information can exist in many forms at once. Finally, deconstructionist conceptions of information challenge the attempt to define information and its dominance as a contract concept. Rather, these scholars suggest that the focus of study should shift away from information and towards the practices, discourses, and communications which produce it (Bates, 2017).

Bates also discusses the impact of the Data-Information-Knowledge-Wisdom (DIKW) pyramid, a model which is often used by educators when introducing the concept of information to students or to scholars outside the information science field. This knowledge hierarchy places information as the second tier of the pyramid, between data and knowledge. Based on this model, information has been defined in different textbooks as '*formatted data*' (Jessup & Valacich, 2003, p. 7), '*data that have been shaped into a form that is meaningful and useful to human beings*' (Laudon & Laudon, 2006, p. 13), or even '*data processed for a purpose*' (Curtis & Cobham, 2005, p. 3). While these definitions are vague, they all agree that information is made up of data which has been retrieved for a given purpose and imbued with meaning.

While these conceptions have provided the foundation for modern information science, they also reflect a distinctly Western epistemological tradition that privileges rationalism, objectivity, and the pursuit of universal truths. Information is treated as something that can be abstracted, categorised, and measured. It is a discrete 'thing' rather than a lived process. This empirical orientation has shaped information science around ideals of control and efficiency, positioning information as an object to be managed rather than a relationship to be experienced (Day, 2014). The 'knower' in Western conceptions of information is typically imagined as an autonomous, individual subject who encounters information in isolation, reinforcing human-centred and often Eurocentric assumptions about cognition and meaning.

At the same time, information science has long engaged with subjectivity and the importance of context in meaning-making through qualitative, interpretive, and relational approaches, particularly in research on information behaviour and socially situated information practices. However, even when social context is emphasised in Western scholarship, information often remains treated as a human-centred construct that is produced, disseminated, and interpreted among people rather than within a broader web of relationships that includes land, spirituality, and the more-than-human world (Wildcat et al., 2014). This paper does not seek to dismiss qualitative or subject-centred traditions within Western information science, but rather to highlight how object-based and cognitive models of information continue to shape many dominant definitions and institutional understandings of information within the discipline. Recognising these limitations invites a broader rethinking of what counts as information.

Indigenous Knowledge and Knowledge Systems

If Western paradigms have defined information as something that can be extracted and possessed, Indigenous Knowledge and Indigenous Knowledge Systems instead understand information and knowledge as relational, dynamic, and inseparable from Indigenous people, their history, their culture, and the land. Indigenous Knowledge and Indigenous Knowledge Systems see information and knowledge not as a 'thing' but as a way of living inseparable from the people and systems that sustain it (McGregor, 2021). As such, information cannot exist on its own, and the term Indigenous Knowledge is used to encompass both information and knowledge, rather than differentiating between them. Indigenous Knowledge is, at its core, relational, land-based, ceremonial, and embodied.

A central principle of Indigenous Knowledge Systems is that knowledge exists within relationships and cannot live apart from them. Knowledge is generated through ongoing relationships among people, the land, ancestors, and the more-than-human world. Indigenous Knowledge Systems '*represent a way of life, something that has to be **lived** (as a verb) in order to be known, understood, and practiced*' (McGregor, 2021, p. 2) rather than 'information' or 'knowledge' as nouns or concepts, as they are understood in dominant Western definitions. This relational approach means that information carries ethical and social responsibilities and that knowing something entails being accountable to that knowledge and to the beings it concerns. Wilson (2008) similarly describes Indigenous research as 'relational accountability', emphasising that knowledge cannot be separated from the relationships through which it is produced and shared. Within this worldview, information has meaning only when situated within a living web of reciprocal connections.

Indigenous Knowledge is also inseparable from land and place. For Indigenous peoples, land is not merely a backdrop from which information can be observed as data and given meaning. The land is instead a co-creator and source of knowledge in Indigenous Knowledge Systems thus differing from Western, cognition-centred approaches to information. Indigenous Knowledge is '*derived from the immediate ecology, shaped by local lands, and expressed through language and practice*' (Battiste & Henderson, 2000, p. 41). Similarly, Cajete (2000) argues that Indigenous ways of knowing emerge through lived experience with the natural world, where learning is an embodied process rooted in observation, participation, and ceremony. McGregor (2021) stresses that disruptions to these land-based relationships through colonisation, displacement, or environmental degradation represent not just the loss of territory but the erosion of entire knowledge systems. Thus, to understand information through an Indigenous lens is to recognise the land itself as a holder, transmitter, and co-creator of knowledge who works in relation with the 'knower'.

Finally, Indigenous Knowledge is embodied and often expressed through ceremony, storytelling, and lived practice. These ways of knowing are not supplementary to Indigenous Knowledge Systems, but constitute central modes through which knowledge is generated, validated, transmitted, and sustained across generations. Absolon (2010) notes that Indigenous Knowledge is not something to be learned or interpreted in abstraction but rather to be lived through one's relationships and spiritual commitment. Knowledge is transmitted through the body, the senses, and communal participation, thereby connecting generations across time. Ceremony, in this sense, is both a method of knowledge sharing and a way of maintaining balance within the knowledge system itself (Simpson, 2017).

In Western information science, recent discussions of embodied information have increasingly emphasised the role of the body, affect, and lived experience in information practices, including work grounded in feminist, queer, and critical traditions that foreground marginalised and non-normative embodiments (Kitzie et al., 2022; Huttunen et al., 2019). This emerging research has meaningfully challenged purely cognitive models of information by emphasising emotion, identity, vulnerability, and situated knowing. While these approaches expand understandings of information beyond text and cognition, they often continue to frame the body as a site of expression, performance, or interpretation within predominantly human-centred epistemologies.

By contrast, Indigenous embodied knowledge is not primarily performative or expressive but ontological. It is a way of being and knowing that arises from reciprocal relationships with land, community, ancestors, and spirit. The body is not merely a medium through which information is conveyed, but an active participant in the creation, stewardship, and ethical governance of knowledge. Knowledge cannot be accessed or transmitted if relationships are out of balance, and embodiment extends beyond the individual to include collective, land-based, and more-than-human relations (McGregor, 2021). This distinction highlights how Indigenous epistemologies, such as ceremony, storytelling and oral traditions, and Western embodied information research

may come into dialogue without collapsing their differences, and while underscoring the unique ontological commitments of Indigenous approaches to embodiment and knowledge.

Reconciliation

The contrasting worldviews of Western information science and Indigenous Knowledge Systems reveal two fundamentally different orientations toward what it means to know. Western traditions, rooted in rationalism and positivism, tend to define information as an abstractable object, whereas Indigenous Knowledge and Indigenous Knowledge Systems understand knowledge as relational, dynamic, and lived. They are inseparable from the people, lands, and spiritual systems that sustain them. From this perspective, information is not a thing to be managed but a relationship to be maintained through reciprocity and responsibility. Recognising this difference challenges the epistemological assumptions that underpin the information sciences and invites a profound re-examination of how knowledge is conceptualised, classified, and shared.

While Western information science has begun to acknowledge social and embodied understandings of knowledge, such perspectives often remain limited to human-centred or cognitive frameworks. In many cases, these approaches continue to prioritise individual experience, meaning-making, and human interpretation as the primary sites of information, even when the body, affect, or social context is foregrounded. Even within recent research that explores embodied information, the body is often viewed as a site of expression or performance, a means of transmitting meaning rather than a participant in its creation. Indigenous epistemologies extend embodiment beyond the individual to include relationships with land, community, and the more-than-human world. Knowledge arises through ceremony, lived practice, and ethical accountability, not through detached observation or interpretation. Bridging these worldviews therefore requires more than the inclusion of Indigenous concepts within Western frameworks but rather the recognition of Indigenous Knowledge Systems as self-determining and complete epistemologies in their own right.

McGregor (2021) proposes several pathways for reconciliation between these distinct traditions of thought through what she terms ethical engagement. She identifies frameworks that respect the integrity of Indigenous Knowledge Systems, including Two-Eyed Seeing (Etuaptmumk), Braiding or Weaving Knowledge Systems, the Two-Row Wampum, and Knowledge Co-production. These approaches emphasise co-generation rather than integration, privileging relationship-building and reciprocity over synthesis. In this context, reconciliation does not involve the merging of knowledge systems and understanding of information into a homogenised whole, but rather the establishment of respectful, ongoing relationships grounded in Indigenous governance and law. Reconciliation therefore operates as a relational and ethical orientation that allows Western and Indigenous conceptualisations of information to coexist in respectful parallel, without subordinating one to the other. Achieving reconciliation in information science thus requires a shift away from universalising and extractive models of information toward approaches grounded in ethical engagement, co-development, and Indigenous authority over knowledge. Such an orientation reframes information not as a neutral object to be managed, but as a relationship that carries responsibilities and accountability.

This reconceptualisation of information has direct implications for information behaviour and information seeking research. If information is understood not merely as a cognitive object sought by autonomous individuals, but as a relational and embodied process grounded in place, community, and accountability, then prevailing models of information seeking require reconsideration. This includes rethinking assumptions about individual agency, neutrality, and universality in information behaviour, as well as considering collective, land-based, and more-than-human dimensions of knowing. For information science, this shift invites methodological approaches that prioritise relational accountability and community-defined information needs around what knowledge may be sought, shared, or withheld. Ultimately, Indigenous Knowledge

challenges long-held academic assumptions about what information can mean, advancing a view of information as lived, land based, and embodied. Reconciliation in the information sciences should therefore not be achieved by incorporating Indigenous Knowledge into existing paradigms, but by supporting the integrity and self-determination of Indigenous Knowledge Systems as equal and essential foundations for understanding and sharing information.

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Authenticity, performativity, and contextuality

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Abstract

Introduction. What does authenticity mean in an era of disruptive technological change, decaying public trust, and cultural contestation? In response, this philosophical investigation reframes authenticity through the lenses of performativity and contextuality.

Method. Conceptual analysis is undertaken to comparatively examine multidisciplinary definitions, implicit ontological assumptions, and emergent theoretical intersections between authenticity, performativity, and contextuality.

Analysis. Investigating authenticity through the lenses of performativity and contextuality positions the designation of *authentic* as an act undertaken by empowered agents to perceive, evince, or assess the cultural authority of knowledge conveyed through documents (i.e., records, events, experiences) within a co-constructed context.

Results. The synthesised documentalist view of *authenticity*, as a context-mediated performance, reframes the status of *authentic* as an intersubjective assessment of identity-relevance around and about documents, rather than as an innate or static informational quality within documents. Hence, two emergent forms of authenticity are proposed to account for the social experience and internal affect of information, respectively: *Exo-Authenticity* (i.e. information *being* authentic), and *Emo-Authenticity* (i.e. information *feeling* authentic).

Conclusion. Guiding questions about authenticity are posed to suggest future critical research directions within library and information science (LIS), emphasising epistemic vigilance toward when, where, why, and for whom concerns around authenticity matter.

Introduction

What is authenticity? Consider the following etymological deconstruction: 1) the prefix *aut-* denotes a creator, author, or originator of information, 2) the suffix *-ent* denotes the presence of an action or agent, 3) the suffixes *-ic* and *-ity* denotes a status or condition, that is, quality. Reconstructed, *authenticity* appears to encompass agential assessments of informational quality. Yet these morphemes echo components of provenance and relevance previously established in the literature of library and information science (LIS). Conceptual ambiguity about and around *authenticity* within LIS warrants clarification and renewed definitory discussions.

In response, this philosophical investigation reframes *authenticity* through the lenses of performativity and contextuality to articulate new directions for critical-cultural LIS research. Interrogating authenticity is essential when considering issues of decaying public trust in information sources (Youngman and Patin, 2024) and the uncritical popular adoption of generative artificial intelligence systems placing a harmful onus upon individuals for the harms inflicted by information systems enabling the proliferation of 'inauthentic' information (Wagner and Blewer, 2019; Youngman et al., 2023; Slater, 2025).

Authenticity

Handler (1986) views authenticity as 'a function of a Western ontology', an individualistic cultural construction positioning cultural experiences as something to be consumed because of their 'unspoiled, pristine, genuine, untouched and traditional' status (p.2). Indeed, authenticity is an 'evaluative concept, however methodical and value-free many of the methods for establishing it may be' (Van Leeuwen, 2001, p.392). Authenticity extends beyond qualities like 'age, provenance, [or] authorship' used to certify 'origin or authorship' and avoid status as 'imitation or copy' (Van Leeuwen, 2001, p. 392). Rather, authenticity is often evaluated when we perceive entities as being 'faithful reconstruction[s] or representation[s]', 'authorized', or 'thought to be true to the essence of something' (Van Leeuwen, 2001, pp. 392-393).

For Tatsuki (2006), *authenticity* evokes 'genuineness, realness, truthfulness, validity, reliability, undisputed credibility, and legitimacy' (p.1). MacNeil and Mak (2007) claim authenticity functions 'as a social construction that has been put into place to achieve a particular aim. Its structures and goals vary from one field to the next and from one age to another' (p.26). They articulate three categories of authenticity (p.26) broadly related to originality (provenance), self-actualisation (belonging), and trustworthiness (factuality). Newman and Smith's (2016) adjacent taxonomy positions authenticity not as an inherent status, but a relative axis 'capturing dimensions of truth or verification' (p.610) through which 'people reason about objects, other people, and themselves' (p.609).

Individually, authenticity reflects a 'commitment to self-values' (Erickson, 1995, p.121) and 'plays a key role in the pleasure that people derive from a variety of experiences' (Newman, 2019, p.8). Authentic experiences are 'something that is mine, that belongs to me, that is my own, that is part of my ownmost (inner) self' (Scannell, 2001, p. 405), and are well-documented in studies of narrative (Doležel, 1980), student perceptions of teachers (De Bruyckere and Kirschner, 2017), well-being (Baker et al., 2017), nursing (Starr, 2008), personal development and transformation (Tou et al., 2015; Gorichanaz, 2019; Ruthven, 2025), and retail (Lee et al., 2019). Notably, authenticity is a long-debated concern in cultural heritage and tourism studies (Cohen, 1988; The NARA Document on Authenticity, 1994; Urry, 1995; Gable and Handler, 1996; DeLyser, 1999; Belhassen and Caton, 2006; Jerome, 2008; Silverman, 2015), specifically in regard to commoditisation: 'Theories of authenticity, as developed over the past 40 years, have accompanied the rapid expansion in tourism and activities designed for *the tourist* to consume' (Kidd, 2011, p. 24). For cultural heritage, authenticity provides 'a more subtle and useful aid to meaning making' (Kidd, 2011, p. 26).

Performativity

Performativity considers how language and action mediate social reality: 'Agency is the capability or potential for action [...] the capability or potential to take performative action'. (Hauser, 2023, p. 4). Performative analysis destabilises 'delimited understandings' and 'metaphysical presumption[s]' about 'culturally constructed categories' and enables descriptions of 'processes that produce ontological effects' including newfound 'realities' and 'socially binding consequences' (Butler, 2010, p. 147). Performativity traces back to speech acts, a concept in philosophy of language which theorises utterances possess the function of performing an action (Austin, 1963, p. 22). Performances, therefore, are situations in which actions are taken, and these actions can change what is known or exists in the world. However, performances only bring about change under certain conditions:

> The performative utterance is not exempt from all criticism: it may very well be criticized, but *in a quite different dimension from that of truth and falsity*. The performative must be *issued in a situation appropriate in all respects for the act in question*. If the speaker is not in the conditions required for its performance [...] then his utterance will be [...] 'unhappy'. (Austin, 1963, p. 23) [italic emphasis added]

For Austin (1963), *unhappiness* encompasses three instances in which performances fail or are unable to bring about lasting social change: breach of commitment (a violation of the performance), nullity (a voiding of a performance), abuse (an insincere performance) (p. 24). Beyond unhappiness, these outcomes are also harmful: the substitution of social action for communicative action, or mere (insincere) performance, constitutes a form of epistemic injustice (Youngman et al., 2022).

Avoiding unhappiness requires performances take place within a designated *context*, or, with appropriate *contextualisation* ('a situation appropriate in all respects for the act in question'). Within this situation are many conditions enabling the performance to change reality, most saliently that the performative agent ('speaker') *be empowered* in the delivery of their utterance. Likewise, far beyond binaries of true and false, or of real and fake, *justification* and *belief* function as additive dimensions through which the ontic value (realness) and epistemological value (meaning) of performances are negotiated. Any combination of disempowered agents, unmet conditions, or inappropriate situations nullifies the performance, leading any attempt to be perceived as abusive and any resulting outcomes a breach of commitment. Customs, rights, protocols, and traditions which contextualise and stage any kind of performance are imperative to avoid blurring the lines between authenticity and appropriation. Successful performances require empowerment and conditionality, together constituting *context*. Unhappiness, or *insufficient contextuality*, diminishes a performance. Austin (1963) elaborates:

> If, for example, the speaker is not in a position to perform an act of that kind, or if *the object* with respect to which he purports to perform it is not *suitable for the purpose*, then he doesn't manage, *simply by issuing his utterance*, to carry out the purported act. (p.23) [italic emphasis added]

Performances possess the potential to fundamentally change *what is true* about the world. Similarly, Tarski (1944) posits truth as a relation between descriptions and the world: 'A sentence is true if it designates an existing state of affairs' (p. 15). For Austin (1979), truth encompasses 'substance', 'quality', or 'relation' depending on *use* (p.117), meaning *truthfulness is contextual*: '*The words* taken in this sense, or if we assign to them such and such a meaning, or so interpreted or understood, *are true*' (p.119). Authenticity, in this regard, is fundamentally an assertion of truth about cultural objects and experiences. Accounting prior observations about authenticity, we may subsequently amend Tarski's (1944) formulaic representation of truth. Whereas 'X is only true, if and only if, P' (p.16), we may state *a performance is only authentic, if and only if, it is contextualised.* Context stages performance. The portrayal of (un)happiness described by Austin accordingly

corresponds with subsequent feelings of (in)authenticity a performance facilitates amongst an audience: thus, authenticity is not merely an object status, but an assessment of cultural authority undertaken by performative agents (Rubridge, 1995).

Given the situational subjectivity of truthfulness, wherein many truths can exist simultaneously or when agents derive and interpret different truths from the same sense data, Austin (1963) reminds us of the importance of looking beyond actions (the performance) to instead consider the circumstances necessary for an action to achieve a desired outcome (the staging and context of performance):

> Under the heading truth what we in fact have is, not a simple quality nor a relation, not indeed *one* anything, but rather a whole dimension of criticism. […] there is a whole lot of things to be considered and weighed up in this dimension alone – the facts, yes, but also the situation of the speaker, his purpose in speaking, his hearer, questions of precision, etc. If we are content to restrict ourselves to statements of an idiotic or ideal simplicity, we shall never succeed in disentangling the true from the just, fair, deserved, precise, exaggerated […] What we need, it seems to me, is a new doctrine, both complete and general, of *what one is doing in saying something.* (p.33) [italic emphasis original]

Contextuality

Context, encompassing the conditions empowering performance, is a foundational concept in LIS-oriented disciplines (e.g.: Dey, 2001; Lee, 2011; Agarwal, 2022). Within documentation, context generally refers to: 1) 'connections (and distinctions)' between documents which mediate and maintain informational boundaries negotiated through consensus, and 2) often retain 'specific ontological and epistemological commitments' which shape documentary relationships (de Fremery and Buckland, 2022a, p. 1272). Documents are inherently performative: 'in the right circumstances, certain outcomes through their presence by offering evidence of something […] Documents evince contexts beyond their immediate presence and, conversely, contexts frame the properties and powers of documents' (de Fremery and Buckland, 2022a, p. 1270). Semiotically, documents concurrently encompass a 'medium[s]', 'message[s]', or 'meaning[s]' (Furner, 2019, p.9), in that 'any object […] may be regarded as a document by a perceiver, whether or not its creator, if any, intended it to be a document' (Buckland, 2017, p.429). Taylor (1995) affirms this view in relation to archives and cultural heritage: '[Documents] become powerful 'signs' in a semiotic sense, and they can move us if we can only enter fully into the context of their creation, which we endeavour to do as part of our profession' (p.3).

Austin's (1963) interpretation of 'objects' as 'suitable for the purpose' positions performativity as documental, insofar as contexts 'frame the properties and powers' of performance (p. 23). Further, performative agents as senders or receivers of information are fundamentally engaged in acts of documenting, whereby 'something deemed significant (a document in a broad sense) is understood in some way (belief) and then that understanding is expressed in a new document' (Buckland and de Fremery, 2024, p. 5). Logically, performances (as an event) obtain documental status through their contextual staging and perception by agents. This synthesised documentalist view of *Authenticity*, as a contextualised performance, reframes the status of 'authentic' as an assessment of identity-relevance, wherein collectives interrogate the capacity of documents (i.e. any given representation) to be given or taken as *real* or *genuine* for the purpose using material things and experiences of cultural value to remember and maintain their own immaterial 'ownmost' sense of self (Modrow and Youngman, 2023). This aligns with de Fremery and Buckland's (2024) model of relevance and creativity, positing relevance not as a static status held by an object (i.e., *a document*), but as a dynamic *contextualised* process in which document affordances are perceived as useful for a given purpose.

To account for the meaning-making power of authenticity, *episemantics* (Hauser and Tennis, 2019) provides a useful analytic for considering the relationship between contextuality and performativity in a manner which 'avoid[s] viewing meaning as an inherent property' (p. 593). Emerging from knowledge organisation, episemantics posits how assessments of aboutness (i.e. meaning) of an entity are shaped by the entities which surround it (aroundness): 'aboutness is thus not a property but a relation that arises out of interpretive acts' (p. 592). Episemantics involves 'the posterior projection of meaning (and aboutness) onto inscriptions via interpretation. Meaning is always enacted rather than inherent' (p.592). This is especially useful for document research: 'the proximity (aroundness) of documents can signal potential relationships between other documents (aboutness), thus informing their co-contextual potential' (Youngman, 2025, p.46). An episemantic analysis of the present issue of authenticity reveals performativity as a mode of 'aboutness' and contextuality as a mode of 'aroundness'. A context-mediated performance (wherein performances only take effect under specific conditions) suggests aboutness relies on aroundness, that is: meaning depends on the circumstances of perception, function, and (re)use. Conversely, aroundness is only determinable through former iterations of meaning, that is, what an entity is about or represents: 'The meaning of a term is impossible to analyze prior to a contextualized account of use' (Hauser and Tennis, 2019, p. 593). Authenticity is never an objectively inherent property of documents or a static informational quality: what counts as *authentic* is an intersubjective assessment of identity-relevance around and about documents equally dependent on the performance and context of use.

Conclusion: Forms and futures of authenticity in LIS

At the intersection of authenticity, performativity, and contextuality, this investigation reveals two salient forms of authenticity immediately useful for future research in LIS. These forms of authenticity account for the social experience ('exo-') and internal affect ('emo-') of information. *Exo-Authenticity* is the externalised assessment of information *within* the world as *being* authentic. As an experience of knowing oneself and the world (i.e. aroundness), *exo-authenticity* evokes provenance, involving an attestation or proof of the circumstances related to the relationships between documents, as is the case with *certificates of authenticity*, professional *grading* or *authentication*, or personally identifiable documents like *social security cards* or *birth certificates*. *Emo-Authenticity* is the internalised assessment of information *about* the world *feeling* authentic. As an experience of being 'true to oneself' (i.e. aboutness), *emo-authenticity* evokes affect and engages with personal criteria related to resonance (Ruthven, 2021) derived from a variety of cultural experiences, from listening to classical music on an antique period instrument, witnessing a tradition in its place of origin, or baking a family recipe in your kitchen from grandma's cookbook. Importantly, the distinction between 'exo'/'emo' is not meant to be a definitive dichotomy, but rather a situational lens through which to contextualise performances and locate the presence or effects of documents, agents, and systems involved in such performances.

To better understand the similarities and distinctions between these and other divergent or emergent forms of authenticity, future LIS research should consider addressing some of the following questions: What challenges do the cultural and political dynamics of copying and imitation (de Fremery and Buckland, 2022b) pose for the design of resilient information systems immune to the disruption and destabilisation of authenticity as a status imposed upon information? How do we adapt to the proliferation of artificial intelligence slop and post-truth information (Youngman and Patin, 2024) in assessing authenticity? How do we, as agents capable of assessing authenticity, engage in collectivist participatory governance over information systems which impose social control (Hauser, 2025)? How do we move beyond false binaries of real/fake or true/false to instead address ways in which certain kinds of personal 'criteria for relevance' are constructed and encouraged in the realm of authenticity (Hjørland, 2003)? Indeed, is there any such threshold by which relevance becomes tied to interpersonal and group identity? Who benefits and suffers from empowered assessments deeming performances as (not) being authentic for the

purposes of establishing and imposing cultural authority? In what contexts is authenticity assumed rather than designated? Understanding when, why, and for whom authenticity matters is of vital importance for cultural information worldbuilders.

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