



Information Research - Vol. 30 No. iConf (2025)

Conceptual approaches to information-as-potentiality

Alexandra Chassanoff and Annie T. Chen

DOI: <https://doi.org/10.47989/ir30iConf47266>

Abstract

Introduction. In this paper, we advocate for the development of holistic approaches, theories, and frameworks for recasting the study of information use as a dynamic, emergent process.

Method. We begin by reviewing the LIS literature on information use to demonstrate the limitations of information-theoretical perspectives. We use the exemplar scenario of digital collections to demonstrate the need for open-ended, qualitative approaches for studying information in the context of its use.

Results. We introduce a conceptual approach called ‘information-as-potentiality’ and articulate a set of four meta-theoretical lenses (experienced information, situated information, participatory information, and embodied information) that can be used to ground empirical inquiry into the unfolding process of information.

Conclusion. We conclude by reviewing the benefits of adopting ‘information-as-potentiality’ perspectives and consider their potential value for informing the design and evaluation of digital collections.

Introduction

Understanding how scholars interpret and use artifacts from digital collections in research pursuits is an essential part of designing and building supportive knowledge infrastructures (Edwards et al., 2013). In these rapidly evolving information environments, interactions are mediated by interfaces, search queries, navigation, classification structures, and other factors that often require specific fluencies and competencies. Observing these new modes of practice in different scholarly domains can generate critical insights about changing epistemic norms and evolving literacies.

Traditionally, libraries and archives/special collections have used methods like circulation analysis and user surveys to determine the value and impact of collection information for users. Evaluating the use of digital collections, however, is difficult because there are currently no standardized assessment measures (Hughes, 2014; Kamposiori, 2020). Empirical studies on digital collections often employ quantified (e.g., transaction logs, web analytics) or causal (e.g., task-based retrieval) approaches, which can fail to capture the complexities of multimodal, multi-stage information processes. Consequently, there is very little qualitative understanding about the organizational, technical, and/or social practices that impede or enhance user interactions in digital collection environments.

In this paper, we propose a holistic approach to studying the epistemic possibilities of information in the context of its use through the conceptual lens of *information-as-potentiality*. We agree with Day (2000, 2011) and more recently Huvila (2018; 2022) that library and information science (LIS) should prioritize the development of methodological frameworks and theories for studying information use as a continuous, highly mediated activity. We use the LIS literature and related work to articulate a set of four meta-theoretical lenses for framing inquiry into information-as-potentiality within the context of evaluating digital collections use. In doing so, we are able to focus attention on the unfolding of dynamic, interpretive information practices and processes that configure meaningful (or meaningless) information use.

Background

Beyond the conduit: information use and digital collections

The information theories developed by Claude Shannon and Warren Weaver in their experiments on communication have had a significant influence on the discipline. Originally published in 1948, Shannon and Weaver's engineering model is primarily concerned with effective message transmission across an information channel and factors influencing message reception (such as channel capacity, noisiness, or degrees of uncertainty). The model is explicit about not incorporating meaning into a definition of information, claiming that the '*semantic aspects of communication are irrelevant to the engineering problem*' (Shannon, 1948).

Scholars from a variety of disciplines have long argued that information theory and its reductions à la the '*conduit metaphor*' have hindered the development of robust understandings of information as a dynamic, emergent process (Reddy, 1977; Soto and Sonnenschein, 2020). LIS (library and information science) does not define concepts, attributes or material properties of information and tends to defer to a larger framework concerned with behavior *around* information. Within the discipline, information-theoretic influences on the operationalization of the field's target value resolve primarily as either painting information use as a causal process of linear transmission and/or portraying information as a variable '*thing*' that can be represented for retrieval and/or preservation. Both conceptions have significant consequences for how we study and understand information in its different contexts of use. Day (2000, p.808) argues that the conduit approach has structured '*how we conceive and define the nature and scope of the field, what methods are allowable, what researchers, researchers, and disciplines are valuable for information studies.*' According to Capurro (1991), proponents of information theory conceive of information as a

singular, fixed representational value that flows linearly between two points. Information thus becomes a one-dimensional message, a '*substance that is transported between the sender and the receiver*' (Mai, 2013, p.676). Consequently, there is very little qualitative understanding about the evidential practices that *make something* information (Furner, 2004).

Cultural heritage institutions have long acknowledged difficulties tracking and evaluating the use of their collections (Dearstyne, 1987; Chapman et al., 2015) and the transformation to digital collections has only amplified an existing problem space for assessment. Namely, what constitutes the use of a [digital] collection? Does clicking on an artifact indicate use? Should it? In LIS studies on digital collections use, the so-called '*conduit approach*' has influenced the kinds of methodologies employed. In the first approach, collection use is quantifiably assessed through measuring access to digital resources. Researchers use transaction logs or web site analytics as tools to evaluate resource use (Prom, 2011; Lapworth, 2020). A second approach assesses use through the occurrence of citations and/or references in publications (Sinn, 2012; Harris and Hepburn, 2013). In the third approach, scholarly preferences for accessing collections are analysed, with an emphasis on whether scholars access materials through print or online methods (Tibbo, 2003; Anderson, 2004; Duff, Craig, and Cherry, 2004).

These studies provide very little insight into the multi-faceted, interactional space of scholarly information use in digital collection spaces. There are inherent limitations with employing quantitatively driven frameworks, theories, and methodologies to frame questions of information use - itself a highly interpretive, and often undefined sphere of information activities. In the first and third approaches, researchers are studying access to (rather than use of) information sources (Spink and Cole, 2006). Citation analysis is only partially helpful as an indicator of use; users might consult multiple sources in the course of their research but may not necessarily cite them. A further problem with citation analysis is the relative newness of standardized practices for citing digital resources, likely painting an inaccurate picture of use. As Sheble and Wildemuth (2013) note, transaction logs '*cannot tell us anything about users' cognitive or affective responses during the system interaction*' (p.174). Treating resource access and retrieval mechanisms simply as a proxy for information use obscures important aspects of the interaction space. How do factors such as digitization quality, the availability of technical metadata, or navigation options impact scholarly interpretation and use? What contextual qualities support meaningful discovery, access, and use of digital collections, and how does the interaction process influence the experience or outcomes of use? Answers to these questions can help inform the successful design of dynamic collection spaces and influence how LIS proceeds with theoretical developments.

Information use as an ongoing interpretive process

The dynamics of information flows within larger computer-mediated communication ecosystems introduce heuristic and practical complexities. Scholars working in digital collections now encounter artifacts through an interface where form, content, and interpretation converge in a particular space-time context (Hedstrom, 2002). This convergence meshes together '*previously separated realms*' (Lowood, 2002, p.9) into singular knowledge representations conditioned by ongoing mediations. As the factors which mediate content change (e.g., device, modality), so will the interpretation. Writing in the 1960s, the sociologist John McHale warned:

we are faced...with the emergence of a new and powerful fusion of technological capabilities which not only potentially amplifies our capabilities to deal with our social and physical environment transactions but which by its function as screen, channel and multiplexer of information actually reshapes the information content and perception of society - in ways that our conventional wisdom and traditional institutional means may not be able to foresee, comprehend or effectively control (p.16-17).

Studies on digital collections use capture a *specific instantiation* of a space-time bound relational link – an enactment of a viewing modality coupled with a representational level of content. But the specificity of this capture can also obfuscate *the process of information*. What gets lost in translation? In studying use in dynamic environments, being able to capture the organic, dynamic, and evolutionary nature of interpretation is essential. Let us consider ‘*information use*’ on social media. What users see on social media such as Twitter (X), Instagram and Tik Tok are algorithmically mediated; for example, Tik Tok’s for you page offers content tailored to the user. The videos – Tik Toks – that each person sees, their order, and how they experience (interpret) them differs. In addition, a person’s use experience is shaped dialogically in an ongoing interpretive process, as future content is based on users’ past and current interactions with content. Tik Tok users are aware of the impacts of the algorithmic nature of the platform, such as the creation of filter bubbles and the promotion of potentially harmful content, and users change their behaviours to reflect how they understand themselves (Karizat et al., 2021). User behavior, then, can only ever be understood in the context of how they perceive system behavior, themselves, and indeed, even their views of the human experience.

As a user, different social technologies may be associated with different meanings, e.g., Facebook as a space for presentation of the socially acceptable; Instagram, for stylized self-presentation; and Twitter as a venue for informal information exchange (Boczkowski et al., 2018). Companies and users co-create experiences with these platforms over time through features with socially embedded meanings, such as retweets on Twitter (X) and stories on Instagram. Considering users’ interactions in context, and through the language and culture of the media can facilitate a more nuanced understanding of meaning-making and use within different social media platforms.

Conceptualizing information-as-potentiality

In this paper, we argue that LIS should develop and adopt alternative frameworks, methodologies, and theories to facilitate the qualitative exploration of information use. We now explore how LIS research can incorporate *information-as-potentiality* in both design and evaluation efforts, with emphasis on digital collections as exemplar scenarios where acts of interpretation continuously mediate use.

Recent LIS studies highlight the importance of grounding study in the activities that constitute and bring forth informational aspects of interactions, what Huvila (2021) calls information making and taking. To this end, we might incorporate user-centred design methods to study interactions with information and technologies. Website visitors’ actions might be studied in behavioral analysis, through page views, queries, scrolling, viewing, and view duration (Barifah et al., 2020). Eye tracking might be used to understand user experiences in digital libraries (Kuhar & Mercun, 2022). The think-aloud protocol is often used in interviews to study users’ experiences and satisfaction with digital collections (Du et al., 2021; Zahidi et al., 2014). Standardized measures to assess usability such as the User Experience Questionnaire (Laugwitz et al., 2008) and AttrakDiff (Hassenzahl et al., 2003), experience measures the attractiveness of products (Walsh et al., 2014), complement these methods by providing information about user perceptions. These methods are congruent with the capture of motivation, affect, and satisfaction in the study of the use of digital collections (Kuhar & Mercun, 2022), but also afford a richer exploration of information experiences,

Kreiseler et al. (2017) argue that four functional principles support exploration in digital collections – view, movement, contextualization, and participation – and that the exploration of digital collections and cultural artifacts more broadly, could be studied through a three-part methodology, ‘*reverse information architecture*’, that facilitates connection between visual interfaces and design concepts they are based on. Concretely, this involves analysis of navigation, wireframe (page layout) and position (positioning of text and image elements). The idea that information experiences can be modelled applies not only to visual interfaces, but also those involving other modalities.

Practice-based perspectives provide a useful lens for understanding collectively how and why people do things with information (Lloyd, 2010) and can be useful for explicating shared meanings and social contexts underlying sites of interrogation (Schatski, 1995). Concepts relating to visual information practices and knowledge organization, mixed with user-centred methodologies, can also inform design and evaluation efforts. For example, Morse et al. (2021) incorporate the concept of *rich prospect*, an interface design framework that includes seven core principles: representation, organization, depth, availability, multiplicity, coherence, and selection, which was developed to enhance browsing and discovery in visual information collections. They employ rich-prospect in a mixed-methods study of three different cultural heritage collections, *Coins*, *Curator Table*, and *Museum of the World*. After an initial exploratory session using the think-aloud protocol, participants were introduced to the principles of rich-prospect on cards and then asked to consider the collections given these principles and their utility for their browsing experience. The use of these principles, along with other data collection techniques, facilitated a nuanced understanding of the relative contributions of different facets to one's overall experience, which in turn could inform prioritization and shaping of collection features.

Using a synthesis of the literature and our related work, we now introduce a set of meta-theoretical lenses that can guide analytical approaches for designing and evaluating digital collections use. We argue that each of these lenses provide a useful methodological orientation, framing inquiry into facets of informational interactions grounded in critical contexts of use. Metatheories are 'a set of assumptions, epistemological and ontological, that orient and direct theorizing about a given phenomenon' (Lawler and Ford, 1993, p.4). They can serve as a clarifying device for a disciplinary field to showcase underlying philosophical or theoretical assumptions commonly in play. According to Bates, metatheories represent 'the philosophy behind the theory, the fundamental set of ideas about how phenomena of interest in a particular field should be thought about and researched' (2005, p. 257). Each lens might be applied separately or together as they are not mutually exclusive, and one or more of them may apply in any given situation. Below, we briefly describe each lens and provide examples from the literature demonstrating their potential applicability in framing inquiry into digital collections use.

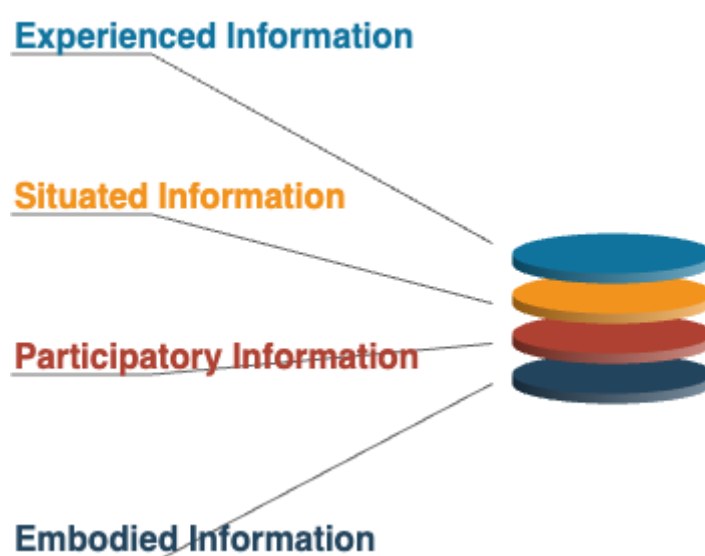


Figure 1. The metatheoretical lenses of *information-as-potentiality*

Meta-theoretical lens #1: experienced information

The lens of experienced information provides a conceptual window into environments where people build understanding by engaging with documentation (Gorichanaz, 2017). Focusing on experienced information emphasizes the interactions between individuals and their life-worlds rather than only capturing the outcomes of those interactions (Bruce, 2014). Holistic accounts that capture how information is experienced prompt attention to processes underlying *'what information a given artifact imparts'* (Hoyte, 2019, p.415).

Information pathways is one methodological approach for studying how information is experienced and has been proposed as a guiding metaphor from which to characterize the design of cultural heritage collections. Goodale et al. (2012) observe that information pathways can have various conceptualizations, including as information-seeking journeys, a starting point or way in, a route through, a learning process, and others. Wray et al. (2013) emphasizes two dimensions of pathways, one involving creative, non-linear journeys (e.g., a search history) and one supporting learning and meaning making (e.g., linked metadata). Assessment of the similarity between works in a collection affords a sense of the potential for non-linear serendipitous explorations. In a similar vein, Adams, and Blandford (2005) performed a grounded theory analysis of the *information journeys* taken by users of digital libraries in two domains, health, and academia, identifying three main stages – information initiation, facilitation (or gathering) and interpretation – and opportunities to better support users in these experiences.

Though log data collected concerning digital collection use are often quantitative in nature, they can be considered more interpretively, as pathways for understanding how information is experienced. Behavioral metrics could serve as a temporal view of the path that one takes – their experience – of an artifact or collection. Though the manifest meaning of page views, click-throughs, and other user interactions may be unclear, an alternate way of conceptualizing log data are as the artifacts of an experiential process. When one views the traces of activity through a website, one is viewing a process of sense-making. Considering users' behaviours sequentially could lead to informative re-constructions of how users learn and engage in meaning-making with collections, as well as paths that perhaps designers had not anticipated, facilitating the imagining of new potentialities.

Meta-theoretical lens #2: situated information

Given the right conditions and environments, all kinds of entities (artifacts, people, events) can inform or *'make something known'* (Briet, 1951), but it is the processing of that entity for *'informational purposes'* (Buckland, 2001) that signifies a transition to documentation status. Taylor (1986;1991) is one LIS scholar who recognized the importance of approaching information from a situated perspective, arguing that specific meaning(s) and value are established in the context of use. He developed a conceptual framework for studies on information use environments, aiming to capture influential elements that impact flow and determination of informational value. According to Taylor, information always exists as a phenomenon of study in a situational context. He explains, *'Data becomes information when we establish relationships among data...it is the structure and relations among data, and most important, the rules and conditions used to establish those relations'* (1991, p. 7-8). Viewed through this lens, artifacts can serve as prompts for informational study and in practice approaches, as *'epistemic objects'* always in the process of unfolding (Knorr-Cetina, 2000). The situated nature of information interactions was also taken up in LIS by Blandford and Attfield (2010), elaborating on previous work theorizing information journeys. They describe how sites of situated information interactions are mediated contexts that are *'physical, social, and activity-centred'* and can overlap situationally (2010, p.2).

In affiliated knowledge communities, the intersecting spheres of information studies, human-computer interaction, and organizational work studies have produced relevant theoretical work on *'the situated entanglement of the technical and the social'* (Orlikowski, 2005, p.185). Interrogating

processes of information from this perspective can be fruitful for unpacking the ‘multiple logics that configure together social and material realities (Barad, 2007). Technology itself can be interpreted as a social practice and efforts to study knowledge-generative environments must account for the ‘constitutive, co-dependent relations of complexity’ that underpin all digital information environments (Drucker, para. 30, 2013). Studying conditions of situated information permits attention to the ‘the individual work and its activation of the particular conventions as its point of departure’ (Doane, p. 131). Rather than focusing on the medium and its corresponding material presence, though, information is studied in the context of its performative becoming; though not the sole, liminal focus of interest, the medium is an inherent part of the (informational) context.

While in principle, studying situated information or information in its ‘performative becoming’ may seem intuitive, questions may arise concerning how this might be achieved in practice. There are methods from different disciplines and approaches that can be helpful. For example, the concept of *information horizon* introduced by Sonnenwald (1999), referring to the perceived horizon of potential information resources, affords an intuitive representation of the socially constructed and situated use of information by different users. Often used in contextual inquiry (Beyer & Holtzblatt, 1999), visual tools such as information flow diagrams, cultural models, sequence models and other diagrams might also be used to understand and envision potential information uses. Jo Bates et al. (2016) introduces a methodological approach they call *data journeys* for exploring the socio-material, constitutive nature of digital data in the context of its use. The value of this situated perspective is the ability to attend to *how* information flows through complex environments, making visible ‘potential movement, blocked movement and lack of movement.’

Meta-theoretical lens #3: participatory information

In this paper, we argue that participatory approaches to information practice research can be an effective means of contending with ‘information-as-potentiality’ and meaning-making. Let us consider the scenario of information creation and use in heritage sites such as archives and museums. Rather than viewing these as static, participatory information practices invite people to interact with sites as a ‘means for social interaction, participation, co-creation and contribution’ (Stuedahl, 2018, p. 219). Incorporating users’ information practices and potentially leveraging available technologies to assess feelings and reactions in the moment (e.g., through ecological momentary assessment) could facilitate richer engagement with and design of heritage environments. For example, the Acropolis Museum invited museum visitors to evaluate mobile-based storytelling guides designed to facilitate personalized experiences (Roussou & Katifori, 2018). They incorporated data collected through ethnography (i.e., shadow observation), interviews, questionnaires, and data logging into analysis, and ultimately considering themes such as interactive story plot and narration, staging, and wayfinding, personalisation, and social interaction.

Participatory information approaches such as decentralized curation focus on usability and findability (*‘radical user orientation’*) and contextualisation of both records and the entire archival process (Huvila, 2008); and engaging community members in the appraisal, arrangement, and description phases of creating an archival record, are needed to ensure meaningful representation (Shilton & Srinivasan, 2007). Examples of participatory archives projects are #NorthVanStories, a social media collection project in which residents of North Vancouver were encouraged to tag social media with this hashtag, and #NorthVanStories–Living Histories, a digital video oral history project (Bushey, 2023). #NorthVanStories–Living Histories involved multiple steps, including identification of community assets, selection of projects relevant to the communities, contact with storytellers, sharing a questionnaire with questions to support the aims of the project, and creation of five videos with storytellers from diverse and vulnerable communities. This multi-step process illustrates consideration of the information to be included and scaffolding (the questionnaire) to

support, but not define the knowledge representation, thus preserving voice and flexibility for storytellers to tell stories their own way. In both projects, meaning was defined and evolved through dialectical engagement, thus highlighting the need to: a) design with the participation of communities involved; and b) develop designs that allow for information to be defined and evolve as it is being produced. Thus, participatory information practices facilitate the realization of collective negotiation of the meaning of information as an emergent process.

Meta-theoretical lens #4: embodied information

Information can become embodied in and through a variety of forms that extend beyond the human body. Different contextual factors catalyse the informational process, including affective motivations and goals (Nahl, 2007) and align with domain-specific meanings (Hjorland & Albertson, 1995). Working in the vein of digital information studies, Hayles (2002) argues that the materiality of information arises from the combination of user interactions and interpretive strategies. In other words, information emerges in its material form through the coupling of interpretation with interaction. Dourish (2001) also proposed a theory of embodied interaction that emphasizes context-aware approaches to studies of social interactions with physical and/or technical artifacts. Bates (2018) helpfully reminds us that as humans ‘operating in a world of possible affordances’ (p.255) we have the embodied capacity to perceive, experience, and communicate information in meaningful ways.

The relational links between perception and embodiment were made in early critiques of information theory, initially by the British scientist Donald MacKay who noted the significant role of perception in the transfer of information. For MacKay, the act of perceiving messages is made possible by an existing internal state of conditional readiness. He writes,

the mechanical energy of a message must be sufficient to do the mechanical job that eventually resets the brain-levels; but the selective job, of determining which levels shall move, depends on the form of the message, and on the state of your brain before you hear it (1969, p.24).

Drawing attention to the job of selection is critical for MacKay’s argument; while all sorts of stimuli might be received, only stimuli that evoke a matching response in the organism can be perceived. This distinction is critical to understanding how perception itself is embodied in the activity of information, or, as MacKay puts it, the ‘activity of knowing is an activity of internal adaptive response’ (p. 61).

More recently, the concept of embodied information has received attention by LIS, often by way of studies on information practices. According to Olsson and Lloyd (2016),

embodied information practices (social, physical, and material) therefore act as complex and rich sources of information that are referenced through the social, physical, and material conditions of the site and its ways of knowing.

We also observe embodied ways of knowing in serious leisure, including in ultra-running (Gorichanaz, 2015) and enthusiast car restoration (Lloyd-Zantiotis & Olsson, 2017). Similarities in these examples include the complexities of information practices, their social and oral nature, and the important role of acquired knowledge. However, there are also differences in individual ways of knowing. Whereas, in the context of ultra-running, the body was a key source of information (Gorichanaz, 2015), a participant in Lloyd-Zantiotis and Olsson’s (2017) study developed a feel for different types of materials and how to work with them in the context of the car restoration process.

Studies of embodied information have employed a variety of methods, such as interviews, diaries, and observation, that might be useful for capturing the richness of information behavior that occur

– ‘*information-as-potentiality*’ – with digital collections. For example, the experience of historical artifacts in digital form, can be embodied. Green (2018) writes that social media affords ‘*curatorial hands*’ through haptic experiences of digitized manuscripts. Though even the physical access to artifacts is often limited to a select few who are able to travel to view artifacts behind glass display cases, today social media such as Instagram can afford novel forms of engagement manipulating a digital representation via tapping, clicking or swiping, or scrolling back and forth through an set of images curated as a story, thus enabling viewers to interact with artifacts in ways not hitherto possible using traditional viewers. How is such engagement to be measured? One might conceive of the utilization of different ethnographic methods, but also the development of novel instruments that incorporate consideration of the embodied nature of information.

Media archaeology is one possible theoretical approach for augmenting embodied information research in interacting with digital collections. For example, a media archaeological approach could prove useful in presenting scholars with technical (e.g., EXIF) metadata alongside the display of digital artifacts from online collections. How do scholarly interpretations of digital artifacts change in these different contexts? How might such factors inform or contribute to the design and use of digital collections?

Conclusion

This paper is an initial attempt to offer a set of metatheoretical lenses for conceptualizing *information-as-potentiality*. We use the exemplar scenario of digital collections to show how the application of information-theoretical understandings offers an incomplete vantage point for assessing informational qualities generated by interactions, and grounding inquiry in perspectives that frame *information-as-potentiality* cultivates the appropriate, relevant logic from which to evaluate the design and use of digital collections. Conceptualizing information use as an experienced, participatory, situated, and/or embodied set of practices captures key insights into the dynamic, unfolding nature of the information process in the context of use. We offer these conceptual lenses as ways that can help direct our attention to dimensions of interest throughout the information use process, an increasingly important endeavour considering how often we now encounter information across a variety of spatiotemporal dimensions and contexts.

In this paper, we have shown that there is both opportunity and a need to consider the potentiality of information in research involving digital collections and cultural heritage. The use and interpretation of information can be complex, non-linear, situated, and organic, dependent on and evolving alongside user interactions in different contexts. Ultimately, we aim to contribute to a nuanced understanding of how information behaves in computationally aware platforms, interfaces, and networked environments. Though user-centred design, ethnography, and other approaches provide a rich set of methods to study human experience, we suggest that information use studies engaging with the meta-theoretical lenses specified here can further enrich our understanding of dynamic information use behavior and in turn, inform the design of more fulfilling digital collections and other information environments.

Acknowledgements

Alexandra Chassanoff University of North Carolina Chapel Hill and Annie T. Chen University of Washington

About the authors

Alexandra Chassanoff is Assistant Professor in the School of Information and Library Science, University of North Carolina, Chapel Hill, North Carolina, USA. Her research focuses on born-

digital curation and community-driven approaches to cultural heritage. She can be contacted at: achass@unc.edu

Annie Chen is Associate Professor in the Department of Biomedical Informatics and Medical Education at the University of Washington School of Medicine. Her research interests include information behaviours in the context of long-term health management; information and interaction in online communities and other digital spaces; the use of natural language processing and visualization methods to study linguistic patterns relating to psychosocial and communicative processes; and user-centred design. She can be contacted at atchen@uw.edu

References

- Adams, A. & Blandford, A. (2005). Digital libraries' support for the user's 'information journey.' *Proceedings of the 5th ACM/IEEE-CS Joint Conference on Digital Libraries*, 160–169. <https://doi.org/10.1145/1065385.1065424>
- Anderson, I. (2004). Are you being served? Historians and the search for primary sources. *Archivaria* 58, 88–129.
- Barifah, M., Landoni, M., & Eddakrouri, A. (2020). Evaluating the user experience in a digital library. *Proceedings of the Association for Information Science and Technology*, 57(1), e280. <https://doi.org/10.1002/pra2.280>
- Bates, M. J. (2005). An introduction to metatheories, theories, and models. In K. E. Fisher, S. Erdelez, & L. McKechnie (Eds.), *Theories of information behavior* (pp. 1–24). Medford, NJ: American Society for Information Science and Technology.
- Bates, M.J. (2018). Concepts for the study of information embodiment. *Library Trends* 66(3), 239–266.
- Bates, J., Lin, Y.W., & Goodale, P. (2016). Data journeys: Capturing the socio-material constitution of data objects and flows. *Big Data and Society* 3(2).
- Beyer, H. & Holtzblatt, K. (1999). Contextual design. *Interactions*, 6(1), 32–42.
- Blandford, A. & Attfield, S. J. (2010). *Interacting with information*. Morgan & Claypool Publishers.
- Boczkowski, P. J., Matassi, M., & Mitchelstein, E. (2018). How young users deal with multiple platforms: The role of meaning-making in social media repertoires. *Journal of Computer-Mediated Communication*, 23(5), 245–259. <https://doi.org/10.1093/jcmc/zmy012>
- Bruce, C., Davis, K., Hughes, H., Partridge, H. & Stoodley, I. (2014). *Information experience: Approaches to theory and practice* (Library and Information Science, Vol. 9), Emerald Group Publishing Limited, Leeds, 3–15. <https://doi.org/10.1108/S1876-056220140000010001>
- Buckland, M. K. (1991). Information as thing. *Journal of the American Society for Information Science*, 42(5), 351–360. [https://doi.org/10.1002/\(SICI\)1097-4571\(199106\)42:5<351::AID-ASIS>3.0.CO;2-3](https://doi.org/10.1002/(SICI)1097-4571(199106)42:5<351::AID-ASIS>3.0.CO;2-3)
- Bushey, J. (2023). A participatory archives approach to fostering connectivity, increasing empathy, and building resilience during the COVID-19 pandemic. *Heritage*, 6(3), Article 3. <https://doi.org/10.3390/heritage6030125>
- Capurro, R. (1991). Some critical comments on three leading paradigms of information science section, para.1," *Foundations of Information Science: Review and Perspectives*. <https://www.capurro.de/tampere91.htm>

- Chapman, J., DeRidder, J. & Thompson, S. (2015). Developing best practices in digital library assessment: Year one update. *D-Lib Magazine*, 21, 11-12. <https://www.dlib.org/dlib/november15/chapman/11chapman.html>
- Day, R.E. (2000). The “conduit metaphor” and the nature and politics of information studies. *Journal of the American Society for Information Science & Technology*, 51(9), 805-811.
- Day, R.E. (2011). Death of the user: Reconceptualizing subjects, objects, and their relations. *Journal of the American Society for Information Science & Technology*, 62(1), 78-88.
- Dearstyne, B. (1987). What is the use of archives? A challenge for the profession. *The American Archivist*, 50(1), 76-87. <https://doi.org/10.17723/aarc.50.1.572q383767657258>
- Dourish, P. (2001). Seeking a foundation for context-aware computing. *Human-Computer Interaction*, 16(2), 229-241. https://doi.org/10.1207/S15327051HCI16234_07
- Drucker, J. (2013). Performative materiality and theoretical approaches to interface. *Digital Humanities Quarterly*, 7(1). <https://www.digitalhumanities.org/dhq/vol/7/1/000143/000143.html>
- Du, J., Yuen, C., Slaughter, M., & Chen, A. T. (2021). Perceived usability and experience with digital tools in the context of digital humanities research. *Proceedings of the Association for Information Science and Technology*, 58(1), 435-439. <https://doi.org/10.1002/pr2.474>
- Duff, W., Craig, B., & Cherry, J. (2004). Finding and using archival resources: A cross-Canada survey of historians studying Canadian history. *Archivaria*, 58, 51-80.
- Edwards, P. N., Jackson, S. J., Chalmers, M. K., Bowker, G. C., Borgman, C. L., Ribes, D., Burton, M., & Calvert, S. (2013). Knowledge infrastructures: Intellectual frameworks and research challenges. University of Michigan. <http://hdl.handle.net/2027.42/97552>
- Furner, J. (2004). Information studies without information. *Library Trends*, 52(3), 427-446.
- Goodale, P., Clough, P., Ford, N., Hall, M., Stevenson, M., Fernando, S., Aletras, N., Fernie, K., Archer, P., & de Polo, A. (2012). *User-centred design to support exploration and path creation in cultural heritage collections*, 75-78. <https://oro.open.ac.uk/68751/>
- Gorichanaz, T. (2015). Information on the run: Experiencing information during an ultramarathon. *Information Research: An International Electronic Journal*, 20(4). <https://eric.ed.gov/?id=EJ1087433>
- Green, J. M. E. (2018). Digital manuscripts as sites of touch: social media for “hands-on” engagement with medieval manuscript materiality. *Archive Journal*. www.archivejournal.net
- Harris, V. & Hepburn, P. (2013). Trends in image use by historians and the implications for librarians and archivists. *College and Research Libraries*, 74(3).
- Hassenzahl, M., Burmester, M., & Koller, F. (2003). AttrakDiff: Ein Fragebogen zur Messung wahrgenommener hedonischer und pragmatischer Qualität. In G. Szwillus & J. Ziegler (Eds.), *Mensch & Computer 2003: Interaktion in Bewegung* (pp. 187-196). Vieweg+Teubner Verlag. https://doi.org/10.1007/978-3-322-80058-9_19
- Hedstrom, M. (2002). Archives, memory, and interfaces with the past. *Archival Science*, 2(1-2), 21-43. <https://doi.org/10.1007/BF02435629>
- Hjørland, B. and Albrechtsen, H. (1995). Toward a new horizon in information science: Domain-analysis. *Journal of the American Society for Information Science*, 46(6), 400-425.

- Hoyte, P. (2019). Implications of the embodied, enactive mind on theorizing about information experience. *Proceedings of the Association for Information Science and Technology* 56, 413-416. <https://doi.org/10.1002/pra2.40>
- Huvila, I. (2008). Participatory archive: Towards decentralised curation, radical user orientation, and broader contextualisation of records management. *Archival Science*, 8(1), 15-36. <https://doi.org/10.1007/s10502-008-9071-0>
- Huvila, I. (2018). Ecology of archaeological information work. In I. Huvila (Ed.), *Archaeology and archaeological information in the digital society* (pp. 121-141). Routledge.
- Huvila, I. (2022). Making and taking information. *Journal of the Association for Information Science and Technology*, 73(4), 528-541. <https://doi.org/10.1002/asi.24599>
- Kamposiori, C. (2020). Measuring the impact of special collections and archives in the digital age: Opportunities and challenges. *LIBER Quarterly: The Journal of the Association of European Research Libraries*, 30(1), 1-31. <https://doi.org/10.18352/lq.10345>
- Karizat, N., Delmonaco, D., Eslami, M., & Andalibi, N. (2021). Algorithmic folk theories and identity: How TikTok users co-produce knowledge of identity and engage in algorithmic resistance. *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW2), 1-44. <https://doi.org/10.1145/3476046>
- Knorr-Cetina, K. (2000). Objectual practice. In Karin Knorr Cetina, Theodore R. Schatzki & Eike von Savigny (Eds.), *The practice turn in contemporary theory*. New York: Routledge.
- Kreisler, S., Brüggemann, V., & Dörk, M. (2017). Tracing exploratory modes in digital collections of museum web sites using reverse information architecture. *First Monday*. <https://doi.org/10.5210/fm.v22i4.6984>
- Kuhar, M. & Merčun, T. (2022). Exploring user experience in digital libraries through questionnaire and eye-tracking data. *Library & Information Science Research*, 44(3). <https://doi.org/10.1016/j.lisr.2022.101175>
- Lapworth, E. (2021). Assessing large-scale digitization using web analytics. *Digital Library Perspectives*, 37(2), 133-150. <https://doi.org/10.1108/DLP-09-2020-0095>
- Laugwitz, B., Held, T., & Schrepp, M. (2008). Construction and evaluation of a user experience questionnaire. In A. Holzinger (Ed.), *HCI and Usability for Education and Work* (pp. 63-76). Springer. https://doi.org/10.1007/978-3-540-89350-9_6
- Lawler, E. J., & Ford, R. (1993). Metatheory and friendly competition in theory growth: The case of power processes in bargaining. <http://digitalcommons.ilr.cornell.edu/articles/1195>
- Lloyd-Zantiotis, A., & Olsson, M. (2017). Being in place: Embodied information practices. *Information Research: An International Electronic Journal*, 22(1), Article 1. <http://informationr.net/ir/22-1/colis/colis1601.html>
- Lowood, H. (2002). Shall we play a game: Thoughts on the computer game archive of the future. *Bits of Culture*. Stanford University. https://web.stanford.edu/~lowood/Texts/shall_game.pdf
- MacKay, D. (1969). *Information, mechanism and meaning*. Cambridge: MIT Press.
- McHale, J. (1976). *The changing information environment*. Boulder: Westview Press.
- Mai, J.E. (2013). The quality and quantities of information. *Journal of the American Society for Information Science and Technology*, 64(4).

- Morse, C., Niess, J., Lallemand, C., Wieneke, L., & Koenig, V. (2021). Casual leisure in rich-prospect: Advancing visual information behavior for digital museum collections. *Journal on Computing and Cultural Heritage*, 14(3), 1–23. <https://doi.org/10.1145/3437257>
- Nahl, D. (2007). The centrality of the affective in information behavior. In D. Nahl & D. Bilal (Eds.), *Information and emotion: The emergent affective paradigm in information behavior research and theory*, Medford, New Jersey: American Society for Information Science and Technology
- Olsson, M. & Lloyd, A. (2017). Being in place: embodied information practices. *Information Research*, 22(1), CoLIS paper 1601. <http://InformationR.net/ir/22-1/colis/colis1601.html>
- Orlikowski, W.J. (2005). Material works: Exploring the situated entanglement of technological performativity and human agency. *Scandinavian Journal of Information Systems* 17(1), Article 6.
- Prom, C.J. (2011). Using web analytics to improve online access to archival resources. *American Archivist* 74(1), 158–84.
- Reddy, M. J. (1979). The conduit metaphor: A case of frame conflict in our language about language. In A. Ortony (Ed.), *Metaphor and Thought* (pp. 284–310). Cambridge: Cambridge University Press.
- Roussou, M. & Katifori, A. (2018). Flow, staging, wayfinding, personalization: Evaluating user experience with mobile museum narratives. *Multimodal Technologies and Interaction*, 2(2), 32. <https://doi.org/10.3390/mti2020032>
- Shannon, C.E. (1948). The mathematical theory of communication. *The Bell System Technical Journal* 27, 379–423.
- Sheble, L. & Wildemuth, B. (2009). Transaction logs. In B. Wildemuth (Ed.), *Applications of social research methods to questions in Information and Library Science* (pp. 166–177). Westport, CT: Libraries Unlimited).
- Shilton, K., & Srinivasan, R. (2007). Participatory appraisal and arrangement for multicultural archival collections. *Archivaria*, 87–101.
- Sinn, D. (2012). Impact of digital archival collections on historical research. *Journal of the American Society for Information Science and Technology*, 63(8), 1521–1537.
- Sonnenwald, D. (1999). *Evolving perspectives of human information behavior: Contexts, situations, social networks, and information horizons*. In Wilson, T. & Allen, D. (Eds.). *Exploring the contexts of information behavior* (pp. 176–190). London: Taylor Graham.
- Soto, A.M. & Sonnenschein C. (2020). Information, programme, signal: Dead metaphors that negate the agency of organisms. *Interdisciplinary Science Review*, 45(3), 331–343.
- Spink, A. & Cole, C. (2006). Human information behavior: Integrating diverse approaches and information use. *Journal of the American Society for Information Science and Technology* 57(1), 25–35.
- Stuedahl, D. (2018). Participation in design and changing practices of museum development. In *The Routledge Handbook of Museums, Media, and Communication* (pp. 219–231). London: Routledge Publishing.
- Taylor, R. (1986). *Value-added processes in information systems*. New Jersey: Ablex Publishing Corporation.
- Taylor, R. (1991). Information use environments, In B. Dervin & M.J. Voight (Eds.), *Progress in Communication Sciences* Vol. 10. Norwood, NJ: Ablex Publishing Corp.

Tibbo, H. (2003). Primarily history in America: How US historians search for primary materials at the dawn of the digital age. *The American Archivist*, 66(1), 9–50.

Walsh, T., Varsaluoma, J., Kujala, S., Nurkka, P., Petrie, H. & Power, C. (2014). Axe UX: Exploring long-term user experience with iScale and AttrakDiff. *Proceedings of the 18th International Academic MindTrek Conference: Media Business, Management, Content & Services*, 32–39. <https://doi.org/10.1145/2676467.2676480>

Wray, T., Eklund, P. & Kautz, K. (2013). Pathways through information landscapes: alternative design criteria for digital art collections. *International Conference on Information Systems* (pp. 1–22). United States: Association for Information Systems.

Zahidi, Z., Lim, Y. P., & Woods, P. C. (2014). Understanding the user experience (UX) factors that influence user satisfaction in digital culture heritage online collections for non-expert users. *2014 Science and Information Conference*, 57–63. <https://doi.org/10.1109/SAI.2014.6918172>

© [CC-BY-NC 4.0](#) The Author(s). For more information, see our [Open Access Policy](#).