Information Research - Vol. 30 No. 1 (2025)

Hektor's framework, embodiment and superabundance in research on information activities in serious leisure

Jan Raoul Weber
DOI: https://doi.org/10.47989/ir30140522

Abstract

Introduction. In 2016, Hartel et al. introduced Hektor's framework of information activities as a tool for analysing human information behaviour in serious leisure. They also noted a lack of attention towards embodiment and superabundance. This study aims to examine serious leisure papers published between 2017 and June 2023 to determine if and how Hektor's framework has been utilised and if embodiment and superabundance have been addressed.

Method. A systematic review of serious leisure literature from 2017 to June 2023 in selected journals and databases is conducted.

Analysis. The final sample of nineteen publications is thematically categorised and analysed to identify common patterns and themes.

Results. Hektor's framework is mentioned in nine publications, but only used as a structuring tool in five. Embodiment is discussed in thirteen publications, with body as information source and body as sign emerging as categories for analysis. Two studies briefly touch upon superabundance, but do not investigate it further.

Conclusions. Hektor's framework is only one of several being used, but using it leads to more comparable results. Embodiment appears to be of high interest, with the body as information source and body as sign being useful categories for analysis. Superabundance still lacks attention.

Introduction

Serious leisure, a concept established by sociologist Robert A. Stebbins (see Stebbins, 1982), defines leisure as an uncoerced activity centred around a core activity. The core activity is defined as 'a distinctive set of interrelated actions or steps that must be followed to achieve the outcome or product that the participant seeks.' (Stebbins, 2009, p. 620). Examples for core activities include descending snowy slopes for alpine skiing or working on wood for carpentry. Serious leisure can manifest as hobbyism, amateurism or volunteering, with individuals pursuing leisure careers based on their deep interest and fulfilment in a core activity (Stebbins, 2009, p. 620). While previous studies in information science have explored serious leisure activities (see Ross, 1999, for reading, and Kari, 2001, for paranormal activities), it took until 2003 for Hartel to explicitly connect the serious leisure perspective with information science (Hartel, 2003). Since then, researchers have investigated serious leisure in various domains such as online environments (Urban, 2008), cooking (Hartel, 2010) or in its connection to affect (Fulton & Vondracek, 2009). However, some studies have explored aspects of information activities within serious leisure without mentioning the concept, for example, Dolence and Gilmour (2006) on amateur scientist or Duff and Johnson (2003) and Yakel (2004) on family historians. To facilitate comparative and precise research, Hartel et al., 2016, in their paper Information activity in serious leisure proposed using the information activity framework developed by Hektor (2001) to categorise serious leisure information activities. It consists of four types of information behaviours (seeking, gathering, communicating, giving) and eight corresponding information activities (search & retrieve, browse, monitor, unfold, exchange, dress, instruct, publish) that can be used to categorise different types of information activities. Section 2 provides a more detailed explanation of the framework. In addition to showcasing the ingenuity of Hektor's thesis through its connection to everyday life, its incorporation of social worlds and its anticipation of information seeking in context, Hartel et al. highlight the framework's inclusion of using, creating and sharing information. These activities are usually overlooked in other frameworks that primarily focus on information seeking and searching (Hartel et al., 2016). Hartel et al. demonstrate the applicability of the framework through examples from liberal arts, amateur musicianship and running. While the framework effectively captures the activities within each domain, they identify two major shortcomings. First, its lacking accommodation for embodiment, which is crucial in dynamic leisure activities involving various sensations like sight, touch, smell and even the olfactory nerve (Hockey & Collinson, 2007). Second, they highlight that the framework was developed during a time when the information environment was less information-rich and thus does not account for information superabundance. Nevertheless, Hartel et al. suggest further utilisation of the framework in research on serious leisure in information activities to enhance comparability and precision. Accordingly, this paper aims to investigate if the recommended framework, which could serve as a common framework for structuring research on serious leisure in human information behaviour, has been applied in research. Additionally, it seeks to determine if the two shortcomings identified by Hartel et al., embodiment and superabundance, have been further explored in research. Thus, the following research questions are put forward:

RQ1: Has Hektor's framework been utilised in serious leisure research since the publication of Hartel et al.s' 2016 paper, and if so, how?

RQ2: Has embodiment in serious leisure been addressed since the publication of Hartel et al.s' 2016 paper and if so, how?

RQ3: Has superabundance in serious leisure been addressed since the publication of Hartel et al.s' 2016 paper and if so, how?

The premise of this study is that Hartel, being the researcher who initially introduced the serious leisure perspective into information science and one of the authors of the article proposing Hektor's framework, would be widely read within the field and therefore the possibility of the employment of Hektor's framework given. Owing to the exploratory nature of previous studies on information activities in serious leisure, to the author's knowledge, no generalisable findings exist, resulting in the absence of a comprehensive theory regarding information behaviour in serious leisure (Hartel et al., 2016).

Hektor's framework

In his doctoral thesis on the usage and usefulness of information systems in everyday life, Hektor developed a framework of information activities (Figure 1) consisting of four basic types of information behaviour (inner circle) and eight corresponding information activities (outer circle). Owing to the comprehensiveness and readability of this paper, only the activities that are not commonly understood in an information science context will be explicitly explained. The ones assumed as commonly understood are search and retrieve, browse, monitor, instruct and publish. The activities that are less familiar or have specialised meanings are unfold, exchange and dress.

In this context, unfold refers to the continuous direction of one's attention towards an 'information system and the symbolic display it offers' (Hektor, 2001, p. 84). This can be done by visual means, such as reading a book, auditory means, such as listening to a newscast, or multi-sensory means, such as watching a movie (Hektor, 2001, p. 84). Dress refers to the externalisation of a 'cognitive product' (Hektor, 2001, p. 86). This can take the form of signs, symbols, text, words, physical expressions, images or pictures (Hektor, 2001, p. 87). Therefore, unfolding and dressing are both uni-directional processes (Hektor, 2001, p. 85).

In contrast, exchange is a bi-directional process that requires reciprocity to avoid becoming unfolding or dressing (Hektor, 2001, p. 85). Acts of exchange can occur through face-to-face conversations, telephone calls, or ongoing email exchanges over an extended period (Hektor, 2001, p. 86). However, this exchange does not necessarily involve text or sound, it can also occur between players of a game either in real life or technologically mediated (Hektor, 2001, p. 86).

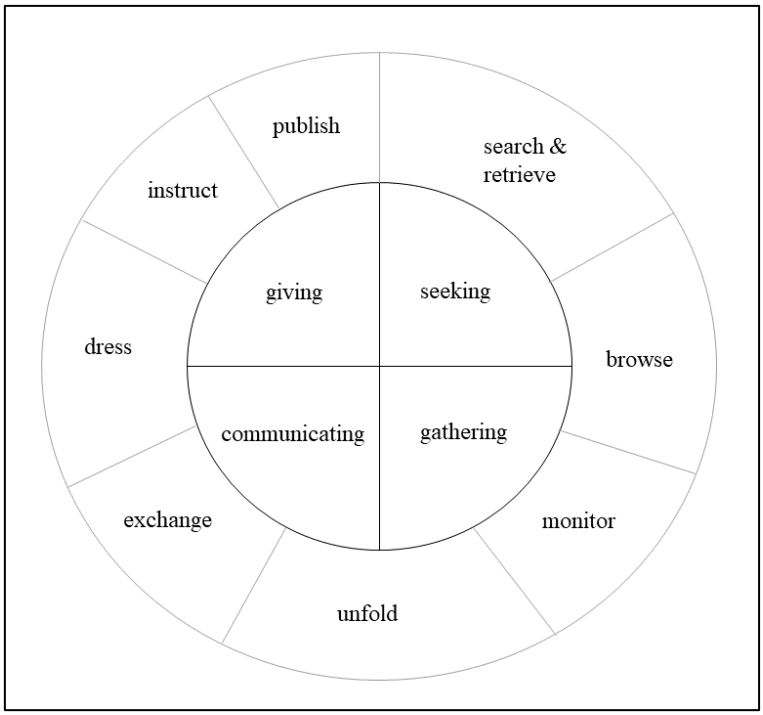

Figure 1. Hektor's framework (inner circle: types of information behaviour, outer circle: corresponding information activities). Redrawn from Hektor (2001, p. 81).

Method

The presented review was conducted in the summer of 2023. Because of its research questions only covering the timespan from 2017 to June 2023, it can be classified as a 'mini review' rather than a 'full review' (Pautasso, 2013, p. 2). Despite being a mini review, it was designed to be as deep and rigorous as possible (Snyder, 2019, p. 338) and systematic, as it tries to use clear and accountable methods (Gough et al., 2012, p. 2).

Literature selection

The first step in searching for relevant literature involved identifying suitable databases and journals. The selection process considered the academic quality and relevance to information science as selection criteria. The two languages that were considered were English and German. To find potential candidates, the author consulted curated information science journal databases available through university libraries. For a broader search across databases and journals, the Open Public Access Catalogues of the respective libraries, as well as Google Scholar were included. Table 1 provides an overview of all the chosen databases and journals for investigation. As a last step, the paper by Hartel et al. (2016) was used as a starting point to conduct forward chaining using the Web of Science, aiming to identify any additional relevant publications. Unfortunately, Hektor's doctoral thesis could not be found on Web of Science and, therefore, could not be included in the chaining process.

Databases	Journals
Emerald Insight	Information Systems Research
Library & Information Source	Journal of Information Technology (JIT)
Library, Information Science & Technology	Journal of the Association for Information Science and Technology (JASIST)
Bibliothekswissen, das	Information Research
DABI: Datenbank Deutsches Bibliothekswesen	Aslib Journal of Information Management
ELIS: E-Prints in Library and Information Science	The Electronic Library
FID Buch, Bibliotheks- und Informationswissenschaft	Journal of Documentation
OLC Informations-, Buch- und Bibliothekswesen – Online Contents	Bibliothek: Forschung und Praxis
Library and Information Science Abstracts & Behaviour	Information Technology
Google Scholar	
University library OPACs	

Table 1. Overview of databases and journals

To comprehensively search for literature related to leisure even if the serious leisure perspective was not explicitly taken up by the author, but implied in the context of the activity, a broad approach was adopted for searching the databases and journals. The search was limited to publications starting from 2017, as it was assumed that no publication would be written and published within such a brief time as the same year as Hartel et al.'s article.

The initial search involved combining the terms "information" and "entertainment", with an added "information science" for databases or journals not specialised in information science. This approach tried to capture even the broadest investigations of leisure activities. The more specific search terms regarding serious leisure were derived from the central concepts of Kari and Hartels' (2007) and Gorichanaz's (2019) articles, focusing on higher/lower contexts of information and personal meaning, with an added information science in non-purely information science journals and databases. The search was, where possible, set to all fields, including titles, abstracts and full text. In a second step, to narrow the search, the terms "leisure", "serious leisure", "information activities" and "information seeking" were searched for and combined. For a full list of the terms that were used, see Table 2. The terms were always connected using the Boolean AND operator. Even though in some cases, where it could not be set in an extra field in the Advanced search, it could not be ensured that the system actually used it.

Search queries	
Information entertainment	Information activities personal meaning
Pleasure (information science)	Information activities leisure
Profound (information science)	Information activities serious leisure
Personal meaning (information science)	Information seeking entertainment
Leisure (information science)	Information seeking pleasure
Serious leisure (information science)	Information seeking profound
Information activities entertainment	Information seeking personal meaning
Information activities pleasure	Information seeking leisure
Information activities profound	Information seeking serious leisure

Table 2. Overview of search queries used in each iteration

In each iteration of the search of each database/journal, the first 100 results were examined. This number was determined after conducting initial search iterations in Emerald Insight, Library & Information Science Source and Library & Information Science & Technology Abstracts and observing that no relevant publications were found beyond that cut-off point.

For German databases, the English search terms were translated into German, except for serious leisure. As this term has no counterpart in the German language and is a specific concept, it was assumed that if referred to, it would be done so using its original English name. For the German translations of the English search terms, see Table 3.

English	German
Entertainment	Unterhaltung
Pleasure	Genuss
Profound	Tiefgründig
Personal meaning	Persönliche Bedeutung
Leisure	Freizeit
Information activities	Informationsaktivitäten
Information seeking	Informationssuche

Table 3. Translation of search terms

The initial number of publications found was 223. Of these publications, the abstracts were read to determine if they were concerned with serious leisure. During this process, 155 publications were disregarded, leaving the sample at 68. These publications were then investigated in detail regarding their treatment of serious leisure. In this process, another 17 publications were disregarded, because they either had an abstract written in German or English, but were not written in either of the two languages and therefore unintelligible to the author (e.g. Solhjoo, 2021), or because they only mentioned the concept of serious leisure, without making it part of

investigation (e.g. Ocepek, 2018). The publications were then thoroughly read, in the case of journal articles and conference papers, in their entirety or the relevant chapter(s) corresponding to one of the research questions, in the case of doctoral theses. After reading, a decision had to be made regarding what qualified as serious leisure and what did not. Studies that focused on possible serious leisure activities but were centred around professionals (e.g. Terrile, 2022; Vamanu and Terronez, 2022), were disregarded. This left the sample at 51 publications. The number of publications which were then identified as being applicable to either of the three research questions were 19. The selection process is depicted in Figure 2.

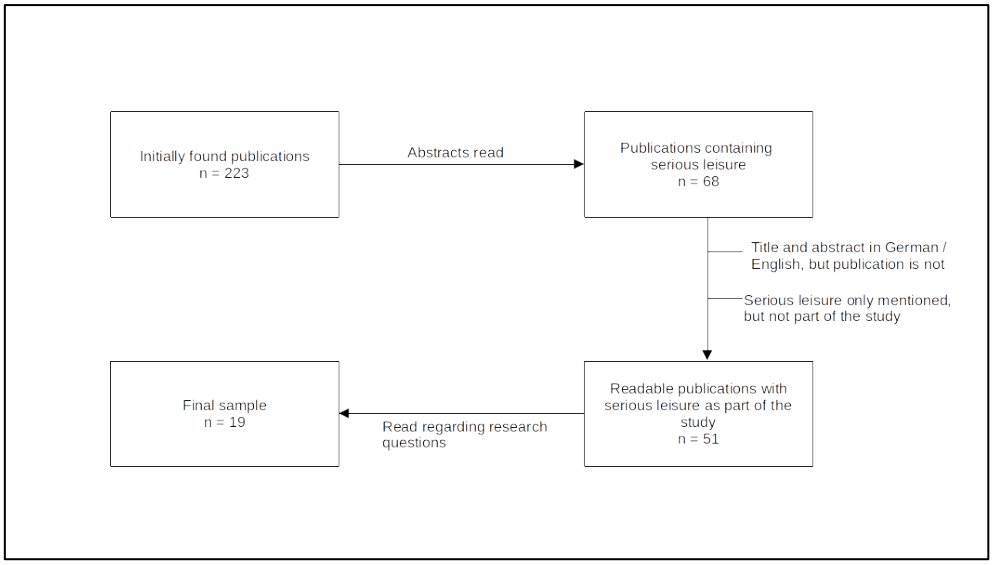

Figure 2. Literature selection process

Analysis

The final sample was first categorised into three subgroups, mirroring the three research questions: Hektor's framework, embodiment and superabundance. Publications were allowed to be part of more than one subgroup if they addressed more than one of the research questions. The sources in the Hektor's framework subgroup were then analysed regarding the topics the publications cover, to which extent Hektor's framework is employed and how each information activity is present across the publications. Within each information activity, categories were then inductively allowed to emerge following the structuring content analysis by Kuckartz & Rädiker (2022). The publications regarding embodiment were first divided into the categories conceptual/theoretical and empirical. The conceptual/theoretical publications were summarised to highlight their main points. The empirical publications were analysed using two questions derived from the conceptual/theoretical publication by Cox et al. (2017): 1) How is embodiment defined? 2) Are the categories of body as information source and body as sign applicable to the empirical studies? During this process, the publications were read and every instance in which the authors offered a definition of embodiment was recorded. Following, the results of each publication were deductively categorised in either body as information source or body as sign as established by Cox et al. (2017). Within these categories, subcategories were allowed to inductively emerge. The publications of superabundance were analysed regarding the context in which superabundance is mentioned.

Results

The following section presents each sub-group and therefore each research question individually. Out of the fifty-one publications included in the sample, nine contained Hektor's framework or parts of it (Table 4), fourteen addressed embodiment (Table 7) and two touched upon the topic of superabundance (Table 9) (for each Table, see the respective subsection).

Analysis Hektor's framework

Nine publications include Hektor's framework (Table 4). As indicated in Table 4, the studies that mention Hektor's framework encompass a wide range of serious leisure topics. These include sports such as ultrarunning, less intense bodily activities like hiking and backpacking, activities related to basic needs such as cooking, but also fan communities and idol fans, social media creators in the realm of YouTube-lifestyle and amateur classical musicianship. However, the extent to which Hektor's framework is used varies across these studies.

Author Name	Year	Type	Approach	Topic
Gorichanaz	2017	Journal article	Conceptual/theoretical	Ultrarunning
Price	2017	Doctoral thesis	Mixed	Fan communities
Gorichanaz	2018	Journal article	Mixed	Ultrarunning
Thomson	2018	Doctoral thesis	Mixed	Serious beauty and lifestyle YouTube
Griffin	2020	Doctoral thesis	Empirical	Amateur classical musicianship
Hyatt et al.	2021	Journal article	Empirical	Backpacking
Tsai and Chen	2021	Journal article	Empirical	Cooking
Munro et al.	2022a	Journal article	Empirical	Hiking
Zheng	2022	Conference paper	Empirical	Idol fans

Table 4. Publications regarding Hektor's framework

One publication briefly mentions Hektor's framework as an example for discussing the types and dynamics of information activities without further utilisation (Hyatt et al., 2021, p. 685). Two studies solely focus on the dress activity within the framework. Thomson (2018) uses it as an exemplification to conceptualise content creation on YouTube (p. 24) and in everyday life (p. 33), without further referencing it. Price (2017) emphasises the relevance of the dress activity in the creation of information objects by fan communities (pp. 286-287), such as wikis, fanfiction or fanart (p. 292).

Out of the nine publications, six authors utilise (or plan to utilise, as in the case of Munro et al., 2022a) Hektor's framework as an analytical tool to classify information activities in their respective studies. However, it is important to note that among the five publications that have employed the framework, two are by the same author (Gorichanaz, 2017, 2018), one is written by one of the co-authors of the original article that introduced Hektor's framework (Griffin, 2020) and one is merely a conference paper accompanying a poster presentation (Zheng, 2022). Therefore, excluding Griffin and subsuming both publications by Gorichanaz, it can be concluded that three authors, have utilised Hektor's framework since its introduction in 2016. These authors are Gorichanaz

(2017, 2018), Tsai and Chen (2021) and Zheng (2022). Munro et al. (2022a) might join this list once their study has progresses further but can as of now not be considered as utilising the framework. For an overview of how Hektor's framework is employed, see Table 5

Analytical Tool	Only *dressing*	Only mentioned	Used in the future
Gorichanaz (2017)	Price (2017) - used	Hyatt et al (2021)	Munro et al. (2022a)
Gorichanaz (2018)	Thomson (2018) - mentioned		
Griffin (2020)			
Tsai and Chen (2021)			
Zheng (2022)			

Table 5. Publications using Hektor's categorised by the extent of utilisation

Overall, four studies (Gorichanaz, 2017; Gorichanaz, 2018; Griffin, 2020; Zheng, 2022) employ Hektor's framework in a qualitative research design. In contrast, Tsai and Chen (2021) present a quantitative approach, utilising the activities as items in conjunction with a serious leisure score based on Stebbins's six aspects of serious leisure (perseverance, career, effort, durable benefits, unique ethos, and identity) in a survey to determine their frequency across various stages of serious leisure cooking. Tsai and Chen demonstrate that search and retrieve, browse, monitor and unfold are prevalent in cooking as serious leisure. Among these activities browsing is the only one that exhibits differences in various situations (p. 170 & 171). Additionally, all activities increase when participant have higher serious leisure scores (p. 170).

Regarding the qualitative studies, each activity is individually examined to identify differences or similarities in the results. However, not all outcomes of each study are presented, as it was judged that including all results would unnecessarily clutter the review without adding any value (e.g., Gorichanaz, 2018, p. 346). Instead, representative examples of activity types from each study are chosen.

Regarding the search and retrieve activity, web retrieval is the only method employed across studies. For instance, ultrarunners search for race reports before upcoming races (Gorichanaz, 2017, p. 466) or look up suspected injuries (Gorichanaz, 2018, p. 347). Musicians search for information on injury rehabilitation (Griffin, 2020, p. 157) or search for advice on etudes/repertoires or instrument repair (Griffin, 2020, p. 194). Idol fans use the web to gather information in general (Zheng, 2022, p. 3).

Concerning the browse activity, two distinct approaches are observed. The first involves personal browsing, exemplified by turning to a brother for information who was a former collegial runner (Gorichanaz, 2018, p. 347). The second, more prevalent approach, involves online browsing, such as browsing the web for race reports when deciding on new races to participate in (Gorichanaz, 2017, p. 466), checking running calendars (Gorichanaz, 2018, p. 347) or browsing social media platforms like Facebook (Gorichanaz, 2018, p. 343), Sina Weibo, Twitter, Instagram or Bilibili (Zheng, 2022, p. 3).

Regarding the monitoring activity, three distinct aspects are identified. The first is the monitoring of physical, paper-based recurring magazines, as observed in the runners' monitoring of an ultrarunning magazine (Gorichanaz, 2017, p. 466). The second involves monitoring online news portals (Gorichanaz, 2017; p. 467, Griffin, 2020, p. 194) or social media platforms (e.g. being a part

of an ultrarunning Facebook group [Gorichanaz, 2018, p. 467]), monitoring YouTube for videos of a favourite performer (Griffin, 2020, p. 189) or following idols on various social media platforms (Zheng, 2022, p. 3). The third aspect relates to embodied monitoring, which involves monitoring the body as a source of information. For example, checking the effectiveness of a stretching technique by monitoring the body's response to ultrarunning exercises over time (Gorichanaz, 2018, p. 348).

Concerning the unfold activity, four distinct approaches are identified, here referred to as visual, audio, embodied and embodied/cognitive. Visual unfolding occurs through reading, such as reading race reports (Gorichanaz, 2017, p. 467) or reading materials on violinist.com (Griffin, 2020, p. 194). It also involves watching, like watching filmed performances (Griffin, 2020, p. 136 & 141), stage performances (Zheng, 2022, p. 3), or observing a brother showing one a stretch (Gorichanaz, 2018, p. 347). Additionally, it can include merely looking at a GPS watch (Gorichanaz, 2018, p. 348). However, it can be assumed that watching a brother perform a stretch may lead to the embodied aspect of unfolding, where one replicates the movement, making this activity a hybrid between the two. The audio aspect is demonstrated when a brother conveys that training through an injury is possible (Gorichanaz, 2018, p. 348). Although visual and audio aspects are treated separately to emphasise the primary input, they are usually intertwined. The third aspect involves embodied unfolding, which manifests as feeling tired (Gorichanaz, 2018, p. 348) or experiencing pain (Gorichanaz, 2018, p. 348). An additional and more unusual aspect is the repetitive practice to build or establish muscle memory (Griffin, 2020, p. 138). Two instances of unfolding information that sit between the embodied and cognitive are 'vicariously experiencing a race' (Gorichanaz, 2017, p. 467) and 'mental practice' of a musical performance (Griffin, 2020, p. 141). On the one hand, they represent cognitive processes, on the other, the imagination incorporates envisioned muscle movement, thus straddling the line between the embodied and cognitive aspects.

When it comes to the exchange activity, not much can be said. All instances of exchanging are confined to the ultrarunning topic, making it challenging to compare them with other activities, to build categories. However, within the context of ultrarunning, exchanging is mentioned as reading about a technique, trying it out and using the body as a feedback source for evaluation (Gorichanaz, 2017, p. 467). Additionally, reading about markers being difficult to see and then paying close attention to them during the race (Gorichanaz, 2017, p. 467), are mentioned as examples of exchanging.

Moving on to the dress activity as an act of information creation (Thomson, 2018, p. 24), two primary approaches can be identified: creating physical artefacts and embodied dressing. In terms of physical artefacts, dressing takes on various forms. This includes writing towards others, such as composing race reports detailing personal ultrarunning experiences (Gorichanaz, 2017, p. 467), creating encyclopaedic (e.g. wikis) or transformative (e.g. fanfiction) articles (Price, 2017, p. 289 & 292) or towards oneself, as in coded information on sheet music (Griffin, 2020, p. 130). Other forms include painting fanart (Griffin, 2020, p. 130; Zheng, 2022, p. 3) or creating diverse types of fan artefacts like translations (Zheng, 2022, p. 3). Embodied dressing is evident in the musical context, where dressing information is conveyed by an artist to an audience through performance (Griffin, 2020, p. 138), music teachers dressing information during instruction by exaggerating movements (Griffin, 2020, p. 160) or members sharing information during group performances (Griffin, 2020, p. 160). In the context of ultrarunning, dressing information occurs when a brother demonstrates a stretching exercise, effectively conveying how to perform it (Gorichanaz, 2018, p. 347) (not categorised by Gorichanaz as such but can be inferred from the brother's perspective).

Regarding the instruct activity, two categories emerge: instructing oneself and instructing others. Instructing oneself entails actions like writing codes on sheet music for a later performance (which simultaneously encompasses dressing) (Griffin, 2020, p. 130). Instructing others involves activities such as providing instructions within race reports (Gorichanaz, 2017, p. 467), delivering explicit

music lessons (which is also simultaneously part of dressing) (Griffin, 2020, p. 159) or core fans guiding others in a fandom (Zheng, 2022, p. 3).

The final activity, publishing, is exclusively observed in an online context, involving activities like writing and publishing race reports (Gorichanaz, 2017, p. 467) or publishing content on social media, such as singles, stage performances or schedules (Zheng, 2022, p. 3).

Search and retrieve	Browse	Monitor	Unfold	Exchange	Dress	Instruct	Publish
Web searching	Personal	Paper-based recurring	Visual	-	Physical artefacts	To oneself	Online
	Online browsing	Online	Audio		Embodied	To others	
		Embodied	Embodied				
			Embodied/ cognitive				

Table 6. Categories of Hektor's activities

Table 6 provides an overview of the categories. Overall, certain activities stand out more prominently than others. For instance, search and retrieve, browse, monitor, unfold and dress are consistently observed with distinct characteristics, while exchange, instruct and publish appear less frequently. It is worth mentioning that there are overlaps between the activities of dress and instruct unlike in any of the other categories. Additionally, embodiment emerges as an important characteristic present in monitor, unfold and dress. This observation naturally leads to the next section, which focuses on publications discussing embodiment.

Analysis embodiment

Fourteen publications address embodiment (Table 7). These publications can be categorised into conceptual/theoretical and empirical studies, which are treated separately in the following sub-sections.

Author Name	Year	Type	Approach	Topic
Cox et al.	2017	Journal article	Conceptual/theoretical	Embodied information
Gorichanaz	2017	Journal article	Empirical	Ultrarunning
Hansson	2017	Journal article	Conceptual/theoretical	Embodied documents
Hedvall et al.	2017	Journal article	Empirical	Horse Rider Safety
Gorichanaz	2018	Journal article	Mixed	Ultrarunning
Guzik	2018	Journal article	Empirical	Muslim converts
Thomson	2018	Doctoral thesis	Empirical	Serious Beauty and Lifestyle YouTube
Olsson and Hansson	2019	Journal article	Empirical	Mid-Life Martial Arts
Griffin	2020	Dissertation	Empirical	Amateur Classical Musicianship
Mansourian	2020b	Journal article	Conceptual / theoretical	Passionate People Information Seeking
Hyatt et al. 2021	2021	Journal article	Empirical	Backpacking
Munro et al.	2022a	Journal article	Empirical	Hiking
Munro et al.	2022b	Journal article	Empirical	DJing

Table 7. Publications regarding embodiment

Conceptual investigation

Only Cox et al. (2017), Mansourian (2020b) and Hansson (2017) will be discussed here as conceptual papers, while the other publication with a mixed approach is disregarded because of its conceptual part focusing on information activities as such, (Gorichanaz, 2018), rather than embodiment. It is important to note that this exclusion does not diminish the value of the conceptual contribution, but rather acknowledges its misalignment with the scope of this study.

First, Cox et al. (2017) address the issue of the missing body in information research within the context of serious leisure. Notably, the authors (Cox, Griffin, Hartel) are the same as those of the article *Information Activities in Serious Leisure* (Hartel, Cox, Griffin) that serves as the vantage point for this paper, but in a different order. They respond to their own call for further research on the body in serious leisure. Their study aims to establish a foundation for developing a comprehensive theory of the body's role in serious leisure.

The authors highlight the lack of well-established and clear terminology surrounding embodiment in serious leisure. After exploring other theoretical frameworks such as information grounds or Savolainen's everyday life information seeking model (pp. 388-389), they arrive at Lloyd's three modalities of information: epistemic, social, corporeal (Lloyd, 2010). Focusing on the corporeal modality, they emphasise its tripartite nature: the body possesses knowledge, the body produces information and the body disseminates information. They consider it a promising starting point

for developing a more comprehensive theory of the role of the body in human information behaviour (Cox et al., pp. 390-391).

Cox et al. proceed to apply this framework to three areas of serious leisure: running, music and liberal arts. During this process, they suggest that, based on Tortora and Derrickson (2007), each practice may have its own sensory order and that the interpretation of sensory information is culturally coded, leading to a merging of the first two aspects of Lloyd's tripartite concept into one: receiving information from the senses (p. 395 & 399). Consequently, they propose two types of embodied information that can tentatively be called *body as sensory information source* and *body as sign*. Drawing on this conceptual analysis of Cox et al., the following two questions are formulated to structure the analysis of the empirical publications and investigate the viability of Cox et al.'s conceptual implications beyond their own examples:

(1) How is embodiment defined? (Regarding fuzzy terminology)

(2) Are the categories of body as information source and body as sign applicable to the empirical studies?

In his conceptual paper, Mansourian (2020b), introduces a tentative model that defines three categories of serious leisure pursuers: appreciators (intellectual pursuits), producers/collectors (creating/collecting physical things) and performers (experiential activities). According to Mansourian's model, these three groups exhibit distinct preferences for information sources. The appreciators focus primarily on explicit sources, the producers/collectors rely on a combination of explicit and tacit sources, while the performers primarily rely on tacit sources.

Hansson, 2017, builds upon Briet's definition of documents (p. 6) and Lloyd and Olssons' concept of embodied information practice (pp. 17-18) to investigate the possibility of Tai Chi being a document in itself. While a description of Hansson's analysis is beyond the scope of this discussion, it can be stated that Tai Chi serves as a symbolic corporeal expression and can be viewed as a document in this form (p. 20). Although the concepts by Mansourian (2020b) and Hansson (2017) are valuable contributions to understanding human information behaviour in serious leisure, they are not investigated further, because the questions provided by Cox et al. (2017) were considered a more fruitful starting point, providing a suitable structure for analysing the empirical publications.

Empirical investigation

Definition embodiment

The analysis of the publications suggests that there is no shared definition of embodiment. Hyatt et al. (2021) do not provide a definition, while Gorichanaz (2017) does not use the term embodiment. Munro et al. (2022a) explain embodiment by giving examples. Hedvall et al. (2017), describe embodied knowledge as 'knowledge learned through observing or directly participating in the practice' (sec. 2, para. 8). When attempts are made to define embodiment, two authors are cited: Bates and Lloyd. Gorichanaz (2018) and Griffin (2020) both refer to Bates's (2006) definition of embodiment as a 'corporeal expression of information that was previously encoded' (p. 334; p. 45). Guzik (2018) expands upon Bates (2016), including the concept of embodied information practices existing not only between humans but also between different species (p. 352). On the other hand, Munro et al. (2022b) use Lloyd's (2010) definition of corporeal information as 'information that is experienced through the situated and sensory body as it interacts with material objects, artefacts and other people that inhabit the same landscape' (p. 4). Lloyd and Olsson (2019) also use Lloyd in addressing the idea of corporeal modality in 'representing embodied or contingent information drawn from & learnt through the body as it is practiced or engaged with doing' (p. 1313).

Overall, it is challenging to establish a common emerging definition of embodiment, as the terms corporeal and embodied are often used interchangeably, and it is not always clear if a distinction is made between embodied information and embodied knowledge.

Other emerging themes in the definition of embodiment suggest the use and expression of embodied information or knowledge existing in the context of a community (Griffin, 2020, p. 162) or a disciplinary network (Olsson and Hansson, 2019, section 4.6). This implies that embodied information does not exist in isolation but is inherently tied to its context.

Another notable theme that emerges is the expansion of a Western perspective on the terminology and definition of the senses. Olsson and Hansson (2019) for instance, propose the Japanese concept of Mushin, which refers to the mind without mind which suggests a type of knowing that is not based on consciousness and articulation (section 4.7). Griffin (2020) proposes an expansion of the commonly employed Western senses by incorporating the concepts of flow, proprioception (the positioning of the body in space and to itself), and the vestibular sense (pp. 58-59).

In conclusion, while there is no consensus on specific terms, studies tend to align with either Bates's definition of corporeal expression or Lloyd's corporeal modality of information.

Application of body as sensory information source and body as sign

Based on the considerations presented in section 4.1, not every result from each publication is presented, but rather a selection from each publication or similar group.

The concept of the body as information source is prevalent across all the studies, except for Guzik (2018). Table 8 summarises instances of the body being used as an information source. One notable way in which the body is used as an information source is through proprioception, expressed in a physical awareness of musicians of their own body to enhance the accuracy and quality of a performance, highlighting a kinaesthetic sense (Griffin, 2020, p. 150 & 154). Similarly, martial arts fighters rely on the sense of balance within themselves and their weapons as a form of information (Olsson and Hansson, 2019, section 4.3). This demonstrates that the body as an information source can go beyond the traditional five senses usually prevalent in Western understanding.

The publications also highlight the significance of the body as a sign. Two ways of using the body as a sign are observed. The first involves the body itself being a sign, while the second one involves something external to the body that is not explicitly expressed as information. Examples of these are summarised in Table 8. One peculiarity of body as sign is that it does not have to be limited to human beings, but can also be expressed between humans and animals, as in the example from Hedvall et al. (2017).

Overall, the analysis reveals that categorising embodied information into body as an information source and body as a sign proves to be a useful framework. However, there is one instance of embodied information activity that transcends these categories. Hedvall et al. (2017) report the constant communication between a horse and a rider in which there is a constant exchange of embodied information and therefore both types of embodied information happening simultaneously.

Body as sensory Information Source	Body as Sign	
	Immediate body	*Externalised*
Pain in foot (Gorichanaz, 2018, p. 364)	Musicians assessing themselves in mirror (Griffin, 2020, p. 149)	Wearing certain clothes (Guzik, 2018, p. 362)
Monitoring body for effectiveness of technique (Gorichanaz, 2017, p. 467)	Other runners' bodies as information sources to mimic (Gorichanaz, 2018, p. 346)	Restored cars as embodiment of skill (Lloyd and Olsson, 2019, p. 1316 and p. 1320)
Body as tool to assess danger (constant sensory feedback) (Hyatt et al., 2021, p. 694)	Convey information through body in musical performance (Griffin, 2020, p. 150)	Baked goods and calligraphy as proficiency / belonging (Guzik, 2018, p. 362)
Buzz (standing hair) after taking risks (DJs) (Munro et al., 2022b, p. 10)	Music teachers over-exaggerating movements to teach embodied technique (Griffin, 2020, pp. 159-160)	
Euphoric state in well-going performance (Munro et al., 2022b, p. 12)	DJs receiving feedback through body movement, flow to and from the dancefloor or physical gestures (Munro et al., 2022b, p. 9)	
Multisensory encounter with nature as meaningful experience (Munro et al., 2022a)	Martial artists feeling the pressure of an opponent's weapon against their own (Olsson and Hansson, 2019,)	
Sense of self-worth through correct handywork (Lloyd and Olsson, 2019, p. 1321)	Horse's embodied information (Hedvall et al. 2017, n.p.)	
Physical awareness in musical performance (proprioception) (Griffin, 2020, p. 150 & 154)		
Feeling balance of body and weapon in martial arts (Olsson and Hansson, 2019,)		
Constant exchange of horse's and rider's embodied information (Hedvall et al. 2017,)		

Table 8. Examples of expressions of embodied information in the Body as sensory Information Source and Body as Sign categories

Superabundance

The concept of superabundance is mentioned in only two papers related to serious leisure (Table 9). In Mansourian's (2020a) article on transcendental information, the author challenges the overall acceptance of superabundance or information overload by noting that while the 'volume of information production is greater than it ever was in history' (pp. 33-34), not everyone necessarily faces information overload, and that there are also cases of information scarcity (p. 34). While this observation is valuable, it does not significantly contribute to the understanding of superabundance in the context of this research endeavour.

Author Name	Year	Type	Approach	Topic
Mansourian	2020a	Journal article	Conceptual / theoretical	Transcendental information
Hyatt et al. 2021	2021	Journal article	Empirical	Backpacking

Table 9. Publications regarding superabundance

On the other hand, Hyatt et al. (2021) observe filtering techniques employed by backpackers in their study of the relationship between backpackers and mobile information technology. These backpackers counteract the superabundance of information by very carefully selecting authoritative sources such as blogs and forums or mediated word-of-mouth information from within the community (p. 692). Another interesting observation is that the need for redundancy of information, in case one method (e.g., map or smartphone) fails, can lead to other issues such as power management. However, the existence of information superabundance makes achieving redundancy easier (pp. 694-695).

In summary, since its introduction by Hartel et al. in 2016, Hektor's framework has been utilised, enabling more comparable results, even though it has only been used in five instances. Within the two sub-areas, embodiment has garnered more attention. Despite inconsistent terminology surrounding embodiment and the difficulty of comparing results due to the diverse nature of the areas studied, the categories of body as information source and information as sign appear applicable.

Discussion

The scope of the results of this review is limited by only considering German and English publications, potentially leading to the omission of publications that could have been relevant for this study. Despite this limitation, the research questions can be answered as follows.

Regarding research question 1 , it is evident that Hektor's framework has been utilised, albeit in a limited capacity. Regarding research question 1, which asks whether Hektor's framework has been utilized in serious leisure research since the publication of Hartel et al.'s 2016 paper and if so, how, it is evident that Hektor's framework has been utilized, albeit in a limited capacity. Out of the fifty-one initially identified publications, Hektor's framework is mentioned in nine, with seven of them using it (or planning to use it) or parts of it, as an analytical tool and one publication written by one of the original authors of the paper used as the vantage point of this review. Notably, all the studies found regarding Hektor's framework, reference Hartel et al. (2016), implying that Hartel et al.s' support of the framework may have led to its usage. Additionally, it is often used in combination with other models (e.g., in Price, 2017, among others: Wilson's model of information behaviour, Savolainen's model of everyday information behaviour, information grounds) or as a part of a more elaborated model (Gorichanaz, 2018). This suggests that the framework is not disregarded, but one among many used for serious leisure research. One aspect of it that might make it continually relevant, is its emphasis on information usage, particularly in the dressing activity, as highlighted already in Hartel et al.s' (2016) original proposal for the utilisation of Hektor's framework.

Regarding research question 2, which asks whether embodiment in serious leisure has been addressed since the publication of Hartel et al.'s 2016 paper and if so, how, there is a substantial number of studies could be found that incorporate embodied information. This trend is further evidenced by five studies that feature embodied elements without reference to the original article by Hartel et al. (2016) or the conceptual paper by the same authors (Cox et al., (2017)) (Hansson, 2017; Hedvall et al., 2017; Olsson and Hansson, 2019; Lloyd and Olsson, 2019; Munro et al., 2022a). This suggests that the call of Hartel et al. (2016), for a stronger focus on embodied information in

serious leisure was heard, but that also independent of this call, research on embodiment emerged. The terminology used is still fuzzy, but the emergence of Lloyds's corporeal modality of information and Bates's corporeal expression of information that was previously encoded as frequently used components of definitions suggests progress in this area. Additionally, the review indicates that the categories body as information source and body as sign established by Cox et al. (2017) offer a structured approach to analysing embodiment in serious leisure.

Regarding research question 3, which asks, whether superabundance in serious leisure has been addressed since the publication of Hartel et al.'s 2016 and if so, how, it can be stated that superabundance appears to be a minor focus in current serious leisure research. Only two studies address this concept and neither of them treat it as the primary focus, but rather as a byproduct of their respective studies.

Conclusion

Rather than having a unifying effect, Hektor's framework appears to be part of a broader collection of models and frameworks used in human information behaviour research in serious leisure. However, this study showed that using it can lead to results that are comparable, which can then be categorised into more abstract categories. Therefore, future studies on serious leisure could use Hektor's framework to produce results that offer a degree of comparability and in that produce an empirical basis for the development of a more comprehensive theory of information activities in serious leisure, which, as pointed out in section 1, is still missing.

Embodiment emerges as an evolving topic that intersects studies utilising Hektor's framework, providing a new and necessary perspective on research on information activities in serious leisure. However, the literature review revealed that there is no common definition of embodied information. Therefore, future studies could focus on finding common ground between the definitions presented and develop a more unified definition. Regarding the empirical results, the structuring categories of body as information source and body as sign, as suggested by Cox et al. (2017), prove to be categories that are useful beyond the authors' initial examples. Further studies could use the categories of body as an information source and body as a sign to give empirical findings more structure and therefore, as with Hektor's framework, produce more comparable results. Interesting new research directions that surfaced in this review and should be investigated further are understanding embodied information as not only existing between humans, but also between humans and animals and expanding upon the Western senses, as Olsson and Hansson (2019) have done with the Japanese concept of *Mushin*.

Information superabundance does not currently appear to be a prominent focus in serious leisure research. Based on the findings in this study, further work could investigate if information superabundance is even an issue in certain serious leisure activities and if it is, how people deal with information superabundance in other serious leisure activities besides backpacking, which was the only activity touched upon in the results found in this study.

Overall, this study provides a "lay of the land" of the utilisation of Hektor's framework, embodiment and superabundance in serious leisure research as of June 2023, which does not only provide aggregated results from different serious leisure activities, but also provides analytical frameworks which could be used in future studies.

About the author

Jan Raoul Weber is a Master's degree student in Information Science at the Berlin School of Library and Information Science, Humboldt Universität zu Berlin. His research interests encompass

information literacy, interactive information retrieval and information behaviour, with a particular focus on short video platforms.

References

Bates, M. J. (2006). Fundamental forms of information. *Journal of the American Society for Information Science and Technology*, 57(8), 1033-1045. https://doi.org/10.1002/asi.20369

Bates, M. J. (2016). *Information and the Information Professions Selected Works of Marcia J. Bates. Volume 1*. Ketchikan Press.

Cox, A. M., Griffin, B., & Hartel, J. (2017). What everybody knows: Embodied information in serious leisure. *Journal of Documentation*, 73(3), 386–406. https://doi.org/10.1108/JD-06-2016-0073

Dolence, T., & Gilmour, R. (2006). Libraries, information, and amateur scientists. *Technical Services Quarterly*, 23(3), 1–18. https://doi.org/10.1300/J124v23n03_01

Duff, W., & Johnson, C. (2003). Where Is the List with All the Names? Information-Seeking Behavior of Genealogists. *The American Archivist*, 66(1), 79–95. https://doi.org/10.17723/aarc.66.1.l375uj047224737n

Fulton, C., & Vondracek, R. (2009). Introduction: Pleasurable pursuits: Leisure and LIS research. *Library Trends*, 57(4), 611–617. https://doi.org/10.1353/lib.0.0061

Gorichanaz, T. (2017). The information of story: The genre and information activities of ultrarunning race reports. *Aslib Journal of Information Management*, 69(4), 460–474. https://doi.org/10.1108/AJIM-03-2017-0071

Gorichanaz, T. (2018). Understanding and information constellations in ultrarunning. *Library Trends*, 66(3), 329–350. https://doi.org/10.1353/lib.2018.0006

Gorichanaz, T. (2019). Information experience in personally meaningful activities. *Journal of the Association for Information Science and Technology*, 70(12), 1302–1310. https://doi.org/10.1002/asi.24142

Gough, D., Thomas, J., & Oliver, S. (2012). Clarifying differences between review designs and methods. *Systematic Reviews*, 1, Article 28. https://doi.org/10.1186/2046-4053-1-28

Griffin, B. L. (2020). *Information practices in amateur classical musicianship* (Unpublished Ph.D. dissertation). University of Toronto, Toronto, Canada. https://hdl.handle.net/1807/103773

Guzik, E. (2018). Information Sharing as Embodied Practice in a Context of Conversion to Islam. *Library Trends*, 66(3), 351–370. https://doi.org/10.1353/lib.2018.0007

Hansson, J. (2017). Representativity and Complementarity in Tai Chi as Embodied Documentation. *Proceedings from the Document Academy*, 4(2), Article 12. https://doi.org/10.35492/docam/4/2/11

Hartel, J. (2003). The serious leisure frontier in library and information science: Hobby domains. *Knowledge Organization*, 30(3), 228–238. https://doi.org/10.5771/0943-7444-2003-3-4-228

Hartel, J. (2010). Managing documents at home for serious leisure: A case study of the hobby of gourmet cooking. *Journal of Documentation*, 66(6), 847–874. https://doi.org/10.1108/00220411011087841

Hartel, J., Cox, A. M., & Griffin, B. L. (2016). Information activity in serious leisure. *Information Research*, *21*(4). http://informationr.net/ir/21-4/paper728.html (Archived by the Internet Archive at https://web.archive.org/web/20230522135603/https://informationr.net/ir/21-4/paper728.html)

Hedvall, K. N., Gärdén, C., Michnik, K., Carlén, U., & Byström, K. (2017). Social media in serious leisure: Themes of horse rider safety. *Information Research*, *22*(4). https://www.informationr.net/ir/22-4/paper772.html (Archived by the Internet Archive at https://web.archive.org/web/20220925145654/https://www.informationr.net/ir/22-4/paper772.html)

Hektor, A. (2001). *What's the use: Internet and information behavior in everyday life*. Linköping University. (Linköping University Ph.D. dissertation). https://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-34015

Hockey, J., & Collinson, J. A. (2007). Grasping the Phenomenology of Sporting Bodies. *International Review for the Sociology of Sport*, *42*(2), 115–131. https://doi.org/10.1177/1012690207084747

Hyatt, E., Harvey, M., Pointon, M., & Innocenti, P. (2021). Whither wilderness? an investigation of technology use by backpackers. *Journal of the Association for Information Science and Technology*, *72*(6), 683–698. https://doi.org/10.1002/asi.24437

Kari, J. (2001). *Information seeking and interest in the paranormal. towards a process model of information action*. (Unpublished Ph.D. dissertation). University of Tampere, Finland. https://urn.fi/urn:isbn:951-44-5134-1

Kari, J., & Hartel, J. (2007). Information and higher things in life: Addressing the pleasurable and the profound in information science. *Journal of the American Society for Information Science and Technology*, *58*(8), 1131–1147. https://doi.org/10.1002/asi.20585

Kuckartz, U., & Rädiker, S. (2022). *Qualitative Inhaltsanalyse: Methoden, Praxis, Computerunterstützung: Grundlagentexte Methoden* (5th ed.). Beltz Juventa.

Lloyd, A. (2010). Corporeality and practice theory: exploring emerging research agendas for information literacy, *Information Research*, *15*(3), colis794. http://InformationR.net/ir/15-3/colis7/colis704.html

Lloyd, A., & Olsson, M. (2019). Untangling the knot: The information practices of enthusiast car restorers. *Journal of the Association for Information Science and Technology*, *70*(12), 1311–1323. https://doi.org/10.1002/asi.24284

Mansourian, Y. (2020a). What is Transcendental Information? A Conceptual Paper. *Library and Information Science Research E-Journal*, *30*(1), 33–44. https://doi.org/10.32655/LIBRES.2020.1.2

Mansourian, Y. (2020b). How Passionate People Seek and Share Various Forms of Information in Their Serious Leisure. *Journal of the Australian Library and Information Association*, *69*(1), 17–30. https://doi.org/10.1080/24750158.2019.1686569

Munro, K., Innocenti, P., & Dunlop, M. (2022a). Exploring information behaviour and meaningful experience amongst hikers on the West Highland Way. *Information Research*, *27*, Special Issue. https://doi.org/10.47989/irisic2204

Munro, K., Ruthven, I., & Innocenti, P. (2022b). Can you feel it? The information behaviour of creative DJs. *Journal of Documentation*, *79*(4), 830-846. https://doi.org/10.1108/JD-05-2022-0106

Ocepek, M. G. (2018). *Bringing out the everyday in everyday information behavior*. *Journal of Documentation*, 74(2), 398–411. https://doi.org/10.1108/JD-10-2016-0119

Olsson, M., & Hansson, J. (2019). Embodiment, information practices and documentation: A study of mid-life martial artists. *Information Research*, 24(4), paper colis1928. https://informationr.net/ir/24-4/colis/colis1928.html

Pautasso, M. (2013). Ten simple rules for writing a literature review. *PLoS Computational Biology*, 9(7). https://doi.org/10.1371/journal.pcbi.1003149

Price, L. W. S. (2017). *Serious leisure in the digital world: Exploring the information behaviour of fan communities*. (Unpublished Ph.D. dissertation). City University of London, London, U.K. http://dx.doi.org/10.17613/M64N7K

Ross, C. (1999). Finding without seeking: The information encounter in the context of reading for pleasure. *Information Processing & Management*, 35(6), 783–799. https://doi.org/10.1016/S0306-4573(99)00026-6

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Solhjoo, N. (2021). Embodied information in yoga: Proposing a research topic at the intersection of information and contemplation. *Library and Information Sciences*, 24(3), 170-188. https://doi.org/10.30481/lis.2021.271476.1800

Stebbins, R. A. (1982). Serious leisure: A conceptual statement. *The Pacific Sociological Review*, 25(2), 251–272. https://doi.org/10.2307/1388726

Stebbins, R. A. (2009). Leisure and its relationship to Library and Information science: Bridging the gap. *Library Trends*, 57(4), 618–631. https://doi.org/10.1353/lib.0.0064

Terrile, V. C. (2022). Gigging it in the shire: Information practices of renaissance faire performers and artisans. *Journal of Documentation*, 79(4), 937-354. https://doi.org/10.1108/JD-07-2022-0164

Thomson, L. E. A. (2018). "'Doing' YouTube": Information Creating in the Context of Serious Beauty and Lifestyle YouTube. (Unpublished Ph.D. dissertation). The University of North Carolina at Chapel Hill, U.S.A. https://doi.org/10.17615/kk5z-mg37

Tortora, G. J., & Derrickson, B. H. (2007). *Introduction to the human body: The essentials of anatomy and physiology* (7th ed.). John Wiley. https://archive.org/details/introductiontohu0006tort

Tsai, T.-I., & Chen, H.-Y. (2021). Examining Cooking Hobbyists' Information-Seeking Behavior in Different Situations and in Different Stages from a Serious Leisure Perspective. *Data and Information Management*, 5(1), 167–173. https://doi.org/10.2478/dim-2020-0030

Urban, R. (2008). Second life, serious leisure and LIS. *Bulletin of the American Society for Information Science and Technology*, 33(6), 38–40. https://doi.org/10.1002/bult.2007.1720330611

Vamanu, I., & Terronez, M. (2022). "Our ancestors passed this down to us for a reason": information practices of *ballet folklórico* dancers in Mexican-American communities. *Journal of Documentation*, 78(6), 1213–1227. https://doi.org/10.1108/JD-11-2021-0225

Yakel, E. (2004). Seeking information, seeking connections, seeking meaning: Genealogists and family historians. *Information Research*, 10(1). https://informationr.net/ir/10-1/paper205.html (Archived by the Internet Archive at

https://web.archive.org/web/20231202124959/https://www.informationr.net/ir/10-1/paper205.html)

Zheng, W. (2022). *Double identity and double mission of information activities in serious leisure: A case study of idol fans from China.* Poster presented at Information Seeking Context (ISIC), Berlin, Germany. https://doi.org/10.18452/25289

Copyright