Future of IB Research

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Introduction to Information Behavior Research

Information behavior (IB) refers to people's behaviors and other "serendipitous" actions they perform when interacting with information (Case & Given, 2016, p. 6). Whether it be understanding their actions motivations, deconstructing the logic of people's information management and evaluation strategies, or observing how people use information, IB is a crucial cornerstone in the information science (IS) field because its conclusions often help create the foundations of so many other aspects of IS. Understanding IB can aid IS specialists in developing information literacy (IL) improvement strategies (Saxena & Lamest, 2018) (Cezar & Maçada, 2021 & 2023), help UX designers develop more intuitive information system designs (Puleston, 2016), or inform IS policymakers when writing policies related to information access, privacy, and ethics (Lund & Wang, 2022).

However, the impacts of IB are not only limited to the IS field; rather, the study of IB impacts various sectors outside of IS in many ways. IB research can inform educators when developing learning models, influence the development of database and information systems or streamline employee training programs within the business sector, or aid healthcare providers in providing tailored care to patients.

This essay intends to review six scholarly articles related to a recent topic of study within IB, critique it, analyze its trends, and finally speculate where future research directions may lead. The topic of study that will be reviewed is the intersection of Information management and data science (DS): Human-Data Interaction (HDI), a relatively new field of research within IB. Following this review and analysis, the author will conclude by reflecting on her own IB and on the insights she gained from studying IB this semester.

Literature Review of Six Information Behavior Articles

To begin this literature review, Lund & Wang (2022) conducted a literature review exploring why DS should be an IS field rather than mathematics or computer science. Lund & Wang (2022) seek to answer this by reviewing the evolution of data ethics research and examine what IS has to offer it guided by the research questions (RQ) “How do data bias and the evolution of data ethics appear in information science literature” and “What perspectives on data science bias and ethics within information science appear in the literature?” Lund & Wang (2022) raise concerns about the ethical use of data amid its rapid generation and argue that IS's historical focus on ethical information management equips it to provide valuable insights to DS.

The second article is the conference summary of results made by Puleston (2016) on his study on the value of visuals in information management and retention. This study aimed to address a perceived gap in research within the infographics industry regarding what makes infographics compelling, memorable, and sharable. While the specific RQ was not provided, Puleston (2016) reports results from 70 different trials, testing over 500 infographics with roughly 10,000 participants from five different countries. Puleston (2016) primarily concluded that effective visuals significantly enhance information retention, with facts becoming up to twice as memorable. However, excessive visuals can diminish effectiveness.

Saxena & Lamest (2018) examine how the rise of big data, despite being viewed as a business opportunity, often causes stress for administrative managers. Their RQ focuses on how managers in the hospitality industry handle information overload (IO). Employing a case study approach, the authors collected data through interviews using a responsive interviewing technique, which confirmed that the volume and pace of information generated undoubtedly

leads to information overload in managers. To manage IO, managers reportedly used a combination of coping strategies, such as filters, withdrawal, summarizing, and avoidance.

The fourth article examines current Human-Data-Interaction (HDI) literature. The RQ declared by Victorelli et al. (2020) was to review "What is being researched about in HDI". Because this is such a new area of study, Victorelli et al. (2020) sought to conduct the first formal literature review in the HDI field. and after filtering search results down to 47 articles, found that almost all articles studied unique subjects. For each article, they examined a variety of factors, including domain, methodology, outcomes, and research type. Victorelli et al. (2020) concluded that HDI was not yet a well-consolidated field of study and was still incredibly new, with no major influencers yet.

The following articles were selected based on the insights gained from Victorelli et al. (2020) to review more articles explicitly related to HDI. The first of these articles, Cezar & Maçada (2021), aims to examine the cognitive challenges of working in data-rich environments and the relationship between data literacy (DL), perceived data overload (PDO), and technostress (TS). Their RQ seeks to validate a model investigating these factors and their impact on individual performance (IP). Utilizing a survey method to gather qualitative data, their survey had 19 questions, used a 1-7 scale (highly disagree – highly agree), and concluded with 321 responses from data professionals who work in data-rich environments. The results showed that DL is positively correlated with IP and negatively with PDO. PDO is positively correlated with TS and negatively with IP, however, no significant correlation between TS and IP was found.

In the final article, Cezar & Maçada (2023)’s investigates the relationship between Cognitive Overload (CO), Anxiety, Cognitive Fatigue (CF), Avoidance Behavior (AB), and data literacy (DL). Utilizing a quantitative approach, they collected data through surveys consisting of

25 questions rated on a 1-7 scale, garnering 372 responses. Their findings indicated various relationships among factors, such as: as CO increases, so does Anxiety and AB; however, the effects of CO on CF are mediated by anxiety, whereas the effects of anxiety on AB are mediated by CF. Higher DL led to a decrease in CO but an increase in CF.

Critique of the Reviewed Articles:

Each of the four experimental studies used an inquisitive methodology involving direct contact with their sample populations. While three studies (Puleston (2016) and Cezar & Maçada (2021 & 2023)) aimed for generalized results utilizing survey methods, the fourth (Saxena & Lamest (2018)) focused on a specific group, relying on case study interviews. Despite all employing an inquisitive methodology, the degree of personal interaction with their sample population influenced the specificity of their conclusions. Meanwhile, despite both being literature reviews, the primary methodologies of Lund & Wang (2022) and Victorelli et al. (2020) greatly differed. Lund & Wang (2022) was overwhelmingly literature-heavy, with their conclusions entirely derived from literature sources. In contrast, Victorelli et al. (2020) reviewed HDI literature and used statistics and relationship web diagrams to track patterns and trends in HDI research. Despite both being literature reviews, their differing methodologies led to different styles of conclusions, implications, and applications.

In chapter 11, Case & Given (2016) present several criticisms of past IB research, claiming that past research often too heavily relied on survey, lacked sufficient empirical data, and failed to significantly engage with theory. These critiques can be seen in the reviewed articles, yet they also show developments in addressing them. For example, Puleston (2016) may have utilized the criticized survey methodology, however, he gathered ample empirical data and

statistics to support his findings. Meanwhile, Lund & Wang (2022) sufficiently consider IB theory yet lack the empirical evidence to make significant contribution to it.

Outside of these reported criticisms, each of these studies has unique sets of strengths and weaknesses. Puleston (2016), while an interesting insight into information retention, lacks accessibility, as the paper is locked behind a paywall, making verification of the study's methodologies difficult. Lund & Wang (2022) offer compelling arguments for considering DS as an IS field, however, it lacks significant contribution to IS literature beyond these arguments. Saxena & Lamest (2018) manage to provide specific examples information management strategies being utilized by hotel managers; however, its subject population is incredibly niche, and its study methodology would be challenging to expand for generalized results. Victorelli et al. (2020) expertly blended literature elements with statistical analysis to help establish HDI; however, their conclusions lack practical applicability beyond being intriguing. Cezar & Maçada (2021 & 2023) provide well-organized, statistically supported conclusions on variable relationships, but the generalizability of their results is questionable due to their sample sizes.

Despite their individual strengths and weaknesses, it's evident that each paper successfully addresses perceived gaps in IB research. Puleston (2016) sought to research effective infographic design and its relation to information retention and concluded with concrete statistics that expressly supported that compelling visualizations improve people's memory of information. Saxena & Lamest (2018) and Cezar & Maçada (2021 & 2023) investigated IB factors when handling big data, a surprisingly underexplored topic in IB research, and Victorelli et al. (2020) significantly contributes to IB research by conducting the first known literature review on HDI. While its contributions to IB are limited compared to other studies in this review,

Lund & Wang's (2022) work adds clarity and context to the ethical dimension of DS within the IB framework.

Trend Analysis of the Six Articles:

One of the central themes across all reviewed articles is the relationship between people and information. Puleston (2016) focused on optimizing information presentation to maximize retention. Saxena & Lamest (2018) interviewed people on their exact information management strategies for dealing with big data. Both of Cezar & Maçada's articles (2021 & 2023) statistically analyzed the correlations between different variables relating to cognitive fatigue in the big data environment, and Victorelli et al. (2020) helped identify HDI. While Lund & Wang (2022) departs from the theme, they do discuss people's societal obligations when handling big data, which can be interpreted a human-information relationship.

The trends and themes identified in these articles have various practical applications. The conclusions from Puleston's (2016) study can inform the design and implementation of communication systems, or help IS specialists ensure user interfaces are optimized for information uptake and retention. The information management strategies identified by Saxena & Lamest (2018) have the potential to shape various IB models, whereas the statistics calculated in Cezar & Maçada's articles (2021 & 2023) could inform the formulation of intervention strategies aiming to reduce adverse IB effects within the DS industry. Victorelli et al. (2020)'s identification of HDI could help facilitate future discourse and research into HDI, amplifying previously mentioned benefits could be compounded upon through further research and exploration. Lastly, Lund & Wang's (2022) arguments for ethical considerations in DS to be aligned with IS and IB could lead the development of explicit ethical and organizational policies.

Overall, the trends observed in these articles help contribute to the increasingly nuanced understanding of IB by offering fresh perspectives and insights that highlight the inherently interdisciplinary nature of IB. While each of these studies exists within a common field (the intersection of IS and DS), their applications and impacts can be seen across a multitude of fields, including graphic design, psychology, business operation, and politics, to name a few.

The Future of Information Behavior Research:

Based on this literature review, there are several possibilities for future research within IB. One such direction could be the continuation of HDI research and its complicated dynamics. Future research in HDI could include analyzing specific populations data interaction strategies, behavioral analysis of DS analysts, or studies analyzing the impacts of "negative" IB on data conclusions. Because of the incredibly recent nature of HDI, there is much room to explore different areas within IS/DS and other interdisciplinary directions, such as avenues in psychology, business, or politics. Outside of HDI, there are several other possible research directions, such as developing ethical guidelines specifically tailored for DS or the development of information systems that utilize machine learning to adapt to user cognitive preferences, learning styles, and information needs.

These are just a handful of future research possibilities based on the results of these studies, not even considering the development of the studies themselves. Both Saxena & Lamest (2018) and Cezar & Maçada (2021 & 2023) outlined specific future research opportunities in their studies, which involved increasing the generalizability in Saxena & Lamest (2018) 's case or the specificity in Cezar & Maçada (2021 & 2023) 's. Overall, future research opportunities within this subsection of IB will most likely continue to be concerned with addressing,

understanding, and improving the complex relationship between man and data and studying the long-term implications on IB and mental health in an ever-increasingly data-driven world.

While it could be argued that HDI alone has the potential to advance and impact the IB field, the ever-increasing focus on mental factors within IB studies could also be indicative of a shift in the field. According to Case & Given (2016) in chapter 7, Kuhlthau's model of IB is infamous for its inclusion of mental states and emotions as IB factors, something that was not common before Kuhlthau. Many models preferred studying objective actions over subjective emotion. However, the articles reviewed in this literature review imply an increasing focus on mental factors as an explanation for behaviors that implies a shift away from objective models and instead towards ones more subjective and emotionally driven.

Personal Reflection on Information Behavior Trends:

At the beginning of this semester, I would describe my personal IB as most resembling Kuhlthau's model of information gathering. Before, when I conducted research, I usually started in Google Scholar and searched for general topics I was interested in. From there, I would pick the article with the most interesting-sounding title and read through it. I would continue down this rabbit hole on Google Scholar, utilizing other search results and citations from each source to build a more stable foundation for my paper and repeating until it felt like I had significant enough evidence to formulate an argument. This felt most like Kuhlthau's search process to me because of the back and forth between uncertainty and optimism I experienced as I conducted my information searches.

While I do not think my IB has drastically changed due to taking this course, I have definitely started defaulting to following the web of citations of my sources. That skill was

invaluable for this paper, especially as HDI is a relatively small field of study. That being said, one behavioral change I can report, despite struggling with it at first, was utilizing Boolean logic for database searches. This was an information-seeking strategy I had never considered before, and as I have a background in coding, it logically made a lot of sense. When I first tried Boolean logic during the first annotated bibliography, the system felt clunky, and I needed help finding the results I wanted or was interested in. However, I had more success with my Boolean logic searches after I found the correct vocabulary to describe the sources I was looking for. I think Boolean logic will be a valuable skill set once I master it and am happy to have another tool in my arsenal to assist with my information searches in the future.

Overall Reflection and Application:

I think the most significant insights I gained from this assignment was that I now know what kind of researcher I want to be if I end up pursuing DS research. While reading articles for my literature review, I found the articles written by Cezar & Maçada greatly resonated with me and my "research ideals". Cezar and Maçada helped showcase the power of stats and why I should look forward to my advanced stats course next semester. Granted, I did struggle reading these papers because the stats work conducted by Cezar and Maçada was a little beyond my current capabilities; however, this did not detract from the respect I had for the methodology and conciseness of conclusions these papers. I realized I would love to be able to write and understand papers like this and examine information theories from both a qualitative and quantitative position. Cezar and Maçada helped show me the type of data researcher I want to maybe one day become.

This course helped remind me about how fascinating human behaviors are. I have not been in a behavioral course since my first year of high school, and this course helped remind me

how interesting I find human behaviors. This course ended up combining this latent interest with my newfound academic passion: Information and Data. Overall, This course has genuinely been one of my favorites throughout my college career, and I hope to bring the insights and skills forged this semester forward as I continue down my data science path.

References

Case, D.O., & Given, L.M. (2016). Looking for Information: A Survey of Research on Information Seeking, Needs and Behavior. United Kingdom: Emerald Group Publishing Limited.

Cezar, B., & Maçada, A. (2023). Cognitive Overload, Anxiety, Cognitive Fatigue, Avoidance Behavior and Data Literacy in Big Data environments. Information Processing & Management, 60(6). https://doi.org/10.1016/j.ipm.2023.103482

Cezar, B., & Maçada, A.. (2021). Data literacy and the cognitive challenges of a data-rich business environment: an analysis of perceived data overload, technostress and their relationship to individual performance. *Aslib Journal of Information Management. 73*(5), 618–638. https://doi.org/10.1108/AJIM-01-2021-0015

Lund, B., & Wang, T. (2022). What Does Information Science Offer for Data Science Research?: A Review of Data and Information Ethics Literature. *Journal of Data and Information Science (Warsaw, Poland)*, *7*(4), 16–38. https://doi.org/10.2478/jdis-2022-0018

Puleston, J. (2016). Tackling data overload: Making sense of complex multi-source data. *International Journal of Market Research 58(*1), 141-152. https://doi.org/10.2501/IJMR-2016-008

Saxena, D., & Lamest, M. (2018). Information overload and coping strategies in the big data context: Evidence from the hospitality sector. *Journal of Information Science*, *44*(3), 287–297. https://doi.org/10.1177/0165551517693712

Victorelli, E., Reis, J., & Hornung, H.. (2020). Understanding human-data interaction: Literature review and recommendations for design. *International Journal of Human-Computer Studies, 134*, p. 13-32. https://doi.org/10.1016/j.ijhcs.2019.09.004