Knowing and not knowing about algorithms

Research Paper

Abstract

Purpose

This paper considers the implications of not knowing – hypocognition - the lack of a cognitive or linguistic representation of a concept, algorithms, held by librarians responsible for programs of information literacy in universities in NSW, Australia.

Design/Methodology/Approach

A practice-based study of university librarians and their role in the development of algorithmic literacy, using semi-structured interviews and thematic analysis, showed that they had limited socio-technical knowledge of algorithms.

Findings

Not knowing led most participants to anthropomorphise algorithms, including those found in search engines such as Google, sometimes explaining them as something mysterious, although they were aware that the algorithms were gathering data about them and their online interactions. Nonetheless, they delegated responsibility for online activities. These online interactions were not presented in system terms, but often could be interpreted as examples of Goffman's civil inattention, a social norm used in interactions with strangers, such as fellow passengers. Such an understanding prevented the development of robust algorithmic literacy.

With technologies disrupting social norms, algorithms cannot be considered strangers who understand such civility; instead, metaphorically and practically, they rudely rummage through wallets and phones. Acknowledging the implications of the reliance on socio-cultural understandings of algorithms and their anthropomorphic representations for explaining online system-based interactions can present new ways for developing algorithmic literacy.

Originality

This study suggests that the links between hypocognition and the anthropomorphising of algorithms can undermine the development of knowledge and skills in information and digital literacies.

Keywords

Information literacy; digital literacy; algorithms; hypocognition; academic librarians

Introduction

The literature of librarianship and information studies has had a significant emphasis on identifying and meeting information needs for several decades (eg Dervin & Nilan, 1986; Julien & Duggan, 2000; Naumer & Fisher, 2009), and on bridging the gaps in knowledge (eg Dervin & Dewdney, 1986). These gaps in knowledge and understanding are expressed in some way by users of library and information services; librarians are seen to have the knowledge, skills and expertise to enable the enquirer to meet their information need and to fill the knowledge gap. Yet, there has been little concern for what librarians do not know and how they use their limited understandings, outside the context of the reference interview (Labaree & Scimeca, 2021).

A gap in professional or organisational knowledge, not knowing something related to one's professional or work responsibilities, is often considered in negative terms, as something that affects an individual's ability to do their job effectively; it is rarely considered an opportunity to develop new knowledge and understandings. This not knowing can be labelled in several ways, including uncertainty, ignorance, and ambiguity (Labaree & Scimeca, 2021). Each of these can be seen as states that should be managed or eliminated, especially in the context of information literacy; they are states that can be overcome with new information or with a greater understanding of the ways information can be deemed trustworthy.

In professional settings, as in everyday life, a common way to express a gap in knowledge is to say 'I don't know'. However, in professional settings, other behaviours and expressions may be more common. Uncertainty, for example, may be expressed in terms of probability or risk or through a listing of alternatives. Ignorance can be expressed in many ways in organisational settings, for example through silence or through bluster. Ambiguity may be apparent through the assumptions that underpin the decisions that individuals may make.

The concept of hypocognition is proposed as a useful approach for understanding these behaviours. According to Wu and Dunning (2018), the concept which refers to lacking a conceptual or linguistic representation of a concept, was introduced in 1973 by anthropologist Robert Levy. In complex areas such as policy development related to environmental matters, it is invoked to explain the imbalance in debates on new technologies and e-waste (Good, 2016), or to express the dangers inherent in over-simplification (Saltelli & Giampietro, 2017). In the field of librarianship, although the term, hypocognition, is not used, comparative

studies of novices and experts identify simplistic and narrow understandings of concepts, and a lack of familiarity with the technical vocabulary necessary to discuss aspects of expert practice (eg. Hsieh-Yee, 1993; Luca, 2019; Saunders & Budd, 2020).

Participants in a recent study of university librarians and their perceptions of algorithmic literacy (Henninger & Yerbury 2024) were found to have elaborated socio-cultural understandings, but to lack a socio-technical understanding of algorithms. That study was concerned with how academic librarians providing services and programs in information literacy express their understandings of algorithms and how they perceive these services link to the processes of democracy. We were intrigued by the ways participants talked about their online interactions and how they seemed to convey the idea that they did not know much about algorithms. These findings triggered questions about these gaps in knowledge.

A response to these questions called for the data to be re-analysed. Thus, using secondary analysis, this study seeks to identify how these librarians express their not knowing about algorithms and describe their interactions with them within the social context of information literacy in order to answer the question of how they understand their interactions with algorithms. This secondary analysis took an interpretive approach to the interview data and how it could be understood. It led us to the concept of hypocognition, the consequences of hypocognition for online interactions and the possible implications of this hypocognition for the development of information literacy The conceptual context for this interpretation includes a brief discussion of how algorithms are understood and presented in the literature; an overview of the representation of algorithms and their agency from the larger project; and the introduction of ways to understand the relationships between algorithms and librarians. This conceptual context is used to make sense of the understanding of algorithms described by participants and to consider the implications of these descriptions and of the approaches to interactions they present.

Understanding algorithms

Striphas, in his seminal work, ‘Algorithmic culture’ (2015), lays out the need for specialist, technical knowledge to come to terms with algorithms, while at the same time recognising the social power they wield. These two aspects of algorithms and the need to balance them is a feature of much of the literature. Beer (2017, p. 4) notes that “seeing the algorithm as a separate item of study outside of its social ecology is likely to be a mistake”. Kitchin (2017, p.

18) emphasises that algorithms are more than a technology, and "need to be understood as relational, contingent [and] contextual". Similarly, Ridley and Pawlick-Potts (2021, p. 2) assert that while the "technical and operational aspects of algorithms are important to understand and use", a broader awareness of their positioning is important.

Writing in the context of a conceptual approach to information literacy, Lloyd argues that those providing education in information literacy should be aware of the issues of "power, agency, reflexivity and trust" (2019, p. 1843) that arise from the ways that algorithms have pervaded our everyday lives. She notes that, for many years, in their everyday lives, people have delegated tasks to algorithms, but with the rise in big data and the complexity of social media and other interactive online sites, they have become more aware of algorithms and some consequences of using them. Algorithms act as a black box, their lack of transparency making them difficult to work with because they represent at the same time the codes and rules through which they operate, and they are part of everyday social interactions, having impacts in this social world.

Algorithm is a threshold concept – once understood, it can never be ignored and knowing it opens up new possibilities of thinking and of action. But, unlike environment, a threshold concept from an earlier time, where we can use our senses to identify the concept in the world around us, algorithms are mostly hidden from us, existing as they do as computer coding, with system-based implications.

Algorithms and their agency

Algorithms are evident in our everyday lives (Willson 2017). Many of us use the "recommendations" we find in online services. Apparently, 70% of our time on YouTube is spent watching clips that have been recommended for us (Newton, 2017); 30% of Amazon page views come from recommendations as does 80% of Netflix content (Adomavicius et al., 2019). These mundane examples may obscure the power that algorithms wield. Yet, even in these mundane examples, we see that humans have delegated decision-making to algorithms (Striphas, 2015; Latour, B. and American Council of Learned Societies, 2005 in Llolyd, 2019,), emphasising the very function that underpins the technical, operational aspect of algorithms.

We also find warnings about the social influence of algorithms (Jarvis, 2022; Seaver, 2017). In Australia, the findings of the Royal Commission into Robodebt have forced us to confront

the ways in which algorithms can undermine trust in government and destroy the lives of ordinary people (Commonwealth of Australia, 2023). What has come to be known as Robodebt was a system implemented by the government of the time to identify overpayment of social welfare benefits and enforce repayment. The investigations of the Royal Commission found that the system was developed to remove the human element in decision-making and support the delegation of this process to the algorithm, through "automated decision-making". Thus, algorithms took the place of human decision-making (see Commonwealth of Australia, 2023 (Vol. 2) Effects of the Scheme); they were seen as ways of streamlining work and removing the human element. However, neither the senior bureaucrats involved in the development of the system, nor the politicians who supported the project understood the technical and operational aspects of the algorithms nor had they fully considered the broader social contexts of implementing them.

Algorithms have the ability "to make choices, to classify, to sort, to order and to rank" (Beer 2017, p. 6). From this perspective, among other things, they have the ability to shape our knowledge, for example limiting our experiences in the ways Pariser labelled as filter bubbles (2011). Discussions of agency suggest that algorithms hold forms of power, for example in 2009, Beer suggested algorithms may have "the capacity to shape social and cultural formations and impact directly on individual lives" (p. 994). Lloyd makes this explicit in her reference to Latour's ANT approach, where algorithms are conceptualised as actors, taking their place alongside humans in interactions (2019, p. 1477-78). Kowalkiewicz (cited in Hinchcliffe, 2024) describes algorithms as digital minions who "want to be helpful, they want to work 24/7, full of energy right? … But you look away for half a day and they start creating havoc."

Among the few studies that consider how humans interact with algorithms, Gibbons, researching from a communication perspective, acknowledges that algorithms "make things happen", and conceptualises them as a "covert rhetorical audience" (2021, p. 52). In the context of the attention economy, she uses Morris's conceptual framing of the fourth persona to establish how algorithms are created as this audience. The notion of the fourth persona is particularly helpful in the context of the layered meanings of algorithm. It refers to a rhetoric aimed at two audiences, one of which grasps the hidden or coded message while the other remains oblivious to it (Morris III, 2002, p. 230). When humans write text for the internet,

and use techniques of search engine optimisation, they expect the algorithm as audience to acknowledge this action, but equally, the strategy should not be recognised by human readers of the text. In this way, a relationship of collusion, the "wink", is established, where the search engine algorithm is both audience and potential conspirator with those creating textual systems and audience for those setting out to use its ability to "make choices, to classify, to sort and to rank" (Beer 2017, p. 6).

Those 'in the know' will be able to engage in interactions with the algorithms of search engines, databases and other tools of librarianship. However, to follow that metaphor, those without that knowledge and understanding are likely to find themselves seeking to interact with an unknown entity. This in turn, may give rise to fear and to threats to privacy through inappropriate disclosures.

Without specific knowledge of how to act in a given situation, we fall back on social norms that sustain us in similar situations. In western society, we are used to engaging with strangers on a daily basis, for example through interactions on public transport. We know how to acknowledge the presence of some unknown other, without infringing their privacy or our own. Goffman (1963) identified this behaviour as 'civil inattention', part of a pairing with disattendability. In civil inattention, we appear to ignore others and their behaviours in various circumstances, while maintaining a level of courtesy towards them; in disattendability, we ensure that in public settings, we do not draw attention to ourselves. He argued that such behaviours regulated social interactions in the complexities of contemporary society, and supported the maintenance of an individual's privacy when they were exposed in public. Such behaviours are mutually reinforcing. However, technologies disrupt social norms (Sharon & Koops, 2021, p. 341), requiring the establishment of new values and practices. Algorithms cannot be considered strangers who understand the intricate reciprocal nature of civility. Thus, an approach to online interactions with algorithms based on the principles of civil inattention and disattendability is unlikely to be sustainable.

Methodology

As noted above, the study reported here is part of a larger project exploring the practices of librarians in universities responsible for programs and services in information literacy. The original project began from the premise that algorithms posed "a wicked problem" for librarians whose professional responsibilities in some way supported the development of "an

informed citizenry" (Lloyd, 2019, p. 1476), as they disrupt the development of knowledge, intervening between the individual and the information (Head, 2020, p. 11). It took these practices as a representation of established professional values in the context of the mission of university libraries. The larger project used a practice theory approach (Mahon et al., 2017) to interview thirty librarians from university libraries in NSW, Australia, with responsibility for providing information and digital literacies services to students and academic staff. These librarians were drawn from each university library in the state. Participants comprised men and women, whose professional experience ranged from seven years to more than twenty years, and included librarians who work face to face with students as well as team managers and senior managers. Managers were asked to identify staff to be contacted for interview, and their decisions reflected the structure and organisation of the provision of information literacy programs and services. The interview schedule for the original project contained three parts. The first asked librarians to describe the programs and services they offer that develop digital literacies, a term that was not defined. The second focused on algorithms and algorithmic literacy. Here, questions drew on the question bank developed by Dogruel et al. (2022), aimed at identifying what the person in the street knew about algorithms. Our interest was in going beyond the factual answer to explore any explanations or justifications that participants gave for their answers. The third part sought perspectives on the relationship between digital literacies and democratic processes. In this third part, the first question adapted Nicolini's interview to the double (2009), with participants being asked to recount what digital literacies are to a librarian unfamiliar with the concept and to explain how the associated services and programs are related to the development of democratic processes. Each interview lasted between 45 and 60 minutes, and the audio recordings were transcribed verbatim. The transcripts were first analysed using the concept of practice architectures (Mahon et al., 2017), that is the cultural-discursive, material-economic and social-political arrangements, and then a thematic analysis to identify key features of the literacy practices of these librarians. The analysis using practice architectures revealed 'practices of representation in which objects in the world are represented, imagined and evaluated' (Reckwitz, 2017, p. 122). The findings from this analysis were particularly important in identifying social norms, emotional engagement with key issues and in suggestions how these practices led to actions, both individual and collective.

The secondary analysis was carried out using a form of narrative analysis, where the interview transcript was taken as a whole story, rather than as answers to discrete questions. Throughout the interviews, participants offered comments, explanations or justifications of their answers. It was these that formed a storyline through the interviews and that demonstrated the knowledge and understandings of participants (Connelly & Clandinin, 1990). Approval for the study was given through the Human Research Ethics Committee of the University of Technology Sydney, with the condition that participants and the universities where they work were to be anonymized. In the findings, all participants are referred to as female.

Findings

The findings will present the understandings participants have of algorithms and their interactions with them. A picture emerged of a group of librarians who recognised that algorithms are ubiquitous for anyone who engages with the Internet. However, their storylines showed that many of them were uncomfortable with trying to say what algorithms are and what they do. Lacking a socio-technical vocabulary, many participants anthropomorphised the online functions with which they interacted. While some participants were not concerned about the impact of delegating to algorithms, others acknowledged that they could retain some level of autonomy. Most of those concerned with the impact of algorithms arising from online interactions, are concerned with the impact on individual privacy and well-being. A small number consider that the real impact is on the workings of civil society.

Ubiquity of algorithms

Questions and interview prompts were designed to keep participants focussed on their practices in working with students and staff in the development of knowledge and skills in information and digital literacies. Mostly, the answers were grounded and practical and suggested an understanding of the ubiquity of algorithms, but participants often diverged from the practical. We probed where they thought students might come across algorithms in their everyday lives.: “their smart watch is constantly gathering data” (022); “every level of their online presence” [is providing data] (016); “[you can] assume your phone is spying on you” (006). Students were described as being “Google-brained” (017), indicating that the use of the Google search engine was an unthinking aspect of behaviour. The responses from two participants stood out as being different, the first asserting “I don’t go looking for algorithms”

(001) and the second indicating uncertainty: “Well, I’d need to do some research myself” (027).

Knowing and not knowing about algorithms

The common thread to the request to explain how they would explain algorithms to students or provide a definition was in the struggles to answer the question. Although one participant (003) used a standard technical approach to definition, she was an exception. Others drew on examples from their professional practice (eg “these suggestions on the side, the right-hand panel” (016)). The majority, however, were uncomfortable with answering the question: “I’ve never had to do this” (020); “This is a stab in the dark” (027); “I’m going to struggle to articulate this” (021); “it’s probably an inadequate explanation” (026). Some tried to get across the idea of the danger posed by algorithms, for example “the darker side … the black box” (002) or “It’s just like having a gun” (015).

The responses provide evidence of hypocognition, with a clear example being expressed by 011: “I don’t know a lot about it, except for the fact that the algorithm is about the keywords that will come up. But whatever's been put into Google, whatever words have been indexed, will be the words that will come up.” In an attempt to draw out technical knowledge that participants might not think to reveal, we asked about their expertise in programming. This caused some to reflect that they had learned some programming languages “as a student” (020), “back in the 1980s, 1990s” (027), but that they lacked current expertise. Most participants, however, asserted in different ways that “I’m not a coder, I’m not a computer scientist” (024). They followed this quickly with the acknowledgement that “you don’t need to be an expert” (002) because they felt they had “a pretty good understanding of the principles” (004). That “you could apply a lot of the things we do as librarians, as rudimentary programming” (017) was a commonly held belief. The storyline here was one of incomplete knowledge.

Anthropomorphising the algorithm

It was not surprising that most people anthropomorphised the online function with which they interact, as they lacked technical or system knowledge to do otherwise. We heard participants say: “They … [when I say that] it sounds like it’s a human being” (023). They talk about the algorithm in human or humanoid terms, investing it with the agency that they have delegated to it, “[it will] “try and guess what you want” (027). Such responses contrasted strongly with

those from the small number of participants who were able to express systems knowledge: “It’s a sophisticated use of metadata and analytics to track and monitor search behaviour” (022).

Participants also expressed their lack of technical understanding in reflections on how algorithms influenced their own behaviour on the internet. Mostly, they did not use examples from their professional practice. The majority of examples they gave related to online shopping and entertainment and the appearance of pop-up advertisements, although one participant referred to using social media to gain access to information and news not available through other channels (005).

Interacting with algorithms

Two perspectives to interacting with algorithms emerged in the interviews from the role-play question on advertisements. The first can be summarised as “It doesn’t really bother me” and the second as “You can manage your digital footprint”. The overwhelming reason for “not being bothered” was either “you're just not really aware of that. You just go with the flow (015)” or the kind of fatalistic approach that underpins statements like: “I would say ‘look, just accept the fact that that's going to happen and don't worry about it because you can't avoid that kind of thing’, and I think most people do just accept that fact” (017). The approach to managing your digital footprint was more carefully explained, indicating some level of agency for the individual and the possibility of an interaction that could control the algorithm to some extent. Managing one’s digital footprint included a range of strategies, including searching in incognito mode, making choices on acceptance of cookies and clearing the cache, making active choices on the use of privacy functions and so on. Participant 004, for example, stressed the possibilities of an individual’s capacity to take action: “yes, the ads are frustrating, yes, the data is a problem. It's really important to be aware of what data is being retained of yours, but also remember that your behaviour is what dictates a lot of these things, and if [managing your digital footprint] is something you're interested in, you have the opportunity to click strategically and make sure that the things you're getting are most relevant to you” (004). This participant’s approach is interesting, in the light of a level of hypocognition. She had earlier said that the felt that she understood “the principles” of programming but did “not necessarily have the ability” to implement them. Participant 015’s lengthy response identifies her as one of the few participants who acknowledged that there was more than one response to dealing with advertisements. Having first indicated that one

could “go with the flow” as indicated above, she presented the possibility of a significant level of interaction with the algorithm, situating her response in the context of teaching students about aspects of information literacy. Her response is provided in full: “It's a product of how much information you put out there and that sort of thing and the accounts that you have, finding out about the policies of the companies that are providing this information, … . What else would I say? I might even go into that territory of saying, if you think of yourself as part of a system, what role do you wanna play in that system? Do you want to be someone who is subject to everything that happens to you? Or do you wanna have some agency in that situation, so I might talk to [the students] about the question of generally what their position is going to be in a world where this is happening” (015).

The storylines showed that interactions with algorithms were seen in a number of different ways. Half of the participants (15/30) were concerned with privacy, “being very alert to [their] behaviour being monitored” (022), or “live[d] in fear” of being scammed (030), whereas others were “inclined to switch off” (009), and even knowing their privacy might be being invaded, “we still do it” (011). Most of these participants, however, spoke in general terms about the safeguarding of privacy, and indicated the importance of the expertise of librarians being brought together with that of counsellors to boost students’ understandings of how to protect themselves and their well-being, a topic of discussion in all the universities at the time. A small number of participants made specific links into their work with students, emphasising the importance of “understanding of how to live and operate in an informed manner, within an online world” (006). Participant 014 linked “a kind of lesson about privacy settings” with the possibility of “controlling your own digital footprint”. Just one participant (028) took an activist perspective when she asserted: “I don't think any of us can avoid algorithms now, but if we know how to manage them and if we can recognize when an algorithm is working, I think that will go a long way towards improving our digital literacies and also safeguarding how we interact and how that democratic process works”.

Most participants, though, were considerably more apathetic about the possibility of interacting with algorithms with any degree of agency. The following list provides a taste of the reasoning behind not taking action to manage their digital footprint: “We all know [that algorithms are collecting our data], but we still do it”; (011) “It’s just annoying” (027); “You just accept it, don’t you? … Big Brother’s watching you …” (017); “It’s part of the online

experience" (026). They might have found the "loss of control … irritating" (024), or been resentful that the Google search engine or social media sites "shrink down my options" (023). Even though they know that previous online behaviours have an influence on current search results, some still find an element of "creepiness" (014) in it. The very all-pervasiveness of algorithms is, for one participant, "like knowing that there's oxygen in the air, so it's a little bit scary" (015). However, none of this was enough to prompt most participants to action, whether to increase their knowledge and understanding of algorithms or to actively manage their digital footprint.

Knowing, not knowing and their implications

A note of caution should be sounded about expressions of not knowing. In a research study, participants may prefer to say they do not know, rather than look foolish with a partial answer, or they may have been caught off guard by the discussion and not been able to bring to mind familiar aspects of their practice and expertise. Even though the interviews were set in the context of their information literacy practices, the examples given from everyday life may have been provided to establish common ground, rather than to indicate a lack of awareness of relevant examples from those professional practices. The discussion that follows takes the narratives in the interviews at face value.

The findings from the narrative analysis present a picture of a group aware of social issues and problems arising from the interactions that students, and they themselves on a personal level, may have with algorithms, but most of whom lack the language and conceptual understanding to express the technical aspects of the entity with which they interact. The use of the cultural-discursive arrangements of practice architectures as an analytical tool has revealed that these librarians use a discourse which emphasises the social or personal or which expresses their not knowing. Algorithm, as noted in the literature review, is a concept with two strands of meaning (eg Beer, 2017; Kitchin, 2017; Striphas 2015; Willson, 2017). The distinction between these two strands appears in the literature of librarianship and information studies as the difference between a socio-technical understanding and a socio-cultural understanding of algorithms (cf Lloyd 2019), with the emphasis in information literacy on the socio-cultural. This emphasis on the socio-cultural is clearly expressed in this study, at the expense of socio-technical knowledge.

Signs of not knowing

In using a socio-cultural approach, these participants exhibit signs of hypocognition. This is not the hypocognition of the anthropologist Levy (1973), where the worldview of a group means that a concept such as grief does not exist in a culture and therefore cannot be expressed. Rather, it is hypocognition in a sense developed by Wu and Dunning, involving expertise and culture (2018, p. 6). People who do not have a sound grasp of a concept cannot use it to make sense of the world in which they live. This has implications for the development of knowledge around that concept and for strategies that depend on the use of that concept. The distinctions between the novice and the expert, and their varying capacities for competent performance as librarians found in the literature (eg Hsieh-Yee, 1993; Luca, 2019; Saunders & Budd, 2020) assume that the knowledge and skills of the expert can be documented and used as a benchmark against which to assess other levels of professional knowledge and skills. In considering expertise with regard to algorithms, such a benchmark for knowledge and skills does not seem to exist for the participants in this study. Indeed, a common thread in the storyline of the interviews was that explaining that one did not have specific technical knowledge was an acceptable response in a professional context. Even though the study is framed in the context of the professional practice of developing information and digital literacies, the responses of participants indicate a concern with privacy and well-being, rather than a concern with "managing the digital footprint". That is, the narratives privilege concern for the individual over developing the ability to exercise a level of agency in interactions with algorithms. This is not to deny that protection of privacy is an important aspect of the development of these literacies. However, as Beer encourages (2017, p. 10), we "need to continue to look inside the black box … to understand the technicalities of the systems as well as their social ordering potentials". Thus, the ways that participants in this study discuss algorithms, taken as part of the discourse of professional practice, impose a limit on expertise, to some extent minimising the important of the socio-technical strand of meaning in the concept.

Algorithms as collaborators

Hypocognition, the lack of complex understanding of algorithms, similarly has implications for the ways that the participants interact with algorithms in online systems. Few maintain a strong sense of engagement with a system, with the user acting as part of the system. Instead, there is evidence that many participants to some extent anthropomorphised the algorithms in

the search engines and online interfaces they interacted with. “Who ARE they?” (021) was a rhetorical question posed by one participant. The vehemence in the utterance made it stand out in the interview data. Thinking on it, and on the comments made by many participants, it was clear that THEY, the anthropomorphised algorithms, were not Kowalkiewicz’s helpful minions (Hinchcliffe, 2024), rather, they represented the unknown. This personified unknown can be understood as the audience for their online interactions. The audience, in this context, is not the same as the audience as persona 4.0 presented by Gibbons (2021). Her concern was with the interactions between those who were writing text to be used by search engines. However, the principles of search engine optimisation, for example, are as relevant to librarians searching online as they are to those developing searchable text. Thus, the idea that the search engine’s algorithm is an audience for anyone interacting online is relevant. Those seeking to “manage their digital footprint” (eg 014 and 015, who are not from the same university), engaged with the algorithm, at least at some level, although the algorithm here would be seen more as an actant, in Latourian terms (Lloyd 2019, p. 1477-78), a collaborator in a joint venture. They were able to “wink”, in Gibbons’s term, to the algorithm, indicating that they were aware of functions that enabled them, for example, to manage cookies, or to engage in an incognito search, functions that gave them a certain level of agency in those interactions.

Algorithms as strangers

Taking the anthropomorphic perspective, for most participants, the algorithm can be understood as a stranger. In this section, we adopt the anthropomorphic story line of participants. The algorithm is no longer a collaborator or an audience; it is, at most, an entity that makes things happen. Participants described how they are “inclined to switch off” (009) when they have to interact with algorithms, suppressing their irritation and annoyance. The behaviours described by many of the participants could be seen as the kind of “civil inattention” that Erving Goffman (1963) identified; behaviours that are essential to the maintenance of social interactions among strangers. Algorithms are not human strangers. Writing here in anthropomorphic terms, we assert that they are not set up to abide by the rules of courteous social interaction. Yet, over time, our collective behaviours and discourse as we interact with algorithms have established for the human participants social norms for these interactions. Behaviours such as accepting the filter-bubble created by our previous online searches or suppressing annoyance at the pop-up advertisements or other feeds that interrupt

our transactions, or accepting that we must constantly identify ourselves, often providing intimate details of ourselves, have become accepted as part of the norms and standards of online behaviours, created by the everyday practices of Internet users. In the "headspace" that cyberspace can be, that might seem a reasonable social behaviour, maintaining a restrained but courteous approach. After all, the algorithm itself is hidden, its workings not apparent. However, continuing to consider the workings of algorithms in human terms may lead us to a different conclusion. Algorithms know our date of birth; they know where we live; if we have a loyalty card for a supermarket, they know what we buy; Google and most other search engines know what we are curious about; the algorithms that manage our emails know who our contacts are. Yuval Noah Harari (Thompson, 2018) says that algorithms know us better than our own mothers. But algorithms are just computer code – they are not humans: they do not have a sense of privacy. They do not forget and they have the capacity to create links among and between discrete elements of data. If the stranger sitting next to us on the bus started rummaging through our wallet or investigating the messages on our phone, most people would find this behaviour beyond the bounds of civility. They would exclaim; remonstrate; make a fuss. Yet, the findings of our study have shown that even though people know there are actions they can take to prevent the intrusions of this "stranger" into their personal affairs, they may never take them.

The findings of this study would also suggest that hypocognition, whether the not knowing is an expression of uncertainty, ignorance or ambiguity, has implications for programs and services in information and digital literacies in the context of a democratic society. It affects online interactions, so that firstly, the algorithm takes on the characteristics of the unknown and secondly it becomes anthropmorphised into a stranger with whom interactions may be interpreted as being those of civil inattention. The librarians in this study, mostly, adopted what can be seen as the principle of disattendability, making themselves unobtrusive. In the context of democratic society, based on principles of deliberation on information, a person with a high level of information and digital literacy would be expected to draw attention to examples of mis- and dis-information, making themselves obtrusive in the process. The principle of disattendability has no place in the behaviours of those who are informationally and digitally literate.

Information and digital literacies, the capabilities which fit someone for living, learning and working in a digital society, require an awareness of the potential power in a cultural sense of these algorithms. Hypocognition affects the ways librarians talk about expertise on algorithms, so that it becomes acceptable in a professional context to say that one cannot articulate the workings of an algorithm, because one does not know. Librarians, as educators in this space, need to be part of the conversations about algorithms and their societal and cultural effects, and for this, they may need some level of understanding of the technical nature of online interactions as well, even though the workings of algorithms may be largely hidden from the general public.

Conclusion

This study has highlighted the importance of the innovative concept of hypocognition in considerations of the information practices of librarians in universities in NSW, Australia, with responsibility for programs and services in information and digital literacies. It has shown that the imbalance between socio-technical and socio-cultural knowledges and awarenesses has implications for the ways librarians talk about their expertise and their understandings of algorithms, and that this in turn has consequences for the ways librarians behave in their interactions with search engines and other online interfaces, frequently conceptualising them in anthropomorphic terms. It also has detrimental consequences for the way that others perceive the expertise of librarians responsible for developing information and digital literacies. Significantly, this study has suggested that hypocognition, as a collective professional state, has the capacity to undermine programs and services in information and digital literacies offered by librarians in university libraries. Kwalkiewicz (Hinchliffe, 2024) implores us to not let algorithms "spiral out of control". The key to this, he argues, is asserting human agency through digital literacy.

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