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Title: Information World Mapping: A Participatory Arts-Based Elicitation Method for Information Behavior Interviews

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Abstract

Participatory, arts-based methods generate rich data with which researchers can explore information behavior in context, and may be particularly apt when engaging with youth or participants with low literacy levels. Information world mapping (IWM) is an innovative and interactive drawing-based interview technique for data elicitation. Initially developed for use in a study of young parents' health information practices, IWM guides participants in depicting their personal social information worlds, including items, places, and relationships. Maps are then used to facilitate critical incident elicitation from participants' stories about, and interpretations of, their information practices. Within the young parent study, three styles of map were commonly seen: the directional map, the mind map, and the symbolic map. Use of IWM requires time and ethical care, but the method enables researchers to center participants' own perspectives on information practices, triangulate data obtained via more traditional methods, and enrich understanding of social information worlds.

1. Introduction

In an era dominated by growing media interactivity and increasing visual communication methods, information researchers must explore, develop, and apply creative methods for participant engagement (Given, Opryshko, Julien, & Smith, 2011). Information world mapping (IWM) is an innovative and interactive drawing-based technique for eliciting rich data about information behaviors in context. Such participatory, arts-based methods can complement traditional data collection, allowing researchers to explore and triangulate information behaviors and socially- and culturally-constructed information practices. Creative methods may be particularly apt when engaging with youth or participants with low literacy levels, and within the context of traditional prolonged data collection or research dissemination.

1.1. Problem statement

Visual and creative methods have been identified as holding great potential to enhance research into everyday information practices (Given, O'Brien, Absar, & Greyson, 2013) and the information behavior of marginalized groups in particular (Benson & Cox, 2014). However, when exploring such methods for use in a longitudinal ethnographic study of young parents in Canada, there was no sole participatory technique that was at once accessible (requiring no sophisticated technology or costly supplies), flexible (usable with a diverse population and various topics), extensible (applicable to cross-sectional or longitudinal study designs), and focused on centering the views of marginalized participants. Therefore, in order to engage participants from varied cultural and academic backgrounds in describing their information practices in the context of their everyday lives, elements of multiple existing arts-based methods were combined, resulting in IWM. In this initial use of the method, the aim was to use the

technique to augment data collection within traditional qualitative interviews (Greyson, 2013). In this study, IWM made accessible the abstract concept of information practices, enriched and triangulated oral interview data, and enhanced the interview experience for participants.

2. Development of the concept

Within qualitative information behavior research, semi-structured face-to-face interviews are common. In order to improve accuracy of participant recall and disclosure, researchers triangulate interview data (e.g., with observations or surveys) and employ elicitation devices such as the critical incident technique (CIT), asking participants to focus on a specific situation or event rather than their perceived typical behavior (Flanagan, 1954; Urquhart et al., 2003). In recent years, information researchers have increasingly used visual and artistic methods, for example, asking participants to respond to pre-selected images related to a topic about which they might seek information (Genuis, 2010), involving them in participatory methods of documentary photography (Given et al., 2011; Julien, Given, & Opryshko, 2013), or asking them to artistically interpret information-related concepts (Hartel, 2014; Hartel & Thomson, 2011). Such studies demonstrate that arts-based methods “can aid in the illustration of participants’ perspectives by allowing an audience to not just hear their words, but also experience the world the way they see it” (Given et al., 2011, p. 4).

The young parent study focused on a population known to be both heavily surveilled and socially marginalized. It was therefore important for researchers to minimize assumptions about the lived experiences of participants, and to find accessible ways of capturing their authentic voices and worldviews. Taking a practices approach (Savolainen, 2008), this study explored the socially-constructed things participants did with health information in their lives. Information world mapping developed out of a need for a creative and participatory tool that would elicit

accurate data about participants' information practices in their real-life contexts, as they understood those practices. The desired elicitation device needed to be sufficiently simple so that participants with diverse educational and cultural backgrounds could carry it out, and engaging enough to feel refreshing within a long face-to-face interview. Further, the ideal method would be adaptable in the future to a variety of information topics, social contexts, and geographic settings. IWM meets all these criteria, engaging participants and enhancing participant-researcher communication about everyday information practices in context, placing the depiction of an information world into the hands of socially-marginalized participants, and remaining sufficiently flexible and adaptable to be deployed in a variety of field settings.

3. Conceptual geographies and information activities, behaviors, and practices

Since the latter half of the twentieth century, space, place, and various physical, cultural, and social geographies have been explored from a variety of perspectives beyond a concrete spatial science approach (Agnew, 2011). Buschman and Leckie (2007) have explored application of these approaches to library and information research. Resulting from explorations of information behaviors in context, a number of conceptual geographies have emerged as theoretical containers in which information activities could take place. As a new arts-based method to enrich interview participants' narratives regarding information practices in their everyday contexts, IWM draws on elements of multiple conceptual geographies of information behaviors: information grounds, information horizons, information ecologies, and information worlds.

Information grounds is the most concretely geographical of these constructs, as it describes a physical (or sometimes online) location where people exchange information, although this information sharing is not the intended primary purpose of the space. Fisher

developed this concept based on observations of information interchange among patients in the medical waiting room (Fisher, 2005; Fisher & Naumer, 2006; Pettigrew 1999), drawing on Tuominen and Savolainen's (1997) social constructionist approach to conceptualize temporary and context-dependent information sharing in what Oldenburg referred to as third place locations—those beyond home and workplace (Fisher & Naumer, 2006). This discovery led to exploration of other physical and virtual spaces that serve as hosts for social information grounds (Fisher, Durrance, & Hinton, 2004; Fisher & Naumer, 2006).

In contrast to the informal information sharing that is the focus of information grounds, information horizons (or information source horizons) offers a way to conceptualize deliberate information seeking and specifically informational sources. Sonnenwald and colleagues (Sonnenwald & Wildemuth, 2007; see also, Sonnenwald, 1999; Sonnenwald, 2005; Sonnenwald, Wildemuth, & Harmon, 2001) developed a theoretical framework that acknowledges the social and collaborative nature of information seeking, as well as the context-dependence of information seeking activities. They developed a method for interviewing people about information seeking, which involves a drawing and writing exercise embedded within an oral interview. Participants are asked to create a written map of their usual information sources and to describe the roles of each source within their horizon. This task has been used in conjunction with CIT for eliciting accurate stories within information seeking interviews (Sonnenwald et al., 2001). The stories are typically analyzed quantitatively in a type of social network analysis that identifies preferred sources and seeking pathways within a population of interest. This analysis may complement qualitative analysis of other interview data or quantitative analysis of data from an information seeking survey, and has been applied to topics such as the study of college

students seeking coursework-related information (Tsai, 2012) and that of environmental activists seeking everyday life information (Savolainen, 2007).

Nardi and O'Day have used the concept of information ecologies as a biological metaphor to explore the integration of information technology into society. Their definition states that an information ecology is "a system of people, practices, values, and technologies in a particular local environment." (Nardi & O'Day, 1999, p. 49). They describe an ecology as an organizational setting in which information activities involving people and technology take place (e.g., a library), and identify "keystone species" (e.g., librarians) therein. This use of ecology as a biological metaphor for a network is distinct from ecological behavioral models (see, Bronfenbrenner's, 1979, ecological systems theory) that emerged from developmental psychology to model micro to macro influences on an individual. However, some information researchers have drawn theoretically on both ecological psychology and information ecologies to investigate information behaviors and practices such as student plagiarism (Williamson & McGregor, 2006) and the role of affect in student information behaviors (Given, 2007).

Information worlds is perhaps the broadest and most commonly used among the conceptual geographies of information behaviors, yet there remains lack of clarity around what is intended by this metaphor (Yu, 2012). Chatman pioneered deliberate, theoretical use of the worlds metaphor in information research (Chatman, 1987; Chatman, 1991; Chatman, 1992; Chatman, 1996; Chatman, 1999; Pendleton & Chatman, 1998) as a result of investigating information practices among vulnerable or socially-marginalized social groups, whose worldviews and experiences tended to constrain information practices. Working from a constructionist perspective focused on the sociology of knowledge, Chatman discovered self-protective information practices such as secrecy and deception, collecting key propositions into a

theory of information poverty, relating to impoverished, and often highly surveilled, information worlds (Fulton, 2005). Many information researchers have expanded and tested Chatman's propositions with various populations (see, Burnett & Jaeger, 2008; Fisher et al., 2004; Hersberger, 2001; Hersberger, 2002; James, 2006). However, the term "information worlds" has also become broadly applied without clear grounding, often appearing to mean nothing more than the setting for an individual's information behaviors (Yu, 2012).

Scholars of information worlds have begun to call for a more deliberate and specific theoretical understanding of the concept of information worlds. Yu (2012) proposes to bring information worlds back to Chatman's focus on poverty and inequality, harnessing the concept to create a more integrated view of information practices than the currently dominant work-life versus everyday-life research divide allows. Noting that the term "information world" is widely used across disciplines, usually with little information-related theoretical grounding, Burnett and Jaeger (2008; Jaeger & Burnett, 2010) adopt an interdisciplinary approach, constructing a theory that incorporates both Chatman's micro-level small worlds (an influential concept in information science but not beyond) and Habermas' macro-level lifeworlds (a sociological concept with broad use and appeal).

4. Integrating and applying spatial conceptual models.

Information grounds, horizons, ecologies, and worlds are all conceptual geographies in which information behaviors can and do take place. In some cases these geospatial metaphors become tangible—for example, when interviewees are asked to draw their information source horizons, or when researchers create visual models of participants' information behaviors. The development of IWM incorporated elements of each of these conceptual geographies in order to create a flexible and extensible tool that could be used for future research applications.

Information horizons provided a concrete model of a low-barrier diagram-generating drawing and writing activity for use within an interview. IWM expands on this model to include social context, a variety of things one might do with information, and a greater degree of participant control over the design and interpretation of their maps. It was important, for example, for IWMs to be capable of depicting a participant's information grounds, formal and informal information sources, and activities beyond seeking information (e.g., sharing, storing, sensemaking). IWM can be inclusive of people, places, technology, and organizations in participants' lives, and be compatible with ecological models in order to inform potential interventions to improve information-related problems and inequities. IWM adopted the language of worlds as most inclusive and accessible to a diverse set of participants, and in particular to socially marginalized populations for whom language such as grounds, horizons, or ecologies might be confusing or difficult. Given that the aim of the study was to understand these participants' perspectives on what information people, places, things, and activities were important to them, the researchers elected to leave the term "information world" open to participant interpretation, rather than aligning the term with one of the many definitions currently in use.

5. Using arts-based methods to illustrate conceptual geographies

Social scientists have used visual imagery to complement traditional data collection methods for decades. In the mid-twentieth century Collier experimented with photo elicitation in anthropological interviews, noting that this activity "elicited longer and more comprehensive interviews but at the same time helped subjects overcome the fatigue and repetition of conventional interviews" (Collier, 1957, p. 858). Thanks to advances in technology, photography and many other arts are now easily created and transported. As a result, arts-based approaches

have increasingly been used in research “when traditional methods cannot fully access what the researcher is after” (Leavy, 2008, p. 227).

Information is an abstract concept, and outside of information science the concepts of information behaviors and practices carry little meaning. Cox and colleagues assert that, “Visual methods generate richly textured and nuanced accounts and can be used to explore abstract phenomena that are made more concrete through visual means” (Cox et al., 2014, p. 4). Arts-based methods can help refine and triangulate spoken language about contextualized everyday information behaviors. The development of IWM drew specifically on elements of three arts-based elicitation methods: Photovoice, relational mapping, and information horizons (the last has already been discussed above). These methods vary in their output, scope, and specificity, but are all adaptable to social processes that relate to abstract concepts such as information practices.

Photovoice, a participatory method developed by Wang and Burris (1997), is popular in health research (Boydell, Gladstone, Volpe, Allemang, & Stasiulis, 2012; Catalani & Minkler, 2010) and has more recently been taken up by information researchers (Given et al., 2011; Pollak, 2012). The Photovoice method is more than an elicitation technique, and involves participant-generated photography, participant interpretation of their own photos, and inclusion of participants in data analysis, validation of findings, and dissemination of research results. Photovoice was developed with marginalized communities and social processes in mind, and is highly complementary with conceptual geographies such as information worlds and grounds, as the photos show participants’ own perspectives on spaces and abstract concepts.

Relational mapping, as proposed by Radford and Neke (2000) for use in conflict resolution, is a tool for understanding individuals’ realities within complex systems. Participants

are typically asked to diagram their interpersonal relationships, using concentric rings to show proximity to themselves as the hub (Josselson, 1995, pp. 251–260), although some researchers have interpreted the instructions more loosely, allowing more participant control over map design (Bagnoli, 2009). Relational mapping has some commonalities with information horizons but is aimed at eliciting information about important people in a participant’s social world rather than important information sources, and is not usually subjected to quantitative analysis.

Information world mapping is a form of relational mapping that draws procedurally on information horizons, but focuses on interpersonal relationships and a variety of personal information practices (including, but not limited to, seeking). IWM draws philosophically on Photovoice, aiming to give participants control over the creation and interpretation of their images, but without requiring ongoing participant involvement in the overarching study design. IWM integrates elements of three existing visual methods—information horizons, relational mapping, and Photovoice—to create a highly mobile and adaptable device for enriching and triangulating the data participants provide within an interview, with a broad scope to allow for participant creativity and control and an objective of understanding a variety of information practices and processes within an individual’s information world.

6. Implementation of IWM

Within the context of a longitudinal cohort study of young parents (ages 15-24) in British Columbia, IWM was embedded within intake interviews to explore the health-related information practices of a subset of the population comprising 39 individuals (37 mothers and two fathers). IWM was not used with three mothers within this group due to one or more of the following reasons: 1) limited participant availability required abbreviated intake interviews, 2)

participants' toddlers were present and active, making implementation of a drawing exercise difficult, and 3) English was difficult for the participant, resulting in a simplified interview.

The IWM activity was embedded midway through an audio-recorded 90-minute semi-structured intake interview. The interviews were multifaceted in nature, spanning a variety of topics including housing, education and career planning, parenting, childcare, and health. The IWM exercise was directly preceded by a set of questions about information seeking, assessment, and sharing, which served to prime participants and provide the interviewer with a basic understanding of the participant's social information world. The interviewer then transitioned to the IWM activity with a segue such as,

We've talked some about specific examples of times you've needed health information, gotten health information you didn't want, served as a health information source for someone else, and used health information in making a decision. Another thing that we're trying in this study is that we're asking people if they could draw what we're referring to as their health information world.

Borrowing language from information horizons, participants were asked to "put themselves on this page" and fill in the information people, places, and things in their social worlds. The interviewer assured participants that, "people draw this in different ways, and there's no right or wrong way to draw your information world," and provided, both verbally and in writing, a list of things participants might wish to include in their information worlds. This list included prompts around common information practices including seeking, receiving, sharing, sensemaking, storing, and managing information. Prompts were described in simple language and tailored to

address the research questions of this study (see Appendix A for the Young Parent Study IWM Interview Guide).

Participants were given the choice of thinking aloud (Ericsson & Simon, 1980) while drawing, or completing their maps silently with the understanding that the researcher would ask them to describe their maps afterward. Most chose to narrate, often leading to a conversation about their drawing. Audio recording continued throughout. Following completion of an information world map, the interviewer clarified what had been drawn, probed for what had not been depicted, and used CIT to ask participants to walk through one or more specific memories using their information world map, which sometimes led to modifications to the original map.

7. Maps produced during the young parent study.

In the current study, information world maps generated by participants varied greatly. Within this diversity, however, certain trends emerged across multiple maps. Some themes emerged related to information seeking and assessment, for example, certain sources were identified by the majority of young parents as useful for health information. There were also a few dominant ways in which participants chose to represent their information worlds. While a minority of the participants with artistic confidence or training drew full-color murals, most primarily used words and symbols in their maps. Three common styles of maps seen in the young parent study were directional maps, mind maps, and symbolic maps, although a given map could contain elements of all three styles.

Figure 1 shows Mary's¹ directional and color-coded information world map. Mary is a twenty-one year old parent of one, who works in a business that primarily served expectant and new parents. Her map was highly organized, as she classified her information sources as useful (depicted in green, upper right quadrant), or not useful (red, upper left quadrant). She also

included people for whom she was an information source (blue, lower half), and used arrows to indicate information flows to and from herself. Mary was in the unusual position of being an information source for parents in her work setting (customers would consult her for advice) yet being perceived as an information needy young mother in community settings (on the playground with her child she received unsolicited advice from “community grandmas” and “concerned citizens”). Mary’s map helped clarify the context-dependent nature of her positionality as knowledgeable or information needy, and also emphasized that the same person (e.g., “My Mom”) could be both a good source and an undesirable source, and both a giver and recipient of information.

Figure 1: Mary's directional information world map

Sarah’s information world web, shown in Figure 2, is characteristic of many information world maps drawn by young parents currently or recently in secondary school. When the researcher introduced the activity to Sarah, the seventeen-year old mother of two asked, “Can I do a web or something?” It is likely that this style of bubble diagram or mind map is taught as

part of the regional school curriculum, influencing participants' interpretation of how to create a map of their information worlds. These webs sometimes included directionality or color-coding.

Sarah's map started with her "Me" bubble, to which she added "Google" on her "cellphone," and then, if still seeking an adequate answer, "Ask Mom." Another route (if Google did not provide a satisfactory response to a health question) was to ask other people, that is, a friend, counselor, or teacher. In addition, Sarah subscribed to automatic emails pushed to her phone, bringing health and developmental information for her baby's current age. When the researcher probed about whether Sarah ever received information she did not find useful in her world, she added a "Doesn't work" list of items far across the page from her web. At the researcher's prompting, Sarah talked through a few critical incidents in which she needed or used information to make a health decision. Some of these anecdotes featured Sarah consulting her doctor for information, although the doctor had not been included in Sarah's information world map. Sarah had also mentioned her doctor several times prior to the IWM exercise. The researcher asked Sarah if her doctor belonged on the page, to which she replied, "Yes, I would put my doctor. I would put him in big writing. My doctor." The researcher verified that Sarah saw her doctor as a major source of information, and Sarah confirmed that he was a "Huge one," writing "Family Doctor" across the bottom of the page in large red print.

Figure 2: Sarah's information mind map

Jane was sixteen and expecting her first baby when she completed her intake interview. Once IWM was explained, Jane took a variety of markers and immediately began drawing pictures of “all the things I learn stuff from.” After a few minutes, the researcher asked Jane to talk about her drawing. The largest portion of the page (left of the vertical line) was taken up by what Jane described as places where she (a pink stick figure with a question mark on its head) was “happy to find information.” She talked through the images she had drawn representing her school, books about pregnancy, and a heart symbolizing her family. A tree represented common sense and intrinsic knowledge on her map, and a picture of a computer symbolized online information seeking. A cross represented religion, which informed Jane’s health decisions (whether or not to have an abortion), and the numbers 8-1-1 denoting the provincial nurse hotline. Jane also drew a series of stick figures boxed off with a red X drawn through them (lower left corner). She explained with a laugh, “This is all the information from all the friends trying to tell me stuff that I don’t want to hear.”

On the other side of the dividing line on Jane's page were images symbolizing information she disliked, or about which she felt conflicted. Some of these referred to unsolicited parenting advice from her boyfriend's mother. Another symbol represented her boyfriend who had "no idea what's going on" and said "all this stuff that really doesn't make sense." This unhelpful information was stressful to Jane because, as she described it, "this information clashes with that information but I have to take these both into...consideration." Upon the researcher's probing, Jane explained in depth how she negotiated different information sources—for example, which Internet sources she trusted and how she used social media for information seeking and management. Although literacy was not a challenge for Jane, she primarily used pictures and symbols to populate her information world.

Figure 3: Jane’s information world map of symbols

The young parent study is a 5-year longitudinal study that includes multiple interviews conducted periodically with participants. IWM was primarily used in intake interviews, however, as the study progressed, it posed opportunities to test repeat uses of IWM and visualize shifts in information worlds over time. For example, at intake, when Sofia first drew her health

information world map, she was a twenty year old mother of one. Her information world was in a state of flux as she had recently aged out of eligibility for various youth programs and transitioned from high school to college. She had many sources on her original map, but several of them were no longer readily available to her.

Two years later, when she drew another map, Sofia was expecting a second baby with her new fiancé. Many of the individuals listed on her intake map (high school teacher, doula from her first birth) were no longer important parts of her information world, although some (family doctor) still were. Sofia's first child had also aged out of services by this time, cutting off additional information sources from the initial map. On her second map, Sofia clearly delineated pathways she would follow for different types of information needs—for example, if a concern might be an emergency, call 811 and then, if needed, go to hospital; if it was minor and not embarrassing, ask a nurse friend; if potentially embarrassing or sex-related, Google. This clarity about information seeking pathways for different types of information needs appeared to have developed over time and through experience, and was striking in its contrast with the more cluttered and less directional intake map. Sofia's follow-up map also contained a substantial portion focused on providing information to others—something touched on as an emerging social role in her intake interview, but stated much more firmly and clearly in the follow-up.

8. Analysis of information world mapping interviews

To date, the maps generated by IWM have been used to supplement analysis of textual data sources (e.g., transcripts and field notes). The researchers in this initial study did not have specialized training in the interpretation of the drawings, so—not wanting to infer meaning that might not be there—the study team decided to err on the side of caution in analysis. While the semi-structured interview questions often elicited a variety of information sources, people with

whom information was shared, and sometimes assessments of which information was good or bad, the conversation around the IWM exercise often elicited additional information sources and behaviors that had not come up in previous questioning. For example, a young mother who mentioned her own doctor as her primary health information source, other young parents as people who sought information from her, and social media group members as unreliable sources of information, might draw an information world map featuring “Google,” “school,” and “library” prominently, none of which she had previously mentioned. She might also include elements such as her own brain or her faith as important information sources or as instrumental in information assessment and use—abstract concepts that rarely surfaced when asking direct questions about health information seeking, assessment, and use. When asking her to use the map to talk through an example (using the critical incident technique), she might reflect on and revise the map further in order to reconcile her typical information practices with a specific behavioral example—for example, adding a public health drop-in group that she attended with a specific question about her infant’s health, even though this was not a typical information source or space of hers. The IWM exercise added richness to the interview data, eliciting information in ways that complemented traditional semi-structured interviewing and the CIT. Referencing the maps while coding the textual data was helpful as an illustration accompanying the interview transcript. However, it is possible that visual analytic methods such as semiotic analysis (Turkcan, 2013), situational discourse analysis (Clarke, 2005), or hermeneutics (Röhl & Herbrink, 2008) could also be applied to information world maps in the future to explore how people use signs, meanings, and mental shortcuts to depict their information worlds.

Although initial use of IWM has emphasized putting control over the maps into the hands of socially marginalized research participants, IWM could also be applied in settings in which

power dynamics are not of such concern. New methods of analysis of IWMs could either apply researcher interpretation to the images or be carried out in collaboration with study participants. Additional analysis of IWMs could focus on the extent to which participants' maps of their social worlds do or do not reflect the models and frameworks researchers use to explain information behavior and practices.

9. Advantages and disadvantages

Information world mapping had both advantages and disadvantages as an elicitation tool. These span the logistical and the ethical, and should be carefully considered by researchers using IWM. In terms of strengths, IWM provided a low-barrier way to incorporate an arts-based activity within a traditional qualitative interview. No electronic technology is required; and the paper and markers used in the young parent study were portable and easily photographed for digital upload. Feedback from participants indicated that switching to a drawing activity midway through the lengthy intake interview provided a refreshing change of pace, and may have reduced participant fatigue. IWM served as a method for triangulating data within a given interview. In the young parent study, IWM was preceded by traditional semi-structured interview questions about participant information behaviors, and followed by CIT questions. Each of these methods often resulted in slightly different or modified answers, as they led a participant from more general thinking about information behaviors to increasingly specific ones, building on each other to enrich the interview data.

Engaging in IWM provided a way for researchers to learn more about the participants by observing their mapping processes. Were they artistic? Did they immediately identify regular information pathways or did they have to think for a while? What did their written literacy level appear to be? Allowing for participant-directed free expression sometimes led to surprises, as

when a participant's map looked very different than most others, or when unexpected people, places, or practices appeared. While this occurred in a minority of interviews, those cases underscored that IWM could reveal areas of a participant's life that might otherwise have been missed. IWMs augmented data analysis, providing more nuance to transcripts and serving as memory aides to complement textual data.

On a more theoretical level, IWM is about putting representation of information worlds and behaviors into the hands of study participants, both literally and figuratively. By supporting participants in conceptualizing and interpreting their own social information worlds, researchers may challenge the ways in which scholars understand and model information activities. Participants' maps may or may not align with the frameworks and conceptual geographies researchers create to explain information practices or behaviors. The use of IWM can help individual researchers, as well as the field more generally, reflect on methods of categorizing and modeling information seeking and use, the priorities assigned to elements in these processes, and the assumptions made about the information worlds of participants. These strengths of IWM indicate that it functioned partly to extend information horizons: It used similar procedures to produce drawings within interviews but with a broader scope and a more participant-centered orientation. It also functioned as an adaptation of Photovoice principles, by allowing marginalized participants to self-define and interpret concepts such as one's "information world", creating a lower-barrier method that may be more feasible with populations that are transient, have unreliable access to cameras, or who do not wish to be involved with follow-up data interpretation.

However, IWM is not without challenges. Key among these is the time it takes to complete—in the young parent study it was necessary to budget at least 10 to 15 minutes, which

meant that very occasionally the activity had to be omitted when a participant had only very limited time, or had no time free from childcare duties. Some participants may initially be resistant to a drawing activity, and it is important to emphasize that the mapping is not about artistic merit and no artistic talent is required; people draw their maps in many different ways, using pictures, words, and symbols; and there is no wrong way to represent one's information world. In interviews where participants wished to talk while drawing, the researcher had to be careful to not prematurely truncate the mapping by discussing too much before the map was fully drawn. Conversely, for participants whose maps were exceptionally simple, the researcher faced the challenge of exploring whether the participant's information world was truly small and straightforward, or whether it was only represented as such due to discomfort or lack of confidence with the mapping activity. If the map was simple due to discomfort, further conversation building on the map was essential.

The training of researchers and research assistants is also critical to the success of implementing the IWM activity. One cannot assume that a researcher familiar with and adept at traditional interview methods will understand and find success with mapping—particularly mapping such an abstract concept as information worlds—without adequate orientation to the method and concept. Such orientation should ideally include an experiential component: The researcher should both make his or her own map and practice pilot-testing IWM before use in the field.

Finally, in a few interviews the IWM activity went in unexpected directions. In these cases, participants responded in unusual ways to the standard IWM interview guide, and produced drawings that were quite unexpected in nature and content. These IWMs were

challenging, but also provided opportunities to open the subtext of the map and interview. An example of this is shown in Figure 4 in Lilah's aspirational information world map.

Figure 4: Lilah's aspirational information world

Lilah's map was completely non-textual. While there were examples of other highly artistic IWMs, they typically contained drawings of information places, technologies, and people. Lilah's drawing was of an idyllic farm landscape with a young woman in the foreground. During the interview, the researcher struggled with this, attempting to redirect Lilah into more obviously information-related images or asking her to interpret her drawing as a symbol for information. Lilah was unable to provide a critical incident to relate to her information world map, and in her responses to various probing questions kept returning to her belief in natural living as key to physical and spiritual health.

What I wanted to portray is just my love for like, a sustainable life and the idea that... that's how our health should come and that's where it would come from if we were able to—I mean we are able to have all the information on it, but if

it were more emphasized in—in [sighs] the community, and if this were more socially acceptable through the media...

Although the researcher left that interview feeling that the IWM had failed, upon later reflection it became evident that Lilah was communicating her subscription to a different understanding of information than that which is commonly understood. By drawing her idyllic farmscape as an aspirational information world, Lilah was underscoring her stated beliefs in natural healing and trusting nature over human science and information, and her frustrations that the information she received from the medical system and mass media devalued this belief. Once identified, this theme was addressed in a follow-up interview with Lilah, in which she validated and expanded upon the researcher's understanding of her message. This iterative process of interpretation and validation in collaboration with study participants requires a research design that provides the time and space for reflection and analysis, as well as repeat consultations with the same participants for follow up, which may not be possible in all studies and settings.

Unexpected findings, such as that illustrated by Lilah's map, are both a strength and a drawback of the IWM method. By focusing on participants' own interpretations of their information worlds rather than taking an approach that would have been more directional—such as selecting one definition of “information world” and instructing participants to produce more standardized outputs (as one might see, for example, with information horizons)—IWM allowed participants a greater degree of control and freedom with the activity. The resulting diverse maps do not lend themselves to certain analytic methods that require more standardized results, limiting compatible methodological options. However, this approach also allows for exploration of information behaviors and practices from the participants' perspectives, which may lead researchers to reconsider assumptions about existing models of information behavior.

10. Population considerations with visual methods.

The development of IWM sought specifically to create an activity that would be engaging and accessible to young people, participants with low literacy levels, and those who might face difficulty engaging in a prolonged traditional interview or survey. Experts in arts and human development have noted the exceptional resonance of the arts among youth populations; for example, Emunah notes the “heightened creativity during adolescence” (1990, p. 102), and Yonas and colleagues found use of a visual elicitation method with youth to be “developmentally flexible and appropriate” (Yonas et al., 2009, p. 7). Liebenberg (2009), who used participatory visual research techniques with teen mothers in South Africa, found that participant-generated images allowed unique opportunities for validation of participant narratives, and also that they enabled researcher and participants to span boundaries between differences of culture, age, ethnicity, and social role.

In the young parent study participants who were currently or recently in high school tended to be quite familiar with mind mapping and frequently launched immediately into their information world map using a web design. Participants who had not been in school recently sometimes had more difficulty expressing themselves. Although overall the IWM activity was well accepted and liked by most participants, researchers also encountered situations in which low literacy levels or lack of fluency in English remained a barrier. A minority of participants expressed shame that they could not write well, and, despite researcher reassurance, these participants’ maps were often sparsely populated. Further exploration (see Shankar et al., 2016) is needed into the benefits and challenges of using IWM with specific populations, and best practices for adapting the exercise to be culturally and linguistically accessible.

11. Ethical issues

When using IWM, it is important to attend to the usual research ethics concerns such as respect for participants, privacy and confidentiality, research merit that justifies participant involvement, and research being reasonably likely to increase justice and, in particular, to benefit socially-marginalized participants. Arts-based methods carry with them additional ethical considerations (Cox et al., 2014) that are important to highlight regarding IWM. When asking participants to generate art for the study, consent should be specifically obtained for the researcher to retain the artistic output in addition to the survey or interview results.

Anonymization of both interview data and of images or writing in participants' maps should be discussed. It is best practice for the interviewer to specifically confirm, following the interview, that participants are allowing the researcher to take their maps for use in research. This is particularly important with participants who identify as artists themselves, or who are members of cultural groups whose art has frequently been appropriated, such as Indigenous peoples, as issues of ownership may be especially sensitive among such populations. Another ethical consideration that may arise with IWM and other arts-based methods is that of participant comfort. Participants should always be told about the drawing activity as part of the informed consent process, and given appropriate time to consider their involvement in the study. A small amount of time to familiarize themselves with the activity is reasonable, but researchers should also be aware of the level of discomfort a participant may be feeling and expressing, and not push an artistic activity onto a participant who is truly uncomfortable expressing themselves in a given medium.

12. Conclusion

Eliciting accurate data about information behaviors in context, engaging participants in an increasingly interactive multimedia world, and understanding information worlds from the perspectives of marginalized populations are ongoing challenges in information research. In the young parent study, IWM proved to be a low-barrier creative method for eliciting rich data that triangulated verbal interview data, centering the perspectives of a socially-marginalized population, and reducing interview fatigue. Building on the format of information horizons, the relational focus of relational mapping, and the centering of the perspectives of marginalized populations of Photovoice, information world mapping provides a novel arts-based method for information behavior researchers. Future research with IWM could explore application with other populations, repeat mapping over time, and visual analysis of the maps themselves, in order to expand understanding of this new addition to the growing array of arts-based methods in information research.

Footnotes

1. All names used in this manuscript are pseudonyms. Additionally, any potentially-identifying names or places on the maps included as figures have been removed from the images to maintain participant privacy.

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Appendix A. IWM Interview Guide, Young Parent Study

Note: This text was provided as a handout and delivered verbally to guide young parent study participants in drawing their information world maps. Specific prompts are tailored to the current study, and will vary when using IWM with other research questions and populations.

In this activity, we are asking people to draw what we're referring to as their "health information world."

In other words, put yourself on this piece of paper, and then draw in the people and places and things in your life that provide health information to you, receive health information from you, or help you use health information.

Different people draw this in different ways, and there's no right or wrong way to draw your information world.

Things you might want to include in your information world:

- How and where you **look for** information when you have a health question
- How and where you **receive** health information you're not necessarily looking for
- People you **share** health information with, or give information to
- People, places and things that **help you understand or use** health information
- **Sources** for health information you want, as well as information you don't want
- Ways or places you **store** or **remember** information for later
- Places – physical or virtual – **where you do things** with information

You can describe what you are doing while you draw, or do it without talking.

After about 10 minutes, I will ask you to tell me about the information world you drew.