Information Behavior of Makers

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Abstract

Makers' information seeking practices fall under the everyday life information seeking approach, and more specifically under serious leisure. Direct search is employed as an information seeking practice, but active browsing and serendipitous encounters are also common especially for inspiration seeking. Practical and technical knowledge appears to be the most important type of information for makers, and sharing their methods has become a significant part of the online maker community through content sharing platforms. The use and sharing of information is inextricably tied to information seeking for makers because the process of managing information is iterative. Sharing is especially significant since makers rely on others in the community to learn skills and develop ideas. Information professionals should bear in mind these needs when designing spaces, managing collections, and planning programs. Collaboration and access to tools and resources will support makers of various skill sets, and fostering a community of makers will allow makers to teach and learn from one another.

Information Behavior of Makers

The maker community is an exceptionally vibrant information community centered around DIY and STEAM. It is a community built on sharing information—in the form of skills, tools, techniques, and ideas—and sharing products (Sheridan et al., 2014). Despite a diverse array of passions and pursuits, makers constitute a supportive learning community in which "the boundaries between information seekers, users, and providers" are blurred (Fisher & Bishop, 2015, p. 22). Makers transition between learner and expert in an iterative process as they develop their projects and support other makers. Bajarin (2014) estimated there were about 135 million US adults who are makers, let alone the number of children and adolescents who might also identify with that moniker. The maker movement allows all of these makers to share ideas, teach, learn, and access resources within the maker community. As this movement grows and develops, information professionals need to be aware of the information seeking behavior and needs of makers, and they can facilitate that through library spaces, programming, and collection development that supports maker learning, creation, and sharing.

Literature Review

Everyday Life and Serious Leisure Information Seeking

Everyday life information seeking (ELIS) involves finding information to solve a problem that is not directly related to formal work or study (Savolainen, 2017). There is a strong preference in ELIS for familiar, human-centric sources like friends, relatives, and organizations. This aligns with Chatman's (1991, as cited in Hartel et al., 2016) findings that certain information seekers, especially those who live "on the margins of society," prefer human sources

over textual sources. This is logical considering the informal nature of ELIS: informal search topics are more likely to require informal sources of information.

While makers do tend to prefer human sources—in person or otherwise—and seek information to solve problems, makers' information behavior tends to expand beyond one-off projects to focus on exploratory learning and creation (Koh, 2013). It aligns better with the serious leisure vein of ELIS. Stebbins (2009, as cited in Hartel et al., 2016) described serious leisure information seeking as the fervent pursuit of a hobby such that it becomes a second, voluntary career "centered on acquiring and expressing a combination of its special skills, knowledge, and experience" (p. 1). Sheridan et al. (2014) identified an iterative design process in making when they studied how makerspaces function as learning environments and contribute to the participatory culture of makers. They found making is a cycle of discovery and creation, not a linear process; learning informs the creative process, and creating informs further learning needs. That iterative process can extend beyond singular problem-oriented ELIS behavior. Makers can be casual information seekers, but Sheridan et al. (2014) suggested that this more intensive information seeking process is common: while some participants in the makerspaces they studied dropped in as one-time users, others returned regularly to work on long-term projects, hone expertise in specific skills, learn new skills for personal use, and participate in the makerspace community.

Liang, Lu, Liu, and Su (2019) studied the information behavior of university makerspace users and found that makers seek empirical, skills-based knowledge in addition to principle, content-based knowledge. Li and Todd's (2019) study of youth usage of makerspaces also noted these distinct types of information seeking. In both cases, makers found value in the process of

making, not just the final product: they sought more interdisciplinary knowledge as well as more depth of information. They valued the community connection, autonomy, and ability to explore new interests, demonstrating the ardent commitment to the hobby that is characteristic of serious leisure information seeking.

Information Creation and Sharing Within the Maker Community

Sheridan et al. (2014) suggested that makers tend to rely on learner-experts: makers who taught themselves a skill or information and are now responsible for teaching that to other makers. The strong sense of community among makers is not based solely on shared interest, but rather on creating and sharing information among local makers and even across geographical boundaries. Makers seek information primarily to create, and the "things made are meant to be shown, used, sold, or shared" (Sheridan et al., 2014, p. 529). Information seeking becomes an iterative process to optimize, explore, and find new problems stemming from the original one. This demonstrates a complex problem-solving approach in which makers "seek information in a series of stages that link to the performance of a task or project" (Kuhlthau, 1993, as cited in Spink & Cole, 2006, p. 26). They use diverse learning contexts and strategies to discover, explore, create, and extend information as a physical or digital product that is then shared with the maker community or wider world.

When makers become familiar with a particular skill or tool, it becomes their responsibility to share that skill and teach others, hence the inclusivity of the community (Sheridan et al., 2014). Their skills and products become information from which other makers learn. The maker community as a whole has thus become an important source of direct information alongside more formal textual sources. Mason and Robinson (2010) studied the

information seeking behavior of emerging artists and designers and found they preferred a combination of sources for information, including artist communities or "invisible colleges." Human interaction was cited as a major inspirational source alongside other types of information, reiterating the value of the community for learning, creating, and sharing information.

Savolainen (2019) explored the connection between information seeking and sharing and found that they are best seen as linked information behaviors rather than discrete behaviors. He described the information seeking process as a precondition of information sharing, but noted the process may not end with sharing; new information needs can arise after—even as a result of—sharing that information. Described this way, information behavior reflects the iterative design process. Liang, Lu, Liu, and Su (2019) noted that information sharing was a primary activity in university makerspaces. Makers preferred to participate in informal sharing like discussions, workshops, and brainstorming sessions over formal education. This flexible, collaborative atmosphere allowed those makerspace environments to facilitate knowledge generation, sharing, and transformation. This networking is fundamental to a community of makers since many of the shared skills and information are not found in other sources; they are an amalgamation of many makers' ideas and inspirations.

Serendipitous Encounters with Information

The iterative design process of making is in part due to the frequency of unexpected encounters with information that shift the direction for a project. Makers "have a tendency to stop and 'collect' useful or interesting information they bump into," just as other information encounterers do (Erdelez, 1999, p. 26). Encountered information is gathered when it can be applied to a specific problem the information seeker already has or when it has enough potential

use to be valuable later. These serendipitous encounters with information—or nondirected

scanning—are equally as valuable as more direct browsing and seeking for makers (Savolainen,

2017). Sheridan et al. (2014) found it was common in makerspaces for users to learn skills and

information tangential or even unrelated to their active projects. They suggested that serendipity

is a major part of the making process, as it commonly alters the trajectory of a project or gives

rise to a new project idea entirely. Mason and Robinson (2010) found this with emerging artists

and designers as well: when inspiration does not come from a specific problem identified by the

maker, new project ideas often comes from these serendipitous encounters as well as active

browsing.

Methodology

The data for this paper was gathered partly from database searches and partly from

searching within user-generated content from the maker community. In EBSCOhost, search

terms like "information behavior of makers" returned little results, so terms had to be broadened

to address maker culture, the maker movement, and the implementation of makerspaces.

Searches began in EBSCOhost's Library and Information Science Source database; however,

results were limited, so searches were expanded to all EBSCOhost databases. Sources ultimately

came from a variety of databases, including Academic Search Complete and several education

databases. Many articles on the implementation of makerspaces in schools were filtered out as

they were too specific and tended to focus on the information professional rather than the

information user. Several studies of user interaction within makerspaces in different contexts

were retrieved and were found to be useful for this paper. Still, the language of the maker

movement was limited in results, so studies regarding other hobbyists and designers were found

to address both the serious leisure perspective and the information creation perspective. User-generated sources included content-sharing websites and podcasts. These sources tended to come from well-known maker community members and their professional pages.

Discussion

Makers seek many types of information and engage in a wide spectrum of information behaviors. The literature suggests that iteration is key to most information behaviors for makers: finding, using, and sharing information is often a cyclical process rather than a linear one.

Information Seeking

Liang, Lu, Liu, and Su's (2019) findings emphasized the dual purpose of information for makers. Content-based information is sought to develop subject knowledge and conduct preliminary investigations for projects, but skills-based information is also sought to learn how to transform subject knowledge into some creation or product. This is fundamental to makers whose identities center around creation. Mason and Robinson (2010) noted this as well, suggesting that designers seek information to develop project ideas, conduct specific reference searches, and fulfill technical education needs.

Inspiration Seeking. Making typically requires inspiration to develop new projects. Insofar as project development, makers often actively seek inspiration, but they may also rely on serendipitous encounters for new information. This is somewhat paradoxical as it involves seeking information without actively searching or knowing what to look for. However, relinquishing control of the search process in this way is a common practice among designers and makers. Harlan, Bruce, and Lupton (2012) found that among teen content creators, most information was gathered through serendipitous encounters and community connections rather

than through direct search. This provides a variety of information types, such as new tools, skills, and content for inspiration. Often, the inspiration comes from sources not directly related to the field or medium in which a maker typically works. Makri, Hsueh, and Jones (2019) noted that video game designers find inspiration in outside sources, and even actively avoid related topics by looking for irrelevant information. Collecting seemingly random information in this way creates a catalog of inspiration for later browsing, which develops an oddly systematic way of relying on serendipitous information encounters for inspiration.

While many maker projects are artistic in purpose and fulfill a purely creative need, many other projects are intended to be useful and improve life in some way. These ideas can come from serendipitous encounters with new information, but they often also stem from a personal need, a community need, or a creative or academic pursuit (Liang, Lu, Liu, & Su, 2019). This moves from the realm of random information encounters to active inspiration seeking. The information sought is still—paradoxically—an unknown entity, but the search process is still much more intentional than relying on serendipity. Inspiration occurs through discussion with other makers about their processes and projects and through observing the larger community to find gaps in how people interact with the world. Thus inspiration sparks innovation that fulfills a functional purpose and benefits people outside of the maker community.

Practical Knowledge. In addition to inspiration, makers actively seek information about skills and tools that might help with a project they have in mind. They may need to research the type of project to discover technologies and techniques that will be useful, or they have tools available in a makerspace and want to learn more about how to use them (Sheridan et al., 2014). Hobby reenactors, replica prop makers, and others who model and recreate products tend to have

a preference for strong, reliable sources of information to ensure maximum authenticity of the final product. Robinson and Yerbury (2015) found that hobby reenactors seek access to actual artifacts when possible, and at least descriptive secondary sources from the appropriate historical period. They are especially likely to research appropriate materials and techniques to make the product as accurately as possible, regardless of other technologies available.

Makerspaces facilitate this learning through practice and generally focus on STEAM subjects, though they do often incorporate craft and design as well. Tinkering with new technologies without a specific project in mind can act as both inspiration and practical information seeking as makers learn the opportunities afforded by and the limits of the technology they are learning to use (Liang, Lu, Liu, & Su, 2019). Sheridan et al. (2014) also noted the value of tinkering as a means of information gathering. The more background knowledge a maker has about the available tools, the better equipped they are to design and create a product that fulfills the purpose they have in mind. Makers are also likely to actively search for very specific practical knowledge explaining how things work or how to make a particular product (Li & Todd, 2019). The theory behind the project is usually built into making it and is not typically an information pursuit of its own. This suggests practical knowledge may be valued more than content knowledge among makers. Knowing how and why a particular product works may be more important than having general knowledge in a given field.

Maker Community as a Resource. Makers especially value information coming from other makers, whether in their local communities and makerspaces or in online maker communities. Sharing the information they have learned (and the products they have created) is highly valued, which creates a rich culture of exchange and respect among community members.

Robinson and Yerbury (2015) noted a balanced preference for information from peers in the maker community as well as from more formal sources like museums and libraries. The community upholds high standards of participation, yet the barrier to participation is low because community members are willing to share and teach as they contribute to the collective store of knowledge for the community.

Maker-generated sources of information are common in online maker communities like Instructables (n.d.). The website is designed for makers to share their projects as how-to guides with the greater maker community, enabling makers to learn from each other to try new methods and create their own projects. Its goal is to be a place of inspiration, education, and encouragement for makers of all content and levels of expertise. Koh (2013) noted that participation in the maker community engages makers and empowers them to learn more. Makers who make among others are more likely to keep making; the community can act as a sounding board and a source of inspiration. As Liang, Lu, Liu, and Su (2019) suggested, makers learn from other makers perhaps more than from any other source, so it is critical that makers have opportunities to engage with others in the community.

Online communities like Instructables (n.d.) may suffice, but information professionals can work to make physical spaces available and welcoming to local makers to encourage collaboration, teaching, and learning. Li and Todd (2019) found that the social aspect of physical makerspaces was a key motivator for youth usage of the space. Makerspaces facilitate community as users struggle together with peers, become experts and teach others, and develop leadership skills through teamwork.

Information Use and Sharing

Makers must do more than collect knowledge and skills to connect with the rest of the maker community. The use of that information and skillset for product creation is a key facet of the maker identity—they learn so that they can make. Sheridan et al. (2014) corroborated this in their study when they emphasized the product-centric nature of making: tinkering, figuring things out, and otherwise playing with tools and materials is important for project development. This is in some ways a combination of information gathering and use. The two can happen simultaneously, and they often lead to one another in the cyclical process of learning and design.

Li and Todd's (2019) study also emphasized the importance of products. The information required to create the product is of course also necessary, but the purpose of making is the actual use of the information in the production process as well as the final product that results from that work. Especially for young makers, it is necessary that users have the autonomy to build and create in ways that they think are important. When people are engaged in what they learn—especially when they can make something useful to their community or something fun for themselves—it helps them develop a lifelong learning attitude that is not always developed from formal classroom learning. Williams and Willet (2017) also noted the significant role of informal learning, suggesting that the maker movement is impacting and even redefining information services. They identified a tension between book-based and experience-based learning in public libraries and found that library environments and staff roles are changing as experience-based learning becomes more prominent. Libraries are offering more programming and services to empower people to learn outside the walls of the classroom, and it is possible that the maker movement has played a role in bringing that about.

Maker practices of information use are bound together with information sharing. The participatory culture of the maker community highly values information sharing, especially when that information comes from other makers in the form of skill-sharing and knowledge of materials, tools, and resources. When makers synthesize that new information, it demonstrates learning as they process, reorganize, and present the information in a new way for their own audience. Koh (2013) found that young makers remix content in this way to share knowledge through models, sparking creativity in safe, exploratory environments. Making in this way empowers content creators to produce, innovate, and connect with the maker community. They develop a sense of ownership over their products, but they also have a drive to share that product or knowledge with a wider audience. Robinson and Yerbury (2015) noted that hobbyist reenactors tend to document their learning and making processes for future reference as well as for sharing since there is such high regard in that community for authenticity and effective research in recreating artifacts. This is apparent on websites like Instructables (n.d.) where users either document their making as they go or backtrack and recreate their process for others to model. Even on YouTube, established maker channels and amateur individuals alike create tutorials and timelapses of projects to share with others. Kelly (2019, as cited in Tested, 2019) lauds YouTube as an accelerant to culture and learning because of this freedom to share processes and projects.

It is clear then that makers are not afraid of being copied; in fact, it seems to be encouraged. Savage (2018) described this phenomenon in his speech at Maker Faire Bay Area to an audience of makers, reminding them that "art is one of the key ways in which we converse about the world...Human progress is made not simply because of how we make things but also

because we share what we make and how we made it." People learn by modeling others, then connecting and extending that knowledge to new ideas. Students who remix existing content are making new content using others' work as the ingredients. This willingness to share helps to lower the barrier to access for people who otherwise would not have access to the knowledge and resources necessary for making things. Harmer (2013, as cited in Schwarz, 2013) discussed the role of libraries in global innovation and noted that "there is an opportunity for the democratization of the tools of invention...we can create the shop class of the 21st century, [and] the library can be the center of that" (par. 9). Makerspaces then are about more than just play: they empower people to learn, innovate, and invent in a low-stakes, exploratory environment. This access to knowledge and "the tools of invention" is still not equitable, but Harmer's comment suggests an equalizing power in makerspaces that can benefit those with less access to these expensive resources. Even among the scientific community there are journal clubs that share analyses of scholarly works with their peers, often as publically available articles or videos (Kelly, 2019, as cited in Tested, 2019). These sharing practices democratize information by reducing barriers to access and increasing collaboration in the learning and making processes.

Conclusion

The maker community tends to seek, use, and share information in a collaborative and iterative process. Information sharing is especially important as makers rely on others in the community to learn content and skills. More formal information sources may also be used, but there is a strong preference for community sources. Makers' information needs often lie at the intersection of many disciplines and skill sets, requiring a more hands-on approach than textual reference. Libraries can create spaces that give users access to tools, but developing a community

of makers is essential to the effectiveness of that space. Libraries should ensure they have spaces that reflect this need for collaboration. Makerspaces can provide both the space and the resources to make experience-based learning accessible to makers and to the greater community. They should also enable access to digital maker resources and online information sharing platforms. Finally, while maker-based programming is important for exploration and community-building, makers also need room to tinker and explore on their own. This autonomy is essential to maker project development and fostering a lifelong learning attitude.

References

Bajarin, T. (2014, May 19). Why the maker movement is important to America's future. *TIME*.

Retrieved from https://time.com/104210/maker-faire-maker-movement/

Erdelez, S. (1999). Information encountering: It's more than just bumping into information.

Bulletin of the American Society for Information Science, 25(3). Retrieved from

http://libaccess.sjlibrary.org/login?url=http://dx.doi.org/10.1002/bult.118

Fisher, K. E. and Bishop, A. P. (2015). Information communities: Defining the focus of

information service. In S. Hirsh (Ed.), *Information services today: An introduction* (pp.

20-26). Retrieved from

infocom.hyperlib.sjsu.edu/wp-content/uploads/2018/08/Information_Services_Today_An

Introduction-_3_Information_Communities.pdf

Harlan, M. A., Bruce, C., & Lupton, M. (2012). Teen content creators: Experiences of using

information to learn. *Library Trends 60*(3), 569-587. Retrieved from

http://muse.jhu.edu.libaccess.sjlibrary.org/journals/library_trends/v060/60.3.harlan.html

Hartel, J., Cox, A., & Griffin, B. (2016). Information activity in serious leisure. *Information Research, 21*(4). Retrieved from

http://infocom.hyperlib.sjsu.edu/wp-content/uploads/2018/08/EJ1123254.pdf

Instructables. (n.d.) Retrieved from http://instructables.com

Koh, K. (2013). Adolescents' information-creating behavior embedded in digital media practice using Scratch. *Journal for the American Society for Information Science and Technology, 64*(9), 1826-1849. doi: 10.1002/asi.22878

Li, X., and Todd, R. J. (2019). Makerspace opportunities and desired outcomes: Voices from young people. *Library Quarterly: Information, Community, Policy, 89*(4), 316-332. doi: 10.1086/704964

Liang, W., Lu, Z., Liu, G., and Su, W. (2019). Research on makers' knowledge space construction by libraries. *Library Hi Tech, 37*(4), 699-712. doi: 10.1108/LHT-02-2019-0055

Makri, S., Hsueh, T., and Jones, S. (2019). Ideation as an intellectual information acquisition and use context: Investigating game designers' information-based ideation behavior. *Journal of the Association for Information Science and Technology, 70*(8), 775-787. doi: 10.1002/asi.24169

Mason, H. & Robinson, L. (2010). The information-related behaviour of emerging artists and designers: Inspiration and guidance for new practitioners. *Journal of Documentation, 67*(1), 159-180. doi: 10.1108/00220411111105498

Robinson, J., and Yerbury, H. (2015). Re-enactment and its information practices; tensions between the individual and the collective. *Journal of Documentation, 71*(3), 591-608. doi:

10.1108/JD-03-2014-0051

Savage, A. [Make:]. (2018, May 22). *The importance of sharing* [YouTube]. Retrieved from

https://www.youtube.com/watch?v=HhdbN-bRaSo

Savolainen, R. (2017). Everyday life information seeking. In J. D. McDonald & M. Levine-Clark

(Eds.), *Encyclopedia of library and information sciences*, (4th ed.). Retrieved from

https://doi-org.libaccess.sjlibrary.org/10.1081/E-ELIS

Schwarz, M. (2013). Learn globally, act locally. *Library Journal, 138*(11), 34. Retrieved from

https://search-ebscohost-com.libaccess.sjlibrary.org/login.aspx?direct=true&db=lls&AN

=88016278&site=ehost-live&scope=site

Sheridan, K., Halverson, E., Litts, B., Brahms, L., Jacobs-Priebe, L., & Owens, T. (2014).

Learning in the making: A comparative case study of three makerspaces. *Harvard

Educational Review, 84*(4), 505-531. doi: 10.17763/haer.84.4.brr34733723j648u

Spink, A. & Cole, C. (2006). Human information behavior: Integrating diverse approaches and

information use. *Journal of the American Society for Information Science and

Technology, 57*(1), 25-35. Retrieved from

https://doi-org.libaccess.sjlibrary.org/10.1002/asi.20249

Tested. (2019, May 14). Sharing knowledge. *Still Untitled: The Adam Savage Project.* Podcast

retrieved from

https://www.tested.com/art/makers/875698-sharing-knowledge-still-untitled-adam-savag

e-project-51419/

Williams, R. D., and Willett, R. (2017). Makerspaces and boundary work: The role of librarians

as educators in public library makerspaces. *Journal of Librarianship and Information*

Science, 51(3), 801-813. doi: 10.1177/0961000617742467