The paper based on these articles will explore how makers fit into the information behavior domain of serious leisure and how the maker community enables its members to fulfill their information needs.

Statement of Research:

The paper based on these articles will explore how makers fit into the information behavior domain of serious leisure and how the maker community enables its members to fulfill their information needs.

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<thead>
<tr>
<th>Author/Date</th>
<th>Main Idea(s)</th>
<th>Theoretical/Conceptual Framework</th>
<th>Methods</th>
<th>Results &amp; Analysis</th>
<th>Conclusions</th>
<th>Comments (Your Analysis)</th>
<th>Future Research Implications</th>
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<tr>
<td>Sheridan et al. (2014)</td>
<td>Explores how makerspaces function as learning environments; discusses iterative design and participatory culture</td>
<td>Constructionism: extends constructivist theory (knowledge is actively constructed through experience, learning is iterative: “ongoing construction and revision of mental representations” (p. 507); communities of practice: working in common domain share knowledge and experiences; studio thinking framework: 4 key studio structures (demonstration, students-at-work, critique, and exhibition)</td>
<td>Comparative case study; data gathered for 1 year from 3 diverse makerspaces (selected through purposive sampling); data collection via field observations, interviews, and artifact reviews; data analyzed via transcription, summaries, memos, feedback from external advisory board</td>
<td>● Constantly evolving to meet needs ● Personal and collaborative projects ● Tinkering/play ● Informal help and formal workshops ○ Learners become experts and informal teachers ● Inclusive ○ No prior experience needed</td>
<td>Participation with diverse tools, materials, and processes; finding problems and projects to work on; iterative design; community participation; informal leadership and teaching roles; sharing creations and skills (p. 529)</td>
<td>Based on this study, the making process aligns with the information seeking process by which initial curiosity leads to discovery and exploration (through play, trial and error, tinkering). This leads to design and creation of a product, then often to an elaboration or extension of knowledge beyond the project’s original scope. The study also suggests that serendipity is a major part of the making process, as it can alter the trajectory of a project or give rise to a new project idea. Thus, information seeking among makers is a combination of active seeking, active browsing, and serendipitous encounters with information. This leads to product creation in multiple iterations to then share 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. Their skills and products become information from which other makers learn.</td>
<td>This is not a study on information seeking behavior or information needs. Rather, it studies learning and the use of makerspace environments, and so is parallel to information needs. This leaves room for further study of information seeking among makers, especially insofar as the type of services libraries and schools can offer for makers in their communities.</td>
<td>Libraries can utilize the environmental and community-based information discovered in this study to create designated spaces and programs that support making alongside other makers, whether digitally or in-person.</td>
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Examiners what kinds of information emerging artists and designers tend to seek, where they tend to look, and what other info behaviors they exhibit

| 4 purposes for artist seeking information: | Emerging artists and designers exhibit information behaviors stemming from needs for inspiration, specific reference, and techniques. They rely on a variety of sources, including libraries, internet, and communities of artists, which the study describes as “invisible colleges.” Artists and designers are all makers, so these behaviors and needs apply to the maker community as well. The study found that artists search for specific information, actively browse for inspiration, and rely on serendipitous inspiration in the wider world. Makers seek information in the same ways to fulfill needs for technical education, project development (especially in regards to the iterative design process), and project inspiration. The community is of utmost importance to artists just as it is for makers: it is how they learn and share, as well as how they improve themselves as designers and market themselves and their products.

| 4 general issues from the literature: | This study focuses on formally trained artists and designers, and does not address crafting, design and creation of products for specific use, or self-made artists and designers. This leaves room for further study of information seeking among a larger, more inclusive community of designers (including youth and participants in “cottage industries”).

| Wide-ranging needs: | Since the information artists and designers need could be virtually anything, libraries are hard pressed to meet all needs. The study suggests a need for better education on career development, especially in regards to self-marketing. Libraries could embed this service for artists and designers in their existing career and business development services. They should also ensure a variety of resources are available for diverse reference and art and design techniques.

| Unpredictable needs: |

| Variety of sources of info used - categories noted: books and writers, films/TV, magazines, places, people, objects, music, artists, natural world, social world/movements, and abstract
| Beyond library and database search, other info skills (specialized search, career development, etc.) were inconsistent
| There were no boundaries to what counts as art info, which makes it impossible for libraries to satisfy all needs. Trends were noticed among types of artists (eg: painters and sculptors were more likely to cite inspiration from nature, anatomy, and natural history). All disciplines noted human interaction, conversation, and contemplation as inspirational sources.
| Online survey: data gathered from 78 random respondents (who were formally trained, are no longer in education, still create art, and are “new practitioners”) in the UK after it was publicized in a variety of resources; qualitative and quantitative data investigating use of print resources, use of internet, boundaries of art info, info behavior, and career development
|● Most respondents from “Net Generation” with formal info skills training; did not earn majority of income from art
|● Most used libraries for art: searching catalogue as well as browsing
|● Most used books for inspiration, specific reference, and info on other artists; some used books for techniques and materials
|● Most used journals or magazines for news on art world, inspiration, and info on other artists; some used them for job and exhibition info
|● All used internet for all information needs (usually first option) in conjunction with other sources

- **Online survey: data gathered from 78 random respondents (who were formally trained, are no longer in education, still create art, and are “new practitioners”) in the UK after it was publicized in a variety of resources; qualitative and quantitative data investigating use of print resources, use of internet, boundaries of art info, info behavior, and career development**

- **4 purposes for artist seeking information:**
  - **Inspiration, identification of visual elements, materials and techniques, and marketing and career guidance**
  - **Fifth purpose: current trends in art world**

- **4 general issues from the literature:**
  - Idiosyncratic pattern of need, need for “non-art” info, preference for browsing, preference for social networks as info sources

- **Wide-ranging needs:**
  - Unpredictable needs: serendipity, info comes from life

- **Most respondents from “Net Generation” with formal info skills training; did not earn majority of income from art**
  - **Most used libraries for art: searching catalogue as well as browsing**
  - **Most used books for inspiration, specific reference, and info on other artists; some used books for techniques and materials**
  - **Most used journals or magazines for news on art world, inspiration, and info on other artists; some used them for job and exhibition info**
  - **All used internet for all information needs (usually first option) in conjunction with other sources**
  - **Variety of sources of info used - categories noted: books and writers, films/TV, magazines, places, people, objects, music, artists, natural world, social world/movements, and abstract**
  - **Beyond library and database search, other info skills (specialized search, career development, etc.) were inconsistent**

- **There were no boundaries to what counts as art info, which makes it impossible for libraries to satisfy all needs. Trends were noticed among types of artists (eg: painters and sculptors were more likely to cite inspiration from nature, anatomy, and natural history). All disciplines noted human interaction, conversation, and contemplation as inspirational sources.**

- **Library, internet, and virtually anything can be considered art information as inspiration. Browsing is important not just in libraries and the internet, but in the wider world as well. Community is important for emerging artists especially as they do not have an established presence as an artist and they generally lack formally acquired knowledge on career development.**

- **Emerging artists and designers exhibit information behaviors stemming from needs for inspiration, specific reference, and techniques. They rely on a variety of sources, including libraries, internet, and communities of artists, which the study describes as “invisible colleges.” Artists and designers are all makers, so these behaviors and needs apply to the maker community as well. The study found that artists search for specific information, actively browse for inspiration, and rely on serendipitous inspiration in the wider world. Makers seek information in the same ways to fulfill needs for technical education, project development (especially in regards to the iterative design process), and project inspiration. The community is of utmost importance to artists just as it is for makers: it is how they learn and share, as well as how they improve themselves as designers and market themselves and their products.**

- **Since the information artists and designers need could be virtually anything, libraries are hard pressed to meet all needs. The study suggests a need for better education on career development, especially in regards to self-marketing. Libraries could embed this service for artists and designers in their existing career and business development services. They should also ensure a variety of resources are available for diverse reference and art and design techniques.**
<p>| Koh (2013) | Youth info-creating behavior is enabled by digital environments and resources. It goes beyond info seeking and individual use to share, remix, and create new info. | Paradigm shift for info behavior research: web 2.0 and participatory culture have enabled people to share and create info in addition to the typical seeking and individual use. | Qualitative content analysis of literature: Sense-making methodology group and individual interviews with youth ages 12-15 who actively use Scratch. Data gathered from pre-questionnaires, journaling sheets, and group interview transcriptions. | Key characteristics of youth info behavior in digital age: ● Info creation processes ○ Content development, organization, and presentation ○ Seeking info on how to share ○ Presentation includes info retrieval for their audience - wiki example: search box is sometimes too specific, so they created a category tree; ○ Visual display of info is more creative, preferable, accessible: show instead of tell. ● Remixing (building on and making creative change to original info) is a frequent use of Scratch ○ Feel honored when others use their info, resources, or projects for remixing ○ Some projects are specifically designed to be remixed ○ Ask people how they did things - collaborative learning. ● Exploratory learning - tinkering ○ Feel productive, empowered to create and innovate. Info is sought to determine accuracy through manuals, tips, and examples to build on their existing knowledge. Info creation involves identifying relationships and linking info. Presentation includes interactivity and visually engaging formats. Remixing is the creative reuse of info to produce new info, and it demonstrates sophisticated synthesis skills. It is also a learning process through processing examples. Empowerment is an affective result of this experience, building confidence, comfort, and familiarity with digital content creation. | Info creating behaviors are under-studied in favor of info seeking and use. The study illuminates info creating behavior in youth growing up with digital environments. Info seeking and use play a critical role in info production and often function simultaneously, creating an iterative process. | Participatory culture highly values the sharing of info, resources, and knowledge. Info creation presupposes info seeking—for content, skills, and sharing guidance. The synthesis of that new information demonstrates learning as users process info, reorganize it, and present it in a new way for their own audience. Remixing acts as a way for content creators to demonstrate and share knowledge through models, which sparks creativity in a safe, exploratory virtual environment. Info creation empowers users to produce and innovate, which means they are more connected to their learning environment and community; a connected learner is an engaged learner. Creators have a sense of ownership over what they produce, but there is also a drive to share that product or knowledge with a wider audience. | This study focuses on content creation. It leaves room for further research on information seeking behaviors of content creators as spends most of its analysis describing presentation of info (and the cyclical process of search and production) rather than the search process alone. Information professionals should enable access to digital environments and resources for youth. Especially in school environments, it is important to remember that YouTube, forums, TikTok, and other online communities are not the enemy when it comes to the youth in our charge. These are important resources for students to learn and create. |</p>
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<th>Author and Year</th>
<th>Concept</th>
<th>Description</th>
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<tr>
<td>Robinson and Yerbury (2015)</td>
<td>Serious leisure:</td>
<td>activities involving special knowledge, training, experience, or skill without being related to work or formal training (Stebbins, 2009) - hobbyists, enthusiasts, and “geeks.” Stebbins (1992) identified 5 categories: makers/ tinkerers, collectors, liberal arts hobbyists, activity participants, and players of sports and games</td>
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<td>Ethnicographic study with participant observation at 5 reenactment events in Australia; organizational website analysis; participant document analysis; data also gathered from forums, social media, recorded accounts of practices, and casual conversations with reenactors during immersion events</td>
<td>Info practices and creating authenticity:</td>
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<td>Reenactors document their making practices and period. They seek to document this learning and practice so they can add to the collective store of knowledge. Info-gathering and info sharing are equally important in this community.</td>
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<td>Savolainen (2019)</td>
<td>Information seeking:</td>
<td>has subsets like information searching, which involves a search system</td>
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<td>Info sharing:</td>
<td>one way communication like transferring or disseminating knowledge vs. two way mutual exchange in community</td>
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<td>Info seeking is often a necessary precondition of info sharing, but process may not end with sharing - may cycle back to more seeking</td>
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| Library makerspaces need to ensure makers have access to multiple levels of knowledge: principle (why), subject (how, skill), and situation (space for knowledge creation). | **Makerspaces in libraries**: core competency is to "secure info communication." Libraries are knowledge centers, so makerspaces in libraries should be knowledge creation centers. There is room for digital literacy services in makerspaces. **Knowledge space and knowledge management**: personal knowledge and values in digital world. This enables the exchange of knowledge. Knowledge management is "the process that helps orgs find, select, organize, disseminate, and transfer important info and expertise necessary for activities such as problem solving, dynamic learning, strategic planning, and decision making" (Iyer, 2000). Maker knowledge demands have thus far been ignored in the research. | Researchers visited a university makerspace in China, attended a lecture by the founders, and investigated makerspaces and innovation labs associated with other universities. They interviewed 7 student participants in maker competitions, as well as some advisors and executives. | **Motivation**: common interest or competition with rewards  
**Characteristics**:  
- Active knowledge needs: makers are more apt to be internally motivated to learn, enjoy learning  
- Informal learning preferences: discussion, workshops, salons, brainstorming, inspiration seeking are preferred over formal learning  
- Divergent thinking: apply new technologies, innovation, interdisciplinary communication, first to try new apps and tools  
- Close community ties: maker projects often aim to solve community issues  
- Interdisciplinary knowledge integration: intersection of computer science, mechanical engineering, electronics, etc. Some noted it was difficult to complete projects due to single-discipline knowledge - need multidisciplinary knowledge  
**Principle knowledge** (knowing why, principles and rules, STEAM philosophy - basic knowledge, interdisciplinary knowledge, info and digital literacy)  
- Preliminary investigation  
- Knowledge acquisition  
- Subject knowledge from traditional sources  
**Empirical knowledge** (knowing how, skills - hands-on, practical, discussion, cooperation, guidance)  
- Tech and tools  
- Data mining  
- Knowledge discovery and association —> knowledge structure presented to share and inspire other makers  
**Knowledge situation** (social communication groups, physical or virtual space for knowledge creation—environment, innovation platform, community)  
- Maker and librarian network to facilitate generation, sharing, and transformation of knowledge  
**Makers need more than the empirical knowledge gathered through practice; they also need principle knowledge and a knowledge situation. Makerspaces are only impactful if the users have access to the necessary knowledge and are empowered to use the space.**  
Makers work better in communities than in isolation. Tinkering is part of the process, but learning through discussion and workshops are a major part of the informal information gathering process. Makers seek inspiration from a variety of sources, including from others’ projects and from their community needs. The study breaks down the types of information typically sought by makers; this sets makers apart from some other communities because not only are they seeking content-based info, but also skill-based info so they can learn what they can create and how to make it. Additionally, the environment in which makers work facilitates knowledge generation, sharing, and transformation. This networking is fundamental to a community of makers since many of the skills and content they are learning and sharing are not found in other sources; they are an amalgamation of many makers’ ideas and inspirations. | This study focuses on how the makerspace facilitates learning and knowledge dissemination. Further research could examine makers understanding of their info needs and info use, as other studies of designers and content creators have done. | Makerspace users often need multidisciplinary information, not subject specific info. Their needs lie at the intersection of many subjects depending on the particular project. This need requires a more practical, hands-on approach than book reference. Libraries can create makerspaces that give users access to tools, but developing a community of makers is essential to the effectiveness of that space. |
| Li and Todd (2019) | Young people use makerspaces to make meaningful products, learn informally or at more depth than classroom learning, socialize with like-minded peers, and develop their interests in STEM fields. | Makerspaces in libraries: collaboration opportunity with like-minded people. They pose a challenge for staff despite the marked benefits for LIS professionals and communities—personnel lack technical skills, and there is little formal training in this area. Stakeholders may not understand the value of makerspaces. Inclusivity is an issue. Youth voices: teen library use and perception of online privacy has been studied. They have unique needs. | Public library and public middle school makerspaces were studied through observation. Users between grades 6-10 were interviewed. Focus groups and photovoice were also used. | Four major themes: make, learn, social, and interests  
- Make: opportunity to freely create and build; autonomy; access to tools  
  - Enjoyment despite problems  
  - Construction of physical products (personal needs or entertainment)  
- Learn: technology, autonomy, depth of knowledge  
  - STEM knowledge, math, science  
  - Life skills, career readiness, informal learning  
- Social: peer interaction  
  - Fun, productive hang out, working through struggle  
  - Teamwork, shared goals, fair play, leadership, delegation, negotiation  
  - Friendship, new relationships  
- Interests: technology, engineering, building things, curiosity  
  - New interests triggered, 3D printing, coding, science  
- Exploratory space  
- Autonomy —> engagement  
- Lifelong learning and intellectual development | Info professionals should design makerspaces that are relevant to young people’s lives. A major facet is moving beyond digital creation to providing the means for youth to create physical products that are meaningful. | Makerspaces facilitate learning through practice and focus on STEAM subjects like engineering and science. Users are likely to seek information within those content areas, but they will likely search for very specific practical knowledge explaining how things work or how to make something. In making, the theory behind the project is built into making the project; it is not typically an information pursuit of its own. Makerspaces also facilitate community as users struggle together with peers, teach and learn from peers, and develop leadership skills through collaboration. The key is that users have the autonomy to build and make 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 we don’t always get from formal classroom learning. | This study offers perspectives on the value of makerspaces for young people but does not elaborate on information behaviors. There is room for further study on how makerspaces enable information seeking and creation. | This study’s conclusion calls on information professionals to design relevant makerspaces that act as exploratory spaces for young people to make meaningful products. This means makerspaces users need autonomy to explore and create what they think is important, not just based on specific programming. |
| **Makri, Hsueh, and Jones (2019)** | **Game designers rely on info encounters for inspiration that drives creativity and innovation. Info acquisition and use are connected by an intellectual purpose, giving rise to info designers rather than just info seekers or users.** | **HIB research:** gradual shift from isolated info behavior in work, everyday life, etc. to more holistic and contextual view  
**Info-based ideation (IBI):** generating and developing new ideas to encourage creativity by finding and making use of info (Kerne, 2008); ideation is the generation and development of ideas based on synthesis and evaluation of existing ideas. It focuses on the creative processes as people engage with info, especially how people generation and develop new ideas as they work with info.  
**Designer info behavior:** info interaction is fundamental to creative design—designers examine relationships between info. Designers seek inspiration more often than specific info—exploratory search and anomalous states of knowledge. Info encounters are unexpected and often happen during browsing; they catalyze ideation. Use includes annotation, incorporation into existing knowledge base, curation into personal info collections to look back on (Pinterest?), and knowledge creation. | **Researchers conducted interviews with 10 video game designers in London. They screen-casted designers using the web to help explain an example of finding info on the web.** | **● Design briefs (does explaining project purpose, scope, type of product) demonstrated IBI**  
**● Framework: what designers do when interaction with info; how they undertake each behavior, and why they do them**  
**● Info acquisition vs info use (some overlap)**  
**● Acquisition: seeking, encountering, monitoring, examining, immersing, unblocking**  
○ Serendipitous encounters spur idea generation and development  
○ Encountered info not sought during active search for other info; active browsing; not looking for info, but encountering something anyway  
○ Stay up to date on design trends and industry knowledge  
○ Seek as much info as possible on a subject  
○ Strategies to avoid design fixation—refocus by taking a walk, listening to music, looking for irrelevant info, etc.  
**● Use: interpreting, collecting, externalizing, communicating**  
○ Construct meaning based on background, previous, work, interests - meaning is not intrinsic to info  
○ Text and visual info collections - catalog for future reference, inspiration (especially Pinterest)  
○ Create notes, sketches, and artifacts to process thoughts  
○ Mood boards, style frames, sketches, etc. to share ideas with colleagues and clients  
**● Use of info is dictated by its intellectual purpose - intellectual purpose is a type of acquisition and a type of use context — info designers, not just seekers or users, who “find connections between, sculpt, and flexibly wield acquired info to identify and fill their knowledge gaps” (16)**  
**● Info acquisition and use are connected by intellectual purpose — info behavior loop** | **Info-based ideation and the framework provided can inform development of digital info environments. This can nurture creativity during the design process and spur innovation. Intellectual purpose is part of info acquisition and info use.** | **The study breaks down info behavior into acquisition and use. Acquisition involves direct search, active browsing, and serendipitous encounters with information. Game designers, like other designers, seek inspiration for their work in places not necessarily directly related to video games. They gather as much info as possible when searching specific subjects. They collect the info they find into textual and visual collections, in which the info is cataloged for future reference. Designers browse their collections regularly when seeking inspiration, and these collections can be shared with others. Like many other maker groups, game designers practice iterative info behavior in which the search and use of info is connected by a particular purpose. The search informs the use and the use informs further search. The researchers use the term info designers to describe this process since they are simultaneously info seekers and users.** | **This study focuses on game designers as a profession, not as a hobby, so it is not the same as other research on hobbyist makers, although it does suggest similar themes in information seeking behavior. Further study could be done on hobby design to determine what differences exist when the context switches from profession to serious leisure.** | **Information professionals should bear in mind that active browsing is key to designers’ info seeking. In the study, it was suggested that inspiration may come from nature and unrelated product design, so it may be that when a designer asks for reference help they are looking for something more specific than inspirational material.** |
List of Resources included in the Literature Review Matrix in APA Format:


This matrix inspired by the Literature Review Matrix as shown by Walden University ([https://academicguides.waldenu.edu/writingcenter/assignments/literaturereview/matrix](https://academicguides.waldenu.edu/writingcenter/assignments/literaturereview/matrix)) and Re-envisioning the Annotated Bibliography Assignment by Marilyn Sharif at George Mason University ([https://drive.google.com/drive/u/0/recent](https://drive.google.com/drive/u/0/recent))