Pre-service Librarians' Perspective on the Role of Participatory Design in Libraries with Youth

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Abstract. Participatory Design (PD) is a design methodology that incorporates the end users in the design process. An active area of research in PD focuses on designing new technology with children. As more libraries are offering different technologies to their patrons—especially to children—there is an increasing need to think about how to best incorporate such technologies into library services. Recent interest in the field has encouraged librarians to situate themselves as designers, and to find creative solutions to the problems that arise in library settings. However, design methods are not widely utilized in the field of library and information science. In this study, we have interviewed pre-service librarians and children participants who did participatory design in libraries within a service-learning course. These participatory design sessions focused on incorporating new technologies into library programming. Our study indicates that PD is a possible method for capturing the ethos of librarianship. Pre-service librarians found that PD allowed them to effectively enact values of service, such as democratic participation and creativity, while children valued being heard from adults in the library and helping their community.

Keywords: Informal learning · Participatory design · Youth program · Librarianship · Youth service

1 Introduction

An increasing number of libraries are now situating themselves as learning spaces and makerspaces, where patrons are provided opportunities to tinker with new technologies [29]. In these spaces, patrons have access to new technologies, such as virtual reality (VR), 3D printers and e-textiles [26, 28, 30]. These technologies allow people to connect with other adult mentors to learn. The public library space directly positions itself to address issues in equity by supporting marginalized communities who may not have access to technologies otherwise. Recent literature highlights the need for librarians to become designers in creating such democratic and collaborative learning spaces [3, 32].

In discussing how to be designers, prior research indicates that participatory design is one of the effective ways of designing digital learning spaces [31, 32]. Participatory design (PD) is a method wherein the end user is involved in the design process through democratic and collaborative means [13]. More recently PD has been adopted to include

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children in the design and development of digital learning spaces and technologies [10–12]. As opposed to the librarian solely designing the digital learning technologies curriculum, the librarian collaborates side-by-side with their patrons. In a recent study, Yip et al. [32] outlined the roles a librarian can play in partnership with youth by examining a case study of children designing with a single librarian. The study states how different roles librarians can inhabit in PD, including *designer with youth* and *supporter of youth* (such as being facilitators) [32]. However, we still have a limited understanding of how to best teach the method of PD to pre-service librarians.

Despite the active use of PD in libraries, pre-service librarians in library science programs are generally not well equipped to practice these design methods [4, 11, 15, 27]. Cross [8] states that design must be fostered through education and experience. Yet, there are currently few design opportunities for pre-service librarians in the Master of Library and Information Science (MLIS) program [5]. If we are able to understand how pre-service librarians experience, engage, and learn through design methods such as PD, we can better equip them for the changing field of Library and Information Science (LIS). As professionals they can practice such skills, even with the absence of university researchers.

To understand pre-service librarians' perspectives of PD, we conducted an exploratory study to develop digital activities for youth library programming. In this study, we developed a graduate-level class in which researchers, practitioners, and library patrons (children) collaborated together to engage in PD in libraries to build a set of guidelines for digital learning activities. The course was an *Academically Based Community Service* (ABCS) course, which is a form of service learning [20]. To investigate the perspective of the pre-service librarians as future librarians, we interviewed the MLIS students enrolled in the class whose career path was in librarianship. We also interviewed children participants. We aimed to answer the following research questions:

1. What perceptions do pre-service librarians have about their involvement in a participatory design team?
2. What values and challenges does engagement in participatory design bring to the learning environment in librarianship?
3. What is the experience of children engaged in participatory design in the library?

The article concludes with a theoretical contribution of how participatory design can be utilized as a form of pedagogy for librarianship, and how PD shapes identity for future librarians. We also offer practical suggestions by discussing future courses for pre-service librarians, which can better support their career in which they will technology-related service to the community.

2 Related Work

2.1 History of PD

Participatory design (PD) originated in Scandinavia during the 1950s. The core concept of this approach is to include the end user, who will use the technology and design it with designers. Floyd et al. [16] attributes the socio-cultural background of Scandinavia

countries in their explanation as to why this approach originated from this specific region. Democratization is deeply committed and engrained in Scandinavian history. Norway and Sweden did not have a feudal system, which exemplified their goals of establishing an egalitarian society. Therefore, during the 1960s and 1970s when Scandinavian factory workers were threatened by new technology in the working environment, researchers worked with union members to find ways to include them in the design process [13]. During the mid-1980s, inspired by Scandinavian workers, the US also started to implement PD projects [13].

Both Ehn [14] and Floyd [16] discuss two values that guide PD: democracy and humanization. These two values can be distinguished from other approaches of system design. Within democracy, Ehn [14] discusses the importance of considering the conditions for proper legitimate user participation, which implies the creating of the design itself [14]. Similarly, Floyd [16] states, "the system should either reflect the interests of the systems owners, or as fairly as possible the interests of all those affected".

For humanization, Floyd [16] notes, "the system is primarily designed to compensate human weaknesses, or to support human strength". Similarly, Ehn [14] states, "the importance of making the participants' 'tacit knowledge' come into play in the design process". Ehn [14] and Floyd [16] both move beyond the approach of being technocentered.

The guiding principle and the spirit of PD are still relevant today, especially where we see a growing number of new technologies. However, PD is often not inclusive to different demographic groups. As the public library is a democratic space, and librarians have long championed inclusion and access, we find opportunities of understanding how PD can be used in the public library space [21, 22]. In our study, the pre-service librarians worked closely with children to democratically create youth service programs for digital learning.

2.2 Participatory Design in Libraries

Most literature on PD in libraries focus on designing the physical space of the library [1, 17, 27]. For example, Brown-Sica et al. [1] used PD to identify new needs of the library patrons that differed from preconceptions people had in how library space is used. Some scholars have applied PD methods to design services for library patrons [11, 12, 18]. For instance, Druin et al. [11, 12] used PD to specifically understand children's needs as library patrons by working with them to design digital libraries for children. Marquez and Downey [24] also applied PD methods for service design to provide a satisfying user experience for the library patrons. The focus of these papers is twofold: the research either reflects on how PD is implemented in the space of the library with the patrons, or how including the patrons changes the design decisions being made. Though the majority emphasize the partnership being built during the design process, fewer papers examined the perspectives of librarians who participate in PD.

Design partnerships are an important component in PD. Yip et al. [31, 32] present four dimensions of PD partnership: 1) relationship building among the participants; 2) a concern on how designers and participants can co-facilitate the sessions; 3) how the participants and designers design-by-doing together; and 4) how idea elaboration occurs among everyone. In a co-design session, the dimensions of partnership are dynamic, and

range from being balanced to unbalanced. "Unbalanced" moments refer to situations in co-design when either the children or adults are dominating in their contribution, which leads to unequal contribution. For example, in relationship building, "unbalanced" situations occur when adults are socially far from the children and "balance" occurs when closer adult-child relationships are established.

In a more recent study, Yip et al. [32] outlines, through a conceptual model for librarianship, how there is a difference between the traditional roles of being supporters of youth to being designers with youth. For instance, in a more traditional role, librarians are instructors whereas, as designers, they can co-facilitate and foster design relationships. The study argues that training librarians as design partners is about being able to shift between the two roles, rather than giving up their traditional role. This leads us to investigate how such skills can be taught in an MLIS course, and what support pre-service librarians may need in practicing such skills.

2.3 Librarians as Designers

Recently, some studies have argued that the field of LIS has been fundamentally aligned with design [3–5]. These studies point out that librarians have always engaged in design thinking methods and acted as designers, as they create new tools for information services. However, the literature also points out the absence of systematic education of design methods in librarianship.

In a 2020 study by Clarke et al., the authors use an online questionnaire to understand what design methods were being used in library practices, and where librarians gained such knowledge and skills [5]. The study reveals that commonly used design methods are interviews, surveys and observation to understand the user experience. The study also states how children's service and programming are an area where the librarians especially felt the need for design skills. On the questions of where the librarians were gaining such knowledge and skills, the study reveals that the librarians are self-taught or learned through informal sources like blogs. The article emphasizes the need for more courses to be developed, especially for librarians whose career trajectories are in youth and technology.

To understand what specific skill sets youth librarians need to develop, Subramaniam et al. (2018) conducted PD sessions with in-service youth librarians to outline skills to advance youth learning from disciplines outside of LIS [29]. The study coined the term *Youth eXperience (YX) librarian*, and the implications outline the knowledge and skills youth librarians must possess. The study reveals that librarians were in need of 1) training to keep abreast of current technology, and 2) skills to develop and sustain community partnerships. The study highlighted that the skills mentioned were those absent in the traditional librarianship curriculum. In our study, we aim to fill in this gap by reflecting on a class that emphasized such interpersonal skills through PD.

3 Research Method

3.1 Context

In this study, we interviewed pre-service librarians who were enrolled in a special topic course which was offered by the second author at the University of Washington titled

"Participatory Design in Libraries" in the Fall of 2017 and 2018. The goal of the PD sessions was to create a deeper understanding of how to integrate new technologies (e.g., Mario Maker, 3D printer and Arduino) in library programming. The partnering library was in the process of incorporating these technologies into their youth services. The pre-service librarians enrolled in the class had the chance to work with an urban public library in Columbia City in Seattle that serves a diverse community in terms of race, ethnicity, and socio-economic levels. As part of the class, the lead-instructor required the students to engage in the design sessions and to write a recommendation report to the library partner based on what students learned from the community. In a typical week, the students had one day in class to discuss theories through readings and one day in the library to work with the community. A total of 15 children (7 boys, 8 girls) who were ethnically diverse participated in the co-design group. The age of the children ranged from 7 to 11 years old ($M = 8.6$; $SD = 1.2$). Two professors and a teaching assistant also participated in the PD sessions.

3.2 Interview

We used a semi-structured interview protocol adapted from Merriam and Tisdell [25] to give flexibility for the participants to reflect on their experiences of the class. For pre-service librarians, we asked questions about their reasons for coming to the MLIS program, expectations of the class, engagement in participatory design sessions, reflections on the co-design sessions at the library, and their overall takeaways after completing the class. For the children's interview, we asked what they thought about designing with adults in the library, why they continued to come to the program, and their overall experience of designing in the library.

3.3 Participants

In this study, we interviewed a total of 17 pre-service librarians from the 2017 to 2018 cohort (14 women and three men; 11 first-year and six second-year students). Two were international pre-service librarians. All interviews were conducted in the following winter quarter of 2018 and 2019 to avoid any conflict of interest. For children, among the 15 children who participated, we were able to interview a total of seven children (ages = 7–11, 4 boys and 3 girls) who were all recruited by the librarian. The ethnicity of the children consisted of White, Black, Asian/White, Asian and Hispanic. All children and pre-service librarians signed either an assent or consent form as part of the study. Prior to engaging in the library design sessions, the researcher went over the assent forms with the children and caregiver. Pre-service librarians, prior to meeting the children, also reviewed ethics on working with minors with the researcher.

3.4 Procedure

The interviews were semi-structured and lasted an average of 34 min ($SD = 13.8$) for the pre-service librarians' interview. The pre-service librarians' interviews were held at meeting rooms at the University of Washington and through phone calls. For the pre-service librarians' interviews, participants did not receive compensation. For the children

participants, we conducted the interviews in the library. The families received a 25-dollar gift card of their choice for their participation. The interviews were semi-structured and lasted an average of 12 min (SD = 1.3).

3.5 Data Analysis

We approached this analysis using a grounded approach [2]. We transcribed all interview data, and four researchers open coded all 24 interview responses with constant comparative analysis [25]. Each coder was in charge of open coding at least four interview transcripts. We developed a codebook through multiple discussions and by creating affinity diagrams of what has been seen in the interview data [19]. The codebook contained nine categories: 1) perceptions of participatory design; 2) limitation of PD in libraries; 3) relationship building; 4) challenges of PD; 5) designer identity; 6) structure of the class; 7) surprises in PD; 8) future confidence; and 9) lessons learned. Three members of the research team applied the coding scheme. We conducted an additional coding review to refine and clarify the codes. As a result, we removed the code *9) lessons learned* due to its overlap with other categories. We also merged *2) limitations of PD in libraries* and *4) challenges of PD* as both discussed the difficulties of executing PD in the library. The definitions of each category were also clarified during this process resulting in the final codebook (Table 1).

Table 1. Final codebook used for data analysis

Perceptions of PD	Perception and belief of PD as a method/technique used in the library
Limitation and challenges of PD in libraries	Possible and actual limitations/challenges raised by pre-service librarians while conducting PD in the library
Relationship building	Comments regarding the relationship built between the pre-service librarians and the community
Designer identity	Perception and belief of how pre-service librarians viewed themselves as a designer after the course
Structure of the class	Comments regarding the structure of class engaging in both theory and practice
Surprises in PD	Comments on what was unique or learnt through the process of engaging in PD with pre-service librarians and children
Future confidence	Comments regarding students confidence on conducting future sessions using PD as a method

4 Findings

First, we discuss how this course impacted pre-service librarians to reflect on the ways they thought about themselves, their work, and their relationship to design. Next, we discuss the concerns and limitations pre-service librarians felt with regards to conducting PD in a library setting. Lastly, we share the children's experiences of co-designing in the library with the pre-service librarians. All the names in the children's interviews are pseudonyms.

4.1 Perceptions of PD and the Confidence Level of Designer Identity

Pre-service librarians perceived PD as an effective way to do community engagement work. They mentioned that PD aligned with core values of librarianship, such as upholding democracy and participation. They thought PD should *"naturally become part of what librarians do in order to design or create and develop all the programming and resources and services."* (P2). Pre-service librarians pointed out that PD seems to be an efficient way to enact these values. P4 posed the rhetorical question, "*if you're designing something for someone like hey, why don't we involve them?*" Pre-service librarians also perceived that PD can create a more level playing field, which "*changes up the directional power structure*" (P11).

After participating in the course, pre-service librarians expressed mixed feelings about their identity as a designer. Some were able to conceive ways to utilize these skills in the future, whether leading PD activities themselves, or incorporating some of the ideas into workshops and discussions. However, some pre-service librarians still had doubts and concerns about doing PD in the library in their future work. In this particular class, recruiting children for the program was done by the local librarian who had a solid relationship with the community. The pre-service librarians reflected that, for this particular class, they were lucky to have an active librarian and people who were interested in the program. When it comes to building a community of interest around PD, some pre-service librarians worried about being able to replicate the same experience in the future. The findings suggest the importance of offering courses on topics like community outreach and engagement.

Some pre-service librarians also commented that their perception of their identity as designers depended on the context. They recognized that they certainly identify as designers in the class but not necessarily outside of the class. Some felt the need to become "more creative" or "have more design experience" in order to fully identify as designers. *"I don't go around saying I'm a designer but I like to think I'm a librarian who designs"* (P2) *"No. I, because when I was in the class, I always felt that I lacked some design thinking mind, because I couldn't come up with many ideas that are interesting or, say, creative. So, I think that's why I couldn't."* (P7). The following quotes demonstrate that pre-service librarians tended to hold certain expectations about being a designer, for example, that they need to be able to come up with interesting and creative ideas and be confident in their design skills rather than seeing the process of designing as a learning experience in and of itself. To help pre-service librarians identify as a designer, the quotes

indicate the need for more opportunities to practice design methods in a positive and encouraging environment where even failure is perceived as a path to more successful designs.

4.2 Challenges and Limitations in Doing PD in the Libraries

Limitation: Practical. Though pre-service librarians found value in implementing PD in a library setting, they recognized that there were also limitations. They commented on the practical issues of doing PD in libraries without the class, such as lack of resources and librarian time. P5 states, *"I can see an organization not being willing to do it for the amount of time that it takes. I can definitely see that being a hard sell to devote that much time and energy into a program."* In our study, the ratio of the adult to child was one adult per two children. This was because the pre-service librarians enrolled in the class all participated in the library session. Therefore, the children were able to have attention from the different adults in the room who would work side-by-side and another adult who would act as a facilitator. However, the pre-service librarians questioned how this format would take place in the absence of the class. For instance, pre-service librarians questioned what it would look like if there were only one librarian to manage the co-design session.

Limitation: Conceptual. Aside from physical, financial, and resource limitations, pre-service librarians also recognized that practicing PD requires people to change their perceptions about how to solve problems. P12 noted, *"it's hard to conceptualize what [PD] is unless you've actually like seen it…I think like conveying that to a librarian or an educator or something that hasn't had any information about it before could be challenging."* Pre-service librarians feared that it may be difficult to justify this type of paradigm switch when high level managers do not fully understand the value of PD. As much as pre-service librarians perceived PD to be "flexible" and "adaptable" to incorporate different patrons' views, pre-service librarians also felt that PD was a concept still hard to grasp and communicate to the public.

Challenges of PD: Authority vs. Co-design Partners. Similar to prior studies, we also observed the tension between the pre-service librarians wanting to instruct as opposed to facilitating the session, which was more open-ended with a loose structure [6, 9, 33]. However, it was also dependent on the complexity of the technology. For instance, while pre-service librarians who worked with the video game *Super Mario Maker* did not mention the challenge of being co-design partners much, pre-service librarians who worked with 3D printers and Arduino had much more to say regarding the tension between being design partners and instructors. For instance, P1, who used 3D printers, stated "*the balance between learning the new technology and then designing, having the kids help design the program, right, and the balance between having a fun program and then having a program that produces an actually deliverable, I found a lot of struggle between getting the right balance in those two areas."*

For the pre-service librarians, there were challenges in co-designing new activities with children when there was only limited instruction given on how to use the technology to begin with. In our co-design session, we gave minimal instructions on Arduino and

it was the first time that the majority of pre-service librarians used the technology. For instance, P14, who used Arduino, stated *"even though we got basic things, we didn't know how to go above and beyond and be curious about the things."* As both pre-service librarians and children had minimal knowledge of the technology, the majority of the time with the children was spent on figuring out how the technology worked. As a result, pre-service librarians noted that it did not feel like co-design. One pre-service librarian remarked "*I feel like we weren't co-designing. I felt like I was guiding them and teaching them a lot. I also think that was because we did Arduino. Also, since we were getting training on it and the children weren't, so there was some knowledge superiority going [on].*"

4.3 The Children's Experience Designing with Adults

The children enrolled in the PD program mainly participated because of the technology provided. For instance, when we asked the children why they continued to come to the design sessions, Rob (age = 7) stated, "*I like electronics a lot. It's like about technology.*" Other children also discussed the opportunity to design stating "*Well, I like it because you get to, you're allowed to design stuff, and I get to know how to do different stuff*." (Sarah, age = 9). There were a handful of children who mentioned that they came to help other children. Jessy (age = 9), for instance, stated "*Well, we're helping the kids in the future to learn better.*" However, even though we stated in our program we were designing for other children, it was difficult for many children to conceptualize designing for service as opposed to designing an artifact.

The children also talked about the different relationships with the adults in the design session. Some children viewed the adults as people similar to teachers "*They were kind of like teachers, but instead of teaching us to do stuff, they let us do stuff on our own kind of, which I liked, but they helped us when we needed help.*" (Ally, age = 10), and also supporters of technology "*It's fun because they can give you ideas and tell you what you should do, kind of, and they help you.*" (Liam, age = 8). Some children still viewed the adults as holding more of the traditional role of experts "*Well, they know much more than us*" (Tom, age = 8). The biggest difference between the participatory design sessions and other library programming or extracurricular activities was that the children noticed the number of adults present in the room "*There's like an equal number of grown-ups and kids. Because if it was [sic] kids… it'd kind of be boring, like really boring.*" Rob (age = 7). The findings indicate how the children perceived the adults in the spectrum of both *supporters* and *design partners* [32]. They also indicated how the number of adults to children ratio influenced how the children designed with the adults. When there were approximately an equal number of both children and adults, the children felt more comfortable instead of one group outnumbering the other.

5 Discussion

Our findings show that the democratic nature of PD is well aligned with the values of librarianship and design. Pre-service librarians in the program worked closely with children in the design process for digital learning activities for future children at our

partnering libraries. We attempted PD to support the use of design partnership in these settings [13, 32]. We were able to see that the pre-service librarians also had strong motivations to interact with children and the community they hope to serve in the future.

In this section, we extend our findings by providing suggestions for future directions to better support pre-service librarians so they can provide better technology-related services. Based on our interview data, we first identify the need for specific design-related courses for pre-service librarians. Additionally, we suggest ways of creating a more sustainable model for working with community partners. Finally, we discuss the opportunities and limitations of the term *design* in LIS.

5.1 Developing More Courses

Technology Related Courses. The findings showed that the selection of digital learning technology impacted the level of engagement. While prior literature indicated the growing number of new technologies in the library, our findings showed struggles of pre-service librarians balancing between learning new technology and co-designing with children [23]. One possible solution is to select a technology, which requires a lower barrier of entry, to co-design with children. Additionally, this can be addressed by choosing a technology children and adults are more familiar with. However, as there is also a need for pre-service librarians to keep up to date with current technologies, offering more technology-related courses could be useful. This is not necessarily because pre-service librarians can learn all the technologies they could use for youth programming, but because it will help them become more comfortable when they find themselves in situations where they have to quickly learn a new learning technology.

Community Engagement Related Courses. Despite the growing literature using PD as a method of design for systems, services, and space design for libraries, the pre-service librarians had to develop their understandings of the concept of PD [1, 17, 27]. From the pre-service librarian interviews, it became clear that the practical experience of PD in a real-life setting was immensely helpful for pre-service librarians to understand the concept beyond just reading the literature. The pre-service librarians found that the method of PD allowed them to get to know the patrons at a much deeper level, as they sensed the patrons opening up and being more transparent with their ideas once the trust was built and the relationship was solidified. As Yip et al. [31] discuss the relationship building spectrum of socially being far from the design partner to socially being close, we were able to see how pre-service librarians interacting with the patrons led to creating a more balanced design partnership by becoming closer to them.

5.2 Creating Partnership Within the Community

Our findings suggest how pre-service librarians perceived working as equal partners in PD to be a difficult model to replicate outside the classroom without support from external partners. One way to address this challenge is to involve volunteers from the community, who are already patrons in the library, for a more sustainable model. For example, as opposed to just the pre-service librarians working with children in the program, local

teens can work side-by side with the children. Currently, our team is exploring ways the teens in the community can collaboratively develop a learning curriculum with children and librarians. So far, we can point to some successful and promising pilot cases in our library.

The methods in which different elements of PD sessions might be implemented (such as equal partnership, ideal size of the PD session) can vary. Some pre-service librarians viewed this flexibility as a potential obstacle to effectively communicating the idea and value of PD to people who are unfamiliar with this approach. Our findings suggest that while the course attempted to teach the students about the importance of working with the community, teaching how to effectively reach out and persuade various stakeholders was something that was missing in the class. For pre-service librarians to employ new approaches in programming, courses that specifically focus on communication and persuasion skills, as well as evaluation/assessment methods, can be useful. In addition to the challenges inherent in communicating the idea of PD, another barrier in widely adopting PD in libraries has to do with whether pre-service librarians themselves *identify* as designers.

5.3 Exposure for More Design

Regarding these issues of pre-service librarians' confidence, their designer identity, and their ability to communicate PD to other librarians, we believe it is crucial to expose pre-service librarians to more opportunities for design within the MLIS program [4, 5]. This will allow pre-service librarians to develop more confidence on their own abilities to design, communicate their design needs to other librarians, and lead PD activities as future librarians. From the interviews, it was apparent that pre-service librarians were fairly comfortable using the techniques learnt in class. However, when asked if they identify as designers, some were still hesitant, partially because of their perceived lack of their design abilities, but also due to the term "designer" still being perceived as more of an "artist" outside of the LIS context. This brings up a question about the usefulness of incorporating and applying the term "designer" in the LIS context. While we designed a course on PD and libraries, our intention was not to have every future librarian develop their own co-design team. Rather, we believe it is important to give librarians opportunities to work side-by-side with the community in a real-life setting.

6 Conclusion

This study explores pre-service librarian's perceptions of engaging in PD with children in the library within an MLIS course. Our study finds that pre-service librarians found value in interacting with patrons and collaboratively working with children in a partnership when confronted with a design challenge. While the class allowed the pre-service librarians to practice design methodologies, the pre-service librarians were not fully confident in their identities as designers. We believe this is natural, as the LIS field has situated itself as a social science for more than one hundred years and only recently, some started viewing the field with a design epistemology [3].

Findings of the study will help guide the future directions on creating curricula in the field of library and information science to allow pre-service librarians to practice design by engaging with projects where they work closely with libraries and with real problems. We argue that PD allows pre-service librarians to enact values of service, like democratic participation and creativity, through building strong design partnerships. If we believe that practicing design is an effective way for librarians in the ever-changing environment in the library, we need to provide them with opportunities to interact with the patrons, collaboratively work with patrons, and practice creating new solutions to the problems. Furthermore, we need to continue examining librarians' perspectives to understand whether such support increases the level of confidence in engaging in design.

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