STEM Perception, Readiness, & Recommendations: A Conversation with Library Practitioners

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A qualitative summary of phone interviews with library practitioners for Space Science Institute

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Introduction

As part of a larger STAR Library Network (*STAR Net*): Phase 2[1] project, Datum Advisors (Datum) and Research Evaluation Consulting (REC) conducted phone interviews with library professionals across the nation. The primary goal of this qualitative study was to gather information and insight about library professions' views and experiences with STEM, gauge their perceived readiness to implement or build STEM in their library, and solicit recommendations to inform the development of a STEM readiness diagnostic tool. The findings reported in this report along with previous research conducted for this project (e.g., review of the literature) provide key findings and trends for how library professionals and the libraries they represent interact with and view STEM in public libraries.

STAR Net is a hands-on learning network for libraries and their communities across the country. *STAR Net* focuses on helping library professionals build their STEM skills by providing "science-technology activities and resources" (STAR) and training to use those resources. Over 8,000 library and STEM professionals have joined STAR Net to access webinar trainings, monthly newsletters, professional blogs, partnership opportunities, facilitation guides, book recommendations, and much more, including *STAR Net's STEM Activity Clearinghouse*.

Please note that qualitative research is intended to create a deeper understanding of a given topic or new research area, and **not meant to be representative of an entire population** (in this case, library professionals). Interviews of this nature are a valuable tool to dig deeper one-on-one with a given sample, and to hear more "first-hand" experiences that go beyond what a representative survey can do alone. **Therefore, the results herein should not be taken as representing a larger group of professionals, but rather as contributing to the narrative of what we know regarding STEM issues and experiences in a library setting.** Specially, when considering any implications of this report it is important to do so within the "body of evidence" being created by the Research Team. Most importantly, these trends should be considered within the trends of the larger national survey of library professionals completed by Datum.

Methodology

Phone Interview Protocol

The Research Team designed a phone interview protocol with feedback from the Space Science Institute, the American Library Association and the Afterschool Alliance. The phone interview included twelve open-ended questions and thirteen prompts in case a question was not answered fully or more information was necessary. (*Refer to Appendix A*). All potential participants were invited to participate via email and each participant received a debrief email at the conclusion of the phone interview. Participation in this study was voluntary and all information was kept completely confidential. All materials for this study were approved by an Institutional Review Board (Education Development Center, Inc.).

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Recruitment

Potential participants were identified through a library typology survey which was administered in early January of 2018. In this survey[2], participants were asked if they would be willing to participate in a phone interview. Out of a total of 717 completed surveys, 373 individuals (approximately 52%) agreed to be contacted for a phone interview. After discussion with the *STAR Net Phase 2* project team, a target of 20 participants for the interviews was chosen. Participants were randomly selected to participate in this study. While the subset was analyzed to ensure diversity of perspectives (e.g., small and large institutions), the goal of the qualitative analysis was not to speak to sample representative of the larger survey. Rather the goal of this recruitment effort, and the goal of most qualitative research was to both dive deeper on trends, and provide a complementary narrative to the larger survey. Once a sample was identified, the Research Team sent an email to each potential participant and asked if they would be interested in participating in a phone interview. A $10 Amazon gift card was offered as an incentive for all participants who completed the phone interview (*See Appendix A*). It should be noted that not all participants who were originally selected responded to a follow-up email from the Research Team to participate in the phone interview and the final sample size was 20 participants.

Data Analyses

The Research Team conducted quantitative (e.g., numeric, close-ended responses) and qualitative (e.g., text, open-ended responses) analyses on the data in this study.

Quantitative Analysis

Descriptive statistics were performed. Specifically, measures of central tendency (i.e., means, standard deviation, minimum and maximum scores, and ranges) were computed and are reported in the Results section, and within other Research Team deliverables.

Qualitative Analysis

The interview data were analyzed using a Grounded Theory Approach[3]. First, the data were organized into an Excel spreadsheet where each row of text represented an interview participant, and each column represented one of the interview questions. The data were further organized into a Word document by question. Next, two researchers independently read through all the statements, taking note of key words, phrases, and patterns in the data. Both researchers independently organized the codes into broader groups or themes. Both researchers held a consensus meeting in which ten key themes were identified from this qualitative approach. All statements were grouped into the most relevant theme. When a statement could be grouped into more than one theme, the responses were further parsed as deemed appropriate. For any statements that

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[2] This survey asked library professionals questions about how their library engages in STEM programs and activities and solicited information about their views regarding STEM in public libraries. Participants were informed that their input would help provide a deeper understanding of the current state of STEM programming and activities in public libraries across the nation. Participants were also told that their responses would help our team collectively understand what resources and approaches will help libraries facilitate STEM learning for their communities.

[3] Grounded Theory Approach: A technique developed for analyzing qualitative data. Key steps include coding all responses for major categories/concepts, grouping those categories/concepts, and identifying relevant relationships between responses (Hallberg, 2006).

were difficult to categorize, both researchers discussed the statement and agreed on the most relevant theme. The results from the data are presented in the following section.

Results

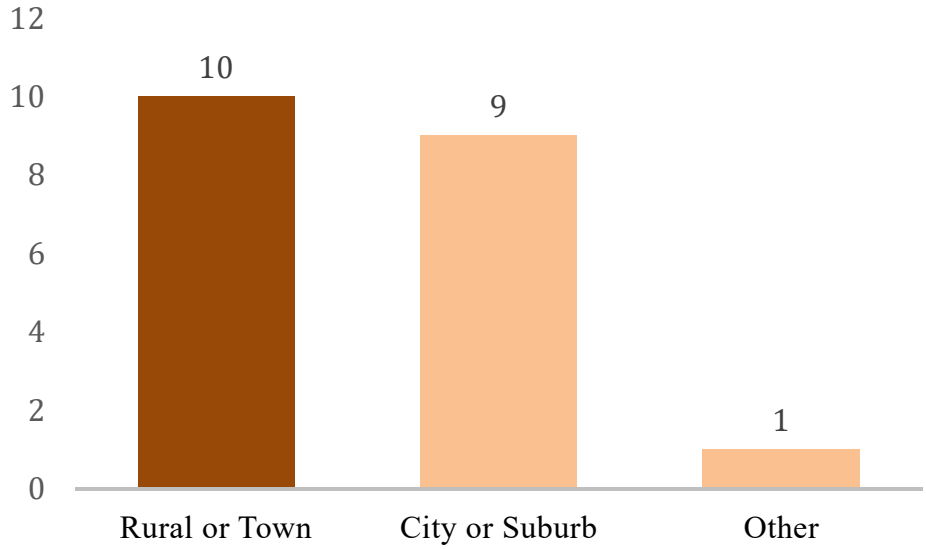
Quantitative Findings

The Research Team was able to successfully recruit 20 participants agreed to complete the phone interview, representing 20 different states, as reported in *Appendix B*. The following section presents findings about the libraries that were represented through the phone interviews. Specifically, data regarding the type of library community, number of full-time employees, participant gender, library service area population, and type of community served are described in further detail below.

Type of Community

Half of the libraries (*n* = 10) were in rural locations (*See Chart A*).

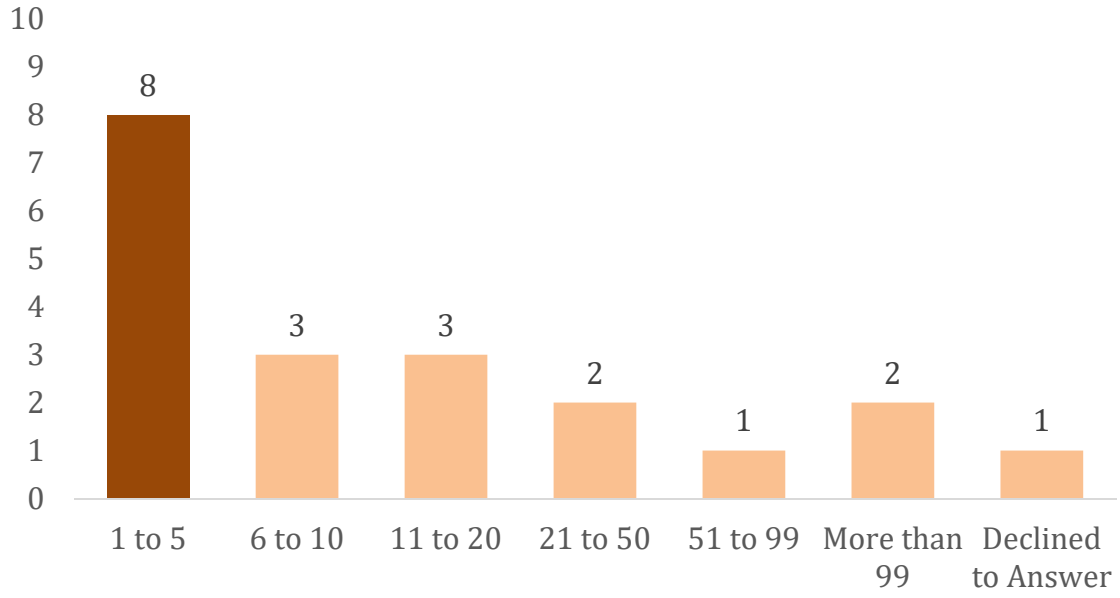
Chart A. Type of Community



Number of Full-Time Employees

With two large outliers removed, the number of employees ranged from 1-40. Below is a categorical representation of the number of full-time employees. As indicated in *Chart B*, 40% (*n* = 8) had small staff size of only 1 to 5 employees.

Chart B. Number of Full-time Employees with Outliers Removed



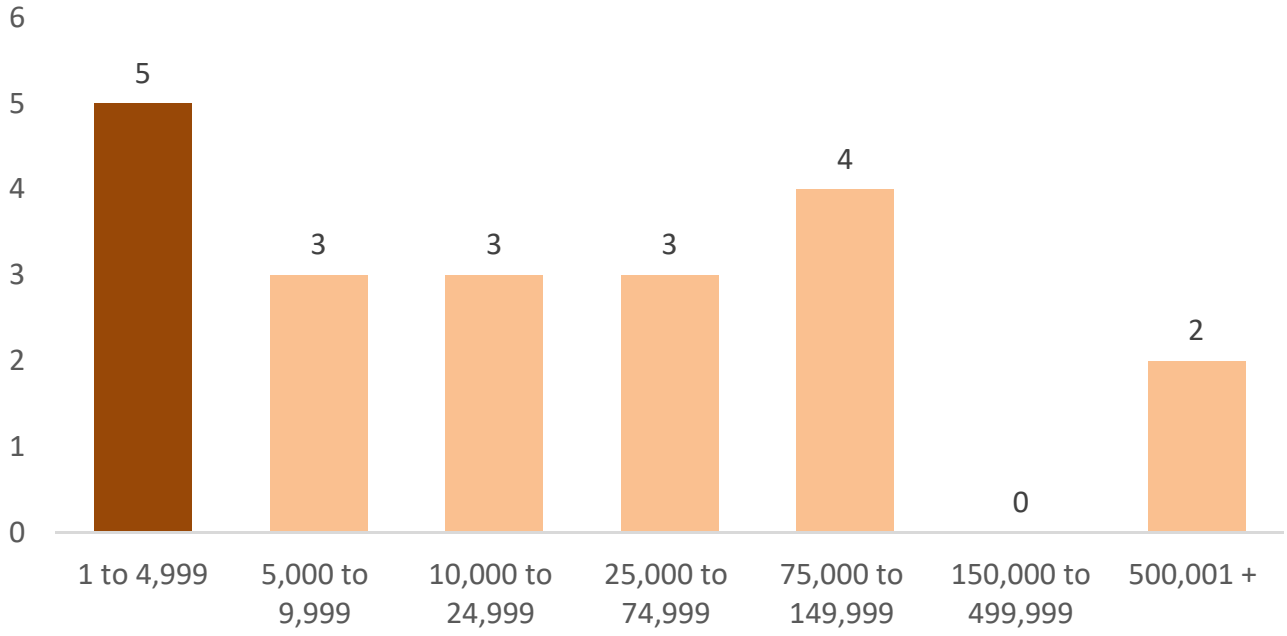
Gender

Eighty-five percent (*n* = 17) of participants were female and fifteen percent (*n* = 3) were male.

Library Service Area Population

Library service area populations varied with the largest number (25%) of responses coming from libraries that served small communities of 1 to 4,999 patrons (*Refer to Chart C*).

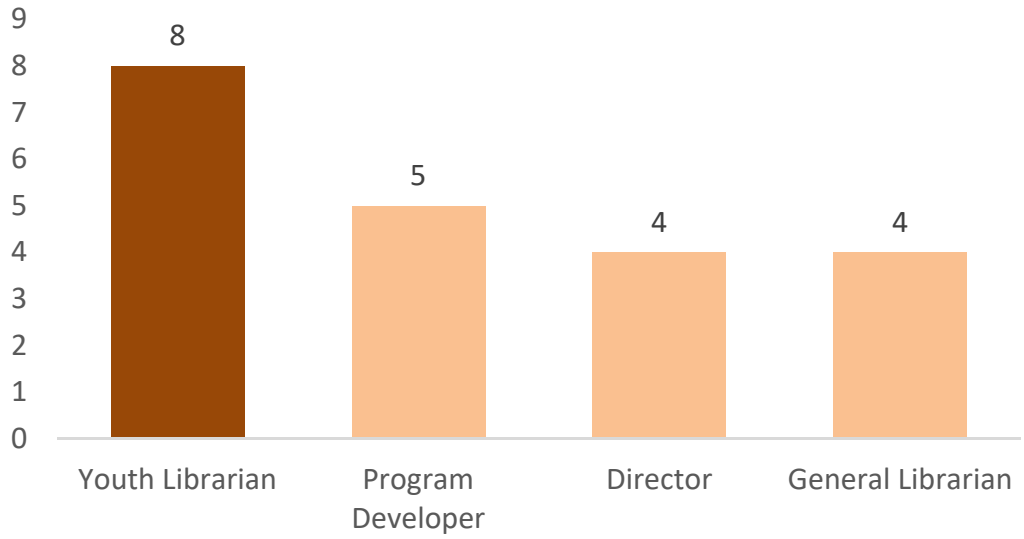
Chart C. Library Service Area Population



Position at Library

Of the interview participants, the largest number of responses (40%) came from youth librarians (*Refer to Chart D*). In this case, "youth" librarians are those that cited working with children, youth, or young adult in their response.

Chart D. Position at Library



Qualitative Findings

The Research Team identified ten themes in the phone interview responses. Specifically, the following ten themes were identified: 1) Capacity, 2) Staff Motivation, 3) Staff Confidence, 4) Need for Resources, 5) Characteristics of Effective Tools, 6) Forming Partnerships, 7) Community Support, 8) Examples of STEM Implementation, 9) Internal Support, and 10) Characteristics of Effective STEM Implementation. The themes below are presented in order of frequency, with the most-prominent themes being presented first.

1. ***Capacity***

   The theme of *capacity* refers to the tangible limitations or advantages associated with implementing STEM programming at public libraries. All participants (*n* = 20) cited at least one capacity issue. These issues included funding, staff time to offer STEM topics, and space.

   Several participants (65%, *n* = 13) mentioned that they had successfully obtained grants or external funding for STEM programming, but most (80%, *n* = 15) referenced a lack of financial resources as a significant barrier. In fact, one participant attributed all capacity challenges to funding, "[We need] *more money and that's about it…If you have money as a library in general, you will have more staff so more time and availability to provide the programming.*"

   The librarian's designated time to offer STEM topics was another frequently cited capacity issue (60%, *n* = 12). While some libraries hire several librarians tasked with offering STEM, more often these responsibilities were given to only one or two staff members, at best. As

one participant shared, *"There isn't enough time for[staff] to do much with STEM because we have other things we need to do with arts, literacy, or other demands, so it is hard to fit it in."*

Space constraints were cited by many participants (55%, *n* = 11) as a challenge, especially in smaller libraries. Even when libraries did have room for STEM programming, these spaces were often multi-purpose spaces. For example, on participant commented that, *"More space would be the most helpful because we could have programs that could be set up and permanent, but currently we have to take down everything after a class."*

In summary, capacity issues were perceived as a substantial barrier to STEM implementation, but the types of capacity issues varied across libraries and there was not a universally-identified problem.

2. Staff Motivation

The theme of *staff motivation* refers to staff willingness, enthusiasm, and interest in offering or facilitating STEM, as well as their understanding of its value. This theme was discussed by all participants (*n* = 20). STEM programming was often assigned to teen librarians or youth librarians, and some participants (10%, *n* = 2) indicated that STEM topics were more quickly embraced by younger staff members. As one participant shared, *"We have a split staff, and some are really enthusiastic (usually our younger staff) so we don't have much STEAM programming offered for adults."*

When asked about the most important factor contributing to STEM readiness, all participants (*n* = 20) indicated that they viewed staff buy-in as one of the most critical elements. Indeed, without staff motivation, the STEM programming would probably not happen. Below are a couple representative quotes that capture this trend:

> *"If staff doesn't support bringing STEM to the library than nothing will work."*
> *"The staff has to be willing and excited and I think most staff would be once they see how STEAM draws in patrons."*

There appeared to be a perception that STEM topics require significant time to facilitate and thus it was imperative that staff see the value in them and believe that they are worth the time and effort. Three participants (15%) responded that they used their own ideas, resources, or past experiences in other libraries to implement STEM, underscoring the enthusiasm they felt about STEM programming. Another three participants (15%) described how there was mixed buy-in from other staff, but this was not a recurring theme across most libraries. As one participant discussed, "*Some [librarians] don't think we are ready so there is a bit of a wall, they just want to do basics rather than integrate STEM into what we are already teaching and the others of us are trying to show them how useful this type of learning is.*

Overall, staff motivation to implement STEM was quite high. Eighty percent (*n* = 18) of the participants noted that motivation was high at their libraries, at least among themselves and in some cases, other staff members.

3. *Staff Confidence*

The theme of *staff confidence* refers to librarian professionals' perceived competency to teach or facilitate STEM. This confidence is usually affected by knowledge, past experiences with STEM, and perceptions of STEM's difficulty. This theme related to librarians concern about whether they can keep up with youth in learning STEM. There was an assumption that youth learn STEM topics more quickly than adults, which can be intimidating for library professionals. Self-confidence is also a key component in self-efficacy, which is beliefs in one's capabilities of successfully completing tasks or goals (Locke & Latham, 2002). This theme may resonate more resolutely within the library context when considering the disparate access to STEM content faced by certain types of libraries across the nation (e.g., those with fewer dedicated resources, rural libraries, and those with a more traditional focus on reading literacy).

It was important to separate the theme of *staff confidence* from *staff motivation.* Some participants were quite willing and eager to provide STEM programming, but do not know where to begin: "*Our staff (although willing) is just not comfortable with STEM so that has been the biggest hurdle for us,"* shared one participant. Some of the confidence issues described came from lack of experience with STEM programming, lack of expertise, or perception that STEM is difficult to implement. Often, these perceptions occurred because participants are more experienced in topics such as art or humanities. Said one participant, "*They [*the library staff*] feel more confident in literacy and childhood programming other than STEM, so we have some growing to do,"* and another comment, "*Our ability to do STEM is somewhat limited because we are mostly into the arts."*

In addition, participants referenced the fact that not all staff felt the same level of intimidation. One participant explained, "*We have a few staff who are really dedicated and have the skills and willingness - that however isn't the majority of staff. The majority of staff seem to like the idea and don't naysay it or anything, but they are just not comfortable running programming."* Two participants (10%) expressed that this lack of confidence also resulted from intimidation of teaching young people, in general. For example, one person said, "*Other staff feels more comfortable with our older patrons who have less knowledge than we do, kids will learn this stuff really quickly and you do have to keep up."*

The theme of staff confidence is critical to consider. Some of the participants emphasized that it was one of the biggest barriers to STEM readiness in libraries. "*Staff feeling comfortable definitely is the biggest obstacle I can think of,"* explained one participant when asked about perceived barriers to STEM implementation. Despite the prevalence of this theme, participants acknowledged that the intimidation about STEM topics was often more perception than reality. *"*[We] *need to show that it isn't a huge scary task to take on,"* said one participant, and another remarked, *"You have to convince your staff that it is worth doing, but also that it is something they are able to do."*

4. *Need for Resources*

The *need for resources* theme refers to the tools that librarians want to obtain, have already used, or currently are using to bring STEM education and programming to their libraries. All

participants (*n* = 20) mentioned the need for resources, referring to conferences, training, assistance in locating funding sources, accessing prepared lesson plans and activities, ideas for STEM programming, success stories from other librarians, databases, and networking opportunities with other STEM librarians. Indeed, even when participants were already motivated to implement STEM, many participants (45%, *n* = 9) observed that effective STEM programming requires staff training. As one participant noted, "*More training for library professionals would be extremely helpful and how to find good and reliable resources for STEM programming would help any library including ours."*

Participants also described different kinds of resources that would help their library adopt STEM education and programming. Ideas such as a searchable database, an inventory of STEM activities, a list of STEM speakers, a tool to connect library professionals to funding opportunities, and STEM kits were all mentioned. For example, a couple participants (10%) shared how a database could be useful. As one participant described, "*Having access to a sort of database that would be searchable for age group to find program ideas would be so helpful."* Another referenced ideas and examples: *"I think anything that would spark new ideas would be a useful thing, sometimes a person can get stuck in a way of thinking and don't want other people's help but if they have a lot of new ways of thinking provided to them tailored to their needs for their library it could help."* Others indicated that such resources would save valuable time: "*I would like to see kits already put together, so it alleviates stress on staff of figuring out what to do in the beginning especially."*

It should be noted that while these themes represent a notable grouping when asking about STEM readiness, we did not distinguish between those currently in the *STAR Net* community. The interviewer asked all participants about their perceptions regarding a STEM readiness tool, and all participants *(n* = 20) gave enthusiastic responses concerning the potential helpfulness of this tool, underscoring their perceived need for resources.

5. Characteristics of Effective Tools

During the interviews, the phone interviewer mentioned the development of a STEM readiness diagnostic tool and asked participants for their feedback about the usefulness of such a tool, as well as the desired features of the tool. Thus, the theme, *characteristics of effective tools* describes the characteristics of an effective diagnostic tool and what would make this tool more likely to be adopted by library professionals. All participants (*n* = 20) cited specific characteristics that would make librarians more likely to use the tool.
One important finding from this theme, is the importance of marketing this tool properly. Seventy percent of participants (*n* = 14) shared that the tool might not be used unless librarians knew the source from which it came or was marketed adequately. Participants provided suggestions for how to appropriately market the tool, including listservs, social media marketing, word-of-mouth advertising, and presentations at library events. Below are a few representative quotes that capture this sentiment:

> *"People hate 'click bait' so [the tool] needs to probably have logos from [the] American Library Association, so it looks authentic and established or like entities like STAR Net, or other trusted people."*

"Having national organizations backing the tool will make people take you seriously, maybe finding conferences you can present at would help start the ball rolling and get the word out there too. If you look on American Library Association's website, you can find conferences. I am sure, lots of people go to these."

"Just getting word out will encourage them, awareness could be an issue I imagine."

Several participants (45%, *n* = 9) noted the time constraints under which they often operate and emphasized the importance of the readiness tool being easy to use and not too time intensive. For example, one participant described how, *"We don't have much time as librarians and if it is too complicated or difficult to use then I feel like I'm wasting time so the simpler the better."* Also, participants (40%, *n* = 8) commented that the tool needed to be presented in a manner that made it user-friendly. For example, one participant described how, "[The tool] *needs to be convenient, easy, and laid out in such a way that [librarians] can see the resources fit for them and they don't need to sift through too many resources because a lot of staff feels pressed for time…Also, if [the tool] points them to resources that are so easy to prepare programming and they have everything right there it would be useful and make it easy."*

Because confidence about STEM content appears to be an issue among library professionals, some participants (25%, *n* = 5) insisted that the tool not be overly intimidating and be accessible to people with little or no prior STEM knowledge. One person suggested that success stories would be helpful in overcoming the intimidation barrier: "*Tying the success of the tool to a successful library and sharing success stories could encourage others to use it."* Another participant remarked, "*I still think STEM has a stigma and scares people, so people need to feel like it isn't over their heads and that we can figure it out."* Finally, three participants (15%) emphasized that tool needed to be a free resource, otherwise librarians would not use it.

Overall, this theme yielded valuable insight into characteristics that would make the STEM readiness diagnostic tool more easily adopted.

6. Forming Partnerships

A recurring theme in the data was that of *forming partnerships.* Ninety percent *(n* = 18) of the participants noted the importance of developing partnerships with individual presenters or volunteers, such as local engineers (60%, *n* = 12), schools or teachers (45%, *n* = 9), local businesses (25%, *n* = 5), informal education institutions such as museums or zoos (20%, *n* = 4), and paid partners who assist libraries with bringing STEM education and programming (20%, *n* = 4). Most of the participants (80%, *n* = 16)) gave positive examples of partners they had used or identified, although a few participants (20%, *n* = 4) mentioned that they had not successfully worked with partners.

Participants described how library professionals often seek out partnerships with teachers, schools, local universities, businesses, and other organizations who are knowledgeable

about STEM topics. Sometimes these presenters are paid teachers and other times they are volunteers. Experts, such as presenters from museums or zoos, were especially helpful for more-advanced topics or presenting STEM programming to adults. *"We bring people in from a museum center for experts, especially for adults,"* said one participant. Another participant mentioned, "*We have a local college here where we have people who have come to teach about coding and robotics."* Often, local companies partner with libraries because of the mutual benefit. As one participant described: *"Large manufacturers in town want our kids to learn the industry and have great skills to eventually work for them but be skilled because a lot of kids work for them after graduation but are lacking a lot of skills, so they are willing to partner with us."*

Three participants (15%) noted that there can be challenges with creating partnerships, not the least of which is finding time to develop partnerships. One challenge was the problem of consistency*: "I have had limited success trying to build partnerships. Most volunteers come only once, and I would love a community partner to help where I am limited in my knowledge,"* described another participant.

However, support for partnerships was mostly positive. "*The partnerships have definitely helped us set up and feel ready,"* said one participant. "*We do rely heavily on people from the community especially where our staff expertise doesn't cover it,"* said another participant. Any perceived disadvantages were overshadowed by examples such as these which indicated that partnerships were extremely helpful.

7. Community Support

The participants discussed the importance of *community support,* which is externally-generated community interest, patron enthusiasm, demand for STEM programming, and parental support. Ninety percent (*n* = 18) of the interview participants had observed a huge patron demand for STEM programming. The following representative quotes capture this sentiment:

> *"The patrons are so excited about exploring the world that way and kids say there isn't much hands-on science in grade school, but kids really want it and are wired a way that learning STEM is exciting for them."*
>
> *"I have to cap the participation at 30 and people are always on the waiting list – [STEM] is sought after and needed in the community."*
>
> *"The material has been hugely popular, and the kits are on a long waiting list right now, so the patrons love it."*
>
> *"There is a lot of interest and patrons have asked for programming a lot and the parents love it for their kids."*

Moreover, the presence of community support was seen by most participants (80%, *n* = 16) as vital to the overall success of STEM programs. As one participant shared, "*If I did not have*

the community respond and attend these programs because they are so staff intensive and take a lot of time we wouldn't do it if community didn't come out."

8. Examples of STEM Implementation

Most of the participants (85%, *n* = 17) provided *examples of STEM implementation* at their libraries. Implementation of STEM depended upon space, size of the community, and other capacity factors. Half of the participants (50%, *n* = 10) described how they use summer camps or special events to present STEM programming. One participants said, *"I started trying to do what I called a "science adventure camp" and I have tried to encourage kids in participating to code."* Another participant shared, *"In the summer we have always had programming for educating youth in the summer and that has always had STEAM elements."*

Other participants (40%, *n* = 8) showed how they incorporate STEM topics into everyday library activities such as homework assistance time. As one participant said, "*We focused on workshops and captive audiences like those who come in for homework help so while they were here we would make things and be kind of crafty, but we also added STEM to it like making little robots and things like that."*

STEM implementation also differed by scope, with some examples being quite simple and others being costly and elaborate. "*I have been able to find pretty affordable ways to offer STEM programs with kitchen sciences or small projects,"* said one participant. Another participant gave examples of higher-quality materials: *"We have brought in 3D printers and did a rocket program. [We are] doing design with Legos - we have also done some computer programming."* Some libraries start small and simple, and then build their programming over time. One participant said, "*In the beginning we had lower tech engineering programs and in the last year or, so we tried to bring more technology like robots and coding to the programming in addition to our basic engineering challenges like building towers out of paperclips and paper."*

These simple and elaborate examples of STEM implementation provide useful information to inform the future development of the STEM readiness diagnostic tool.

9. Internal Support

The theme of *internal support* refers to buy-in from the library system and leadership, as well as mission alignment. Sixteen participants (80%) noted the importance of top-down support, and most participants (75%, *n* = 15) indicated that STEM programming supports their library's mission. For example, as one participant shared, *"Providing access to information… and facilitating lifelong learning is our motto and I think STEM fits into that so well. It is another way to facilitate lifelong-learning*."

Participants had varying opinions when asked about how critical *internal support* was to the success of STEM programming in libraries. Almost everyone (80%, *n* = 16) acknowledged that internal support was helpful for successful STEM programming. *"The main key other than funding would be support from administration,"* shared one participant. Another

participant added, *"We have so much support from our director and without that it would be difficult."*

However, some participants (20%, *n* = 4) acknowledged that *internal support* would be helpful but noted that they did not currently have much support in this area: "*It definitely fits, but I do feel at times it is my own personal agenda rather than the library as a whole,"* shared one participant. Another participant mentioned, "*I think you can do things on your own, but it would help to have buy-in from the top too."*

Some participants expressed that internal support had indirect benefits. For example, four participants (20%) said that one reason internal support was so critical, is because it assists with funding for STEM programming. "*I couldn't apply for grants even to get the money without [the leadership] being behind us,"* Another participant commented that their leadership support STEM programming because it lead to increased attendance and additional funding: "*I think [the leadership] support STEM programming because they are getting good program numbers which has something to do with reporting to municipality or where your budget comes from, so the more patrons participating the more the directors are going to support libraries."*

In summary, participants indicated the internal support was helpful, but perhaps not as critical when compared with staff motivation and capacity.

10. Characteristics of Effective STEM Implementation

Beyond giving examples of STEM programming, some participants (30%, *n* = 6) also described *characteristics of effective STEM implementation.* These examples often illustrated "what has worked" in previous STEM programming.

First, a quarter of participants (25%, *n* = 5) emphasized that it was critical to view the program as STEAM instead of STEM. These participants described how it was important to incorporate more artistic elements, as well as to encourage the more art-focused staff that they could to implement some of the STEM programming. The following are some representative quotes:

> *"Also, don't forget how important it is to make it STEAM rather than STEM. I think that can help us artsy people feel comfortable even giving it a shot and the kids enjoy the art part as well."*
>
> *"Before we go any further I want to be clear that we use STEAM and not STEM because I believe you can't use STEM without vision and creativity."*
>
> *"I think focusing on STEAM rather than STEM is a little less intimidating and welcoming to library staff, it feels more holistic and comfortable for us."*

Two participants (10%) discussed how their library offers STEM (or STEAM) programming for girls, which encourages them to embrace science and technology. Two participants described (10%) the importance of making programming "hands-on" and interactive. The

elements of successful STEM implementation provide insight into what can help support the success of STEM programming and offer additional information to inform the STEM or STEAM readiness diagnostic tool.

Discussion

A total of ten themes were identified from this study. It is interesting to note that there was consistent support (i.e., at least 80% of participants mentioned a theme) for 9 out of 10 of the identified themes. In fact, the themes of capacity, staff motivation, staff confidence, need for resources, and characteristics of effective tools were mentioned by all participants. The findings from this study provide valuable information about library professionals' views, experiences, and insights related to STEM in public libraries. Results from this study will also greatly inform the development of a STEM readiness diagnostic tool for future research. What is clear from the data is that library professionals represent varying levels of readiness to adopt and implement STEM; however, many libraries are ready to embrace STEM education and programming with appropriate resources and support.

Conclusion

In sum, the results from this study provide valuable information about the thoughts, experiences, and insights of library professionals regarding the adoption and implementation of STEM education and programming. Future research is needed to better understand these trends and inform the development of tailored tools, resources, and approaches. However, the findings from this study demonstrate that many library professionals are excited, committed, and ready to offer STEM to their patrons. It should be noted that the trends and narrative from the qualitative portion of the current research will be considered alongside the larger quantitative sample of libraries to help inform a future STEM readiness tool currently being developed by the Research Team. While the trends of this report provide a deeper narrative to complement the broader research agenda, this report should be considered alongside other Research Team artifacts.

References

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Appendix A – Phone Interview Protocol

Introduction

Hello, my name is _____. Thanks for filling out the recent STEM survey and agreeing to be interviewed. I'm calling on behalf of the Space Science Institute's National Center for Interactive learning and its STAR Library Network program. We'd like to learn more about your views and experiences with STEM in public libraries. STAR Net is funded by the National Science Foundation. Your input is critical as our team seeks to strengthen public libraries' efforts to implement STEM learning experiences.

The interview will last between 20-30 minutes. This is a voluntary interview. All information you provide will be completely confidential. You will receive a $10 gift card for participating. Thank you for agreeing to participate in this phone interview!

STEM and Libraries

Many libraries across the nation have begun to implement STEM learning experiences. We've heard of many examples of STEM in public libraries: helping patrons use technology (e.g., 3D printers, coding, robotics); engaging patrons in design challenges (e.g., mission to Mars, create a bridge model); and many others.

1. Tell us a little about how STEM fits – or doesn't fit -- into the mission, vision, and goals of your library?

2. Please tell us a little bit about the history of STEM at your library? Please include how your library got started in STEM, and whether or not you started in a specific STEM area or approached STEM more broadly.
    a. *Prompt if not mentioned in response:* Was there something in particular that you know of that triggered a focus on STEM at your library?

3. How would you describe your library's capacity to offer STEM learning experiences?
    a. *Prompt if not mentioned in response:* What about your staff allows you to do STEM (in terms of capacity, interest, etc.)? Where do you feel limited?

4. Who is involved in facilitating STEM at your library?
    a. *Prompt if external support is not mentioned:* Are there people outside of your library who help you?
    b. *Prompt if the "how" behind the "who" is not mentioned in response:* How do these people/groups specifically support STEM learning?

STEM Readiness

We would like to understand what factors you think influence whether a library is ready to adopt and implement STEM programming.

5. In what ways does your library have the willingness, interest, and support to deliver STEM programs?

a. *Prompt if staff is not mentioned in response to this question, or response to question 3 above is insufficient:* To what degree are your staff onboard with STEM?
b. *Prompt if partners is not mentioned in response to this question, or in question 4 above:* Do you have partners available to support you?
c. *Prompt if funding is not mentioned:* Is funding available to your library for STEM?

6. What kinds of resources would help your library do more in STEM? What resources do you think would help *other libraries* do more in STEM?

7. What are the biggest obstacles or challenges for a library becoming "ready" for STEM?
    a. *Prompt if not specifically addressed:* To what degree is community buy-in important?
    b. *Prompt if not specifically addressed:* What about buy-in from the library staff?
    c. *Prompt if not specifically addressed:* How about buy-in from the top?

8. Is there anything else that you think we should know about what makes STEM in libraries successful or not?

Recommendations

Our team hopes to develop an online tool to help libraries get started in or grow in STEM. Library staff will be able to enter some information about their library and experience with STEM, and the tool will point them to resources to grow further. For example, these resources could be programmatic recommendations or funding ideas based on their input. In the following questions, we want you to reflect on how this tool could best serve and support the needs of libraries, including your own.

9. Would this kind of tool be useful, valuable, and feasible? Why or why not?
    a. *Follow-up:* What would encourage libraries to use this tool?

10. What concerns might library staff, in general, have about using this online tool?
    a. *Prompt if not mentioned in response:* What might prevent your library from using this tool?

11. What are the best ways to get the word out to library staff about this online tool?
    a. *Follow-up:* Would you be willing to help us spread the word once the online tool is launched?

Thank you for your feedback.

12. Is there anything else you would like to share today about your thoughts about STEM in public libraries or the forthcoming online tool?

Appendix B – States Represented

- Alabama
- California
- Illinois
- Indiana
- Kentucky
- Maine
- Maryland
- Massachusetts
- Minnesota
- North Carolina
- North Dakota
- Ohio
- Oregon
- Pennsylvania
- Tennessee
- Texas
- Utah
- Washington
- Wisconsin
- Wyoming