

STEAM Equity

Summative Evaluation Report



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Executive Summary

The *STEAM Equity* project brought science, technology, engineering, art, and mathematics learning experiences to 12 public libraries located in rural communities around the U.S., each with significant Latinx populations. Implemented from 2020-2024, participating libraries received resources to help them develop connections with community partners to reach specific audiences (especially Latinx audiences, tweens, and girls), facilitate STEAM programs for their patrons, and develop their own STEAM learning spaces and outreach kits. Libraries also hosted three traveling exhibits with hands-on STEAM activities designed especially to engage Latinx and tween audiences.

The external evaluation, led by Education Development Center (EDC), utilized mixed methods to investigate the implementation of the project and its outcomes, and to answer the evaluation questions. EDC administered pre- and post-exhibit surveys to library staff who participated in the project, reviewed annual reports submitted by the libraries, and conducted a series of interviews with library staff and community partners from five libraries to understand more deeply how libraries engage with project activities and the impact of these activities.

Key findings were:



Library staff from partner libraries increased their confidence and ability to develop their own STEAM learning spaces, and to facilitate informal STEAM programming.

Project resources prepared library staff to develop and deliver STEAM-related programs and activities for library patrons in general. Librarians reported modest gains in their confidence and knowledge of how to develop and facilitate programming specifically for Latinx audiences. All the libraries developed multiple self-directed STEAM learning spaces and lending kits, and most planned to continue offering these activities after the grant funding ended.



Libraries increased their understanding of their rural communities' interests and needs related to STEAM.

The majority of libraries hosted at least two Community Dialogues, a strategy introduced by the project to help libraries connect with potential partners and learn more about the needs of their community. Most libraries reported that Community Dialogues were “moderately” or “slightly” useful to help them to learn about the needs of their community, identify potential community partners, and learn about ways to better engage Latinx and tween audiences. Although libraries reported mixed success with Community Dialogues, they developed relationships with new partners and deepened their relationships with existing partners to

engage specific audiences. Library staff reported that participating in *STEAM Equity* (especially talking with peer libraries) helped them consider other organizations and individuals they could approach that they had not previously considered. Libraries also learned through trial and error who would be willing and able to partner and implement programming.

Library staff offered the following suggestions for ways libraries can connect with and learn about their community:

- Build relationships by collaborating with schools and other local organizations
- Actively participate in existing community meetings and events to stay informed and connected
- Communicate how the library can be a resource. For example, offer to bring schools to the library or take a program to the school
- Ensure activities are appropriate and accessible for the intended audience
- If a potential partner is not responding to overtures about partnering, move on and develop other partnerships.



Libraries were especially successful at engaging tween audiences, and modestly successful at engaging Latinx audiences.

Libraries reported reaching a total of more than 95,000 patrons through all project activities. Overall, library staff thought *STEAM Equity* had a positive impact on patrons' interest and engagement with STEAM.

All libraries had a history of engaging tweens at a moderate or frequent level prior to participation in *STEAM Equity*. A total of 92% of all programs reported had tweens in attendance. The majority of libraries (58%) said they were “very” successful in reaching tweens, with another 17% reporting they were “moderately” successful. Strategies that engaged tweens included:

- Working with partners, especially schools, to engage tweens
- Making STEAM fun and engaging by offering hands-on activities that combine social interaction and real-world applications, while allowing for individual creativity and exploration
- Providing opportunities for tweens to try new things and experience failure (and success) in a low-stakes environment
- Asking youth about strategies for reaching tweens.

Prior to *STEAM Equity*, libraries were relatively less engaged with Latinx audiences, with 44% reporting on the pre-survey that they engaged moderately or frequently

with Latin X audiences. By the end of the project, a third of libraries (33%) said they were “very” successful in reaching Latinx audiences, with another third saying they were moderately successful. Strategies that helped engage Latinx audiences included:

- Using bilingual materials and having translators available to make programming more accessible
- Identifying and working with local organizations that serve Latinx audiences, and taking the time to develop relationships
- Engaging the whole family and offering family-friendly programs
- Having library staff who are fluent in Spanish and have connections with the Latinx community
- Appreciating that Latinx audiences are not monolithic and understanding the particular interests and needs of the people in their community.

Libraries also reported challenges in engaging Latinx audiences, including: not having bilingual library staff; first-generation Americans sometimes not being familiar with public libraries (e.g., that they are free); Latinx families may have limited experience with and access to STEM resources; and changes in library staff and at partner organizations.



Library staff expressed a strong desire to continue offering STEAM-related programming at their libraries in the future.

Based on post-survey responses, many libraries are planning to continue and build upon their experience with STEAM Equity by continuing and expanding their STEAM-related offerings, and continuing to offer programming specifically aimed at engaging tweens and Latinx audiences. Many libraries also plan to continue building on partnerships they fostered during the project and have plans to bring STEAM activities to local events and schools.

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Project Overview

Introduction

The *STEAM Equity* project brought science, technology, engineering, art, and mathematics learning experiences to 12 public libraries located in rural communities around the U.S., each with significant Latinx populations. Implemented from 2020-2024, participating libraries received resources to help them develop connections with community partners to reach specific audiences (especially Latinx audiences, tweens, and girls), facilitate STEAM programs for their patrons, and develop their own STEAM learning spaces and outreach kits. Libraries also hosted three traveling exhibits with hands-on STEAM activities designed especially to engage Latinx and tween audiences. This report summarizes findings regarding the impact of *STEAM Equity* on participating libraries.

Project Description

The Space Science Institute (SSI) and American Library Association (ALA), in partnership with the Institute for Learning Innovation (ILI) and Twin Cities Public Television (TPT), received National Science Foundation (NSF) Advancing Informing STEM Learning (AISL) funding to develop a five-year project originally called *STAR¹ Library Network Phase 3: Enhancing STEAM Equity and Learning Opportunities in Rural Libraries and Their Communities* (subsequently called *STEAM Equity*). The project built upon two previous phases of the STAR Library Net network which were also supported with NSF AISL funding.

As articulated in the proposal to NSF, *STEAM Equity* had the following goals:

1. Establish three distinct, interconnected STEAM Learning Pathways to engage rural communities through exhibit host libraries and their outreach partners: 1) STEAM Learning Spaces, seeded by STAR Net traveling exhibitions, 2) active learning programs, and 3) STEAM Outreach Kits.
2. Increase art-rich STEM learning opportunities for rural communities through libraries and their support systems.
3. Build the capacity of exhibit host librarians² and their outreach partners to sustain STEAM learning in rural communities.
4. Increase the interest and ability of libraries to conduct outreach to Latinx families.

¹ STAR stands for **Science-Technology Activities and Resources**.

² “Librarians” and “library staff” are used interchangeably throughout this report, although technically, not all library staff members are librarians.

EDC.ORG

5. Advance the informal STEM learning (ISL) field by 1) examining youth (ages 10-13) interest and participation in rural STEAM learning pathways and how it varies as a function of different family and community factors over time; 2) understanding how to build the capacity of librarians and their partners to provide sustainable STEAM learning opportunities for rural communities; and 3) broadly disseminating lessons learned from the project.

Twelve libraries located in rural communities were selected via a competitive application process to participate in *STEAM Equity*. Libraries received each of the three exhibits (*Somos Super Creativ@s (We're Super Creative)*, *Soy Super Curios@ (I'm Super Curious)*, and *Soy Super (I'm Super)*) for approximately three months on a rotating schedule. Each exhibit had multiple display panels, an interactive computer kiosk, and interactive hands-on STEAM-related activities.

Libraries were expected to:

- develop their own “STEAM Exploration” learning spaces with hands-on STEAM activities for their patrons to engage in during times they were not hosting one of the exhibits.
- create and lend STEAM Outreach Kits consisting of STEAM resources, hands-on activities, and off-the-shelf education products.
- host annual *STAR Net* Community Dialogues to build relationships with community informants who, in turn, inform the development of STEAM Exploration Spaces and STEAM Outreach Kits and advise on recruitment of participants in programs.

Libraries were awarded small grants to support development of their STEAM Exploration spaces and kits, as well as public programs related to the exhibits.

Originally, it was intended that a few staff from each *STEAM Equity* library would attend a multi-day, in-person training during which they would learn about the set-up/take down and content of the exhibits, as well as associated programming and other resources. Because the COVID-19 pandemic made it impossible to host in-person gatherings when the project launched, SSI instead led webinars and held monthly check-in calls to share resources with participating libraries.

SSI managed the entire project and led the development of the three STEAM-based traveling exhibits. ALA promoted the project through its network of libraries, led the library selection process, and supported the annual reporting system that host libraries used to document required program activities. ALA also recruited librarians with expertise in outreach to Latinx families to serve as project advisors and mentors. TPT's *SciGirls* staff, who have expertise in gender equitable and culturally responsive digital media, provided virtual training, hands-on activities, family resources, and other resources. ILI conducted a design-based research program to better understand how libraries can contribute to supporting youth (ages 10-13) interest and persistence in STEAM learning in their rural communities.

Evaluation Overview

Education Development Center (EDC) conducted the *STEAM Equity* evaluation. During the first two years of the project, EDC focused on addressing the following formative evaluation questions:

1. How is the project implemented?
2. To what extent do the program offerings and materials appeal to and meet the needs of participants (including librarians and their local community partners)?
3. What, if any, additional supports could enable successful implementation?

EDC then shifted to addressing the following summative evaluation questions for the remaining years of the project:

4. To what extent does the professional development and other supports delivered by *Phase 3* help host librarians to: (a) develop their own STEAM learning spaces, (b) deliver informal STEAM programming, and (c) customize and use the STEAM Outreach Kits? (*Project Goal 1*)
5. To what extent do project activities (including Community Dialogues) help libraries understand the needs of their communities and recruit diverse participation in programs at the host libraries? (*Project Goal 2*)
6. To what extent do the host librarians and their outreach partners sustain STEAM learning in their rural communities? (*Project Goal 3*)
7. To what extent does the project help host libraries conduct outreach to Latinx families? (*Project Goal 4*)

The evaluation utilized mixed methods to investigate the implementation of the project and its outcomes, and to answer the evaluation questions. EDC administered pre- and post-exhibit surveys to library staff who participated in the project, reviewed ALA annual reports, and conducted a series of interviews with library staff and community partners from five libraries to understand more deeply how libraries engage with project activities and the impact of these activities. Approval was received from EDC's Institutional Review Board for the evaluation plan and instruments before data collection began.

EDC worked closely with both the project team and the ILI research team to implement the evaluation and ensure that data collection activities were coordinated, complementary, and did not place an undue burden on participants. The evaluation effort focused on the implementation and impact of the project at the library and librarian levels (while the ILI-led research focused on youth-level outcomes).

Table 1 shows the data collection instruments and when they were administered.

Table 1. *STEAM Equity* Summative Evaluation Instruments

Instrument	Purpose	When Administered	Data Collected
Project Partner Kick-off Meeting Post-Survey	Gather feedback from project team members regarding their experience at the kick-off planning meeting (representatives from SSI, ALA, TPT, ILI, one research advisor, and three librarian advisors; PI and EDC evaluation staff were not surveyed)	March 2020	12 of 15 project partners (80%)
Librarian Pre-Survey	Collect background information about libraries' past experience offering STEAM programming, working with community partners, and reaching specific patron audiences, as well as librarians' personal experience with STEAM programming	January 2021 (shortly after libraries were selected for participation in the project and before they began participating in project activities)	35 of 46 (76% response rate) staff from 12 participating libraries Received at least one response from each library: the project lead from each library completed the full survey; additional staff members from 10 libraries (83%) completed a shorter survey that only asked about their experiences (and not information about their library)
Librarian Post-Survey	Collect data about the impact of project activities on participating libraries and librarians	July 2024	19 of 20 (95% response rate) staff from 12 participating libraries The project leads from all 12 partner libraries completed the survey. Due to staff turnover, fewer additional staff were invited to complete the post-survey than the pre-survey. Still, most post-survey respondents (84%) had been part of the project for at least three years.
Interviews with Library Staff	Understand how a sample of libraries engage with project activities and the impact of those activities over time	A total of five times, approximately every six months (January 2022, July 2022, January 2023, January 2024, and June 2025)	5 library staff were invited to participate in a series of 5 interviews; a total of 23 interviews were conducted (2 library staff did not complete the final interview)
Interviews with Community Partners	Understand how <i>STEAM Equity</i> contributes to the development of community partnerships	Spring 2023 and July 2024	9 partners in April-June 2023 2 partners in July 2024
ALA Report Form	Collect information about participating libraries' activities related to <i>STEAM Equity</i> , including programming, community partnerships, self-directed learning opportunities for patrons, and traveling exhibitions	Libraries completed online annually in August 2021, 2022, 2023, and 2024 regarding the previous 12 months (in 2021—the previous 6 months since project inception)	All 12 libraries completed a report each of the four years

Artificial Intelligence (AI) was used for initial coding of open-ended questions on the library staff post-survey and libraries' annual reports. Responses were input into ChatGPT software which was then prompted with the question and instructions to provide a summary of the responses. When applicable, further prompts were used to query for specifics around engaging tweens, engaging Latinx audiences, and overall highlights or important takeaways. Individual responses were then reviewed by the evaluation team to check for the validity of the themes generated by AI, followed by editing and revision of themes as necessary to develop the final set of themes presented in this report. Interview quotes were lightly edited for clarity when needed.

Findings

The report presents findings regarding the summative evaluation questions, namely: the impact of the project on library staff and their implementation of STEAM learning experiences; the extent to which project activities helped libraries to engage their communities, including tweens and Latinx audiences; and whether and how host librarians and their partners plan to sustain STEAM learning.

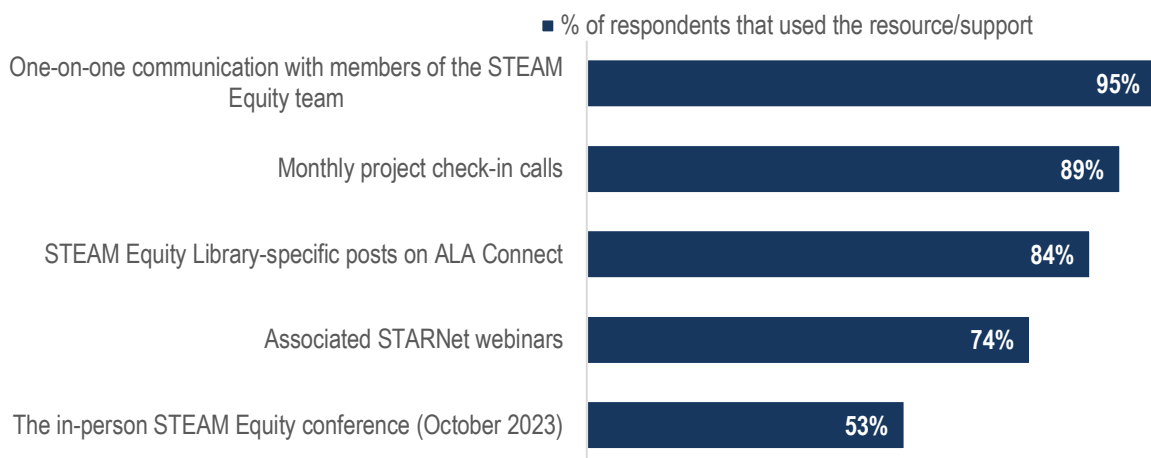
Impact on STEAM Programming

Project Resources and Supports

On the post-survey, library staff were asked about their use of various supports and resources provided by the project team, as well as their views of the usefulness of these resources. Participants utilized (Figure 1) and appreciated (Figure 2) one-on-one communication and the chance to connect in-person or through monthly check-in calls.

Figure 1. **Nearly all library staff utilized one-on-one communication with the project team.**

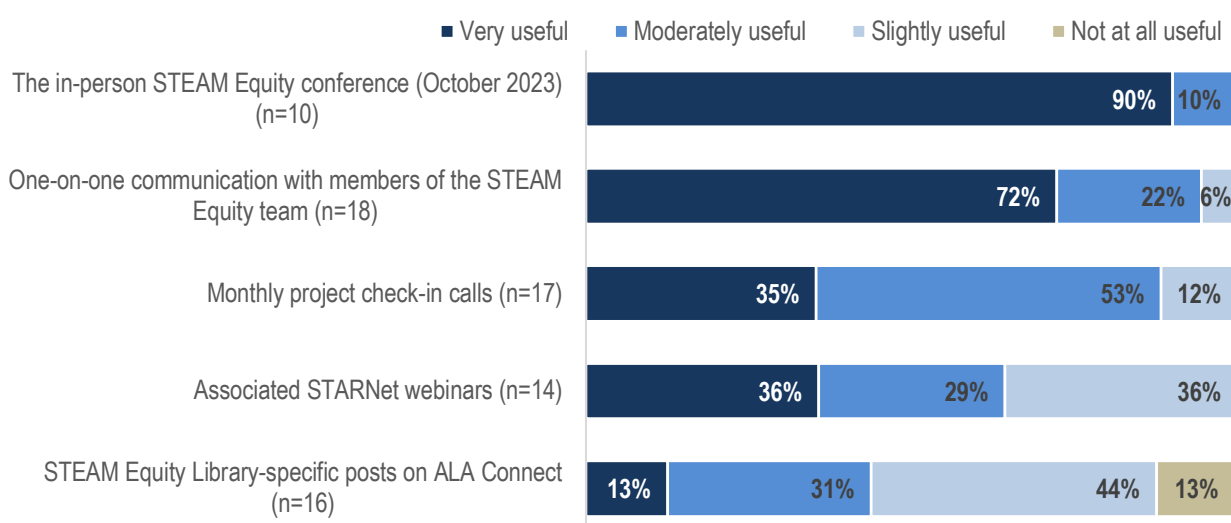
Use of resource/support



Source: *STEAM Equity Library Post-Survey* (n=19)

Figure 2. **Library staff viewed in-person and one-on-one support as most useful.**

Question: Please indicate how useful the following supports were to you.



Source: STEAM Equity Library Post-Survey

In interviews, library staff said they valued the opportunity to ask questions of project staff, get ideas, and learn from one another. For example:

“Having the opportunity to literally just have a check in and have a set time to be able to ask questions and hear other people ask questions that can then be like, ‘Oh yeah. That was an issue for me, too,’ or ‘Oh, that was an issue for us; this is how we fixed it.’” (Interview with STEAM Equity Librarian)

“I really like the check-in calls. I learn a lot and I get other ideas from people. ... It’s helpful to see what other libraries are doing, most definitely as far as their Exploration Spaces. That is very helpful. We just had a discussion about the lending kits, the STEAM kits that we’re going to have. It’s just very helpful to hear the support and what other libraries are doing. It gives you different ideas, as well.” (Interview with STEAM Equity Librarian)

Although many participants accessed materials posted on the ALA Connect online site, they did not find it to be as useful as other resources. For example, one survey respondent mentioned that “the resources were great” but “ALA Connect was not user friendly.” Interview respondents also said they found it difficult to navigate and consequently did not use it as often as intended. One librarian said:

“In general, I don’t love [ALA Connect]. I think it is useful in some ways. I think there is just a lot of information, and so any way it’s formatted is going to be difficult. I think the benefit of ALA Connect is that it is a site where you can have all documents and all of that stuff, and then also have the more social [uses]—dump your questions here and we’ll answer them in a centralized location. I think it tries to do things well. It is helpful in some ways. ... It’s more

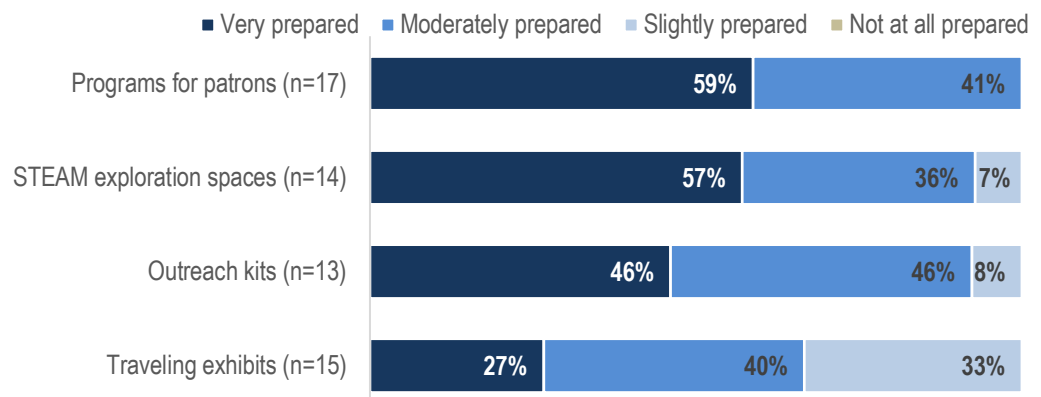
useful when people use it, like any social media platform, right? The more people use it, the better it gets. Part of that is on us, that the organizations that receive the grants aren't really using it a lot. It's not really being as well utilized as it could be." (Interview with *STEAM Equity Librarian*)

Library staff mentioned additional resources that they would have found helpful, including more supports to assist with exhibit set-up (e.g., additional videos and written instructions/diagrams describing how to set-up the exhibit). Survey respondents and interviewed librarians also mentioned it would have been helpful to have the in-person meeting closer to the start of the project. However, they recognized that this was not possible since the first few years of the project were greatly impacted by the COVID-19 pandemic.

Overall, library staff thought project resources prepared them to develop and deliver *STEAM Equity* programs and activities. The majority librarians reported that they felt moderately or very prepared to develop and host various activities (Figure 3).

Figure 3. Library staff generally felt prepared to engage in *STEAM Equity* activities.

Question: How prepared did you feel to develop or host the following STEAM Equity activities?



Source: *STEAM Equity Library Post-Survey*

Influence on Library Staff

The project successfully increased librarians' knowledge, interest, and confidence in designing and facilitating STEAM-related programming in general and specifically for Latinx audiences.

On the post-survey, library staff were asked to think about their interest, confidence, knowledge, and experience in various areas before they began working on the *STEAM Equity* project and at the end of the project (Figures 4-6). A five-point scale

was used where 1 represented “very low” and 5 represented “very high.” Library staff showed increases of more than one point in all areas, with all final scores averaging in the “medium-high” range or higher. Prior to participating in the *STEAM Equity* project, library staff had the lowest scores for confidence in designing and facilitating culturally responsive programming and activities to specifically engage Latinx audiences (an average of 2.0). By the end of the project, library staff averaged 3.4 on these items, thus moving from “low” to “medium-high” scores on these items.

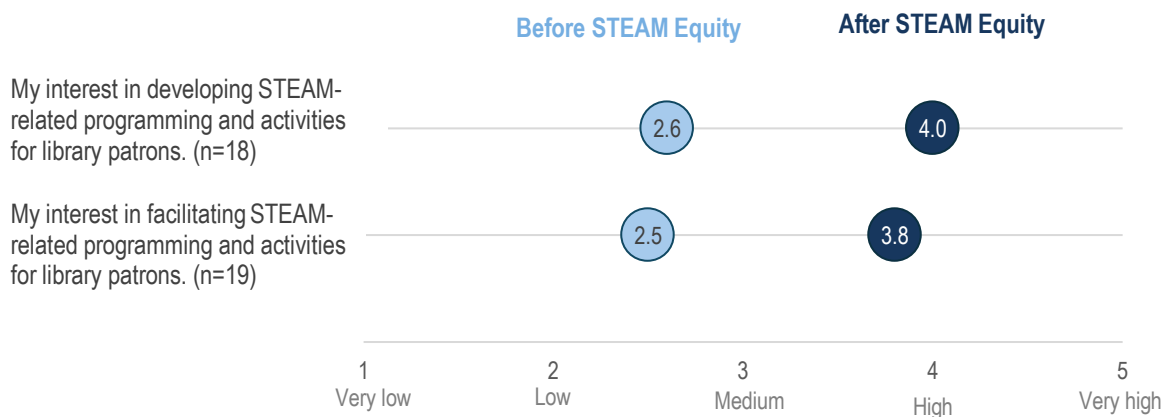
The greatest overall increase was in knowledge of how to design and facilitate STEAM-related programming and activities (with an average increase of 1.6 points), resulting in final scores in the “high” range of the scale. The highest final score (with an average of 4.4, or “high-very high”) was for interest in developing STEAM-related programming and activities for library patrons.

“STEAM Equity helped me build experience with something that I didn’t have an interest in. Now, I know with confidence how to put together STEAM programs, know more about science, and know that I served my patrons the best way I could.”

~Librarian

Figure 4. **Library staff increased their interest in developing and facilitating STEAM-related programming.**

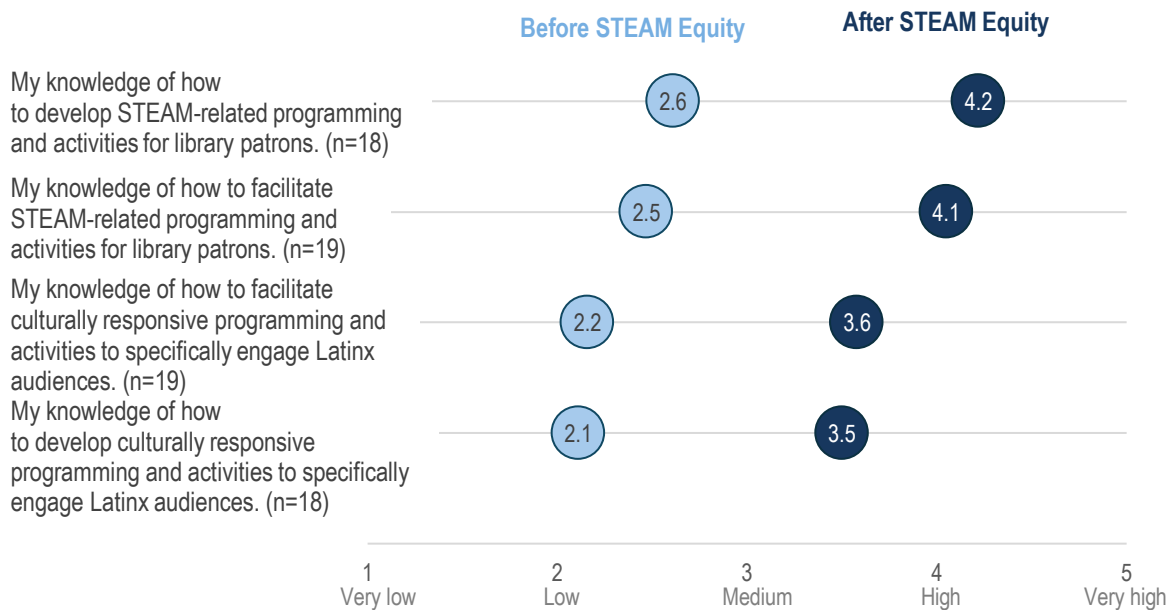
Changes in interest: Mean score (Scale from 1-5)



Source: *STEAM Equity* Library Post-Survey

Figure 5. **Library staff increased their knowledge of how to develop and facilitate STEAM-related programming, including for Latinx audiences.**

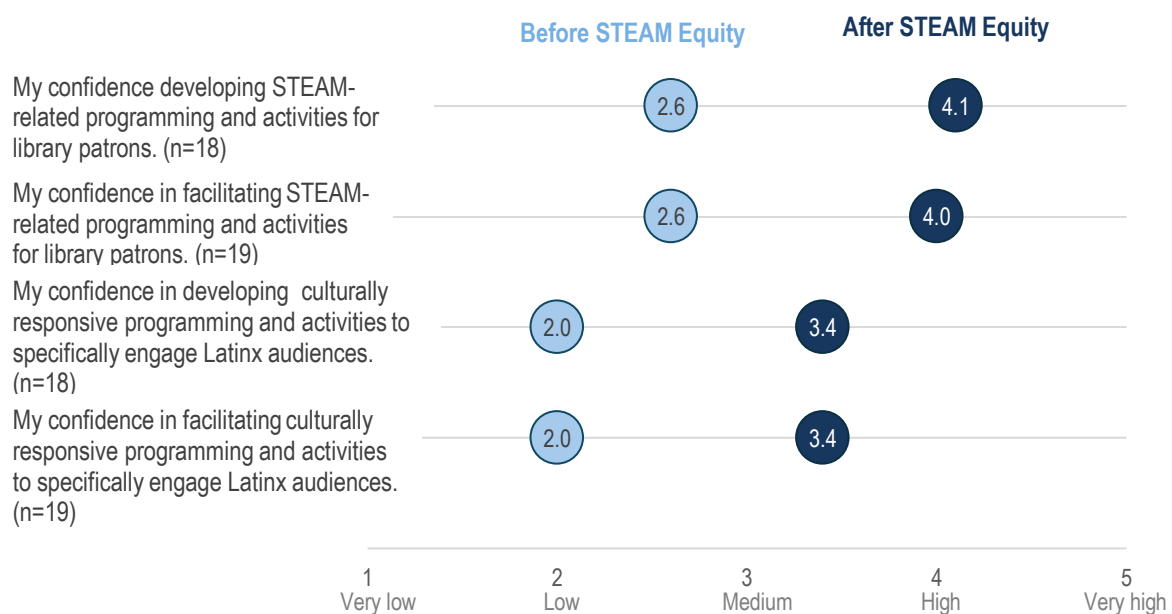
Changes in knowledge: Mean score (Scale from 1-5)



Source: STEAM Equity Library Post-Survey

Figure 6. **Library staff increased their confidence in developing and facilitating STEAM-related programming, including for Latinx audiences.**

Changes in confidence: Mean score (Scale from 1-5)



Source: STEAM Equity Library Post-Survey

Becoming a STEAM Librarian

Librarians became more comfortable with developing and facilitating science-related activities and programs over the course of *STEAM Equity*. During the first year of the project, one librarian was excited about learning how to develop these programs, but saw her lack of science expertise as a barrier:

"I'm not a science person per se. That has been my biggest challenge, not because of the program, but because of me. I'm not a science person. It has made me grow in a sense of, OK, I have to understand things and I have to prepare in another way to do the presentations. I'm trying to put together the science and my way of being so we can work together and produce a good STEAM program. I love having the partnerships, I love having my coworker here who loves science as well. Those are good ways for me to expand and have new ideas so I feel like I'm growing and learning as well, not only my patrons." (Interview with *STEAM Equity* Librarian)

Six months later, she was more confident and saw how STEAM in people's everyday lives could make learning about STEAM accessible:

"Now with the science included, that is opening up more ways of reaching out to other interests of people, and **I have found that science it is not as scary.** It's not as difficult. It's not as distant as you see it, and it can be reached in a different way. It's just finding the way. But I feel like that fear is the one that I am going against. I'm trying to make people understand that this is also part of our way of living just by holding our phones, just by having Alexas in our homes. I mean, all of that is just amazing. It's also science. Breaking that that fear, that's my purpose. That's what I want to do. That's the challenge. (Interview with *STEAM Equity* Librarian)

In interviews, several library staff described how the professional development and other supports helped them to develop their own STEAM Exploration Spaces. Most librarians said they planned to make self-directed learning spaces a permanent fixture of their libraries. For example, one librarian described how they had made a popular component from one of the traveling exhibits a permanent fixture in their Exploration Space:

"I think coming away from this knowing that we're always going to have an Exploration Space here. Even after this project is over with, that's always going to be something that's here. In the very first exhibit, we received a digital microscope. I set it on one of the tables. As a result of the interaction with it, we purchased a couple of them and they are also in our Exploration Space. We have little baskets of trinkets that people can look at and we try to change them out regularly. But it's nice to see that [library patrons] are finding their own things and bringing them in to look at. I think that's cool. We encourage [patrons] to do that and we take a look with them when they're doing that because some of the littler ones are really excited to show you the things that they're bringing in."

(Interview with *STEAM Equity* Librarian)

Another librarian said that their library now makes self-directed, hands-on STEAM activities available for their patrons:

“That emphasis on really having those interactive elements available in the library all the time—it is a lot more of our normal workflow now to make sure that we have some sort of interactive something going on out on the floor, which was not always the case before. That’s another fairly significant change.” (Interview with *STEAM Equity* Librarian)

Similarly, some library staff said they were initially uncertain about how to develop STEAM outreach kits. These librarians said they realized they could use a similar approach as they had employed to develop Exploration Spaces, and even incorporate some of the same materials that patrons found engaging in the learning spaces. For example:

“The first year, I kind of felt overwhelmed, but I do feel like I’ve got my feet under me now. I feel like I didn’t realize how much we already had or did that was STEAM-related until I started looking at, okay, what do we need to do? Then I said, we have the learning stations already and those have books and games and puzzles and manipulators, and a few of them have audio [components] because we try to remember that kids learn in different ways. I did try to take what we were already doing with those learning spaces we had and tried to incorporate that into the kits so that there were usually two books to each kit, and then the actual activity. If there was a way to add a second game or a puzzle or something that tied it together, I tried to do that with the kits. It was kind of eye opening to see, okay, we already have a start. What can we do to build on it and continue to build on it?” (Interview with *STEAM Equity* Librarian)

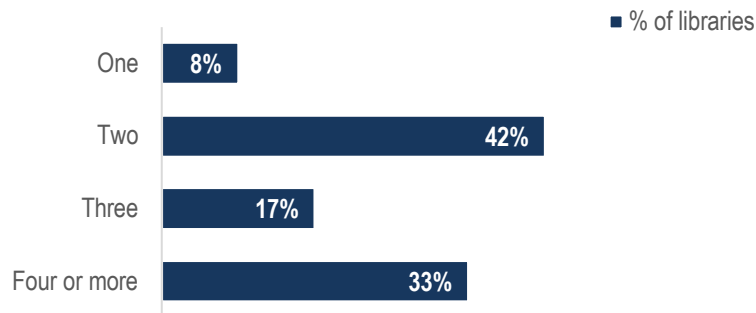
Understanding and Recruiting the Community

Community Dialogues

Community Dialogues were one strategy introduced by the project to help libraries connect with potential partners and learn more about the needs of their community. All libraries hosted at least one Community Dialogue, and most hosted at least two (Figure 7).

Figure 7. **Most libraries hosted at least two Community Dialogues.**

Question: *How many Community Dialogues did your library host as part of STEAM Equity?*



Source: *STEAM Equity Library Post-Survey* (n=12)

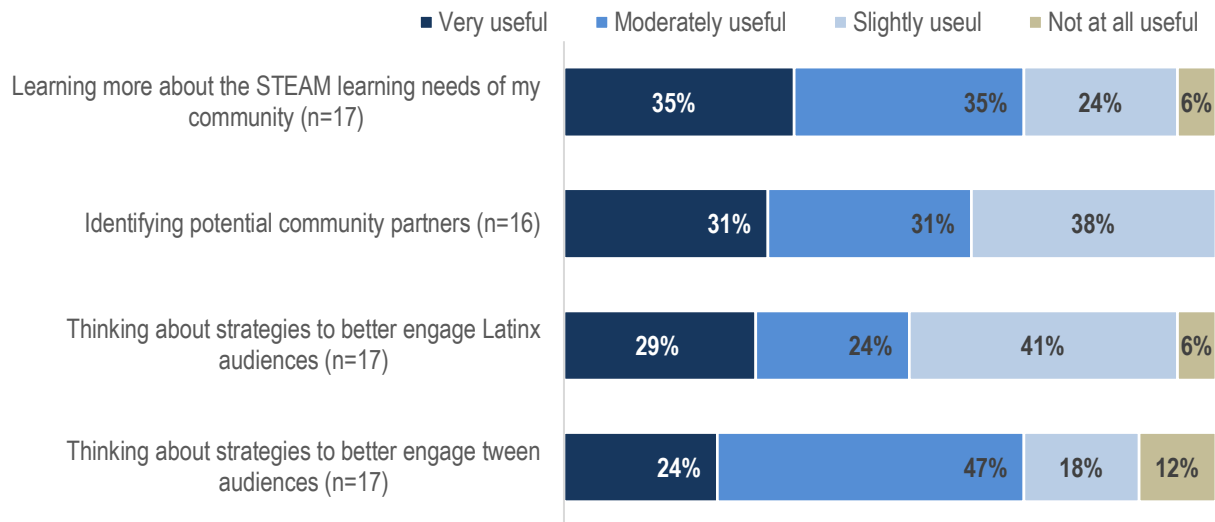
In general, libraries found Community Dialogues to be moderately useful (Figure 8 and Figure 9). Some had success using this strategy to learn about the needs of their community, identify potential partnerships, and learn about ways to better engage Latinx and tween audiences. However, some libraries found Community Dialogues to be less useful, with half of respondents indicating that they were only slightly useful overall.

In open-ended survey responses, library staff shared positive outcomes of Community Dialogues included gaining valuable insights into the interests and needs of specific audiences, especially tweens and Latinx groups, which informed the development of programs and kits. The Community Dialogues also helped libraries identify ways to better promote programs (e.g., through community events) and helped build relationships with community groups which improved outreach to specific audiences.

Libraries also faced challenges with implementing Community Dialogues. Some librarians expressed confusion about the purpose and process of the dialogues, suggesting a need for clearer strategies and suggestions for hosting the dialogues. Some libraries also faced challenges with participation and indicated that this limited the feedback they were able to gather and connections they were able to make.

Figure 8. Libraries had some success utilizing Community Dialogues to learn about their community and identify potential partnerships.

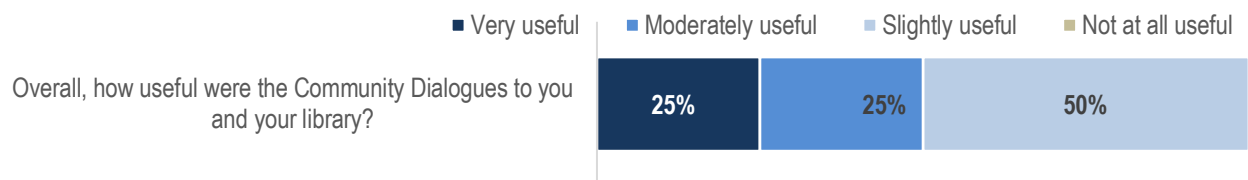
Question: Please indicate how useful you felt Community Dialogues were for addressing each of the topics listed below.



Source: STEAM Equity Library Post-Survey

Figure 9. Half of libraries felt Community Dialogues were only slightly useful.

Question: Overall, how useful were the Community Dialogues to you and your library?

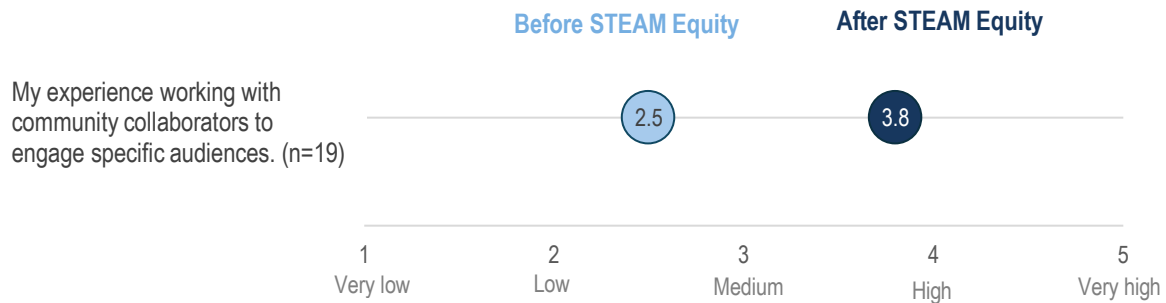


Source: STEAM Equity Library Post-Survey (n=16)

Although libraries reported mixed success with Community Dialogues, they did develop relationships with new partners and deepened their relationships with existing partners to engage specific audiences (see Figure 10). A five-point scale was used where 1 represented “very low” and 5 represented “very high.” An average, librarians rated themselves as having low-medium (2.5) experience working with community collaborators prior to the project, increasing to high experience (3.8) after participating in the project.

Figure 10. **Library staff gained experience in working with community collaborators.**

Changes in confidence: Mean score (Scale from 1-5)



Source: *STEAM Equity* Library Post-Survey

In interviews, library staff described how participating in *STEAM Equity* helped them consider other organizations and individuals they could approach that they had not previously considered, including community-based organizations, local government, and civic organizations. For example, one librarian said:

“The library needs to be that access point for everyone. I didn’t always see how we could do that. This did kind of open up my eyes to, oh, yeah, we can partner with [the local Extension service]. We can partner with Parks and Rec. It opened up my eyes to more possibilities just because of hearing some of the other people’s projects. I was like, ‘Oh, that’s cool, I never thought of that.’ It kind of opened up my eyes to more ways to do that.” (Interview with *STEAM Equity* Library Staff)

Libraries also learned through trial and error who would be willing and able to partner and implement programming. One librarian described pursuing a relationship with a partner who had deep connections with the Latinx community, but which ultimately came to naught when the partner stopped responding to her communications. Another librarian said that it can be tricky to know what level of staff person to reach out to within an organization, and the leaders may not necessarily be the “doers”:

“I also learned that there were people in my asset mapping or [Community] Dialogue, [but] probably somebody else in their organization would be better served to help me. For instance, I’ll give an example. I invited the middle school principal. He attended and he was really, really great. But since then, I haven’t worked with him. I worked directly with a different staff member that actually teaches, so she would have been more versed to give me accurate information because she’s the one working with students every day. I think in the beginning, I wanted to make sure I was reaching out and not stepping on toes. I was just very cautious in the very beginning and I just didn’t want to go above somebody and request a staff member to do something without the necessary permissions and then them kind of not know what was going on. But I think now it would be OK and I think I’m comfortable with doing that.” (Interview with *STEAM Equity* Librarian)

In general, library staff offered the following suggestions for ways libraries can connect with and learn about their community:

- Build relationships by collaborating with schools and other local organizations
- Actively participate in existing community meetings and events to stay informed and connected
- Communicate how the library can be a resource. For example, offer to bring schools to the library or take a program to the school
- Ensure activities are appropriate and accessible for the intended audience
- If a potential partner is not responding to overtures about partnering, move on and develop other partnerships.

Activities and Patron Experience

Program data suggests project activities (including Community Dialogues) helped libraries understand the needs of their communities and recruit participation in programs at the host libraries.

Based on their annual reports, it is estimated that libraries reached over 95,000 patrons through all project activities (see Table 2 for a summary of patrons reached via each type of activity). A total of 92% of all programs reported had tweens in attendance. Facilitated programs were most successful at specifically engaging tween audiences.

Table 2. **Summary of numbers of patrons reached**

Activity type	Number of patrons reached				
	Year 1	Year 2	Year 3	Year 4	Total
Exhibits	N/A	17,253	16,553	26,328	60,134
Facilitated programs	3,326	4,747	5,575	6,211	19,859
Self-directed learning activities	2,794	3,365	2,027	2,461	10,647
Outreach kits	N/A	746	1,819	2,083	4,648
Total reached for all activities					95,288

Source: ALA Annual Reports

On the post-survey, library staff were positive about the various *STEAM Equity* activities. They generally felt that these activities—especially library programs, the traveling exhibits, and Exploration Spaces—engaged patrons (Figure 4) and helped them learn about STEAM-related topics (Figure 5). Nearly all libraries felt that *STEAM Equity* activities helped develop patrons’ interest in learning more about STEAM-related topics (Figure 6). Most library staff felt that all activities were at least moderately successful overall (Figure 7).

Some libraries faced challenges with outreach kits, indicating that they did not circulate well. They suggested multiple reasons for lower than hoped for circulation, including a need for better promotion, their perception that some adult patrons may have felt intimidated by the kit topic(s) and were hesitant to check them out, and their perception that younger patrons preferred programs or explorations stations where they could socialize and engage in more active participation.

Figure 11. Library staff thought *STEAM Equity* programs were especially engaging for patrons.

Question: In your opinion, to what extent did patrons seem engaged in the following *STEAM Equity* activities? Source: *STEAM Equity* Library Post-Survey

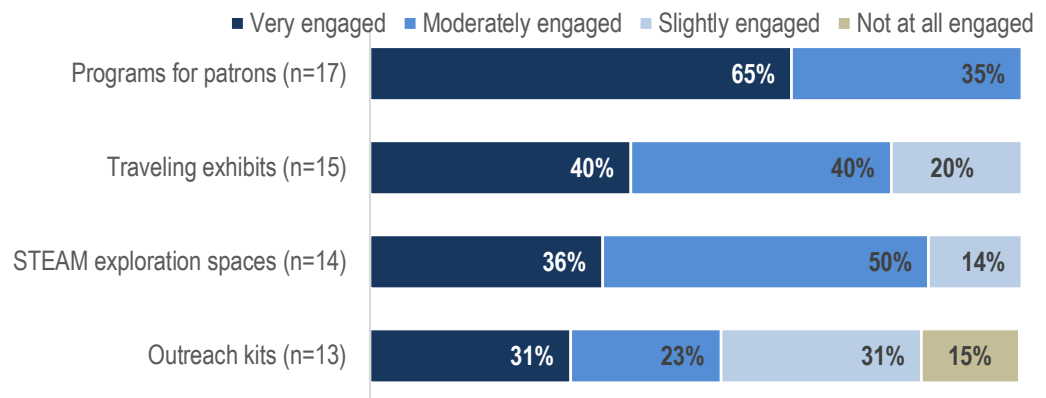
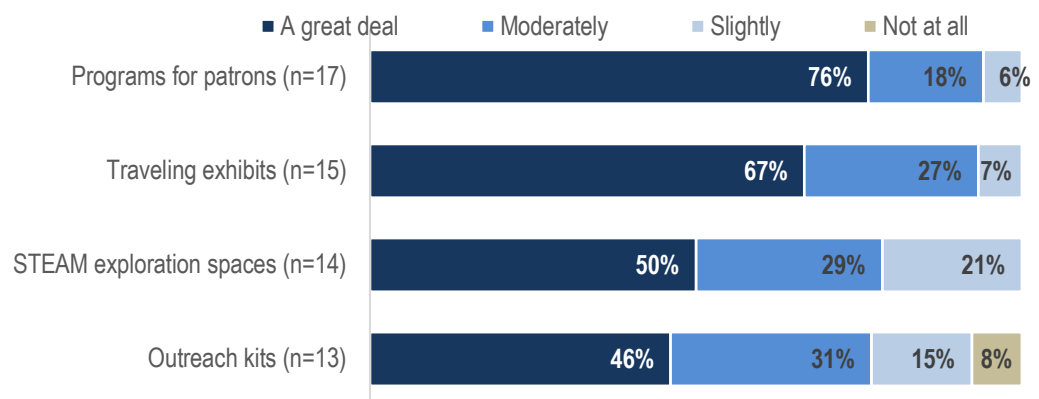


Figure 12. Library staff said *STEAM Equity* activities, especially programs and exhibits, helped patrons learn about STEAM-related topics.

Question: In your opinion, to what extent did the following *STEAM Equity* activities help patrons learn about STEAM-related topics?



Source: *STEAM Equity* Library Post-Survey

Figure 13. **STEAM Equity activities helped develop patrons' interest in STEAM-related topics.**

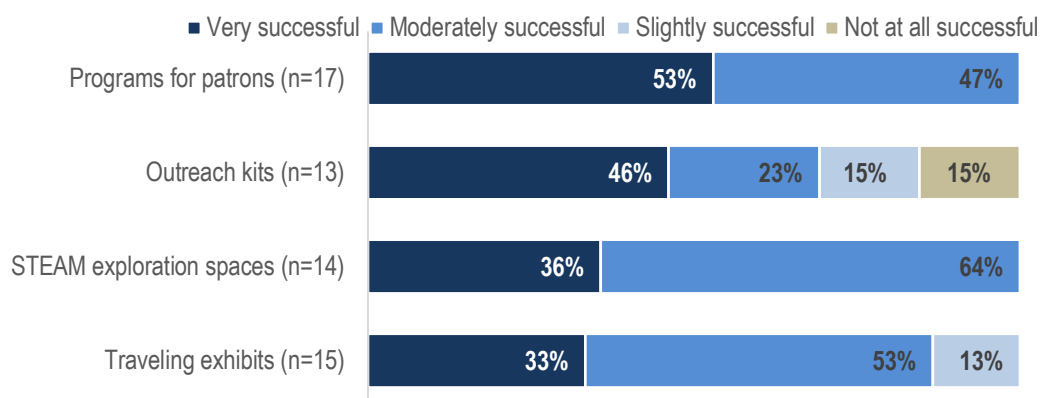
Question: Overall, to what extent do you feel STEAM Equity activities helped develop patrons' interest in learning more about STEAM-related topics?



Source: STEAM Equity Library Post-Survey (n=17)

Figure 14. **Overall, library staff felt STEAM Equity activities were successful.**

Question: Overall, how successful do you feel the following STEAM Equity activities were?



Source: STEAM Equity Library Post-Survey

Overall, library staff thought *STEAM Equity* had a positive impact on patrons' interest and engagement with STEAM, evidenced by returning for additional activities and sharing with family members:

"The most rewarding is to hear and see the kids when they come back [from the library] and you talk to them about what they did, how it worked, and what they learned. You know, they're bombarded with the laptop, the games, and all the videos, and all that kind of stuff. It's just so refreshing and exciting to hear them talk about collaborating and creating and hypothesizing." (Interview with *STEAM Equity* Library Partner)

"We just try to reach as many kids as we can. We're really about initiating what I always say is the spark, the interest in science. We don't go in depth with science, but it sparks that first interest, that first thing that makes science tangible, makes science fun. Maybe a kid who wasn't going to get exposed to it can get exposed to it or can experience forces in a really cool way, or experience physics or chemistry in a cool way that they're like, 'Ooohh.' I always say that with kids, they get to see a lot on the internet. Now they can YouTube something and they can see an experiment on something. But we bring it to them. I always tell them, 'You get to do it now, you get to do it in real life.' It's not just watching somebody

else do it, which is really what? I think we love doing. I think is part of the benefit of all STEM education: it brings it to life. I think anytime you bring it to life, that makes the world of difference. Because it's one thing to hear about it, to see it. But when you actually get to feel centripetal force or you get to experience making a paper airplane that actually flies and works, it's not just something you created. Now you know the science behind it. I think it makes it such a better experience. What I think is great is the kids share that experience with the people at home. They leave this workshop and they go home and they tell their parents about what they did or their little siblings that didn't get to come." (Interview with *STEAM Equity Library Partner*)

"I think we are slowly, slowly, maybe getting the kids engaged. Like I said that they're starting to know that they can go to that area and there'll be something there for them to do and I don't even think they realize that it's that they're learning science or tech or anything." (Interview with *STEAM Equity Librarian*)

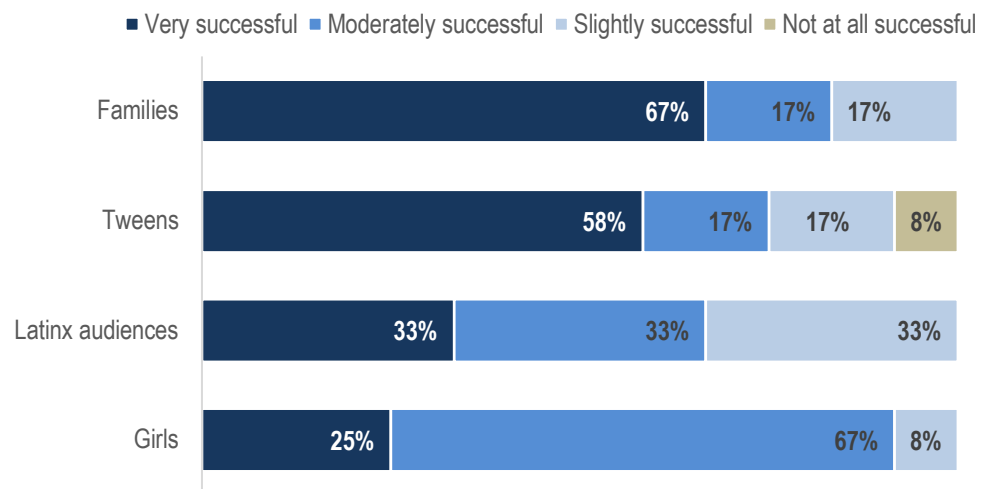
"My son looks forward to the STEAM programs. I don't know if he doesn't have enough at school or if it is because he really loves science. I don't know, but he looks forward to that [STEAM library program]. ... My son, when he comes home, loves to show his father what he did. I think it makes them feel that they did something, that they discovered something. I think that's rewarding. Many times I will try to help. I always try to help and intervene. And he was like, 'Let me do it. I can do it.' It is rewarding to see how much they enjoy this class and that they learn it is experience for life." (Interview with *STEAM Equity Library Partner*)

Engaging Specific Audiences

Project leads from each library were asked about how successful they felt they were at recruiting various audiences to *STEAM Equity* programs and activities (Figure 15). In general, respondents felt they were most successful at engaging families and tween audiences and less successful at engaging Latinx audiences and girls.

Figure 4. Libraries had the most success engaging families and tweens.

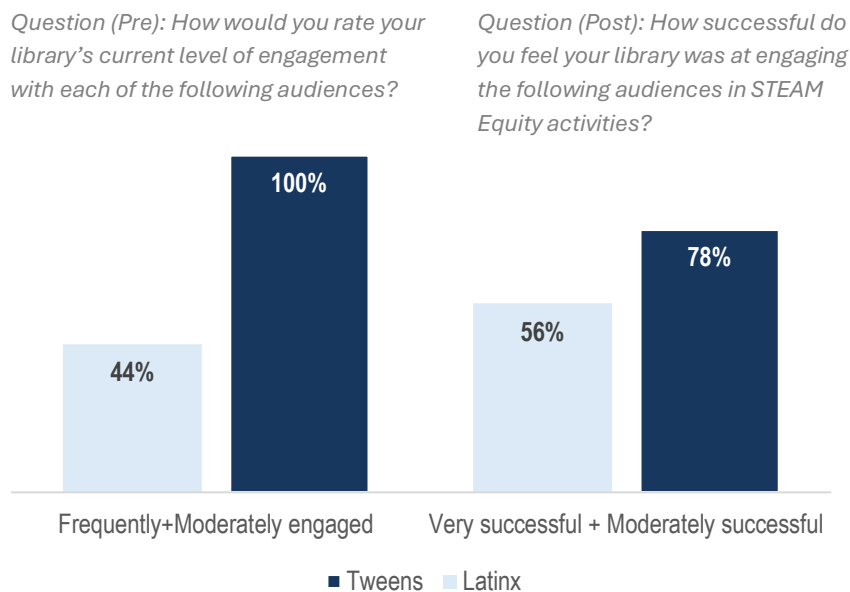
Question: How successful do you feel your library was at engaging the following audiences in STEAM Equity activities?



Source: *STEAM Equity* Library Post-Survey (n=12)

Although libraries were less successful at engaging Latinx audiences compared to tweens (the two main audiences for this project), libraries also had less experience engaging Latinx audiences before participating in *STEAM Equity*. We considered librarians' perceived success at engaging audiences on the post-survey and the frequency with which they reported engaging with those audiences on the pre-survey. As shown in Figure 16 (the two bars on the left), librarians started out with a lower level of engagement with Latinx audiences than tweens. Despite the lower reported success in engaging Latinx audiences, libraries did have success relative to where they were at the start of the project.

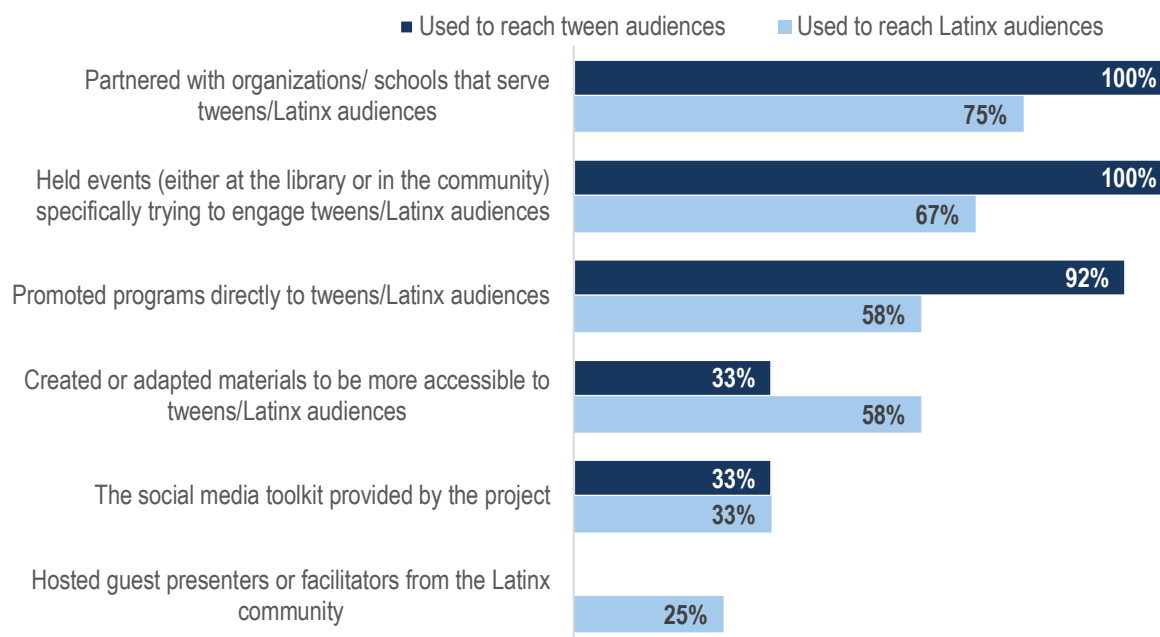
Figure 16. Although libraries were less successful at engaging Latinx audiences compared to engaging tweens, they began with less experience engaging Latinx audiences.



Source: Matched *STEAM Equity* Library Pre- and Post-Survey (n=9)³

Project leads were also asked to indicate what strategies they used to specifically reach tween and Latinx audiences (Figure 17). Partnering with organizations or schools that serve specific audiences was the most utilized strategy for reaching both tween and Latinx audiences. Other common strategies included holding events and promoting programs specifically for tweens and Latinx audiences. About half of libraries (58%) also created or adapted materials to be more accessible to Latinx audiences. In general, libraries used a wider range of strategies to reach tweens than they did to reach Latinx audiences.

³ The percentage of libraries reporting they were very or moderately successful at engaging audiences on the post-survey shown in Figure 16 are different than those shown in Figure 15. Figure 16 shows results only for library staff who answered both the pre- and the post-survey (n = 9), while Figure 15 shows results for all library staff who completed the post-survey (n = 12).

Figure 5. **Libraries worked with partners to reach tweens and Latinx audiences.***Use of resource/support*Source: *STEAM Equity Library Post-Survey* (n=12)

Annual reports also suggest that libraries were slightly less likely to specifically recruit Latinx audiences to engage in *STEAM Equity* activities. In the final year of the project, all libraries specifically recruited tweens to their exhibit, while only ten specifically recruited Latinx audiences. Similarly, 96% of programs in Year 4 involved specific attempts to recruit tweens compare to 71% for Latinx audiences.

The following sections describe more detailed findings regarding how libraries reached tweens and Latinx audiences, respectively.

Reaching Tweens

As noted above, the majority of libraries (58%) said they were very successful in reaching tweens (Figure 15). Based on interviews and open-ended survey responses and interviews, strategies that contributed to their success included:

Working with partners, especially schools, to engage tweens. Several library staff indicated having “great success meeting tweens where they already were,” such as at schools or existing programs in the community. In some cases, librarians relied on existing relationships with teachers, while others developed new connections with community partners. For example, one librarian said:

“When I wrote the grant, my collaborator main collaborators were a teacher at the middle school who is a science teacher. She has been super instrumental, I would say. The

success of the one program that we've done so far ... we had 48 kids there and most of them, not all of them, but most of them came because of her, or because they heard about it at school. I think that's like a huge thing is to make sure that you have somebody in the school system that is plugged in with the kids. Because they're the ones that are going to get them jazzed and get them excited about participating in and at the very least informing them." (Interview with *STEAM Equity Librarian*)

Making STEAM fun and engaging. Based on descriptions of programs provided in annual reports, many programs included hands-on and interactive learning, creative problem solving, and real-world connections to STEAM concepts. According to library staff, programs that engage tweens seem to combine hands-on activities with social interaction and real-world applications, while allowing for individual creativity and exploration. Examples of this approach include:

"It was fun to watch them make rockets for the wind tunnels. They loved experimenting with different shapes that they were making, trying to see different weights and masses for objects, just changing around what materials they were using. They like that part of creating. I think anything that was a challenge and slightly competitive, they liked. I think that what was also enjoyable about it was that they were doing it with other people. I don't know what that experience would be like if it was just them, maybe by themselves looking at each exhibit. I think what exciting was that they were doing that interactive activity with friends." (Interview with *STEAM Equity Library Partner*)

"I definitely do think it had an impact on my community as far as being thankful that the library had something available to them outside of school, thinking creatively, thinking in a way that you wouldn't normally. I know that for the field trips, they were so excited to have something hands-on to do because everything has been virtual for so long to be able to physically touch and do something and see it." (Interview with *STEAM Equity Librarian*)

Providing opportunities to play and experiment with peers. Library staff found success in offering programs that provided a safe space for tweens—including girls—to participate with friends, try new things, and experience failure (and success) in a low-stakes environment.

"It's a great opportunity for [the kids] to meet new people and for them to be social... if they meet somebody that they get along with that knows all about the program. Then they can turn around and teach that individual so it's not necessarily the adults are [the] instructors. We've learned that the kids teach each other." (Interview with *STEAM Equity Library Partner*)

"At first they only wanted to work together and then once they figured it out, they each took their own, and then we raced them. It is exactly how girls work. They are unsure. They do not want to fail. They do not want to look stupid, so they are going to work together. But then once they gain confidence, they were really they were ready to do it on their own. I love seeing that. Then they have fun with it." (Interview with *STEAM Equity Librarian*)

Using the exhibits as an entry point to connect students with libraries. Some libraries hosted school field trips when they were hosting one of the *STEAM Equity* exhibits, while others worked with schools to recruit students for *STEAM Equity* programs.

“There’s been a switch in in the engagement for my students. It’s been fun to see them outside of school. Just to know where the library is, for some of these kids, is a step in the right direction—hearing that they have started to use the library as a study location. I don’t know if they would have done that before. ... [Our field trip to the library to see a *STEAM Equity* exhibit] has truly planted that seed and then provided that space to them.” (Interview with *STEAM Equity* Library Partner)

“I do think tweens were more engaged than they have been in the past because, during that time we had the exhibit here, a lot of them came out and interacted with the exhibit. That was kind of helpful actually to have the program and the exhibit at the same time.” (Interview with *STEAM Equity* Librarian)

Growing Tween Engagement

One librarian told the story of how a *STEAM Equity* activity of planting a garden gradually captured a tween’s interest:

“We installed raised beds in front of our library last summer and then this summer we expanded them. We have six raised beds and one of them was a kids’ garden. They planted their seeds in the little cups. They transplanted them out and now they’re getting to see the lettuce growing.

“One of our library staff had a program where they were planting seeds and one of the kids who was there was around 13 years old. He was kind of just on the far edge of tween and he was definitely too cool for the program. He was just there because everybody else was there. Everybody else, they’re planting their peas or whatever, and they’re putting in their little popsicle sticks with their name on one side and the name of the plant on the other side. The library staff finally convinced him to actually plant something. He wrote what plant it was on the popsicle stick, but there was absolutely no way he was going to have his name associated with that, right? Just—no. She said it’s fine with her.

“About a week later, he came in and he just happened to check out the table where the plants were and he noticed that his was growing. All of a sudden, he’s no longer too cool to be associated with it. Soon he’s like, ‘Oh my gosh, this is actually growing.’ He added his name to the popsicle stick. He would come in almost every day to see how it was going.

“It’s the change from ‘No, this is stupid,’ to ‘Actually, this is really kind of cool, I like this, I do want to be a part of this, and I really liked that.’ Both the change in the engagement level but also hopefully the change in the ‘Oohh, actually, you know this isn’t a stupid thing.’ We’ve had a good opportunity to connect with several of the kids as well on that individual level, really building those connections between the kids and our library staff.”

Including families in activities. At least one library reported success in crafting programs for the entire family, and found that caregivers brought both their younger children and tweens:

“I’ve tried reaching out to the middle school, but the kids are not coming in. ... But the tweens are coming with their families once the little ones are included.” (Interview with *STEAM Equity Librarian*)

“I would love to have families, especially because in middle school, usually families start seeing their kids as a little bit older, so they let the student take charge of what they want to share about school and then you have some parents that still are connected. But it would be great to have parents still be involved with kids. Then a lot of these activities can only really happen if parents can take them or they have permission from their parents.”
(Interview with *STEAM Equity Library Partner*)

“I think another one would be to talk to the parents and find out what can we do to help? Your kids see themselves as a little bit differently and see themselves as like perhaps a scientist or an engineer or a, you know, what do we need to do to help them kind of bridge that.” (Interview with *STEAM Equity Librarian*)

Asking former tweens how to engage tweens. Some libraries said they had consulted or planned to consult with youth about strategies for reaching tweens. For instance:

“I think our next community conversation will probably be with some kids from the high school Spanish club to kind of pick their brains a little bit about, y’all aren’t tweens anymore, but you were more recently than I was. In that demographic to kind of talk about ideas they might have and hopefully, possibly even, hey, would you like to help out with this? Kids are more likely to come when there’s cool high schoolers around.” (Interview with *STEAM Equity Librarian*)

“One other person who [participated in a Community Dialogue] was a high school student. ... She’s on our City Council as a student member and she is Latinx. She actually was able to provide us with some really good things for the asset map that we would not have come up with. ... I think she was great really for connecting with the teens and the tweens and the people who we would like to actually reach through our STEAM equity programs. She brought a lot of that perspective that, unfortunately as you get older, you kind of lose.”
(Interview with *STEAM Equity Librarian*)

While libraries reported success in reaching tweens, they also reported challenges. These included:

Identifying what tweens are interested in and finding ways to engage them so they keep coming to the library. A librarian said one of the biggest challenges with engaging tweens is “establishing our own rapport with the kids. We’re making some progress there, but it’s challenging.” Other librarians explained:

“I’ve had some [tweens]. I get them in here once or twice and then I never see some of them again. We’ll probably talk about it a little bit more with the community conversation portion of everything. I do work with the middle school STEAM teachers and we have them coming in for field trips and doing activities. A lot of times they [students] are really eager to sign up with things, but I don’t know if it’s necessarily the individuals’ issue, or if it’s the parental or guardian issue of getting them back to the library. They don’t always have that resource to get back here.” (Interview with *STEAM Equity Librarian*)

“The other challenge is that the tween age, the 10 to 13 [year olds]. That’s a really hard age to know what they want and what they’re interested in, because if they’re not interested, you’re not getting anywhere with them. ... During summer reading we have a tween/teen club and they meet 4 days a week, 4 hours in the afternoon. That’s based on parent input. It’s easier for the parent to drop them off at lunch and pick them up after work. It’s a group of 15 kids we sign up. A good two-thirds of them come in. They’re ready to do whatever we’re going to do. There’s a third of them that’s already at that, ‘I’m too cool to do this. I’m too blasé.’ So if you get a topic that you can catch that third, if it’s something that they’re really interested in. It’s finding what motivates them and what interests them, and tying it into the programming. We are hoping after this summer that the kids that participated in the camp will maybe be the nucleus of us having a teen advisory board.” (Interview with *STEAM Equity Librarian*)

Staffing changes either at the library or at partner sites. Staff departures can mean the loss of a connection with organizations, requiring the investment of additional time and resources to establish a new connection. On the other hand, sometimes a new staff member has interests or skills that create opportunities for connections:

“Last year one of the science teachers that I really collaborate well with was on maternity leave. She didn’t really promote [*STEAM Equity*] and nobody else did either. I mean, that’s always hard. My relationship with the schools is so much better, but that’s always challenging to get teams to come. I’ve hired somebody that works at the middle school 30 hours a week and then she works for me 16 hours a week and, in the summer, 25 hours. So they know her and they really respond well to her, and I think that has been a huge difference.” (Interview with *STEAM Equity Librarian*)

Reaching Latinx Families

As previously noted, a third of libraries (33%) said they were very successful in reaching Latinx audiences, with another third saying they were moderately successful (Figure 15).

Based on interviews and open-ended survey responses and interviews, strategies that contributed to their success included:

Making programming and activities more accessible (e.g., creating and using bilingual materials).

“We’ve always done everything bilingual. Our community is very paper driven, so a flyer goes a lot farther than a social media post. We do everything in English and Spanish. But in August we resumed a robotics team, but we added an older team this year for 10 to 14 year olds and both of our robotics coaches were Latinas. ... I think we had a team of 12 students and 8 of them were girls.” (Interview with *STEAM Equity Librarian*)

Investing the time to do outreach and work with local organizations that serve Latinx audiences. Library staff also noted that it can take time to engage with Latinx audiences and form community connections.

“Pop-ups at community events, church festivals and soccer games, were by far the most successful way we reached new audiences, especially Latinx members of our community. Having fun, family-friendly activities facilitated by bilingual staff made these even more successful. It was especially gratifying when tweens and families we had met out in the community started to recognize library staff and come into the library from time to time.” (STEAM Equity Library Post-Survey)

“The middle school helps me engage the Latinx audiences, and I would say that elementary school does as well because they have an app that’s called Parent Square. When we have something that’s happening in the library, the school makes sure that it goes out to all of the parents and guardians of the students. They can push community activities. And the city always puts everything in the newsletter.” (Interview with *STEAM Equity Librarian*)

Engaging the whole family and offering family-friendly programs. Multiple interviewed librarians and library partners said it was especially important to engage the entire family.

“Right now, we are reaching out to the Hispanic community. There’s a large Hispanic community in town... Once we put interest in the children, I know the parents will be involved in it too, because that’s it. I mean, I’m Hispanic. I’m Mexican. So I do understand. Once our children are involved or interested in something, we want to see what’s going on. I know that as a parent I would want to go and actually see what these kids are doing. I think once we get Hispanic kiddos involved, I know that we will not only be reaching those children, but their family, the entire family.” (Interview with *STEAM Equity Library Partner*)

“One of the ideas was that I got from the conference was to do a job fair, but specifically focusing on Hispanic, Latinx women. As the people speaking and to invite not only the students, but their families. And I’ve talked to [one of my community partners that works with the Latinx community] about that.” (Interview with *STEAM Equity Librarian*)

“Especially Hispanic parents—you really have to either get them together in a room and feed them food while you’re trying to tell them what’s available or you have to make a phone call. It’s not just a quick email and then you get an answer back. It’s very hands on. It does take a little more time to carve out the day to let them know about services and stuff like that. ... I think once they feel like they actually have a connection, they don’t feel as threatened of what might be available to them. Sometimes they don’t realize that it doesn’t cost any money, or that they’re not going to get a bill a month later. If they have that trust

with you that you're not going to charge them any money and there's no bills to come in the mail later, they tend to be OK to try and stuff. And then there's like, oh, what else can we get?" (Interview with *STEAM Equity Library Partner*)

Having bilingual staff who have community connections (see below).

Speaking the Language

Libraries that had at least one staff person who was fluent in Spanish and from the community reported success in connecting with Latinx audiences.

One librarian described speaking in both English and Spanish, depending on the context:

"I speak the language so when I'm doing those programs, I'm doing both languages at the same time. As soon as I'm saying one phrase in Spanish, I'm saying it in English so that way people can feel included. ... Usually, I do part of my programs bilingual. When we're connecting with the community, I engage with them in Spanish so they can understand and learn what I'm doing and what I'm trying to teach their children." (Interview with *STEAM Equity Librarian*)

Another library happened to have staff openings during the project, and hired staff who were bilingual:

"I think being involved in this project is part of our larger thought about we really do need to do a better job about reaching our Spanish-speaking citizens and community members. We are definitely being more deliberate about that. I don't know how differently we're acting, honestly, but we're always thinking about it at this point. My first five years in this position, we didn't have any full-time positions available. In the past year, I posted my second full-time position. Half of my full-time team has turned over during this grant. In both of those positions, we posted as bilingual preferred. For the first position, we did hire someone who is a part of our local community and who is herself a first-generation American. So we're working towards that. I mean, literally the demographics of our team have changed as at least part of the result of this [project], or coinciding with this [grant]. I think that's one of the big things. Again, I don't know how much of it's because of it, how much of it's correlation versus causation, but that's definitely one thing that has changed along with this project." (Interview with *STEAM Equity Librarian*)

One library had particular success with hiring a Latina staff member who was not only bilingual, but also worked part-time at the middle school:

"My new youth services coordinator is bilingual and that has made a huge difference just in general about who comes through my door. It makes a difference that there's somebody who speaks their language. Finally, after all these years I've been at the library, I have a bilingual story time on a Saturday. I'm really happy about that. She works at my library 16 hours a week but also is an instructional assistant at the middle school so the middle schoolers know her. All of a sudden, the teen programming in general has really taken off. Not the majority, but certainly a representation is Latinx. I can't tell you how thrilled I've been by that. ... She's also one of those people that people in the community contact when they need translation. She just has a lot of connections and she brings a lot of positivity and enthusiasm to the job." (Interview with *STEAM Equity Librarian*)

While libraries had some success reaching Latinx audiences, they also experienced challenges. These included:

Not having bilingual library staff. When asked what the biggest challenges with engaging Latinx audiences, for example, one library staff said:

“That I do not speak Spanish, most definitely. That I rely on staff and the toolkit that we use for the *STEAM Equity* project (the toolkit is actually very helpful), but I still have to rely on other staff to fill in the blanks here and there. ... The biggest challenge for me is that I’m monolingual, that I don’t I don’t do any other language.” (Interview with *STEAM Equity* Librarian)

Appreciating that Latinx audiences are not monolithic and understanding the particular interests and needs of the people in their community. Library staff—especially those who were not Latinx themselves—struggled with issues related to making their services accessible and welcoming. They were not always sure what types of activities would be of greatest value to Latinx audiences in their community, and struggled with whether, when, and how to offer resources in Spanish.

“I know we were gearing towards our Hispanic community so I kind of picked Hispanic culture things like Fiesta and Dia de los Muertos and tied a STEM program into that. But we ended up not doing any of that because our community, while it’s Hispanic, they’re all second-, third-generation, and there’s very little Spanish-speaking among the younger generation. It was more important that they just saw their faces in those careers and those kind of jobs, so we did the programs to introduce them to STEAM topics or careers.” (Interview with *STEAM Equity* Librarian)

“In [our community], you have such a wide variety of people who fall under the Latinx category. So sometimes it can be financial, sometimes it can be language.” (Interview with *STEAM Equity* Library Partner)

“We did the very first community read in April. We made sure everybody had it in the language of their home. We read the book *Wonder*. The culminating activity was to watch the movie and then discuss the book. [We considered] do we use—and we can—Spanish subtitles? We also had people who could help Spanish-only speakers. We did have Spanish speakers attend. I was very thankful for that. But we struggled with, do we have a separate night for just Spanish-speakers? It’s like, no, because the whole point is we want it to be a community event. But then how do you make sure that everybody has an equal sense of feeling welcome? That’s always the struggle. I mean, we don’t want it to feel like us and them. But on the other hand, we want them to have the information that they need.” (Interview with *STEAM Equity* Librarian)

Librarians and community partners noted that **first-generation Americans may not be familiar with public libraries**, understand what kinds of resources libraries offer, or know that their resources are free. Some interviewees noted that the fact that public libraries are typically government-funded could also be a barrier.

“How do you get the word out? How do you make sure that they know they’re welcome? I think it’s still a real barrier that we’re, quote unquote, ‘a government agency.’ I think especially those who are immigrants, they come from countries where libraries are not like they are here—they cost money and they are not really for the average person. Just getting beyond all of those barriers is a challenge. ... I’ll give you an anecdote, but kind of pictures that. [One of my staff] is bilingual, is Latinx. She was outside the library [at an] office across the street. A woman who spoke to her in Spanish. She goes, ‘I didn’t know that [anyone could use the library].’ First of all, one of the barriers is that a lot of immigrants do not realize that libraries are free because where they come from, they are not. Secondly, there are some that are nervous about it because they have to give out personal information and it’s a government entity—not really but it is and so that’s a barrier to using the library.”

(Interview with *STEAM Equity Librarian*)

“A lot of our families do not know what kind of resources they have to be able to be offered from the library. I’m hoping that we can open that door for them, that they realize that there are more options than what we just have at school since. Our school is not that big, so we don’t have a lot of resources for them.” (Interview with *STEAM Equity Library Partner*)

“I had several kids say they’ve never been to the library before. For me, I love the library. I think it’s so important. Not only is it a resource for literature and becoming literate ... but there’s other things the library does for us. I know for my family, that’s how they were able to get citizenship and to be able to do their classes for that. The first computer I ever used was at the library. ... For lots of kids, it became the first time they ever went, and I think that was amazing.” (Interview with *STEAM Equity Library Partner*)

Latinx families may have limited experience with and access to STEM resources. Latinx children may not have family members who work in STEM fields or perceive themselves as knowledgeable in STEM. Finances can also be a barrier.

“I think just in general kids that don’t think they’re good at science and math but do find themselves really good at art or writing. I think they’re just lacking that visual representation of that ... There’s so many barriers, like if you don’t think you’re good at it, you’re not going to want to pursue it. It is hard and it is a lot of failure. But the people that are more OK with failure and not getting it right are still doing it, and they decided to pursue it. I’d say it’s just exposure and seeing themselves actually doing it too, like actually seeing themselves do it. That’s why I think the big thing for me is setting up opportunities where they are contributing to not school science, but real science or maybe getting involved in citizen science, or ... exploring whatever they’re curious about, and then reminding them that this is a form of science. ... Just showing them, you may not be good at school science, that doesn’t mean you’re not good at science. ... Especially if you’re third generation here and you’re Latinx, you really want to make your parents proud. So you’re trying to do whatever things that you’re good at. If you don’t feel like you’re good at it, then you don’t want to do it. If your family doesn’t know what it is, they don’t really know how to support you. And it can be lonely. I think finding community, finding the people that are doing it that are just like you, is

just very much more encouraging to keep pursuing it when you have support.” (Interview with *STEAM Equity Library Partner*)

“A lot of programs like camps and [the science museum in the closest city] and things like that require driving up to [the city] or buying kits. I also think a lot of the students that I work with, their parents are first-generation and so they don’t have the education or ability to encourage their children. With my [own] daughter, I’ve grown up in science so I’m going to be teaching it from when she’s little, but for a lot of these parents, they can’t teach what they don’t know. I think that’s a barrier to a lot of those students if they don’t have it at home.” (Interview with *STEAM Equity Library Partner*)

“I think traditional roles are often a barrier, and opening the vision of what’s available. If the parents are not supportive, then it’s a huge struggle for kids, especially girls, to break out of that role. Not that they can’t, but it makes it harder. You really have to roll over the parents. It’s really hard to figure out how to do that. ... Just the vision, yes, you can do this. You can. You can think beyond working at the nursery or whatever mom and dad do. You know, working as a domestic. You could think beyond that.” (Interview with *STEAM Equity Librarian*)

Changes in staff at the library and at partner organizations could also be a challenge for engaging Latinx audiences, just as they were with tweens.

“Our staff member who had a lot of connections to that community and moved to a different position, ... did impact that. So you know, that link that we were depending on wasn’t there. We did still have some connections, and we did still use those some. But that was definitely somewhere that again, that’s kind of one of those regret areas. I think that was really the thing that made it difficult.” (Interview with *STEAM Equity Librarian*)

Sustaining STEAM Learning

Community Partnerships

Based on open-ended survey responses, a number of libraries found success working with local schools. Activities included bringing programs into classrooms, collaborating on after school activities, and hosting library visits. Partnerships with other community organizations such as 4H and the local Parks and Recreation Department, and others who brought in their own resources (e.g., museums, STEM education groups) helped support library programming and attract audiences.

The main challenge libraries faced with partnerships involved establishing a connection and subsequent follow-through. Some were either unable to engage with a potential partner or had challenges with a lack of follow-up communication. They felt that partnerships require clear communication, mutual trust and understanding of common goals, and shared benefits in order to succeed. They reported that relationship building takes time and library staff need to remain persistent in outreach to engage harder-to-reach communities or organizations.

“This grant has been wonderful for us and just the chance to provide this to our community. I brag all the time that that we are blessed to have gotten this grant—being 1 of 12 in the nation and that it is going to impact our community for a long time to come. The kids that actually are participating in the programs and taking home the kits now. It’s going to be still impacting our community in 15 or 20 years because of what they learned or saw.”

(Interview with *STEAM Equity* Librarian)

“I think I did learn some about building those relationships. ... I don’t know if this is really learning, but a little bit of an internalization—how are we making sure that this is accessible to all of our customers? I think having this that had an emphasis on Spanish-speaking customers was helpful and, three or four years of us having to be intentional about that. That will hopefully then bleed over into the future as well.” (Interview with *STEAM Equity* Librarian)

Next Steps for Libraries

Based on post-survey responses, many libraries are planning to continue and build upon their experience with *STEAM Equity* by continuing and expanding their STEAM-related offerings with a focus on making resources to patrons of all ages and encouraging participation from various groups. Many libraries also plan to continue building on partnerships they fostered during the project and have plans to bring STEAM activities to local events and schools.

Similarly, libraries plan to continue offering programming specifically aimed at engaging tweens and Latinx audiences. They also plan to continue or expand their outreach efforts to directly engage with their community, especially Latinx audiences and schools. Libraries also described plans to continue developing culturally responsive programming to engage Latinx audiences (e.g., bilingual story time, family programs) and collaborate with community organizations to further engage with and reach Latinx audiences.

“Pretty much everything we already do in the library, in some way we can tie that to STEAM. Pretty much any of our programs has one of the elements, maybe not all. Maybe we’re doing financial literacy in the fall. That’s math, right there. We are of course, doing our STEAM club again in the fall. ... We have a garden in the backyard. I’m like we a lot of what we’re already doing. We just need to maybe focus a little more on the, ‘Hey? Did you realize you’re doing science here? And if you’re learning about this and you like it, here’s other resources to try to keep them interested.’” (Interview with *STEAM Equity* Librarian)

“It was the largest grant that my branch had had. We’d had some other ALA or PLA grants in the past. But this was the largest, and, I think, going through this process and maybe more [becoming] comfortable with that, and more likely to apply for other larger grants in the future, and more comfortable with the process. I think that’s a big one as well in addition to the nuts and bolts of the grant itself.” (Interview with *STEAM Equity* Librarian)

“It’s something that I believe [this] Library will offer on a going forward basis. I don’t think that we’re ever going to let go of STEAM here. It’s here to stay. That is especially rewarding to me because I feel like I had a little part in in helping with that, so I know even long after I’m gone that that’s going to be something that people expect of the library.” (Interview with *STEAM Equity Librarian*)

Conclusion

Project resources helped library staff increase their confidence and ability to develop their own STEAM learning spaces, and to facilitate informal STEAM programming. All the libraries developed multiple self-directed STEAM learning spaces and lending kits, and most planned to continue offering these activities after the grant funding ended.

Libraries increased their understanding of their rural communities’ interests and needs related to STEAM. Although library staff reported mixed success using Community Dialogues as a specific strategy to learn about their communities’ interests, they were able to develop relationships with new partners and deepen their relationships with existing partners by utilizing a variety of outreach and engagement strategies.

Libraries were especially successful at engaging tween audiences, and modestly successful at engaging Latinx audiences. Strategies that engaged tweens included working with partners (especially schools), offering hands-on activities with real-world applications in a social environment, and consulting with youth about how to engage tweens. Strategies that helped engage Latinx audiences included using bilingual materials, investing time to develop relationships with local organizations that serve Latinx audiences, engaging the entire family, having bilingual/bicultural library staff, and understanding the particular interests and needs of Latinx individuals in their community.

Library staff expressed a strong desire to continue offering STEAM-related programming at their libraries in the future. Based on post-survey responses, many libraries plan to continue and expand their STEAM-related offerings, and offer programming specifically aimed at engaging tweens and Latinx audiences. Many libraries also plan to build on partnerships they fostered during the project and bring STEAM activities to local events and schools.