



Moon, Mars & Beyond Summative Evaluation Report

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Contents

<i>Moon, Mars & Beyond Executive Summary</i>	ii
Overview of <i>Moon, Mars & Beyond</i>	1
Project Description	1
Evaluation Overview	2
Findings	4
Impact of NASA Resources on Library Patrons	4
Impact of NASA Resources on Library Staff.....	16
Development of Library Partnerships.....	21
Reaching Underrepresented Audiences.....	24

Executive Summary of the Evaluation of *Moon, Mars & Beyond*

In 2021, the Space Science Institute's (SSI) National Center for Interactive Learning (NCIL) was awarded funding from NASA's TEAM II Program to develop and implement *Moon, Mars, and Beyond*. The project partnered with seven public libraries to: (1) increase youth and adult patrons' interest in and engagement with the NASA's Moon/Mars program, its contributions to STEM disciplines, and related STEM careers; (2) build libraries' capacity to deliver (and sustain) NASA-based STEM learning experiences for their communities; and (3) reach underserved and underrepresented library populations in their communities. Each library received professional development and other resources, and hosted a traveling exhibit for two months. Partner libraries were also expected to host two Community Dialogues and conduct at least ten programs for patrons during the grant period.

Patrons found the *Moon, Mars, and Beyond* exhibit and programs engaging, and a substantial number of patrons were interested in learning more about NASA missions and STEM careers. Patrons were impressed by the professional quality of the exhibit, and especially enjoyed the hands-on interactive activities.

Resources and supports provided by the project increased the capacity of library staff to offer Earth and space science-related programs and activities. Partner libraries offered a wide range of activities and partner library staff developed their interest, experience, knowledge, and confidence in developing and facilitating STEM-related programming. Libraries are interested in continuing to offer Earth and space science-related learning activities. They felt supported by the project team and found in-person and one-on-one communications especially useful. Virtual and asynchronous supports (e.g., webinars, Zoom calls, the online community) were utilized less and viewed as slightly less useful.

Library staff developed partnerships that supported programming; however, Community Dialogues were not necessarily the best way for all libraries to make connections. All partner libraries worked with community partners who offered programs for library patrons. They also worked with partners to bring in audiences and promote events. Additionally, library staff grew their capacity to identify and work with community partners. Although some libraries had success using the Community Dialogue strategy to connect with community partners and inform their programming, others faced challenges. Many found it challenging to foster interest in the dialogues and experienced low or no attendance.

***Moon, Mars, and Beyond* helped some libraries reach underrepresented populations in STEM.** The exhibit created excitement and brought in some new people. Partner library staff reported becoming more experienced and confident facilitating programming for underserved audiences. However, most libraries reported only moderate or slight success in reaching the specific underrepresented groups they hoped to engage with *Moon, Mars, and Beyond*. In addition, individuals from minoritized racial/ethnic groups were less likely to say they would recommend the exhibit to others, which could impact future participation since it's not generating as much word-of-mouth promotion.

Overview of *Moon, Mars, and Beyond*

Moon, Mars, and Beyond brought NASA and space science learning experiences to eight public libraries in 2022-23 through a traveling exhibit and professional development for library staff. This report summarizes the findings regarding the impact of the exhibits and accompanying project activities on host librarians and their patrons.

Project Description

In late 2021, the Space Science Institute's (SSI) National Center for Interactive Learning (NCIL) was awarded funding from NASA's TEAM II Program to develop and implement *From Our Town to the Moon, Mars, and Beyond: Increasing the capacity of libraries to engage the public in NASA's journey*. The objective of *Moon, Mars, and Beyond* was to partner with public libraries to inform, engage, and inspire new and underserved public audiences using a combination of a traveling exhibit and professional development.

As articulated in the proposal to NASA, the *Moon, Mars, and Beyond* project had the following goals:

1. **Goal 1.** Increase youth and adult patrons' interest in and engagement with the NASA's Moon/Mars program, its contributions to STEM disciplines, and related STEM careers.
2. **Goal 2:** Build the capacity of public libraries nationwide to utilize NASA resources and deliver inspirational and effective NASA-based STEM learning experiences for their communities.
3. **Goal 3.** Create innovative collaborations between project team members, NASA mission partners, and public libraries to provide sustained STEM programming for both youth and adults.
4. **Goal 4.** Effectively reach underserved and underrepresented library populations in their communities.

The *Moon, Mars, and Beyond* exhibit (an updated version of NCIL's previously developed *Discover NASA* exhibit) included multiple hands-on activities, several interactive computer kiosks, and display panels, all focused on Earth and space science and NASA resources.

Seven public libraries were selected through an application process to host *Moon, Mars, and Beyond* for approximately two months each. (One additional library located near NCIL served as a "shake-down" site and hosted the exhibit shortly after it was developed; this pilot library did not participate in project training or evaluation activities.) Three of the seven libraries had previous experience participating in other NCIL projects focused on providing STEM learning experiences.¹

Two staff members from each library attended a two-day, in-person training (held in April 2022) during which they learned about the set-up/take down and content of their exhibit, as well as associated

¹ Two libraries had previously hosted one or more NCIL STEM travelling exhibits. The lead librarian from a third library had experience hosting multiple similar NCIL-sponsored exhibits, although she moved to a different library after being selected to participate in *Moon, Mars, and Beyond*, and her new library had not previously participated in any NCIL-sponsored activities.

programming and other resources. Library staff also participated in multiple online webinars regarding specific topics (e.g., how to host a Community Dialogue to collect information from community members) as well as regular check-in calls. Over the year and a half between when the in-person training was held and the exhibit tour ended, a few of these staff left their libraries and other librarians² took over the responsibilities associated with hosting the exhibit and planning programming.

Evaluation Overview

Education Development Center (EDC) conducted the external evaluation of *Moon, Mars, and Beyond*. The evaluation focused on whether and how the *Moon, Mars, and Beyond* project influenced patrons' interest in the NASA/STEM topics presented in the exhibit and associated library programs; librarians' ability to deliver programming and develop community partnerships to sustain such programming; and reached underserved library populations.

The following evaluation questions were developed regarding the implementation and impact of the exhibit and accompanying project activities on the host librarians and patrons:

1. To what extent do youth and adult library patrons at *Moon, Mars, and Beyond* host libraries become more interested and engaged in the NASA/STEM topics presented in the exhibit and related programming?
2. Does the professional development delivered by *Moon, Mars, and Beyond* help host librarians feel confident in delivering informal STEM programming using NASA resources? To what extent is their interest and knowledge about delivering STEM-based library programming using NASA resources increased?
3. To what extent do *Moon, Mars, and Beyond* team members, library staff, and NASA mission partners develop partnerships to provide STEM programming for youth and adults?
4. Are the *Moon, Mars, and Beyond* exhibit and programming effective in reaching underserved library populations? To what extent does *Moon, Mars, and Beyond* succeed in reaching the targeted library participants at the host libraries?

The evaluation utilized mixed methods to investigate the implementation of the project and its outcomes, and to answer the evaluation questions. Institutional Review Board approval was received for the evaluation plan and instruments before data collection began. EDC administered pre- and post-exhibit surveys to library staff who hosted the exhibit; collected patron surveys; conducted a site visit at two host libraries (during each site visit, an evaluator observed patrons interacting with the exhibit, interviewed patrons, and observed a library program); and reviewed final exhibit reports. Table 1 shows the data collection instruments, when they were administered, and the data collected.

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

Table 1. Summative Evaluation Instruments and Timeline for Administration

Instrument	When Administered	Responses Received
Librarian Pre-Survey (Appendix A)	March 2022, prior to in-person training	27 responses (77% response rate); received at least 3 responses from each of the 7 host libraries <i>Complete pre-survey results in Appendix B</i>
Librarian Post-Survey (Appendix C)	November 2023, after <i>Moon, Mars, and Beyond</i> exhibit left final library	15 responses (48% response rate); received responses from 1-5 library staff from each of the 7 host libraries
Library Patron Survey (Appendix D)	While exhibit was at each library; available in English and Spanish on paper and online	334 surveys from 6 of the 7 host libraries
Library Staff Interviews (Appendix E)	Within 1-2 months after exhibit left each library (library staff at two libraries who received site visits were interviewed as part of the site visit)	Interviewed 9 library staff (1-2 staff from each of the 7 host libraries)
Site visit to two libraries hosting <i>Moon, Mars, and Beyond</i> to observe patrons interact with exhibit, interview library patrons, interview library staff, and observe library staff conduct exhibit programming (Appendix F)	July and November 2022	2 site visits; observed 2 programs, interviewed 6 patrons, observed 14 patron groups interact with exhibit
Exhibit Report Form	NCIL administered immediately after exhibit left each library to collect information about exhibit visitation and programming offered during the exhibit	7 reports from all 7 host libraries

Findings

This report is organized around the four major guiding evaluation questions regarding *Moon, Mars, and Beyond's* impact on (1) library patrons; (2) library staff; (3) development of library partnerships; and (4) success in reaching underrepresented audiences. Results from all relevant data sources are presented together for each question.

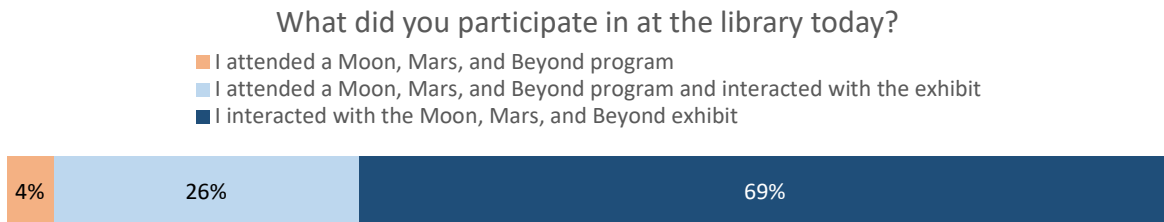
Impact of NASA Resources on Library Patrons

One of the goals for the *Moon, Mars, and Beyond* project was for youth and adult library patrons at host libraries to become more interested and engaged in the NASA/STEM topics presented in the exhibit and related programming. This section describes findings related to the impact of project activities on library patrons.

Patrons found the *Moon, Mars, and Beyond* exhibit and programs engaging

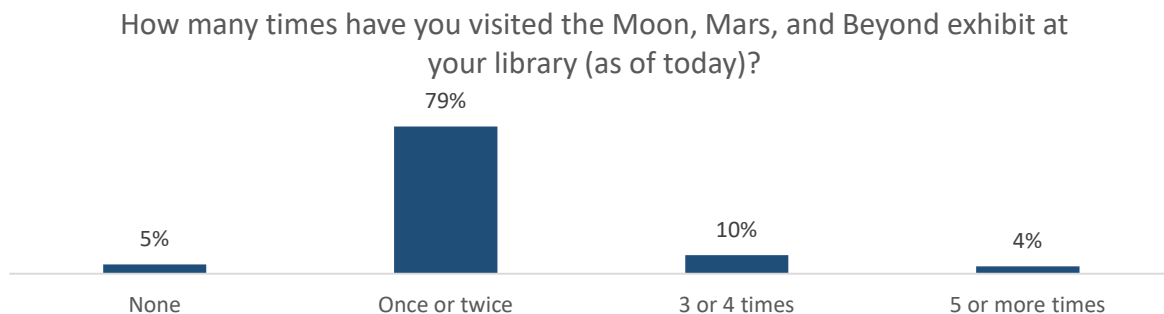
As shown in **Figure 1**, nearly all visitors (96%) who completed a survey reported interacting with the *Moon, Mars, and Beyond* exhibit during their visit. Only 4% reported attending a program but not interacting with the exhibit. At the time they completed the survey, most respondents (79%) reported visiting the exhibit once or twice (**Figure 2**).

Figure 1. Nearly all respondents interacted with the exhibit during their visit.



Source: Patron Surveys (n = 270)

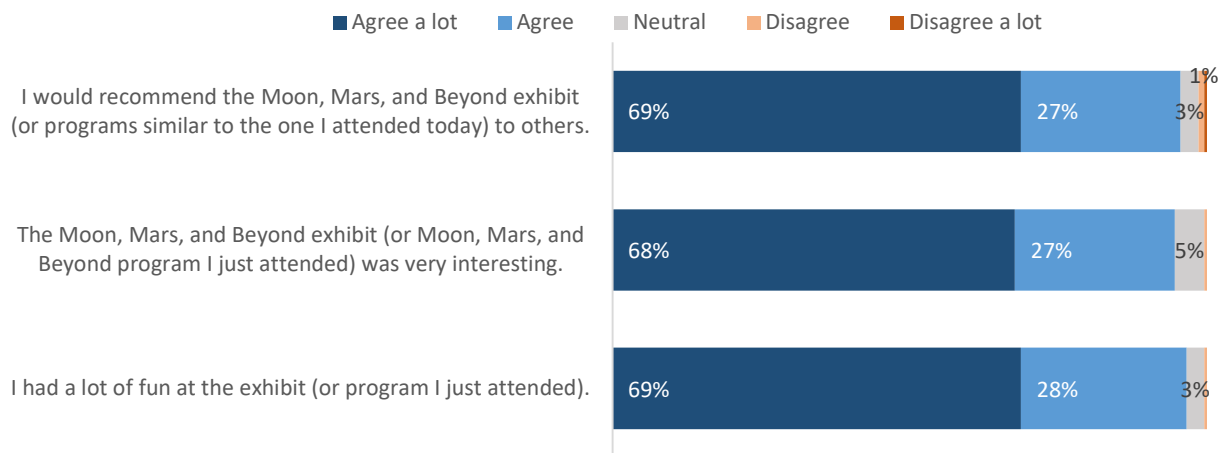
Figure 2. Most respondents reported visiting the exhibit once or twice.



Source: Patron Surveys (n = 326)

When asked about their experience with the exhibit and/or program they just attended, almost all the patrons agreed that it was interesting, they had fun, and they would recommend it to someone else, with about two-thirds of respondents “Agreeing a lot” with these statements (**Figure 3**).

Figure 3. More than two-thirds of respondents strongly agreed that their experience was interesting, they had fun, and they would recommend it to someone else.

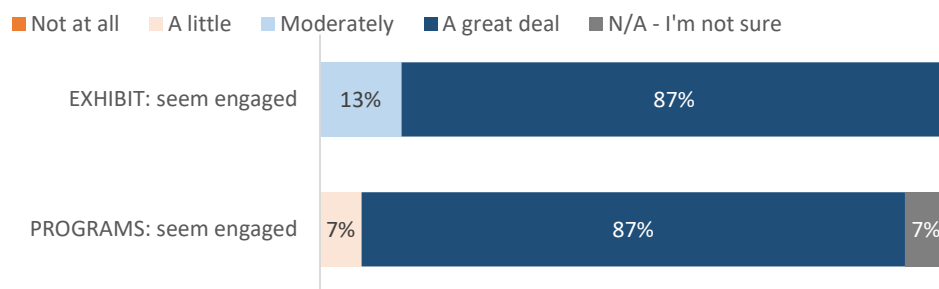


Source: Patron Surveys (n = 327-331)

Library staff reported that the majority of patrons found both the *Moon, Mars, and Beyond* exhibit and associated programs engaging (**Figure 4**). Almost nine out of 10 librarians thought that their patrons seemed “A great deal” engaged. Librarians reported approximately equal levels of patron engagement and interest for both the exhibit and programs.

Figure 4. Library staff reported that the majority of patrons found the Moon, Mars, & Beyond exhibit and programs engaging.

In your opinion, to what extent did patrons interacting with the Moon, Mars, and Beyond exhibit or at your library's Moon, Mars, and Beyond programs...

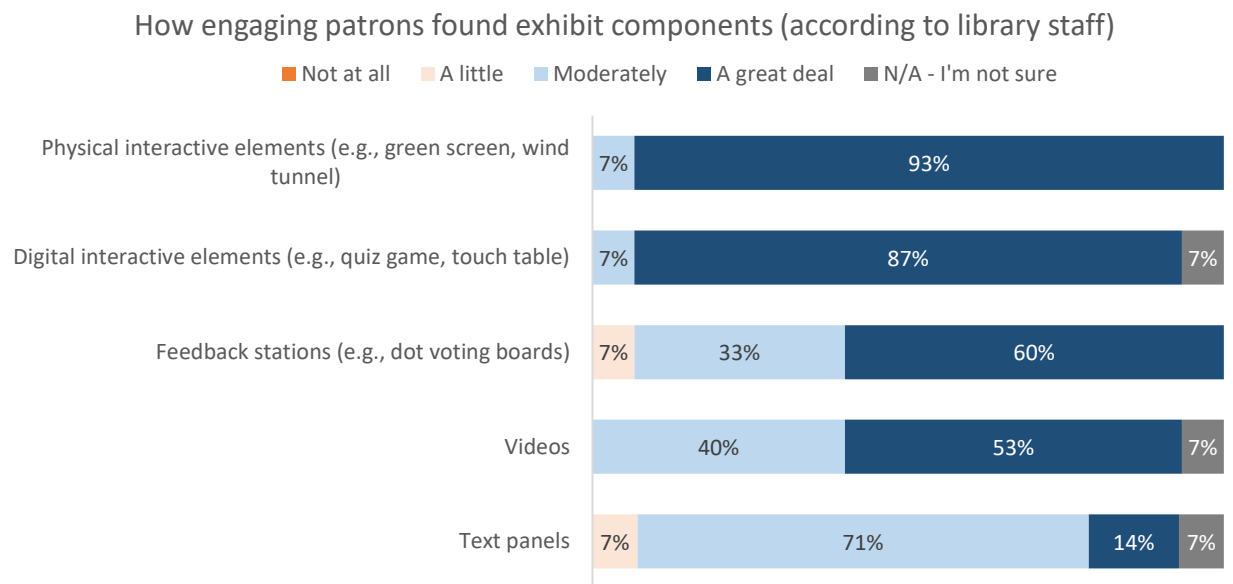


Source: Partner Library Post-Survey (n = 15)

In interviews and on the final report forms, library staff reported that the exhibit was well received by patrons. Patrons were impressed by the quality of the exhibit and the information provided, and appreciated that an experience like this was available at their local library.

Library staff reported that patrons especially enjoyed the hands-on activities, including both physical and digital interactive elements (**Figure 5**). Components such as the Quiz Game, green screen, wind tunnel, and dot-voting/sticky note boards were especially popular. Librarians noted that the *Moon, Mars, and Beyond* exhibit offered something for all ages and audiences.

Figure 5. Library staff reported patrons found the interactive parts of the *Moon, Mars, and Beyond* exhibit the most engaging, and text panels were the least engaging.



Source: Partner Library Post-Survey (n = 14-15)

Overall, library staff felt that, although some components were used less than others, the exhibit was very engaging for visitors. Several patrons—including youth—told library staff that they were sad to see the exhibit leave. Librarians' comments included:

"Our audience loved how interactive the exhibit was, and how there seemed to be something for each age."

"We could see that they also enjoyed the variety in each of the pieces and were really excited around every corner with what came next."

"We had quite a few families who were very interested in the wind tunnel, and their kids would play with it for upwards of 30 to 45 minutes at a time. We had involvement from youth, teens, and adults alike! There were so many great questions about the science behind it. It was a simple exhibit but drew great attention and exploration!"

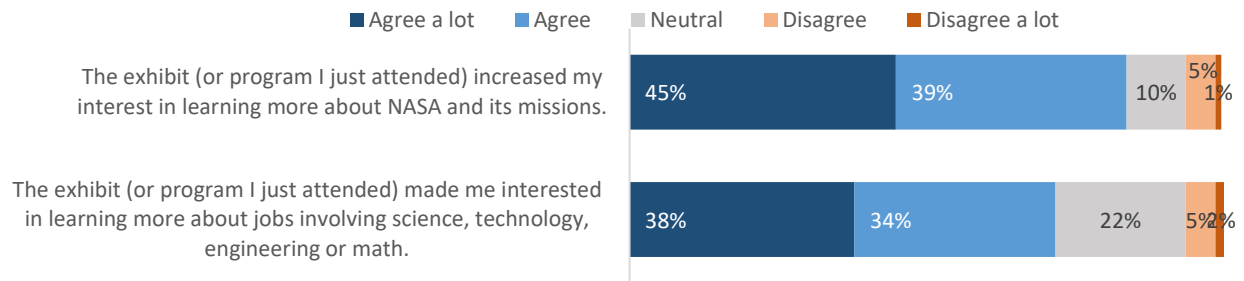
"The audiences liked the exhibit as a whole. However, the younger children were mesmerized by the wind tunnel—so much so that we are buying one."

“They liked how it was so hands-on and that everyone could enjoy it. We had many adults with developmental disabilities visit. They liked the concentration of space-related programs in a relatively short period.”

Some patrons become more interested in NASA missions and STEM careers

Patrons were also asked whether the exhibit or program they had just attended increased their interest in learning more about NASA and its missions, as well as whether *Moon, Mars, and Beyond* made them more interested in learning about STEM jobs. More than two thirds of patrons “Agreed” or “Agreed a lot” that *Moon, Mars, and Beyond* made them more interested in NASA missions or STEM careers (**Figure 6**).

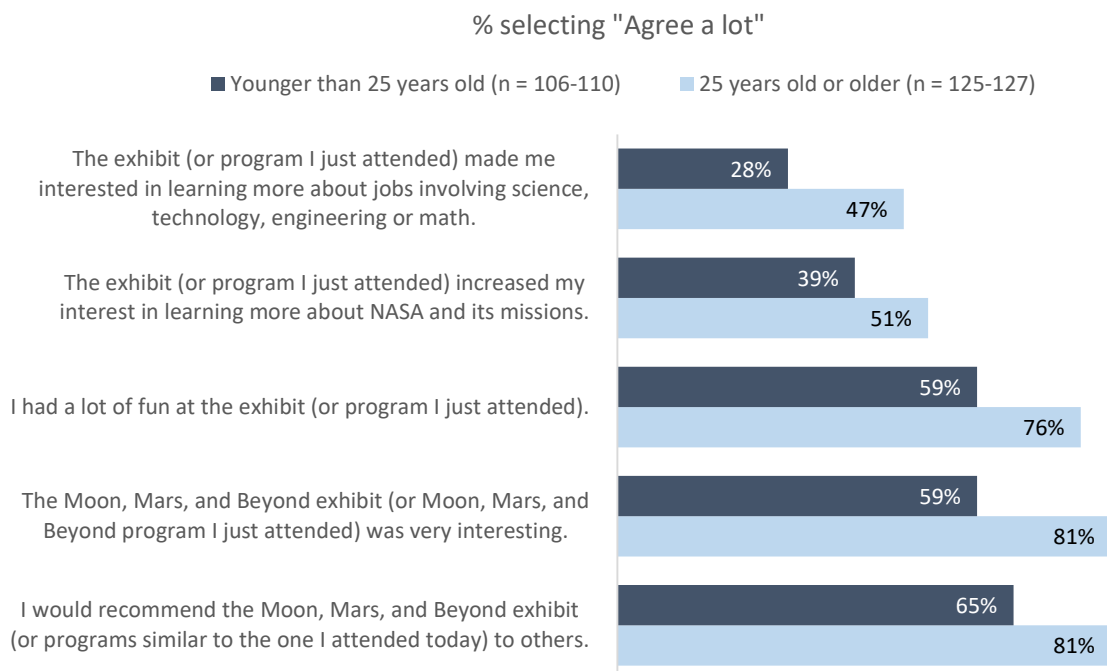
Figure 6. More than two-thirds of respondents agreed that Moon, Mars, and Beyond made them more interested in learning about NASA and STEM jobs.



Source: Patron Surveys (n = 327-328)

Of the questions asked on the patron survey, patrons were least likely to agree that the exhibit made them interested in learning more about jobs involving science, technology, engineering, or math. We investigated whether younger patrons, who might be more likely to be thinking about future careers, scored this question higher than adults. Children and youth under the age of 25 were less likely than adults to agree that *Moon, Mars, and Beyond* made them more interested in learning about STEM jobs (first pair of bars in **Figure 7**). We do not have data to explain this finding. However, some of the libraries hosted field trips for students from nearby schools, and it is possible that some of these “captive” youth were less engaged than adults who chose to visit the exhibit or attend a program on their own. In addition, three quarters of those in the under 25 category were under the age of 15 and many were likely under the age of 10 (based on the comments that some respondents wrote on the survey). Perhaps these youth were so young they are not thinking about careers yet.

Figure 7. Adults (ages 25 years old and older) were more likely to “agree a lot” to all of the statements about their exhibit experience compared to younger patrons.

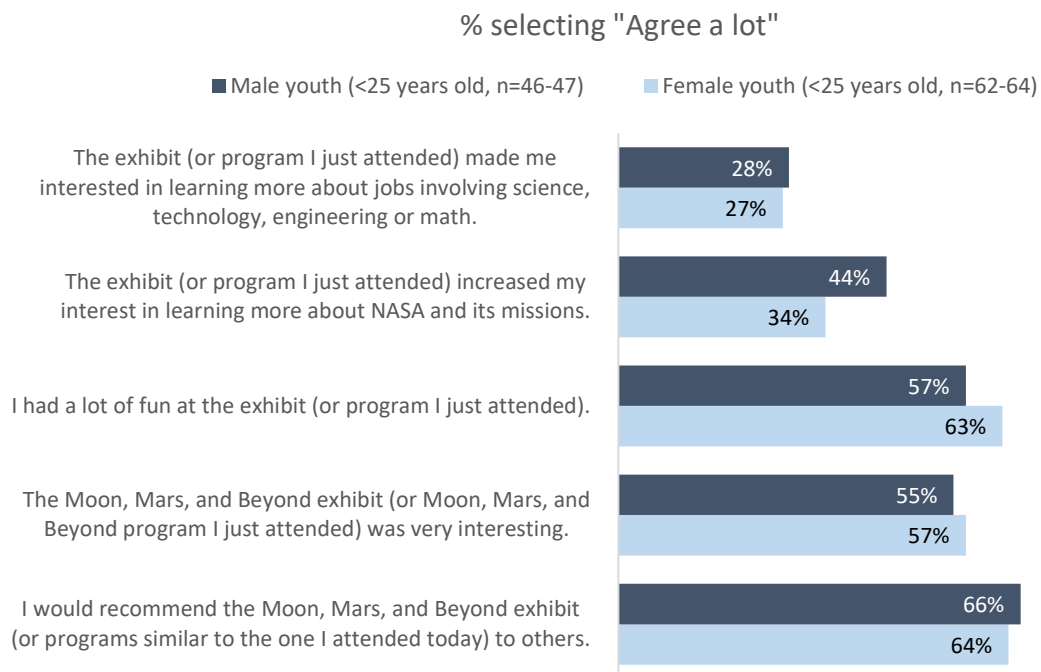


Source: Patron Surveys

Responses to these statements were also examined based on gender identity (younger respondents only) and race/ethnicity (all respondents).

In general, young males and young females (under the age of 25) answered similarly. For example, about a quarter of both male and female youth said the exhibit made them interested in learning more about STEM jobs (first pair of bars in **Figure 8**). However, female youth were slightly more likely to strongly agree that they had fun, while male youth were more likely to report an increased interest in learning more about NASA.

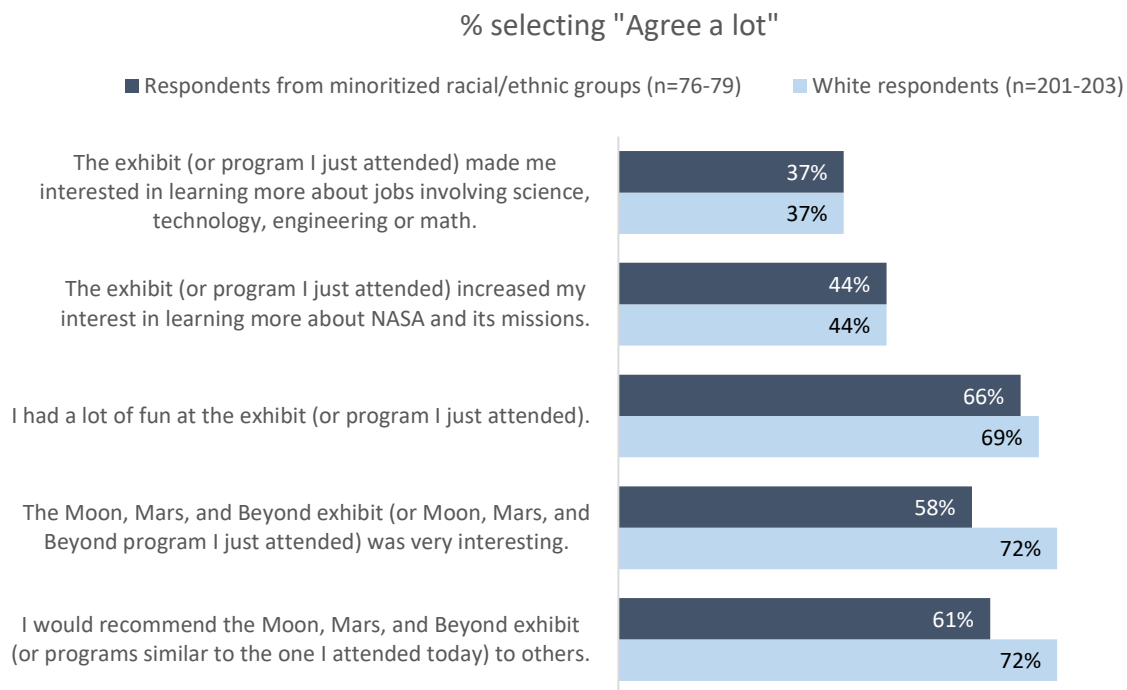
Figure 8. Young females (under the age of 25) were slightly more likely to strongly agree that they had fun, while young males were more likely to report an increased interest in learning more about NASA.



Source: Patron Surveys

When looking at responses by race/ethnicity, respondents from racial/ethnic minoritized groups (defined as Alaska Native, Asian, Black/African/African American, Hispanic/Latino/Latina, Native Americans, Native Hawaiian or Other Pacific Islander, and more than one of these races/ethnicities) were somewhat less likely to “Agree a lot” that they found the exhibit very interesting or that they would recommend the exhibit/program to others than those identifying as White. However, individuals from minoritized groups and Whites were equally likely to “Agree a lot” that the exhibit made them more interested in learning about STEM jobs and in learning about NASA (Figure 9).

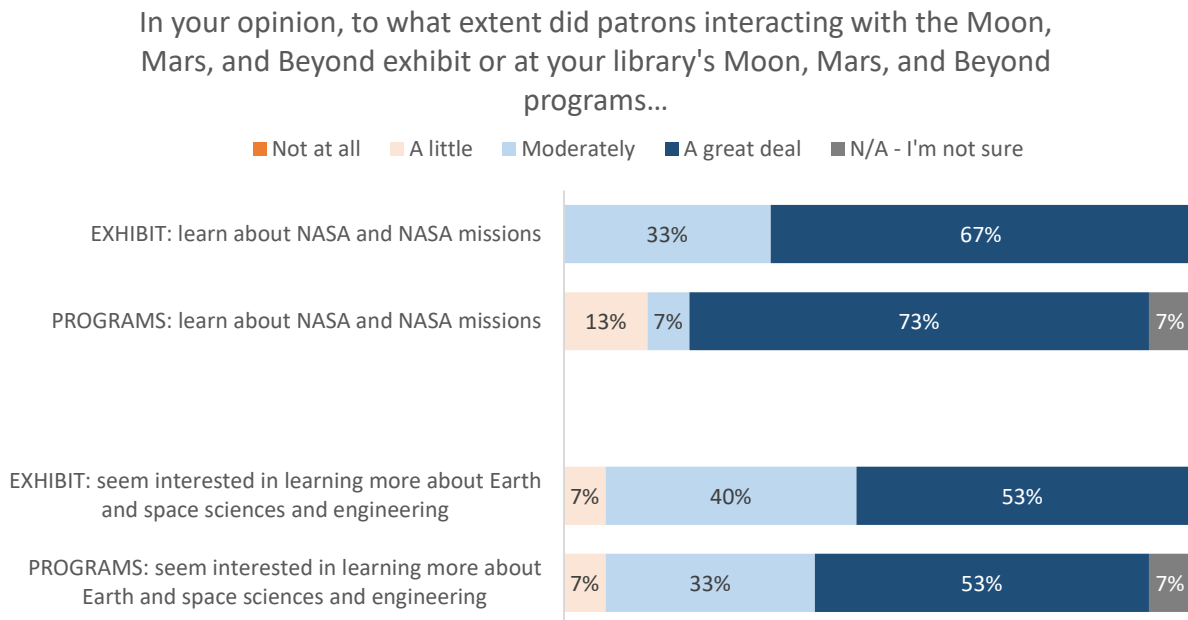
Figure 9. Although individuals from minoritized racial/ethnic groups were less likely than patrons who identified as White to “Agree a lot” that they found the exhibit/program very interesting or that they would recommend the exhibit/program, they were equally likely to say the exhibit/program made them more interested in learning about STEM jobs and about NASA.



Source: Patron Surveys

The majority of librarians (at least two thirds) thought the exhibit and programming helped their patrons learn “A great deal” about NASA and NASA missions (Figure 10). Librarians were somewhat less likely to think their patrons were interested in learning more about Earth and space sciences or engineering, with just over half of library staff indicating that patrons were “A great deal” interested in learning more about these topics.

Figure 10. Library staff indicated that they thought the exhibit and programs helped patrons learn about NASA.



Source: Partner Library Post-Survey (n = 15)

In interviews, libraries saw patrons benefiting in a number of ways, including getting visitors talking and thinking about space, and changing peoples’ thinking about what the library can offer. Librarians also thought patrons learned about NASA science and missions. Library staff comments included:

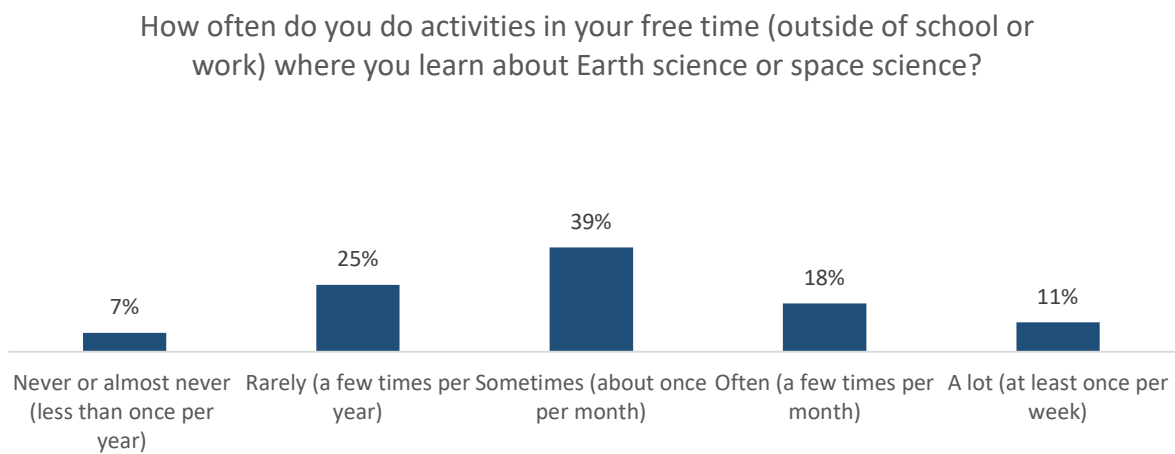
“Teens and tweens liked our space crafting programs that involved some science without being too heavy handed about it. Example—when making the planetary bracelets, they learned about the relative size of the planets, order of the planets, and why we didn’t have a bead for Pluto. This led to them making up a song, ‘We Don’t Talk About Pluto’ sung to the tune of ‘We Don’t Talk About Bruno.’ I wish I had thought to capture this on video.”

“The Mission to the Moon Series family programs were hosted by a well-loved community partner, The Children’s Museum, and had great participation. The program introduced families to the Artemis mission and imagining future lunar settlements through a group prototyping activity.”

***Moon, Mars, and Beyond* provided an opportunity for individuals not otherwise exposed to Earth and space science-related learning activities to learn about NASA**

About one third of patrons who completed the survey indicated that Earth and space science-related free-choice learning activities are something they never or almost never (7%) or rarely (25%) participated in (Figure 11).

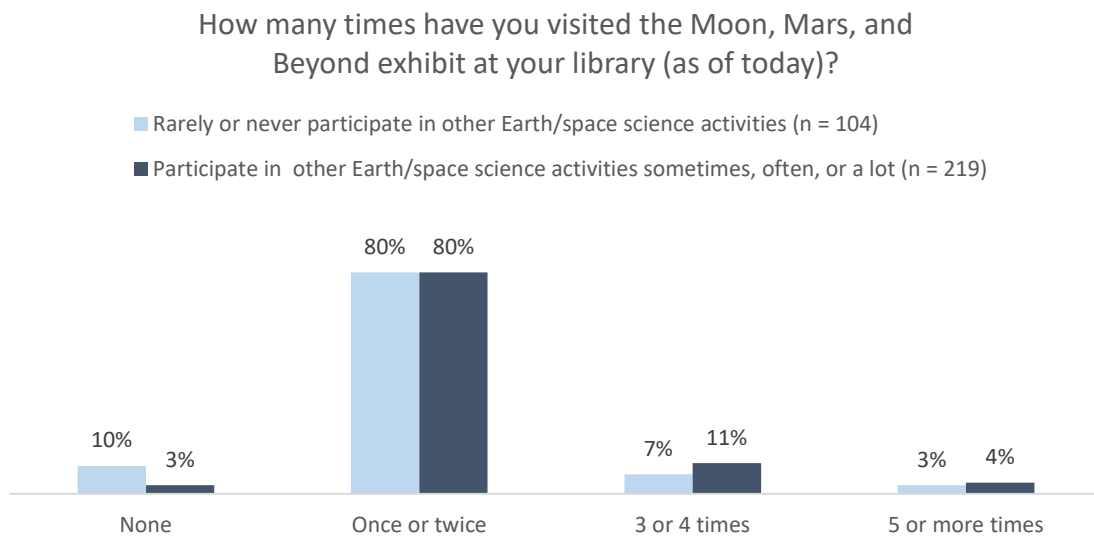
Figure 11. Most respondents participate in free-choice learning activities related to Earth or space science about once per month or less.



Source: Patron Surveys (n = 323)

We examined patrons' responses to other survey questions based on the frequency they reported engaging in free-choice, Earth or space science learning activities, comparing those who said they never or rarely did so (about one third of respondents) to those who said they did so at least once month (the remaining two thirds of respondents). Most respondents (80%) reported visiting the *Moon, Mars, and Beyond* exhibit once or twice, whether they were "frequent" or "infrequent" participants in other free-choice learning experiences related to Earth or space science (**Figure 12**). However, those who had visited the exhibit more often were also slightly more likely to be "frequent" participants in other free-choice learning experiences compared to those who rarely or never engaged in other such experiences.

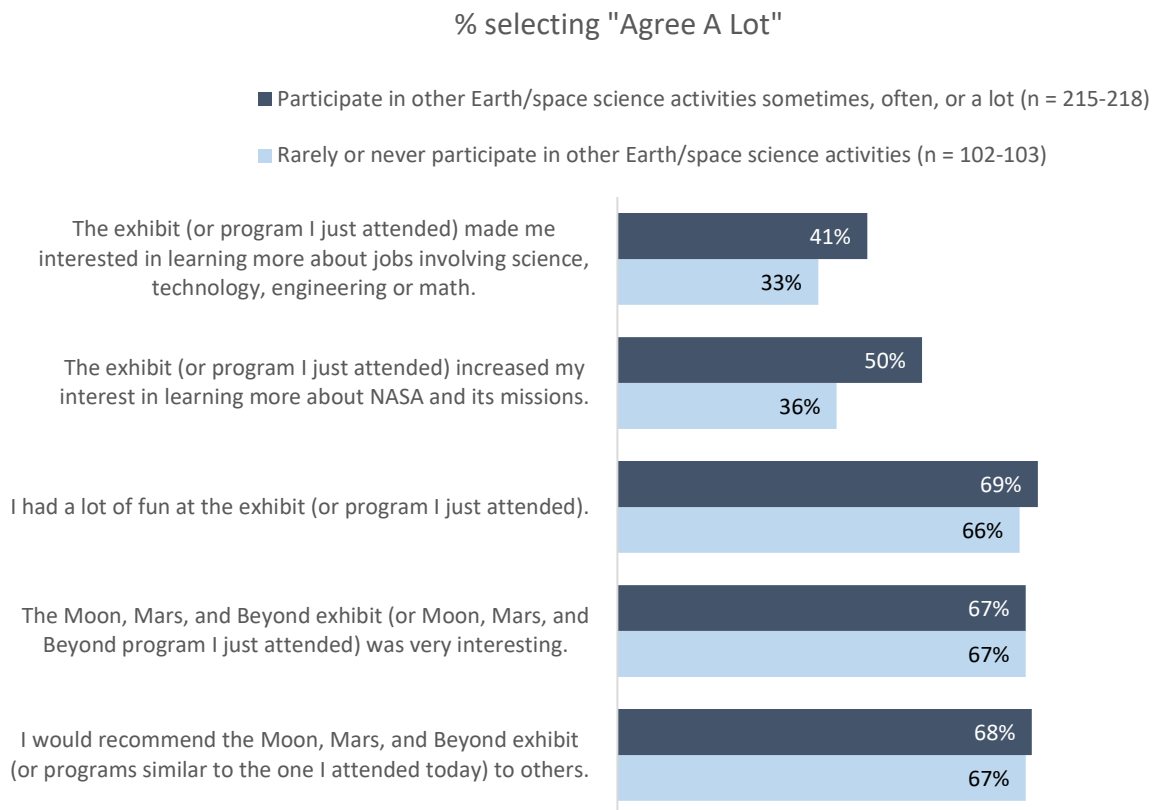
Figure 12. Most respondents (80%) reported visiting the *Moon, Mars, and Beyond* exhibit once or twice, whether they were so-called "frequent" or "infrequent" participants in other free-choice learning experiences related to Earth or space science.



Source: Patron Surveys

Patrons who already participated in other free-choice, Earth/space science learning experiences frequently were somewhat more likely to agree that the exhibit or program they attended made them more interested in learning more about STEM jobs and about NASA than patrons who rarely or never participated in other Earth/space science experiences (**Figure 13**). For example, 50% of “frequent” Earth/space learners said the *Moon, Mars, and Beyond* exhibit or program increased their interest in learning more about NASA and its missions, compared to 36% of “infrequent” Earth/space learners. Although there remains an interest gap, it is noteworthy that more than a third of patrons who rarely or never engaged in such learning activities said the exhibit and/or program made them want to learn more. *Moon, Mars, and Beyond* exposed the “infrequent” learners to experiences they may not have had otherwise—getting them in the door and potentially making it more likely that they want to participate in such experiences again in the future.

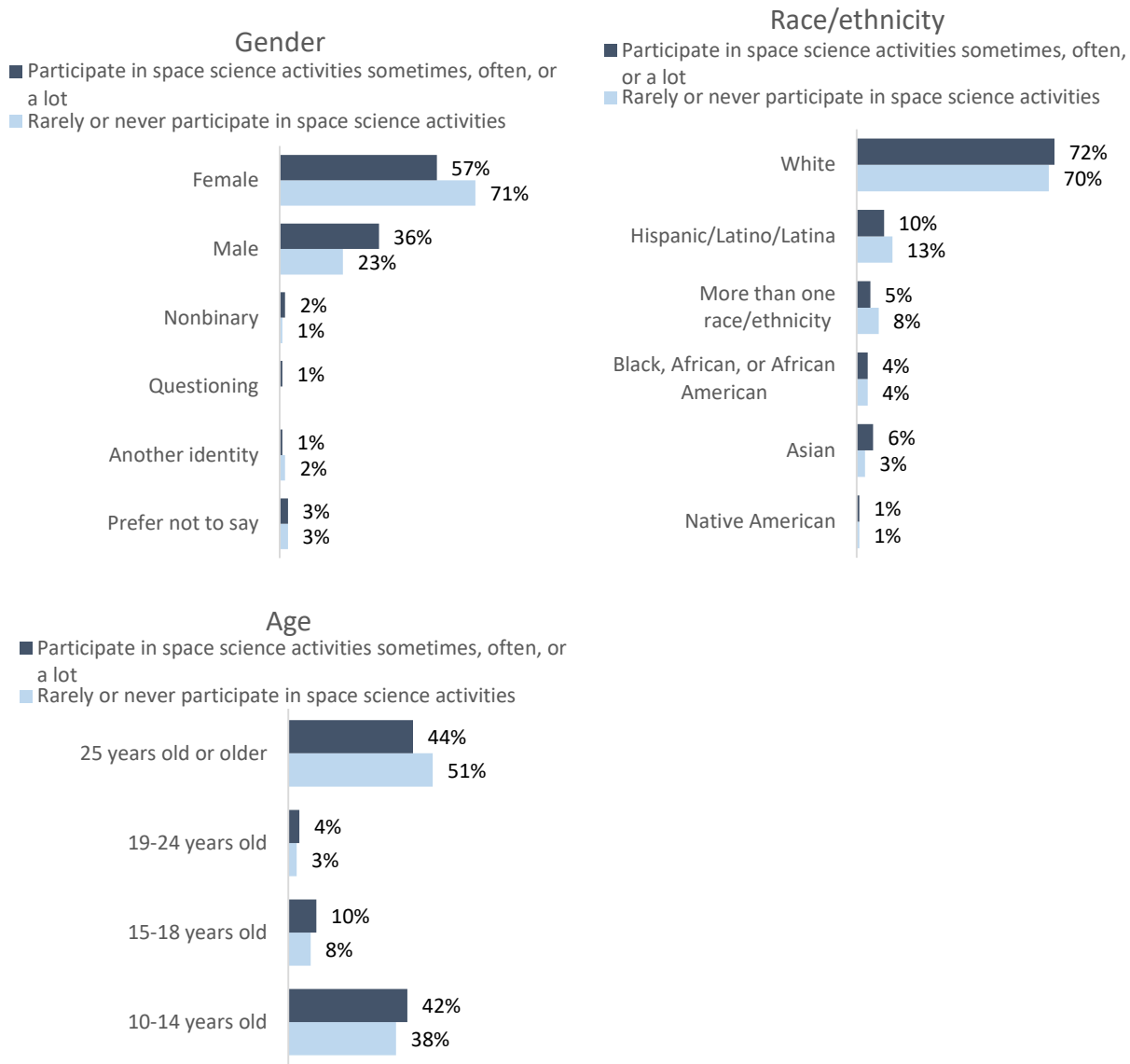
Figure 13. “Frequent” participants in other free-choice, Earth/space science learning experiences were more somewhat more likely than “infrequent” participants to agree that the *Moon, Mars, and Beyond* exhibit or program they attended made them more interested in learning more about STEM jobs and about NASA.



Source: Patron Surveys

Patrons who reported being frequent participants in other free-choice learning experiences related to Earth or space science were more likely to be male, White, and/or over the age of 25 (Figure 14). The *Moon, Mars, and Beyond* exhibit provided females, individuals from minoritized racial/ethnic groups, and youth with opportunities to engage in learning about Earth or space science that they may not have had otherwise. However, as noted above, there is still a gap and an opportunity to improve access and opportunity for individuals who are from groups underrepresented in Earth and space science fields.

Figure 14. Patrons who reported being frequent participants in other free-choice learning experiences related to Earth or space science were more likely to be male, White, and/or over the age of 25.*



Source: Patron Surveys*

The figures above show the demographics of patrons by whether they reported participating in space science activities “sometimes, often, or a lot” or “rarely or never.” For example, as shown in the Gender figure in the upper left, 71% of those who rarely participate in space science activities identify as female while 23% as male. In contrast, 57% of those who frequently participate in space science activities identify as female while 36% identify as male. Thus, those who participate in space science activities frequently are more likely to identify as male.

Impact of NASA Resources on Library Staff

The *Moon, Mars, and Beyond* project offered a number of resources and supports to partner library staff. An in-person workshop was hosted in April of 2022 and partner library staff were also provided with programming kits, an online community, webinars, monthly virtual check-in calls, and one-on-one communications with the project team. This section describes findings related to the influence of these resources on library staff.

Partner libraries utilized provided resources to provide a variety of learning experiences for patrons

Based on final reports from partner libraries, a total of 169 public programs and 38 field trips were offered. Libraries held multiple events, activities, and programs associated with the exhibit including grand opening programs, which were generally very well attended, as well as family programs, programs for youth, and adult programs. Libraries also offered a range of one-off programs and recurring activities (e.g., story time, weekly crafts). Additionally, all partner libraries used *Moon, Mars, and Beyond* materials, with UV beads mentioned frequently.

On the post survey, all respondents indicated that they hosted in-person programs led by library staff and programs led by community partners (**Figure 15**).

Figure 15. All partner libraries offered in-person programs led by library staff and by community partners.

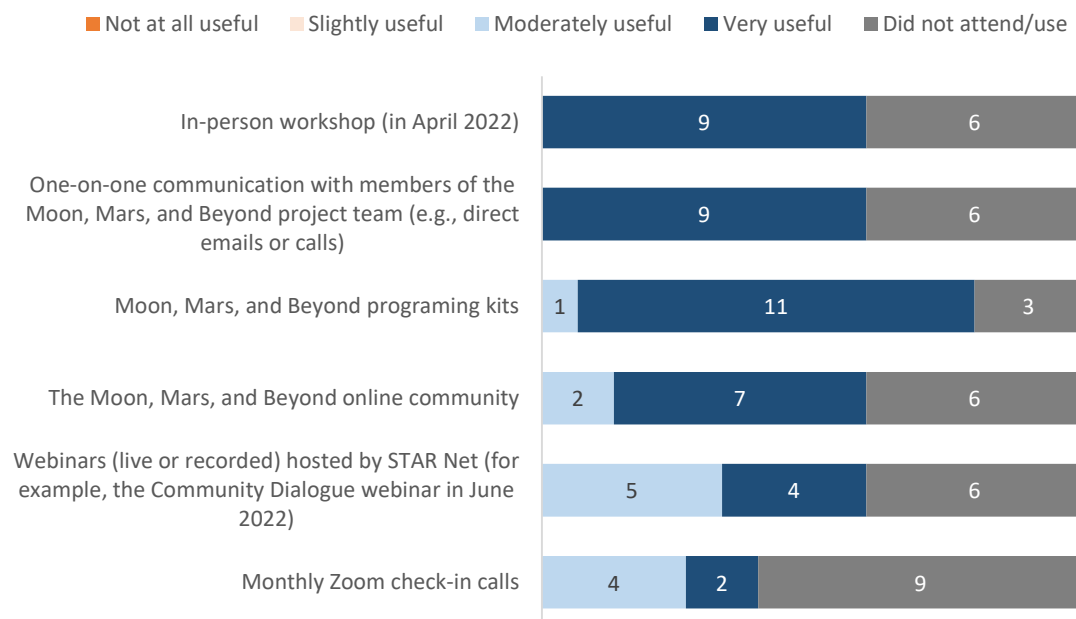


Source: Partner Library Post-Survey (n = 5 Project Directors)

The in-person workshop, one-on-one communications, and programming kits were especially helpful at supporting library staff

As shown in Figure 16, when asked how useful various project resources were, all library staff who reported using a resource indicated that it was “Moderately useful” or “Very useful.” The in-person workshop and one-on-one communications with the project team were viewed as “Very useful” by all who utilized these resources, and nearly all reported that kits and the online community were “Very useful.” Webinars and monthly Zoom check-in calls were more likely than other resources to be viewed as “Moderately useful.” Monthly Zoom check-in calls were also the least utilized resource, with only six of the 15 survey respondents indicating that they attended these meetings.

Figure 16. The in-person workshop and one-on-one communications were very useful to all library staff who utilized these resources.



Source: Partner Library Post-Survey

All libraries were represented at the in-person workshop (although due to staffing changes, not all library staff who were interviewed attended the workshop in person). They found it valuable and useful to:

- Connect with the other libraries involved in the project
- Gain first-hand experience with the exhibit so they knew what to expect when they received it
- Engage with ideas for program activities.

One library staff member said:

“Having the training be hands-on was helpful. You can read about programs. We both have done programs forever. But to get there and see it. I’ve had coding mice forever but never used them. This made me think, I should pull that out.”

Although some library staff reported using the online community (e.g., for programming ideas), most libraries did not post often and they found one-on-one support from the project team to be more useful. Library staff found it easy to reach out to the project team with questions, noting that the team were very accessible and helpful. Additionally, in their final report forms, all partner libraries indicated that they had “just the right amount” of contact with members of the project team.

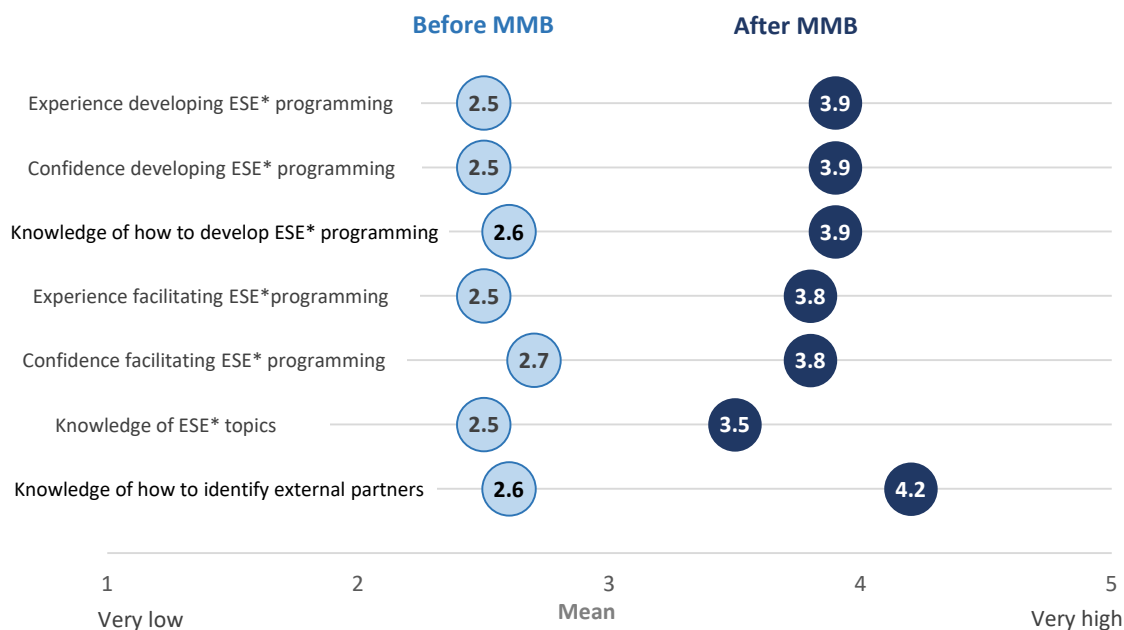
Library staff generally felt well supported. The main challenges they faced involved exhibit set-up or technical challenges with the exhibit. Set-up challenges included exhibit unpacking/setup, components not working, and figuring out how to fit everything in their library. Suggestions for future support included video demonstrations showing how to set up the exhibit and providing the dimensions of exhibit components to libraries ahead of time.

Library staff increased their capacity to offer Earth and space science-related library activities and programs

As shown in **Figure 17**, when asked to reflect on how they felt before participating in *Moon, Mars, and Beyond* and how they felt at the end of the project, library staff, on average, reported an increase of one point or more (on a five-point scale) in their:

- Knowledge of how to identify external partners to support Earth, space engineering programming and activities
- Knowledge of Earth, space, and engineering topics and how to develop earth, space, and how to develop programming and activities related to these topics
- Confidence developing and facilitating Earth, space, and engineering programming and activities
- Experience developing and facilitating Earth, space, and engineering programming and activities

Figure 17. Partner library staff reported increases in experience, confidence, and knowledge associated with developing and facilitating Earth, space and engineering (ESE) programming.



Source: Partner Library Post-Survey, matched questions (n = 15 library staff)

In open-ended responses on the post-survey, library staff further described how they personally benefited from participation in *Moon, Mars, and Beyond*, noting that it was gratifying to offer fun and engaging activities for patrons, and that they were able to grow professionally because they were doing and learning something new. As one library staff member described:

“I learned quite a bit about the space program, all the research that is taking place. I feel more confident about finding resources pertaining to space sciences.”

Library staff are interested in providing more Earth and space science learning experiences in the future

Partner libraries entered the project with an interest in Earth and space science programming, although libraries had varying degrees of prior experience facilitating STEM/STEAM/space science programming. All saw space/NASA programs as of interest to patrons. They felt they were an “equalizer,” a “jumping off point,” and way to draw in audiences (both existing patrons and new).

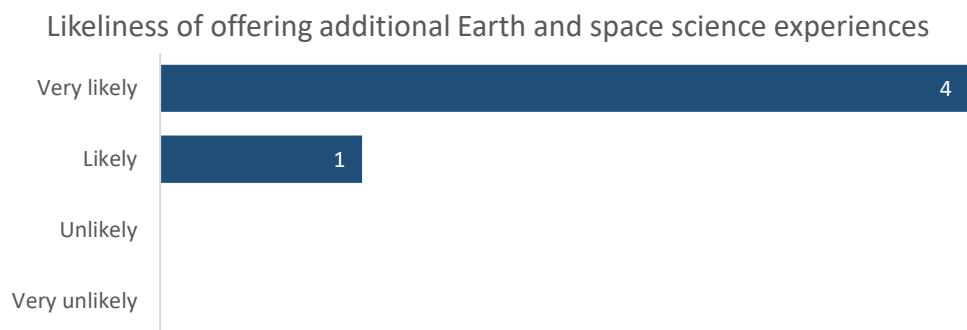
At the end of the project, libraries retained this interest in offering Earth and space science programming. As shown in **Figure 18**, all Project Directors responding to the survey indicated that their library is likely to continue offering Earth and space science learning experiences in the future, and four out of five reported that they were “Very likely” to do so. They noted that that would continue to offer similar programming and utilize resources provided by the project. Additionally, in interviews, library staff mentioned that they may work with partners they had not been able to connect with during the project (e.g., schools) and offer programming associated with upcoming celestial events (e.g., Observe the Moon Night, the upcoming

eclipses). Furthermore, in their final report forms, all partner libraries indicated that they would apply for similar opportunities again in the future. As one library staff member stated:

“Yes, we would definitely apply for an opportunity like this again in the future! We loved being able to bring an exhibit of this caliber/ magnitude to our smaller rural library, and the amount of excitement that was generated in our communities. SSI and partners provided the needed tools for us to sufficiently prep for the exhibit and plan programs, and we got a lot of inspiration and ideas from the in-person training.”

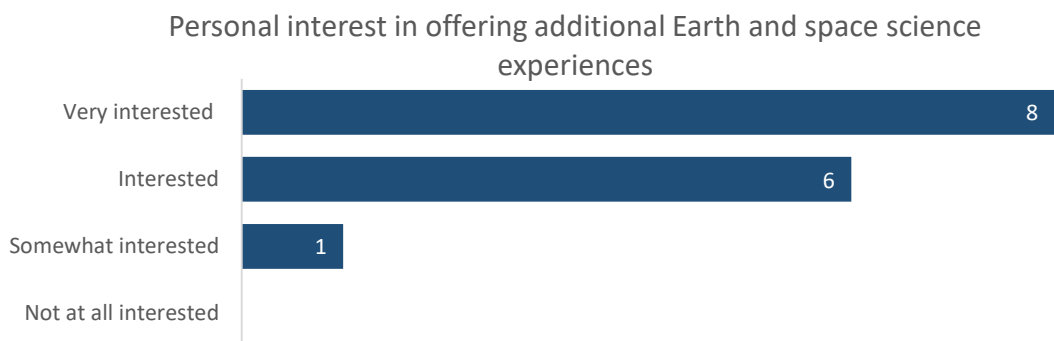
At the individual level, all but one library staff member indicated that they were interested or very interested in offering additional Earth and space science programs and activities (**Figure 19**). Their specific interests varied, with library staff members mentioning interests in other space-related topics and events (e.g., the eclipse), other STEM topics (e.g., geology), and programs for specific audiences (e.g., children, adults).

Figure 18. All partner libraries are likely to continue offering Earth and space science learning experiences.



Source: Partner Library Post-Survey (n = 5 Project Directors)

Figure 19. Partner library staff are personally interested in continuing to offer Earth and space science learning experiences.



Source: Partner Library Post-Survey (n = 15 library staff)

Development of Library Partnerships

Host libraries were expected to develop partnerships in their community. The purpose of these partnerships was to support programming and help libraries better reach and engage underserved audiences.

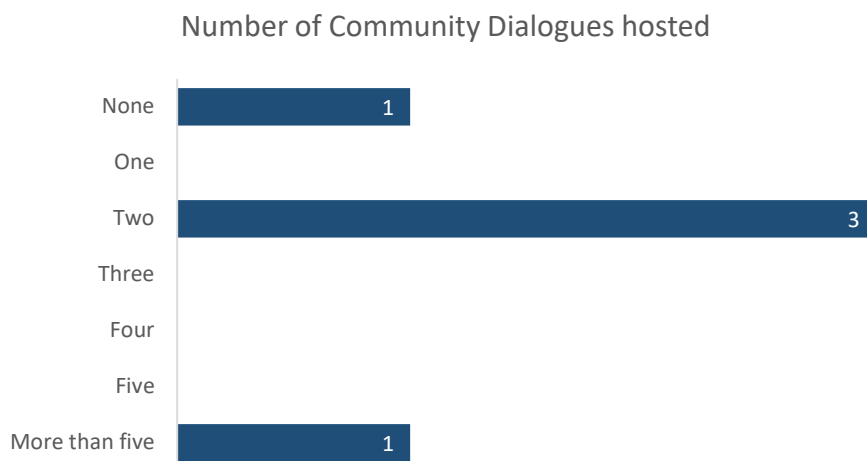
Community Dialogues were moderately useful at supporting partner libraries in programming, but libraries faced challenges engaging their communities through dialogues

Community Dialogues were a strategy used in the project to help libraries learn from and form connections with community members and potential partners. Partner libraries were expected to host two Community Dialogues over the course of the project.

Most libraries hosted the required two Community Dialogues (**Figure 20**). They found them moderately useful at learning about the needs of their community (**Figure 21**) and, in interviews and on their final reports, described gaining ideas for programming (e.g., how to attract tween audiences, identified potential partners to follow-up with). For example, one library described:

“...our first dialogue totally changed our thinking about program planning. We had members of the neurodiverse community...Listening to each group discuss what they wanted and needed from a library program totally changed the way we went about designing the programs.”

Figure 20. Most partner libraries hosted two Community Dialogues.



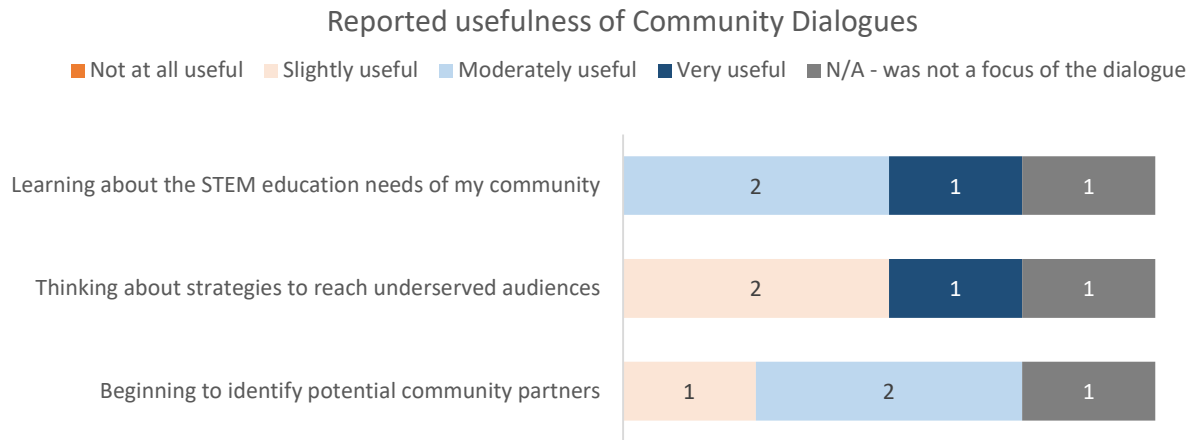
Source: Partner Library Post-Survey (n = 5 Project Directors)

However, libraries faced challenges, mainly with attendance. One library tried to organize a dialogue but was unable to host one due to lack of interest, noting that this type of program may not be suited for her community. Challenges engaging community members was common, with one library staff member describing:

“We cannot get participation. Invitations are always sent out, we are very intentional on who we invite, but we have had no success in getting invitees to come.”

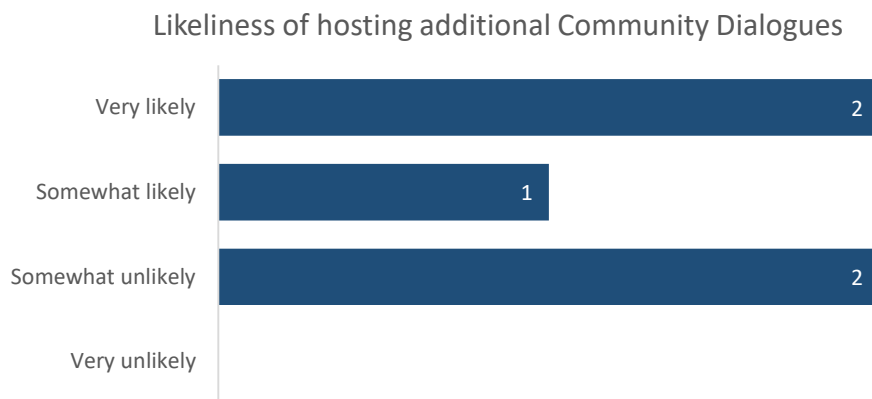
Because of these challenges, libraries varied in their thoughts about utilizing the Community Dialogue approach in the future. As shown in **Figure 22**, two of five project directors noted that they were unlikely to host additional dialogues in the future, with one noting that they would instead “suggest that dialogues be conducted as one-on-one discussions.”

Figure 21. Project Directors reported that Community Dialogues were most useful for learning about the STEM education needs of their community.



Source: Partner Library Post-Survey (n = 4 Project Directors from libraries that hosted Community Dialogues)

Figure 22. Three out of five Project Directors are at least somewhat likely to conduct additional Community Dialogues in the future.



Source: Partner Library Post-Survey (n = 5 Project Directors)

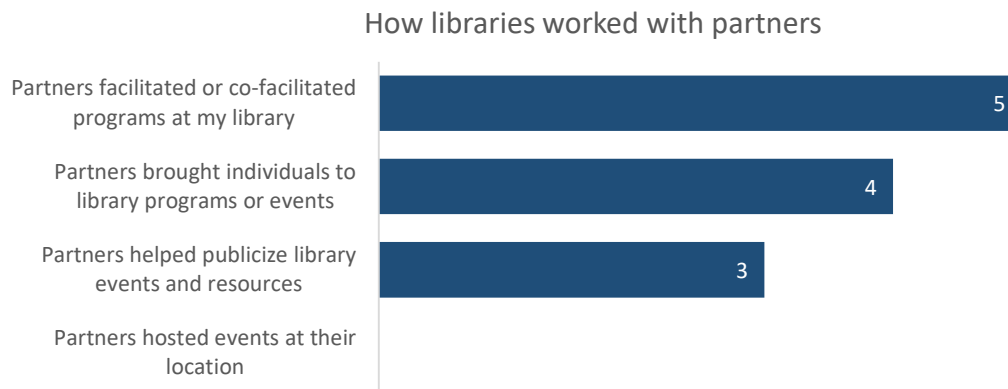
Library staff worked with community partners to support programming and engage audiences

On the post-survey, all partner libraries reported working with community partners who facilitated programs at the library (**Figure 23**). They also frequently worked with partners to reach audiences (e.g., by bringing people to programs, helping to publicize events). In interviews, partner libraries described involving community partners to a great extent, such as by bringing in speakers, offering partner-run programs (e.g., planetarium program), and partnering with local organizations to host festivals.

Library staff also reported that new and strengthened partnerships were ways that they benefited from participation in *Moon, Mars, and Beyond*. As one library staff member described:

“The Moon, Mars, and Beyond project has stretched me in a great number of ways that I otherwise hadn’t been able to experience at my library professionally yet...I also feel that the project has benefited me in helping me in forging new partnerships in the community.”

Figure 23. All partner libraries worked with community partners who facilitated programs at their library.



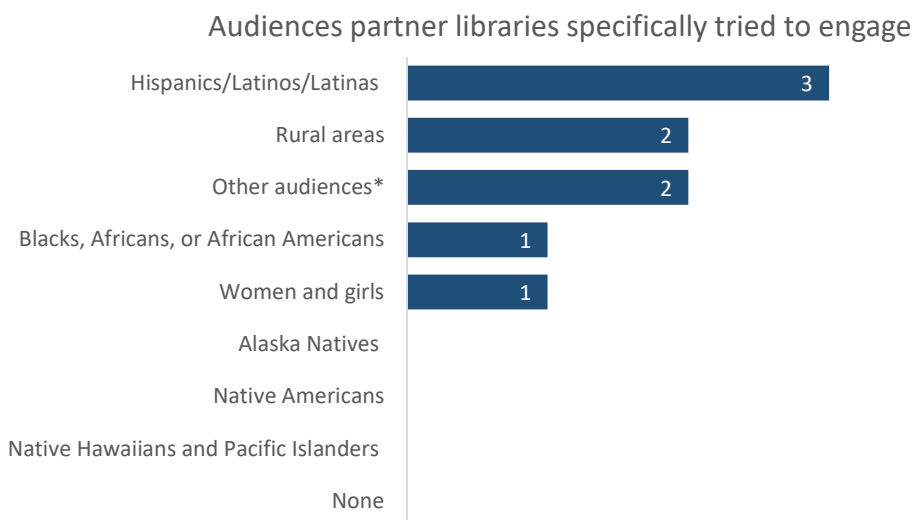
Source: Partner Library Post-Survey (n = 5 Project Directors)
Respondents could select more than one answer

Reaching Underrepresented Audiences

Moon, Mars, and Beyond helped some libraries reach underrepresented populations in STEM

All of the host libraries aimed to engage at least one audience from a group currently underrepresented in STEM. As shown in **Figure 24**, three of the five libraries who completed the post-survey tried to engage Latinx audiences. Two libraries aimed to reach rural audiences. Other audiences (mentioned by one library each) included Blacks, women and girls, South Asians, and individuals with autism and adults with Down syndrome.

Figure 24. All of the *Moon, Mars, and Beyond* libraries aimed to engage at least one audience underrepresented in STEM. Three of the five libraries specifically aimed to engaged Latinx audiences in their community.



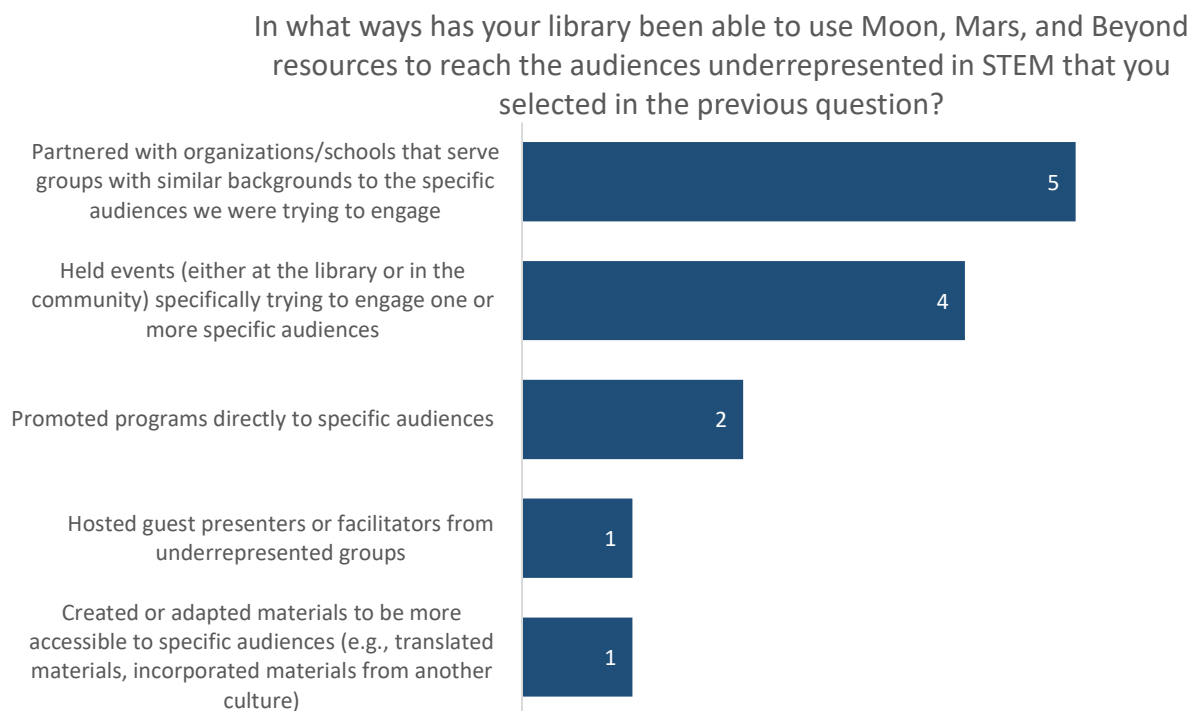
Source: Partner Library Post-Survey (n = 5 Project Directors)

*Other responses included South Asians, and individuals with autism and adults with Down syndrome (one library each)

In interviews, many librarians noted that they serve rural, underserved, and/or low-income populations and often attract patrons from neighboring towns. They appreciated that *Moon, Mars, and Beyond* provided the opportunity to offer their patrons greater access to STEM/space science (e.g., exhibits and associated materials).

In interviews, a few libraries reached out to specific audiences (e.g., schools, Latinx populations), but most noted that they did not do much focused outreach or promotion. Promotion was more general, including flyers, local news, social media, and the library website/newsletter (also see **Figure 25**).

Figure 25. In order to reach underserved audiences, libraries most commonly partnered with schools or other organizations or held events aimed for a specific audience.



Source: Partner Library Post-Survey (n = 5 Project Directors)

The most commonly described method for engaging underserved audiences was working with community partners and schools. For example, one librarian said:

“We wanted to reach girls and we were able to connect a NASA Solar System Ambassador and local Girl Scout leaders who worked together to develop a program for the girls to help them earn badges and really introduce them to STEM. We’re also geographically challenged so we had every grade in our elementary school take a class visit so that they could experience this caliber of exhibit locally—something they may not be able to do on their own.”

Another library also partnered with schools, explaining:

“We made sure that we reached out to the local school district and sent them a personal invitation to come to the library when we had the traveling planetarium. We also put up fliers all around town in places we knew our target audience would frequent such as the laundromat and DES offices. We feel our efforts paid off. We had so many people from this underserved audience come and bring their family members. We had several older Hispanic/Latino community members come to the library that had not been before.”

Two libraries mentioned bilingual marketing or facilitation. A librarian from one of these libraries explained:

“Our identified underserved audience was speakers of languages other than English. To reach this audience, a significant portion of the exhibit was housed at [a branch in] a majority Spanish speaking neighborhood. NASA-exhibit related programs and events were promoted in English and Spanish and engagement with exhibit pieces was facilitated by library staff who are native Spanish speakers.”

A librarian from the other library noted:

“We targeted our identified underserved audience, which was the Hispanic and Latino population in our area, through special programs with students in our Summer School program, most of which are migrant students. They were able to interact with the exhibit pieces, replicate the science experiments from the Summer STEAM Demos, and we even incorporated a Spanish language story about astronaut Ellen Ochoa into one of our storytimes with younger students.”

One librarian said their Community Dialogue was particularly helpful in soliciting input regarding their intended audience.

“Our underserved audience was special needs/neurodiverse adults ages 18-35. We held a community dialogue for members of this group, caregivers, teachers, and other stakeholders to determine what types of programs they would like to attend at the library. Through this dialogue we learned that we needed to be flexible with our program designs. One size does not fit all. For example, when we held a canvas painting program for this audience we made sure that we offered an area in the programming room with low light and that we also had set up work areas for individuals in addition to larger group tables. Our first program was a success and we plan on offering monthly programs for this audience. They have even given us suggestions for future program topics.”

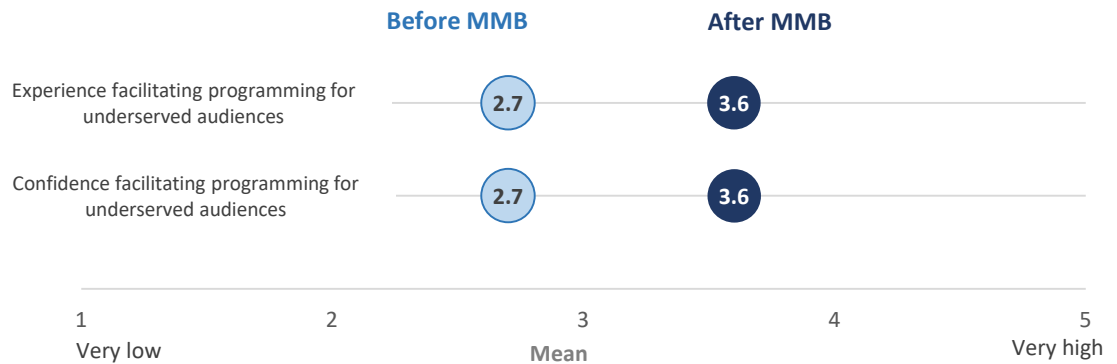
However, two other librarians said the Community Dialogues did help them learn about or reach audiences underrepresented in STEM:

“Our community doesn’t seem to respond to community dialogue, even when we have active and interested partners.”

“Unfortunately, the attendees of neither Community Dialogue that we hosted (one with teens, and one intended for families) helped us learn or reach audiences underrepresented in STEM. The teen dialogue helped us learn about what STEM and other programming spoke to them. We would need to hold another Community Dialogue to accomplish those original goals.”

On the post-survey, library staff were asked to reflect on their experience and confidence in facilitating programming for underserved audiences before and after participating in *Moon, Mars, and Beyond*. As shown in **Figure 26**, their experience and confidence in these areas increased, on average, by approximately one point on a five-point scale.

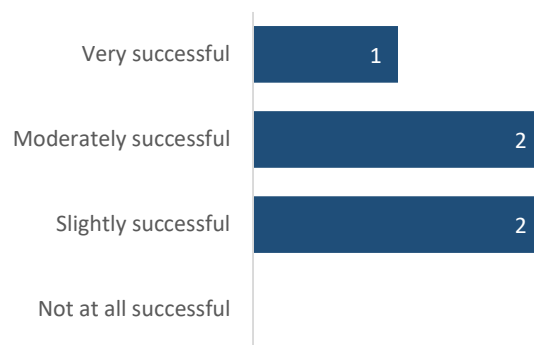
Figure 26. Partner library staff reported increases in experience and confidence facilitating programming for underserved audiences.



Source: Partner Library Post-Survey, matched questions (n = 15 library staff)

Figure 27. Libraries were mixed in their success with reaching the specific underrepresented groups they hoped to engage with *Moon, Mars, and Beyond*.

How successful or unsuccessful do you feel your library was in reaching these groups?



Source: Partner Library Post-Survey (n = 5 Project Directors)

Libraries reported mixed success with reaching the underserved audiences they hoped to engage (**Figure 27**). One library indicated they were “Very successful,” while two said they were “Moderately successful.” Two libraries said they were “Slightly successful.” One of the more successful libraries reported:

“The audiences for our hands-on programming were overwhelmingly minority audiences. They were comprised of predominantly Latino, South Asian, and Far Eastern families. Many immigrants attended, English as a second language.”

Another library reporting mixed success explained:

“I think our effort was partially successful, but not to the extent we hoped when we applied for the Moon, Mars, and Beyond exhibit. ... We were successful in partnering with our Summer School migrant students and teachers in providing programs specifically for our underrepresented Hispanic community while the exhibit was here. However, when we applied for the Moon, Mars, and Beyond exhibit originally, we had much bigger hopes of reaching the Latino/Hispanic communities in our area with specific targeting of programs and using a Community Dialogue as a springboard for increasing our services and programs with that population, in particular, and that has not happened yet due to a variety of factors.”

In interviews, a few libraries noted that word of mouth seemed to be a good way to spread the word about the exhibit and programs. For example, one librarian said, “Our regular visitors would come back with out-of-town company and say, you have to see this.” However, most libraries struggled to say whether or not they were really attracting new visitors in a consistent or sustained manner. Some indicated that new visitors would come out for the opening event, or to view the exhibit once, but they did not notice that many returned after that.

“We held monthly STEM programs for this group during and for about eight months after the exhibit was at our library, but then attendance and interest in the programs seemed to decrease.”

Conclusion and Recommendations

The following conclusions and recommendations emerged based on findings from the evaluation.

- ❖ **Patrons found the *Moon, Mars, and Beyond* exhibit and programs engaging, and a substantial number of patrons were interested in learning more about NASA missions and STEM careers.** Patrons were impressed by the professional quality of the exhibit, and especially enjoyed the hands-on interactive activities.



Patron survey results suggest that interest in learning about NASA missions and careers varied somewhat based on patrons' age and gender. Youth under the age of 25—especially female youth—were less likely to agree that *Moon, Mars, and Beyond* exhibits and programs made them more interested in learning about NASA than adults or male youth. Future projects should consider providing libraries with additional resources to help them learn how to better engage female youth.

- ❖ **Resources and supports provided by the project increased library staff's capacity to offer Earth and space science-related programs and activities.** Partner libraries offered a wide range of activities and partner library staff developed their interest, experience, knowledge, and confidence in developing and facilitating STEM-related programming. Libraries are interested in continuing to offer Earth and space science-related learning activities. They felt supported by the project team and found in-person and one-on-one communications especially useful. Virtual and asynchronous supports (e.g., webinars, Zoom calls, the online community) were utilized less and viewed as slightly less useful.



Since most challenges occurred when libraries were setting up and breaking down the exhibit, the team could focus on these times for focused one-on-one communication to provide reminders, share resources, and answer questions. One-on-one communication and support would likely also be likely when new staff join the library team, especially if they are taking on the role of project director. Library staff also suggested video demonstrations showing how to set up the exhibit.

- ❖ **Library staff developed partnerships that supported programming; however, Community Dialogues were not necessarily the best way for all libraries to make connections.** All partner libraries worked with community partners who offered programs for library patrons. They also worked with partners to bring in audiences and promote events. Additionally, library staff grew their capacity to identify and work with community partners. Although some libraries had success using the Community Dialogue strategy to connect with community partners and inform their programming, others faced challenges. Many found it challenging to foster interest in the dialogues and experienced low or no attendance.



The project team could consider how different approaches (e.g., one-on-one communications) could be utilized to accomplish the same goals as the Community Dialogues and how the project can support libraries in these other strategies as well.

❖ ***Moon, Mars, and Beyond* helped some libraries reach underrepresented populations in STEM.**

The exhibit created excitement and brought in some new people. Partner library staff reported becoming more experienced and confident facilitating programming for underserved audiences. However, most libraries reported only moderate or slight success in reaching the specific underrepresented groups they hoped to engage with *Moon, Mars, and Beyond*. In addition, individuals from minoritized racial/ethnic groups were less likely to say they would recommend the exhibit to others, which could impact future participation since it's not generating as much word-of-mouth promotion.



Develop additional strategies to help libraries engage those from marginalized groups who have limited access and experience with STEM experiences. Relatively few of the libraries reported they promoted their programs to specific audiences, hosted guest presenters from underrepresented groups, or created or adapted materials to be more accessible to specific audiences.



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