



NASA@ My Library 2.0

Summative Evaluation Report for 2021-2022

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Contents

NASA@ My Library Executive Summary	iii
Overview of NASA@ My Library	1
Evaluation Overview	2
Findings	3
Impact of NASA Resources on Library Staff	3
NASA@ My Library's Potential Sustainability	11
Near-Peer Subject Matter Expert Model	15
Impact on Library Patrons	22
Engaging Underrepresented Audiences	25
Engaging Patrons Through Badges	29
Conclusion and Recommendations	33
Appendix A: Logic Model	36
Appendix B: Methodology	37

NASA@ My Library Executive Summary

With funding from the NASA Science Mission Directorate's (NASA SMD) Science Activation program, the Space Science Institute (SSI) launched *NASA@ My Library* in 2016. The vision of *NASA@ My Library* is to help public libraries increase NASA and STEM learning opportunities for library patrons throughout the U.S., including those in geographic areas and populations currently underserved in STEM education. The first five years of the project (from 2016-2020) are referred to as *NASA@ My Library 1.0*.

In early 2021, the *NASA@ My Library* project team received funding from NASA SMD to continue its work for another two years (2021-2022). This effort is referred to as *NASA@ My Library 2.0*. SSI worked closely with its partners, including the American Library Association (ALA) and the Lunar and Planetary Institute (LPI) to deliver the following major components of *NASA@ My Library 2.0*:

- **engagement of 60 public libraries** that received virtual professional development, resources to use in library programming (including funding for three kits with NASA SMD and STEM hands-on materials, activities, and digital learning tools), and a virtual community of practice
- **development of electronic *NASA@ My Library* Patron Badges** to support patron interest in NASA science and increase reach, using the Beanstack platform
- **engagement of library mentors and advisors**, consisting of five library staff who participated in *NASA@ My Library 1.0* to serve as mentors and six state-level representatives from State Library Agencies (SLAs) to serve as advisors. These mentors and advisors participated in affinity groups meetings and conversations with participating public library partners, presented at webinars, and contributed to the development of programming resources
- **preparation of near-peer university student Subject Matter Experts (SMEs)** to facilitate in-person or virtual programs for public library patrons.

Education Development Center (EDC) conducted the external evaluation of *NASA@ My Library 2.0*. The evaluation utilized mixed methods to investigate the implementation of the project and its outcomes. EDC administered pre- and post-surveys to library staff from the 60 partner libraries; conducted interviews with a sample of library staff; surveyed near-peer SMEs who were trained to work with *NASA@ My Library* partner libraries; observed virtual SME programs; collected patron surveys from a sample of *NASA@ My Library* programs, including SME programs; conducted focus groups with SLA and library mentors; and reviewed annual reports libraries submitted to ALA describing their *NASA@ My Library 2.0* activities.

Key findings included:



Library staff from partner libraries increased their confidence and ability to facilitate library programming related to Earth, space, and engineering.

Library staff reported that *NASA@ My Library's* resources and professional development provided them with resources and ideas that increased their confidence, knowledge, and interest in facilitating Earth and space-science-related library programming. The supports and resources they received helped them offer STEM and space science-related activities and programming to a greater extent and in different ways than they had prior to participation in *NASA@ My Library*. They also formed new partnerships to support their programming, such as partnerships with schools and SMEs.



Library staff expressed a strong desire to continue offering, and in some cases expand, Earth and space science-related programming at their libraries in the future.

All Project Directors who completed a post-project survey indicated that they are *likely* or *very likely* to continue offering Earth and space science programs in the future, with 84% saying they are “very likely” to do so. Library staff said they planned to continue offering some programs they set up during *NASA@ My Library* and create new ones. A few indicators suggest that staff turnover was higher during the second phase of *NASA@ My Library* than it was in the first phase—perhaps associated with the pandemic—which could present a challenge to continuation.



The new near-peer SME model (training university students to serve as SMEs) helped a number of libraries reach patrons in new ways.

According to data from partner libraries' final reports, 18 library programs involved NASA-funded university students. Project staff provided a high level of training and support for university students for their role as SMEs. Near-peer SMEs helped libraries offer high quality STEM programming. University student also gained valuable experience doing outreach. Patrons were exposed to scientists, and learned about scientific processes and careers.

Communicating and coordinating schedules between libraries and students was sometimes challenging. In addition, despite the multiple sessions of training offered, a number of university students serving as near-peer SMEs said additional training or support opportunities would have been useful.



Patrons reported that they enjoyed the *NASA@ My Library* programs they attended and that they learned about NASA science; a majority of patrons said they were interested in learning more about earth science, space science, or engineering.

The majority of patrons who completed post-program surveys said they found the programs exciting (86%), and that they learned something new about earth science, space science, and/or engineering (85%). A substantial majority (74%) of patrons said that the program made them interested in looking for more information about NASA.



***NASA@ My Library* helped libraries engage new audiences, including those from communities who are underrepresented in STEM.**

Just under half the patrons (46%) who completed a patron survey after attending a *NASA@ My Library* said they had not been to any other programs about Earth science and space science previously. Patrons who identified as Black or Latinx were the most likely to report that a *NASA@ My Library* program was the first Earth or space science program they had attended at their library. On the final post-survey, almost three-quarters of libraries (73%) felt they had been *moderately* or *very successful* at reaching underserved audiences with *NASA@ My Library* activities and resources.




Many patrons engaged in two online challenges for exploring the science behind the James Webb Space Telescope through books, videos, games, and hands-on activities related to Earth and space science.

More than 100 libraries across the U.S. participated in the first badging challenge (including 11 *NASA@ My Library* partner libraries), with almost 7,300 individual NASA-focused activities completed, and almost 3,000 badges earned. A smaller number of libraries (35) participated in the second badge challenge. For the second challenge, approximately 1,000 NASA-focused activities were completed and 171 badges earned.

Based on these findings, the following recommendations emerged as *NASA@ My Library* continues its efforts:

- ❖ **Create an onboarding plan for new library staff and check in with library staff when Project Directors change.** When Project Directors left their libraries, sometimes the remaining or new library staff were not aware of the *NASA@ My Library* resources. The project team could create an onboarding plan for new staff to orient them to *NASA@ My Library* resources, and subsequently check-in with the current staff to make sure they are aware of resources and have the supports and information they need.

- ❖ **Continue offering ways for libraries to share with one another and consider developing additional ways to help them connect with other libraries similar to theirs.** Library staff appreciated the opportunities to connect with and learn from other partner libraries and mentor libraries. However, some library staff particularly wanted to connect with libraries similar to theirs (e.g., of similar size, serving similar demographics) to make discussions more relevant and useful.
- ❖ **Provide more training and support for near-peer SMEs—in ways that are feasible and cost-effective.** Although multiple training sessions were offered, a number of university students serving as near-peer SMEs said additional training or support opportunities could have been useful. Additional resources include program models for near-peer SMEs to use or adapt with libraries, as well as more opportunities for SMEs to learn or work together, share resources, and learn from one another.
- ❖ **Continue to support libraries in thinking critically about what underserved audiences they have not been engaging as much as they would like, and support libraries in identifying and implementing strategies to intentionally engage and reach these audiences.** One approach would be to continue to support libraries in identifying and working with SMEs who come from communities that have been marginalized and are underrepresented in STEM.

 Acronyms	
ALA	American Library Association
EDC	Education Development Center
LPI	Lunar and Planetary Institute
NASA SMD	NASA Science Mission Directorate
SciAct	NASA Science Activation program
SLA	State Library Agency
SME	Subject Matter Expert
STEM	Science, technology, engineering, and mathematics

Overview of *NASA@ My Library*

With funding from the NASA Science Mission Directorate's (NASA SMD) Science Activation program, the Space Science Institute (SSI) launched *NASA@ My Library* in 2016. The vision of *NASA@ My Library* is to help public libraries increase NASA and STEM learning opportunities for library patrons throughout the U.S., including those in geographic areas and populations currently underserved in STEM education. The first five years of the project (from 2016-2020) are referred to as *NASA@ My Library 1.0*.¹

In early 2021, the *NASA@ My Library* project team received funding from NASA SMD to continue its work for another two years (2021-2022).² This effort is referred to as *NASA@ My Library 2.0*.

SSI worked closely with its partners, including the American Library Association (ALA) and the Lunar and Planetary Institute (LPI) to deliver the following major components of *NASA@ My Library 2.0*:

engagement of 60 public libraries that received virtual professional development, resources to use in library programming (including funding for three kits with NASA SMD and STEM hands-on materials, activities, and digital learning tools), and a virtual community of practice

development of electronic *NASA@ My Library* Patron Badges to support patron interest in NASA science and increase reach, using the Beanstack platform

engagement of library mentors and advisors, consisting of five library staff who participated in *NASA@ My Library 1.0* to serve as mentors and six state-level representatives from State Library

¹ The summative evaluation report for *NASA@ My Library 1.0* is available for download: <https://www.informalscience.org/nasa-my-library-phase-1-summative-evaluation-report>

² The project team subsequently received an augmentation from NASA SMD to extend *NASA@ My Library 2.0* for another three years, through the year 2025. This augmentation is focused on engaging Latinx audiences in eclipse-related programming.

Agencies (SLAs) to serve as advisors. These mentors and advisors participated in affinity groups meetings and conversations with participating public library partners, presented at webinars, and contributed to the development of programming resources

preparation of near-peer university student Subject Matter Experts (SMEs) to facilitate in-person or virtual programs for public library patrons.

The *NASA@ My Library 2.0* logic model (Appendix A) provides an overview of the project's activities and outcomes. The logic model was developed in collaboration with project leaders to ensure a common vision for the project and to guide the evaluation questions, methods, and measures. Key project outcomes include that: participating library staff would have increased confidence and ability to facilitate earth and space science library programming; near-peer student SMEs would be prepared to facilitate earth and space science library programming; and patrons who accessed SMD-related content and SMEs through their libraries would demonstrate greater interest and engagement in earth and space sciences and engineering.

Evaluation Overview

Education Development Center (EDC) conducted the external evaluation of *NASA@ My Library*. This report describes the findings from the evaluation. The evaluation team at EDC worked closely with project leadership to understand the main components and intended outcomes, and to develop and revise measures.

The summative evaluation of *NASA@ My Library 2.0* focused on understanding the project's impact on library staff from libraries that partnered with the project; understanding the near-peer SME model for facilitating library programming; and documenting whether virtual SMD-focused learning opportunities reach learners, including learners of diverse racial/ethnic identities. The summative evaluation questions included:

1. To what degree do project activities help public library staff to: (a) increase their confidence and skills in utilizing NASA SMD assets for library programming, and (b) deliver earth and space science programming, services, and/or outreach to learners of diverse racial/ethnic identities?
 - a. What project supports particularly made a difference for library staff?
 - b. What indications are there that public libraries involved in the project will continue to utilize NASA SMD assets in the future, particularly to reach learners of diverse racial/ethnic identities?

2. To what degree do project activities prepare diverse NASA-funded students to describe their skills and educational pathways in earth and space science?
3. To what degree do virtual SMD-focused learning opportunities with NASA-funded students and professionals reach learners, including learners of diverse racial/ethnic identities?
 - a. To what degree do learners engage in the Patron Badge program?
 - b. To what degree do learners have increased awareness of the skills, educational pathways, and/or careers relating to Earth and space science?

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-surveys to library staff from the 60 partner libraries; conducted interviews with a sample of library staff; surveyed near-peer SMEs who were trained to work with *NASA@ My Library 2.0* partner libraries; observed virtual SME programs; collected patron surveys from a sample of *NASA@ My Library* programs, including SME programs; conducted focus groups with SLA and library mentors; and reviewed annual reports libraries submitted to ALA describing their *NASA@ My Library* activities. Appendix B describes the methodology in more detail, including the data collection instruments, when they were administered, and the data collected.

Findings

The findings are organized into six major sections: (1) the impact of providing training and NASA resources to public libraries; (2) early indicators of *NASA@ My Libraries'* continued impact on libraries; (3) the near-peer SME approach to disseminating NASA resources; (4) the project's impact on library patrons; (5) *NASA@ My Libraries'* ability to reach underserved audiences; and (6) the online badging program. Within each section, a brief implementation overview is presented, followed by strengths and highlights, any weaknesses or challenges, and recommendations related to that project element.

Impact of NASA Resources on Library Staff

Implementation Overview

The *NASA@ My Library* project provided a number of resources and supports to partner library staff. Library staff had access to *NASA@ My Library* virtual toolkits which included hands-on activity guides, book lists, how-to videos, modification and preparation lists, and links to additional relevant resources. The project team hosted unboxing webinars to introduce library staff to each toolkit. In total, three virtual toolkits were created:

- Look Up! Explore Our Universe
- Our Blue Planet: EARTH
- James Webb Space Telescope First Image

STEAM Strategy videos, short (4-10 minute) professional development videos, were also created to support program implementation. These videos featured library staff who had prior experience conducting STEAM programs. The five STEAM Strategy videos covered the following topics:³

- Addressing Earth Science Confusions
- Guide on the Side
- Strategies for Inclusion
- Virtual Program Strategies
- Addressing Space Science Confusions

Partner library staff also had multiple ways to connect with the project team and one another. The project team hosted regional check-in webinars, Affinity Group meetings, and offered one-on-one communication. ALA Connect, an online platform for discussion and collaboration between ALA members, was also used as a platform for sharing information and resources.

Finally, partner library staff had access to staff from mentor libraries who had been involved in the first five years of *NASA@ My Library*. Mentor libraries provided support to partner libraries through one-on-one communication with individual partner libraries, as well as participation in ALA Connect discussions, check-in calls, and Affinity Group meetings. Mentor libraries also wrote NASA-focused blogs on a topic of their choice which were disseminated to partner libraries through ALA Connect.

Strengths/Highlights

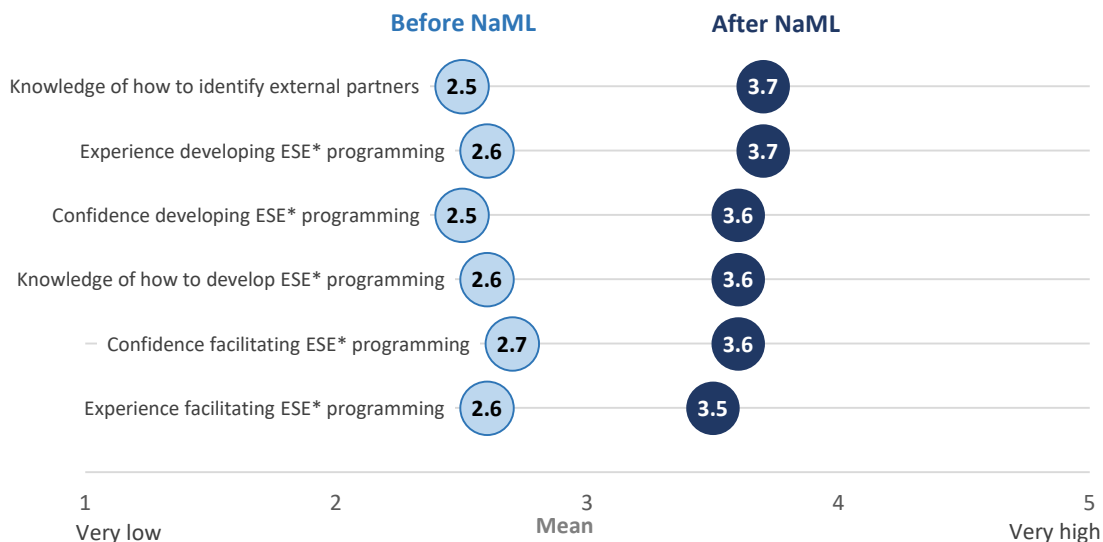
Library staff increased their capacity to offer space science-related library activities and programming.

As shown in Figure 1, when asked to reflect on how they felt before participating in *NASA@ My Library* and how they felt at the end of the project, library staff, on average, reported an increase of approximately one point or more (on a five-point scale) in their:

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

³ For more information about STEAM Strategy Videos see: <https://www.starnetlibraries.org/steam-strategy-videos/>

Figure 1. Partner library staff reported increases in knowledge, confidence, and experience associated with developing and facilitating Earth, space and engineering (ESE) programming



Source: Partner Library Post-Survey, matched questions (n = 108 library staff)

*ESE = Earth, space & engineering

In open-ended survey questions, library staff emphasized how the project provided them with resources and ideas that increased their confidence, knowledge, and interest in STEM-related library programming. The supports and resources they received helped them offer STEM and space science-related activities and programming to a greater extent and in different ways than they had prior to participation in *NASA@ My Library*. They also noted that the project helped them form new partnerships to support their programming, such as partnerships with schools and SMEs. For example, library staff shared:

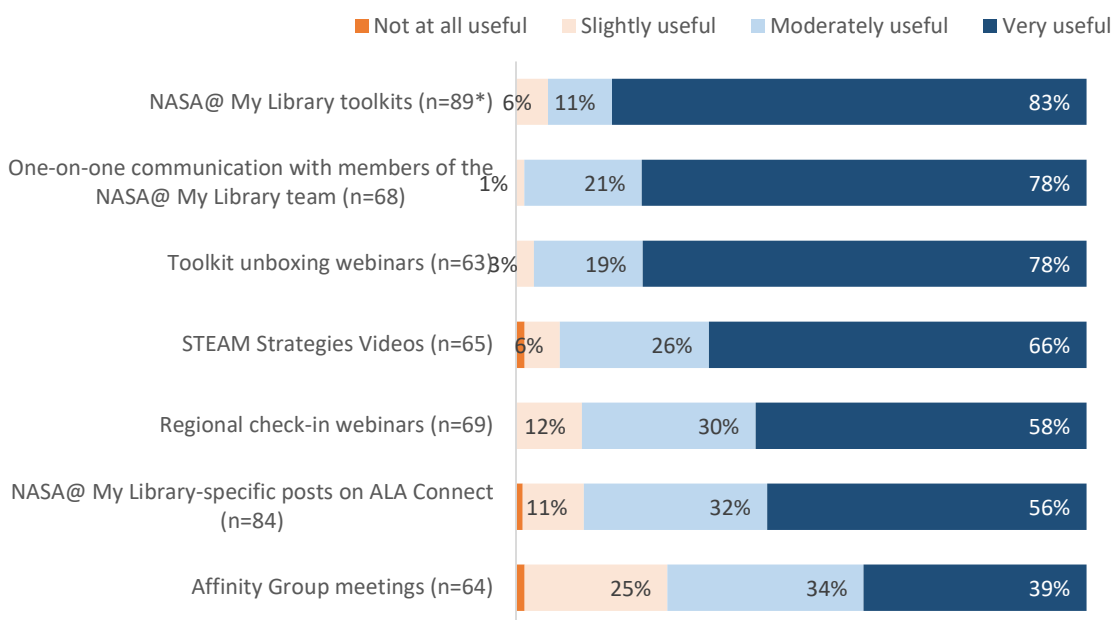
“We have been able to increase STEM programming at our library. Staff confidence in planning and presenting Earth and space science programs has increased, as has our desire to run those types of programs. We now have more resources to utilize and know where to find new ones.”

“It connected us to our Solar System Ambassador and pushed us to think outside the box in our offerings. We do far more programming for families and older kids and teens than we ever have before, and are connecting with our community in a way that is new and exciting for us.”

Toolkits, unboxing webinars, and one-on-one communication with project team members were especially helpful in supporting library staff.

As shown in Figure 2, when asked how useful various project resources were, at least three-quarters of library staff who used the resources indicated that toolkits (83%), toolkit unboxing webinars (75%), and one-on-one communication with members of the *NASA@ My Library* team (78%) were “very useful.”

Figure 2. Toolkits, associated unboxing webinars, and one-on-one communication with project team members were most useful to library staff



Source: Partner Library Post-Survey

*n's represent the number of respondents who indicated that they used the resource

In open-ended survey responses, one library staff member described how the toolkits provided valuable resources that also made it easier to offer STEM-related programming at their library, noting:

“I feel like having the toolkits available will make it much easier. As it was, I was developing my own plan based off my science background, but using the kits is far more streamlined and will help us provide even more earth and space science programs in the coming years.”

In addition to resources provided by the project, library staff also utilized community partners and other professional sources to support programming.

When completing their annual report, partner libraries were asked to describe three *NASA@ My Library* programs in detail. One question asked them to indicate the sources of content for each of their three reported programs. As shown in Figure 3, partner libraries used a variety of sources. Around one-third

more of programs reported utilized content created by library staff (44%), from professional sources other than NASA or *NASA@ My Library* (40%), from NASA web sources (36%), from *NASA@ My Library* toolkits and activities (34%), and other activities from the STAR Net STEM Activity Clearinghouse (32%).

Figure 3. Library staff utilized a variety of sources as content for their programs

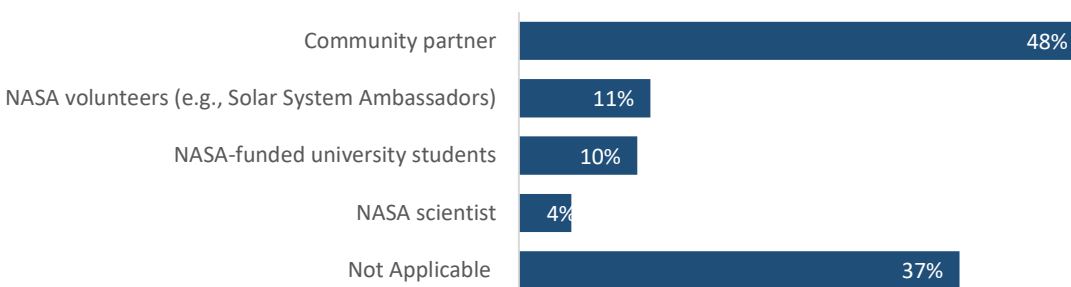


Source: Partner Library Post-Survey (n = 180 programs)

*Percentage is based on the 3 programs described in detail by each of the 60 partner libraries on their annual reporting form. Libraries could select more than one response for each program.

Additionally, partner libraries were asked to indicate the types of collaborators they worked with for each of their three reported programs, if applicable. As shown in Figure 4, about two-thirds of the reported programs involved collaboration, with the majority of collaborations being with community partners (48% of reported programs).

Figure 4. Almost half of programs involved collaboration with community partners



Source: Partner Library Post-Survey (n = 180 programs)

*Percentage is based on the 3 programs described in detail by each of the 60 partner libraries on their annual reporting form. Libraries could select more than one response for each program.

The ability to share resources and learn from others was also valuable.

As previously shown in Figure 2, more than half of library staff members who used the resources selected that *NASA@ My Library* posts on ALA connect (56%) and regional check-in webinars (58%) were “very useful.” One library staff member noted that it was especially helpful when specific resources were shared by other libraries, such as links to PDFs of activities shared through ALA Connect.

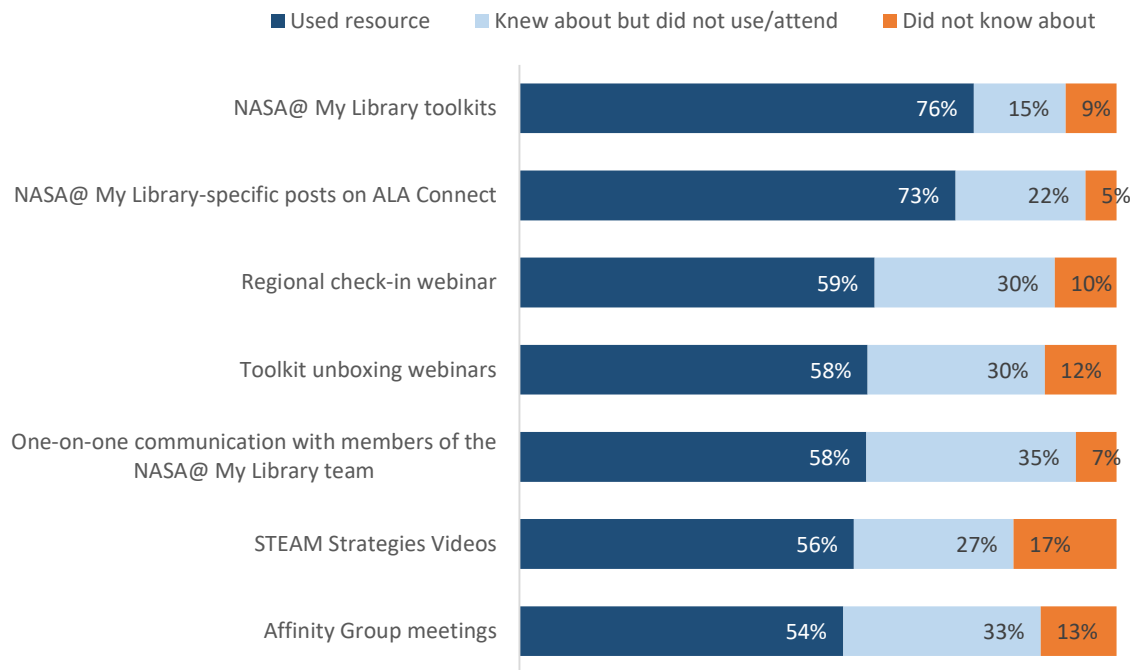
In commenting on the impact the project had on them individually, many respondents noted the value of learning from others, sharing ideas, and troubleshooting together. With previous experience as *NASA@ My Library* partner libraries, mentor libraries were able to provide encouragement and suggestions which helped partner library staff feel that they were not alone in their challenges. For example, one library staff partner stated:

“Hearing programming ideas [from mentor libraries] and best practices they learned during the first round of NASA@ My Library was helpful in my planning of programs. It was also helpful to read some of their posts about times when programs didn’t go quite as planned and not to get discouraged when that happens.”

Weaknesses/Challenges**Many library staff did not know about or use most supporting resources.**

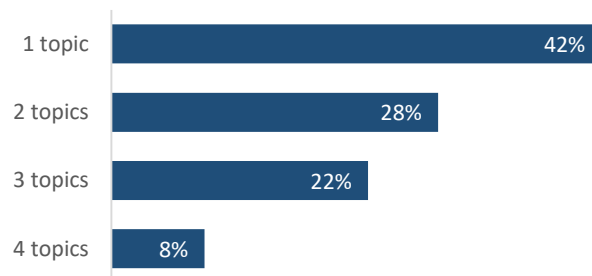
As shown in Figure 5, around 40% of partner library staff either did not know about or did not use most resources listed, with the exception of toolkits and posts on ALA Connect. Affinity Groups were the least utilized resource and those who did engage with Affinity Groups tended to only participate in one topic, as shown in Figure 6.

Figure 5. Many library staff did not know about or use most resources with the exception of toolkits and ALA Connect posts



Source: Partner Library Post-Survey (n = 108-117 library staff)

Figure 6. Library staff who engaged with Affinity Groups typically participated in only one topic



Source: Partner Library Post-Survey (n = 60 library staff*)

*Includes only those respondents who engaged with Affinity Groups. An additional 31 respondents indicated that they did not engage with Affinity Groups and 25 selected that they were not sure whether they had engaged with Affinity Groups.

In open-ended responses, library staff shared reasons why they did not utilize supports and resources and gave suggestions for improving them.

Resource use depended on role.

Some respondents felt that engaging with project resources, such as mentor libraries, was not part of their role and noted that others from their library utilized the resource instead.

The amount of information and resources available could feel overwhelming and may lead to confusion.

Others noted that the amount of information and resources available was overwhelming and they had limited time to explore all that was available. Respondents also noted that ALA Connect could be difficult to navigate and they sometimes faced challenges finding what they were looking for. Some also noted that the amount of information and number of email messages they received from ALA Connect could be overwhelming. Although library staff did appreciate having a space to connect with other library staff and share resources, they wondered if a simpler platform was available.

The number of resources available also caused some confusion around Affinity Groups. Twenty-five survey respondents indicated that they were not sure whether they had engaged with Affinity Groups, suggesting that there was confusion about what Affinity Groups were. As one respondent shared:

“I was a little unclear on what the Affinity Groups were. There are too many different parts to this program so it is hard to keep track of them all.”

Some had a desire to connect more with similar libraries.

Some respondents also suggested that creating Affinity Groups connecting libraries with similar characteristics (e.g., from the same region or of similar size) would help make the discussions less overwhelming and more relevant. As one respondent described:

“Maybe have groups divided by library size (or number of expected attendees). There’s a big difference in the needs of big, multi-branch libraries versus what small rural libraries like mine need.”

Staff turnover lead to a lack of resource awareness.

A few respondents also noted that staff turnover, especially when the Project Director left, led to library staff not being aware of all the NASA@ My Library resources available to them. For example, library staff noted:

“I ‘inherited’ this grant when our previous director took a new job. I have been learning a lot of information and may not have known about some of the resources available.”

“Project Director did not make us aware that we had a mentor library. This would have been a good resource for me to utilize.”

Recommendations

- ❖ **Create an onboarding plan for new staff and intentional check-ins with library staff when Project Directors change.** Since a lack of awareness of resources impacted their use, especially when Project Directors left their libraries, the project team could consider creating an onboarding plan for new staff and new Project Directors to orient them to the resources available to them. Checking in with library staff at libraries where there has been significant staff turnover could also be useful in ensuring that the current staff are aware of resources and have the supports and knowledge they need.
- ❖ **Create a streamlined process and/or repository for sharing resources.** Some library staff noted feeling overwhelmed by the amount of information and resources available, which was further complicated by difficulties navigating ALA Connect. The project team could consider other ways to allow for resource sharing that allows for greater ease of use.
- ❖ **Continue offering ways for libraries to share and consider how to help libraries connect with libraries similar to theirs.** Library staff appreciated the opportunities to connect with and learn from other partner libraries and mentor libraries. However, some felt that connecting mainly with libraries similar to theirs (e.g., of similar size) would help make discussions more relevant and useful. The team should consider to what extent and when partner libraries should engage with all partner libraries and when it would be more beneficial to engage in smaller groups, and perhaps with libraries sharing similar characteristics.
- ❖ **Continue to support libraries in connecting with partners and other resources beyond what is created by the project.** While library staff utilized resources created by the project and found them to be useful, they also utilized a variety of other resources to create their programming. This included connecting with local community partners to collaborate on their activities. Given that library staff tend to have limited time to dedicate to planning activities, these other resources and partnerships can be especially helpful in supporting programming. The project should continue to highlight outside resources and encourage partnerships to give libraries a variety of options for program design and implementation.

NASA@ My Library's Potential Sustainability

Implementation Overview

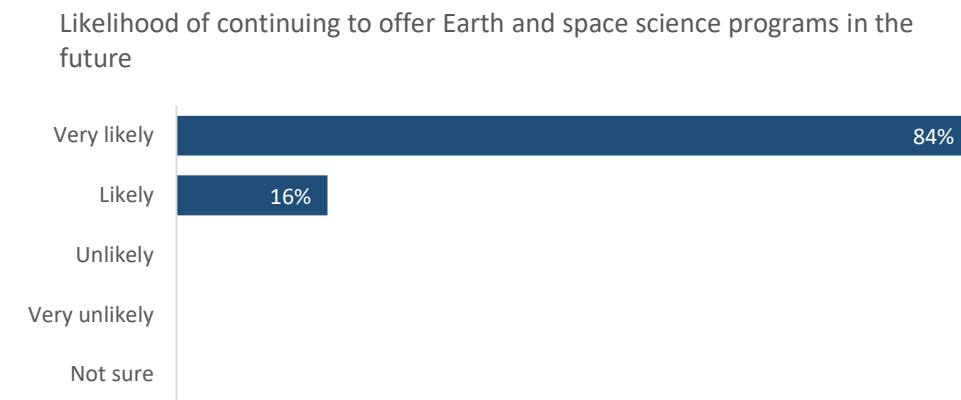
One goal of *NASA@ My Library* was for partner libraries to continue utilizing NASA assets for future programs, especially to reach learners of diverse racial/ethnic identities.

Strengths/Highlights

Project Directors have a strong desire to continue offering, and in some cases expand, Earth and space science-related programming at their libraries in the future.

Project Directors were asked about the likelihood that they would continue to offer Earth and space science programs at their library in the future on the post-survey. As shown in Figure 7, all Project Directors who responded indicated that they are *likely* or *very likely* to continue offering Earth and space science programs in the future, with 84% saying they are *very likely* to do so.

Figure 7. All Project Directors responding to the post-survey selected that they are likely or very likely to continue offering Earth and space science programs at their library in the future



Source: Partner Library Post-Survey (n = 45 Project Directors)

In open-ended survey responses, Project Directors noted that they will continue to offer Earth and space science-related programs, events, and activities, both by continuing programs they set up during *NASA@ My Library* and by creating new ones. Project Directors also mentioned that they will continue partnerships that they utilized during *NASA@ My Library* and hope to establish new partnerships in the future (e.g., with museums/planetariums/observatories, schools). Some Project Directors also mentioned eclipse planning, continuing to utilize *NASA@ My Library* resources, and continuing to learn about and respond to their community.

“We are continuing to work with our partner elementary school by continuing to hold NASA themed class visits throughout this new school year. We are holding another telescope night in December, and plan to hold them regularly in the future. We have every intention of planning more Earth and space science activities from here on out.”

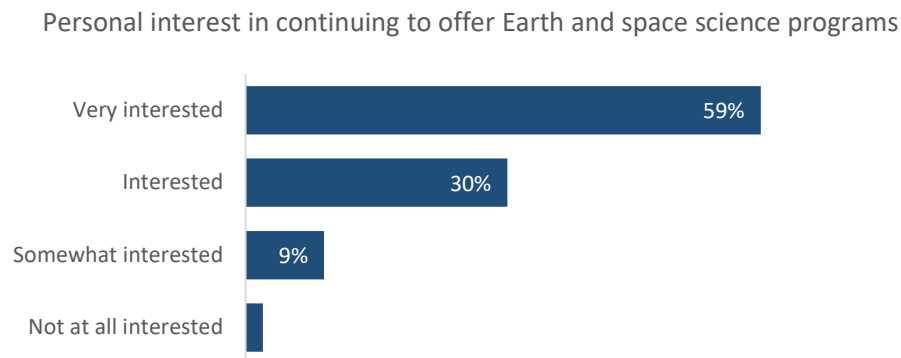
~Library staff member

Library staff have a personal interest in continuing to offer Earth and space science programs to patrons.

In addition to an interest in sustainability at the library level, individual library staff also expressed a personal interest in continuing to engage patrons in Earth and space science programs. As shown in Figure 8, more than half of library staff respondents reported that they are personally “very interested” in continuing to offer Earth and space science programs, and 89% were “interested” or “very interested.”

Library staff who expressed less of an interest in continuing Earth and space science programs gave reasons such as it is not a topic of personal interest, it is not their role at the library to facilitate programming, or because they want to offer more diversity of STEM topics.

Figure 8. Most library staff have a personal interest in continuing to offer Earth and space science programs



Source: Partner Library Post-Survey (n = 116 library staff)

Library staff were asked what topics or activities they would be interested in offering in the future. Common answers included:

- SME programs
- Take and makes
- Eclipse activities
- Star parties
- More about JWST
- STEAM activities
- Climate change/the environment/sustainability
- Telescopes

Library staff were also asked about specific audiences they were interested in engaging in the future. The most commonly noted audiences included:

- Children
- Tweens
- Teens
- Schools
- Underserved audiences
- Families/intergenerational programming
- Adults

Weaknesses/Challenges

Staff turnover at partner libraries is one potential challenge to sustainability.

Although we do not know the exact number of library staff who left their libraries during this project, a few indicators suggest that staff turnover was higher during the second phase of *NASA@ My Library* compared with its first iteration. For example, we noted a higher than usual email bounce rate when post-surveys were sent out (suggesting the survey recipients were no longer at their library). We also noted this in our work with case study libraries as our main contacts at some libraries changed over the course of the project, sometimes more than once.

Although survey respondents generally noted that they would like to continue to offer Earth and space science experiences in the future, the staff turnover experienced in this project could present a challenge to sustaining programming. For example, some survey respondents noted that they were not aware of various resources because of changes at the Project Director level. If staff continue to leave partner libraries at a high rate, their knowledge of resources and experience and interest gained during this project will also be lost if there are not others at the library prepared to continue the work and interested in doing so.

“Our biggest challenge was staffing changes. During the course of the project, we lost both the library manager and the assistant manager. Points of contact changed and we were without a marketing department, so it was a lot of work and more disjointed than typical.”

~Library staff member

Recommendations

- ❖ **Consider creating resources and educating library staff on how Earth and space science can relate to other STEM topics, especially those library staff are interested in.** This may help with sustainability for those who want to offer something new after focusing on Earth and space science programs during the grant period.
- ❖ **Continue to support libraries in reaching specific audiences, especially those from underserved groups.** Libraries have a range of audiences that they want to reach with Earth and space science programs. From young children to adults, schools and intergenerational groups, their audiences of interest cover a large range. The team should consider how to continue supporting libraries by thinking through ways to engage these audiences of interest. The project team should also continue to support libraries in thinking critically about underserved audiences that they are not currently engaging to the extent that they would like, and support libraries in identifying and implementing strategies to intentionally engage and reach these audiences.

Near-Peer Subject Matter Expert Model

Implementation Overview

The first iteration of *NASA@ My Library* showed that library programming with a SME was attractive to librarians and patrons, but it was difficult for libraries to find and coordinate with a NASA-funded SME, even with opportunities for the SME to be connected virtually. Further, library staff were aiming to find a SME from an underrepresented group (such as female or a person of color) because of the project's goals to reach individuals from groups who are underrepresented in STEM.

Library partners in *NASA@ My Library 2.0* could identify and work with a SME, or they could be connected with a university student by project staff as a "near-peer" SME. The near-peer SME could share information on earth and space science while also giving younger library patrons the ability to interact with students like themselves who are pursuing careers in STEM fields at the university level. The project contracted with five different universities that each recruited between three to fifteen students to participate. The project aimed to recruit a diverse set of near-peer SMEs. The students were trained by *NASA@ My Library* and matched with partner libraries based on library requests for topics or timing.

According to data from partner libraries' final reports, 18 library programs involved NASA-funded university students.⁴ (An additional eight library programs featured NASA scientists.) Programs with near-peer SMEs included "Earth's Water Cycle," "JWST (James Webb Space Telescope and Magic Wands)," and "Shaving Foam Planets." The university students assisted libraries with a variety of program types, including in-person story times, hands-on activities, video resources, pre-recorded talks, live one-on-one chats, and development of take-and-make kits. For example, one near-peer SME provided a pre-recorded video that offered a visual representation of the Earth's water cycle, including an experiment on rain clouds and precipitation and a NASA link about

NASA@ My Library connected libraries with university students who lead STEM activities, with hopes of:

- Providing libraries with a subject matter expert who is comfortable talking to patrons about scientific concepts
- Offering library patrons hands-on, interactive opportunities to engage with STEAM and exposure to a role model in STEAM who might broaden their definition of who does science and can speak of their educational pathway and career possibilities
- Giving university students outreach experience

⁴ One library had two programs with a NASA-funded university student, so a total of 17 libraries had near-peer SME programs.

ocean planets. For another library program, a near-peer SME created instructions/handouts and a librarian translated them into Spanish.

A total of 2,116 individuals attended programs that featured NASA-funded university students. Attendance at individual near-peer programs varied greatly, with five programs having ten or fewer attendees and one program having an attendance of 1,250.

Strengths/Highlights

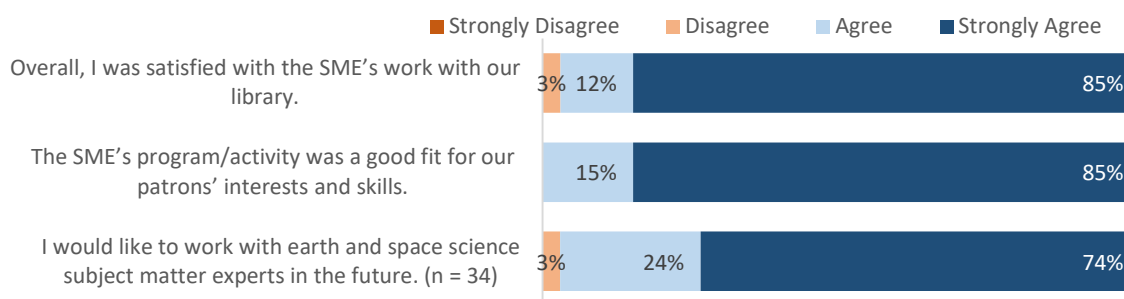
Project staff provided a high level of training and support for university students for their role as SMEs.

The *NASA@ My Library* project staff offered university students who had volunteered to be SMEs training and resources. Since many of the student SMEs had little or no experience with outreach in a library setting, *NASA@ My Library* held foundational trainings on how to facilitate learning in a library, use virtual settings like Zoom, and hold science conversations with the public. Each training session were offered two or three times (and was recorded) to accommodate students' schedules and to allow for smaller groups. Additionally, *NASA@ My Library* created a closed community group for the students with links to the recorded trainings, sample PowerPoints, slide templates, and a place for discussions between them and some of the libraries. Project staff facilitated a call with students to match them with libraries and provided individual assistance related to the programs SMEs were planning for libraries. In a reflective survey, about 80% of SMEs indicated they felt moderately or very prepared for their role.

Neer-peer SMEs helped libraries offer high quality STEM programming.

Thirty-six of the libraries involved with *NASA@ My Library* worked with a SME during their year of project activities, and 20 of those used a university student SME trained by the project. As Figure 9 shows, almost all library staff completing the post-survey reported they were satisfied with their SME's work and agreed that the SME was a good fit for their patrons. Three-quarters of respondents strongly agreed they would like to work with a SME in the future.

Figure 9. Almost all library staff were satisfied with the SME's work with their library (84% strongly agreed)



Source: Partner Library Post-Survey (n = 33 library staff)

Libraries were very appreciative of the programs and of the connections to student SMEs. For example, one librarian commented:

“The value is incalculable! The university students SMEs did amazing jobs and the children who participated in the programs they planned and/or led loved them. They really engaged with both children and parents in a live virtual chat, and the programs they planned for the elementary school we worked with were among the most popular for both students and teachers. The NASA Solar System Ambassador who did our telescope night was wonderful, and patrons requested that we ask him to do another program for the library.”

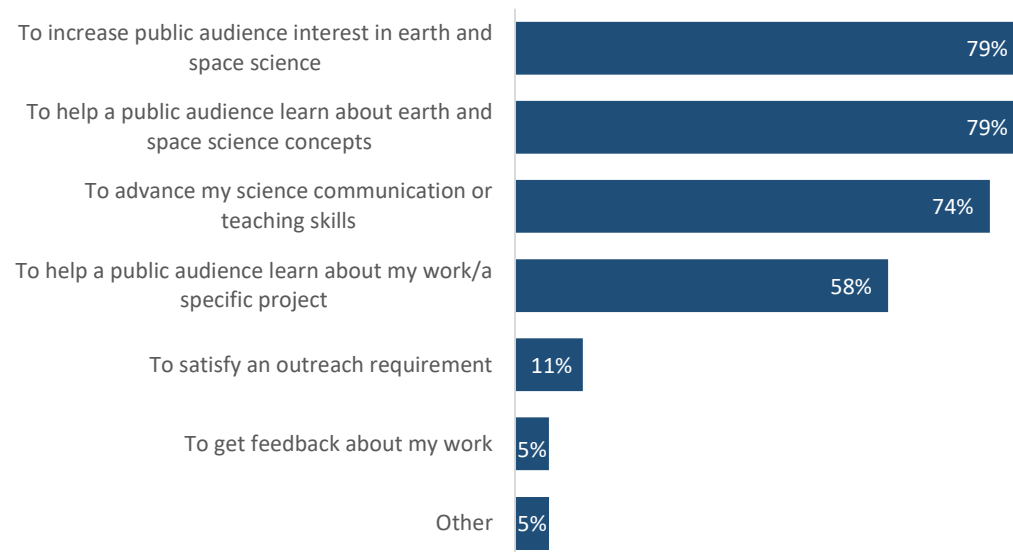
Another librarian offered specific praise for a SME’s presentation skills and making complex ideas understandable to a public audience, saying:

“Our SME was incredibly knowledgeable and able to break down some complicated ideas so everyone felt they understood what he was saying. Not only was he knowledgeable, he was also funny, kind, and patient; an ideal presenter to a diverse audience.”

University student “near-peer” SMEs gained valuable experience doing outreach.

The student SMEs identified multiple reasons why they decided to participate in *NASA@ My Library* as a student scientist (see Figure 10). They most commonly said that they hoped to increase public interest and knowledge in earth and space sciences and hoped to develop their skills communicating scientific knowledge to the public.

Figure 10. Students decided to participate as SMEs in order to increase public interest and knowledge in earth and space science, and to advance their science communication and teaching skills



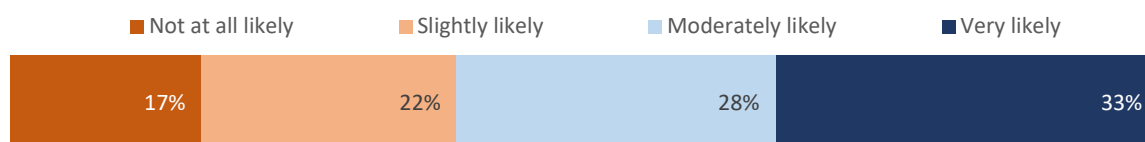
Source: Near-Peer SME Survey (n = 19 students)

“This has been an excellent experience and was very organized. I have learned a lot and have experienced the importance in furthering STEM learning and research.”

~University student serving as a Subject Matter Expert

SMEs spoke of the benefits to themselves of their participation in the project, including being able to add their experience to their résumés and develop new connections to the community. One student wrote, “Being able to relate to and inspire underrepresented communities through my work with NASA@ My Library gave me a sense of purpose and community that I would not have found otherwise.”

Figure 11. More than half the near-peer SMEs said they were very likely or moderately likely to look for opportunities to deliver STEM programming in a library in the future



Source: Near-Peer SME Survey (n = 18 students)

A librarian spoke about how public libraries should provide students opportunities to present and facilitate for the benefit of the student and for the library patrons in the audience:

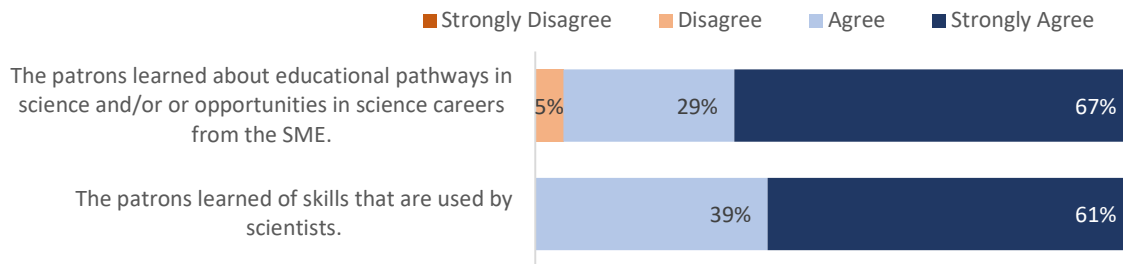
“Working with students and other volunteers is part of our mission as a public library. Giving a student the opportunity to teach in a public setting is beneficial to the student and provides a different perspective to our audiences.”

Patrons were exposed to scientists, and learned about scientific processes and careers.

Programs facilitated by young science students can expose the public to a broader view of what a scientist is. Having a younger person as the scientist was more accessible to the younger audience members. In the ALA report, one library staff person noted:

“I saw so many kids engaging, learning, and creating with the material, and they loved having the students from [a university] that they could talk to and ask questions. I also noticed that many of the parents and caregivers were engaging with their children, either helping with the craft or pointing out different bits of information, which was really nice to see.”

Figure 12. Library staff were very likely to agree that patrons of SME programs learned skills used by scientists as well as about STEM educational pathways or careers



Source: Near-Peer SME Survey (n = 29-30 students)

University students can also serve as role models for children. As one librarian said:

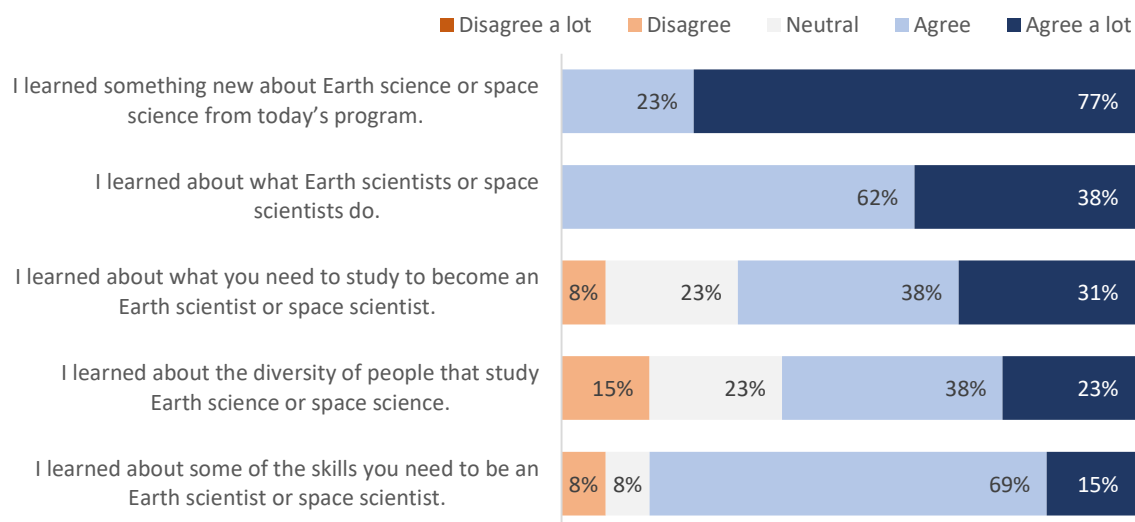
“Such programs expose the community, particularly the children, to different people, topics, and careers. Also, having library programs run by college students exposes children to the possibility of becoming a college student themselves someday.”

The student SMEs shared personal and general information about educational pathways and opportunities in science careers. For example, near-peer SMEs said:

“I did a Q&A and I began by introducing myself as a Ph.D. student, what work I currently was doing, and what work I previously was doing. I also discussed just being interested in astronomy from a young age. One participant asked how to prepare to be a space scientist and I just informed them to be curious, be passionate, and learn as much as you can about the science going on now (especially with JWST).”

“We [the presenters] talked about how astronomers use filters to take images through telescopes and got asked lots of questions about astronauts.”

Patrons who attended a student SME program and completed a post-survey all agreed they learned something new about Earth science or space science and about what earth or space scientists do. Patrons were very likely to agree that they learned about what you need to study to become an Earth scientist or space scientist, the skills used, and the diversity of people that study in these areas.

Figure 13. Patrons agreed they learned about earth or space science and about what scientists do

Source: Patron Survey (n = 13 Respondents who attended a NASA@ My Library program facilitated by a university student SME)

The library programs that featured NASA-funded students as scientists likely reached underrepresented audiences: 15 out of the 18 programs featuring near-peer SMEs said they particularly aimed to reach low median households, and 12 programs engaged Black or African Americans.

Weaknesses/Challenges

Both librarians and SMEs had a desire for more in-person programs.

Due to scheduling issues as well as COVID restrictions, only a few in-person programs were offered by student SMEs despite interest from library staff and from the student SMEs themselves. As one library staff member wrote, "I wish that it were easier to meet with the SMEs. I would have loved to be able to do something in person, but it just wouldn't have been feasible based on location, and also this year especially with the continued effects of the pandemic."

The virtual programs were challenging for some SMEs who experienced technology issues, especially when they could not see the patrons to whom they were presenting.

There are limitations with using near peer SMEs (instead of a NASA-funded scientist).

While using near peer SMEs ameliorated challenges associated with identifying and scheduling library programming with a professional SME, at least one librarian commented that a university student did not attract as large of an audience:

"If you really want to encourage youth to reach for the stars, you need someone who already did that, not someone who is still in training. The student SME we worked with was great, and this should absolutely continue to be a part of this program in the future, but in order to build

excitement in local communities, there is no substitute for getting someone who actually works at NASA (in some capacity) to talk about their work.”

Another librarian was not highly confident in the facilitation skills of the near peer SME:

“Our SME was very young and very enthusiastic, but I just wasn’t confident in them presenting an entire program for us. However, our virtual conversation with them was very helpful and they put us in touch with some great resources to develop the program.”

Finally, some university students serving as SMEs ended up presenting on topics they did not feel fully comfortable with, requiring additional research and preparation to be able to speak to the public in an engaging and knowledgeable way. For example, one near peer SME said: *“I spent hours researching and coming together with videos and activities to send out to the libraries. I also researched other presentations to give to schools in my community to help prepare me for my assigned libraries.”*

Communication between libraries and students was a challenge.

The project team found that students needed a high level of encouragement and support to reach out to libraries and begin a conversation about how they might facilitate a program. Students offered suggestions for future student SMEs related to communicating with libraries, including reaching out early, having a conversation with the library staff to figure out what type of program would be mutually agreeable, and asking for help (from project staff or their advisor), if needed.

There were scheduling difficulties between near-peer SMEs and libraries.

Similar to professional scientists, university students serving as SMEs also had scheduling limitations due to classes, jobs, and their school schedule (e.g., finals week, school breaks). The near-peer SMEs and librarians often had trouble finding a good time for a “live” connection between the SME and a library audience, even for an online program. A handful of near-peer SME programs were, therefore, pre-recorded for later viewing or SMEs offering assistance for STEM programming or resources, such as assistance planning an event or advising on putting together a take-and-make kit. One librarian commented on these types of programs not being as high impact, saying, *“Programs being pre-recorded and not having a Q&A was the biggest issue. SMEs that are students has limited availability for programs to attend either in-person or virtually.”*

Near-peer student SMEs had varying needs for training and support.

While some of the university students had outreach experience before starting with *NASA@ My Library*, others needed more training, support, and practice to feel confident engaging a public audience. SMEs also had different levels of comfort with facilitating an online program, which necessitated technology knowledge and strategies to connect with learners virtually.

Recommendations

- ❖ **Provide more training and support for near-peer SMEs.** Despite the multiple sessions of training offered, a number of university students serving as near-peer SMEs said additional training or support opportunities would have been useful. Additional resources, such as program models for near-peer SMEs to use or adapt with libraries, would help SMEs who were looking for ideas of what types of programs to offer at libraries. In addition, many near-peer SMEs reached out to receive individual support from the project team, which would not necessarily be feasible if the number of SMEs increased substantially. Creating more opportunities for SMEs to learn or work together, share resources, and learn from one another could lift some of the training and support duties from the project team.
- ❖ **Ensure that SMEs are comfortable with the content of the presentations,** capitalizing on their areas of interest and expertise. A few of the university students serving as SMEs were assigned to offer presentations on a topic they did not have a high level of knowledge on (sometimes because of a library's particular interests), requiring a high amount of preparation time.
- ❖ **Design a SME model to allow for more in-person presentations at libraries,** such as finding libraries and universities that are in close proximity to each other and/or providing a travel budget for SMEs to get to libraries. As one librarian said:

"I think the fact that NASA@ My Library provided some [SMEs] was great, but it doesn't always help the more rural libraries. There were none that would've worked for this area, and we would have had to do a virtual program, which our patrons are thoroughly burned out on and tend not to engage with at this point. However, on the flip side, it's not reasonable that you'd be able to provide something for all the little niche, rural places that might participate, either! We were lucky enough to be able to just reach out to local organizations until we found some people, and that worked well with us, but I don't think there's really anything the project itself could've done to assist with that."

Impact on Library Patrons

Implementation Overview

Partner libraries were each expected to implement at least three programs and/or community engagement activities: one related to the JWST Launch, one related to the first images generated by JWST, and a third related to the Collaborative Summer Library Program "Oceans of Possibility" theme, NASA Earth Science, and/or environmental sustainability.

To evaluate the impact of *NASA@ My Library* programming on library patrons, library staff at six *NASA@ My Library* partner libraries were selected to be "case study libraries" and asked to administer post-program surveys to attendees at each of their programs. These libraries received a total of 260 patron

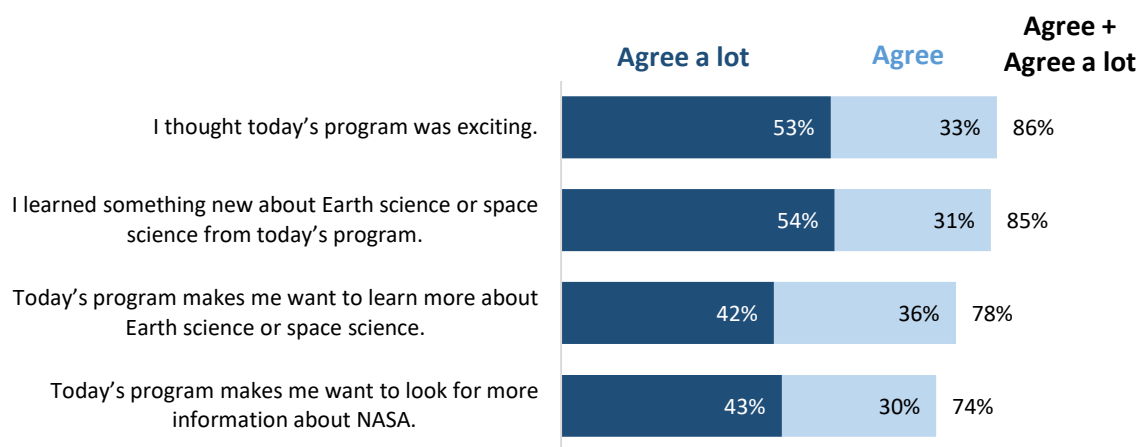
surveys for 16 different programs. The programs surveyed include hybrid (in-person and online) and in-person-only programs, some of which were hosted at libraries and others at partner locations.

Strengths/Highlights

Overall, NASA@ My Library programming was well-received by patrons.

As shown in Figure 14, 86% of patrons *agreed* or *agreed a lot* that the program was exciting. 85% of patrons *agreed* or *agreed a lot* that they learned something new about Earth science or space science. A smaller—but still substantial—majority of patrons said the programs had sparked an interest in learning more. A total of 78% of patrons *agreed* or *agreed a lot* that the program made them want to learn more about Earth science or space science, while 74% *agreed* or *agreed a lot* that the program made them want to look for more information about NASA.

Figure 14. Patrons reported that they enjoyed the NASA@ My Library programs they attended and that they learned a lot about NASA science; a substantial majority of patrons said they were interested in learning more



Source: Patron Survey (n =192-223)

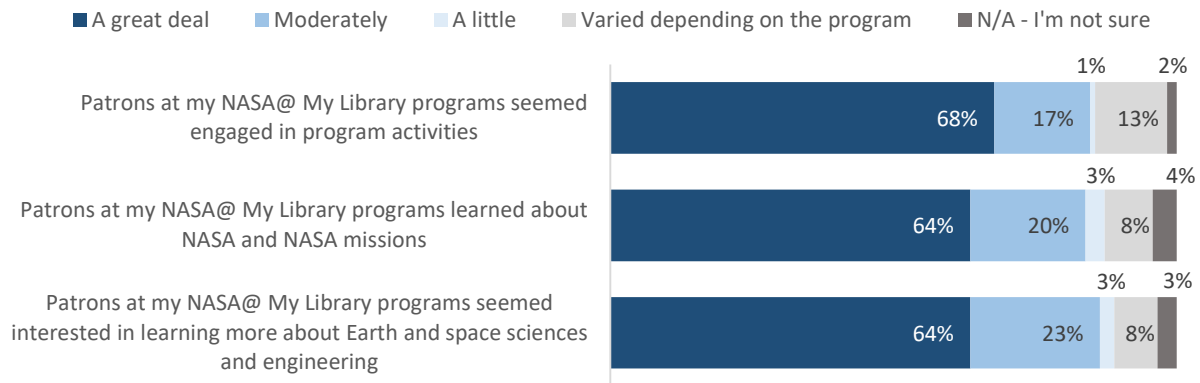
“Overall, we found attendance increased in STEAM programs which reflected the NASA@ My Library connection. During one of my observations of programming services, I saw a lot of parent/caregiver and child connections. This was reaffirming to know the programming was not only teaching new concepts but also creating human bonds.”

~Library staff

Library staff agreed that patrons seemed engaged and learned from the programs. As shown in Figure 15, 68% of library staff at all partner libraries reported in the post-survey that patrons seemed engaged a great deal in NASA@ My Library program activities. Similarly, 64% of partner library staff reported that

patrons learned a great deal about NASA and NASA missions and that patrons seemed a great deal interested in learning more about NASA and Earth and space sciences and engineering.

Figure 15. A majority of library staff thought that patrons learned a great deal about NASA through NASA@ My Library programming and seemed engaged in the program activities and interested in learning more about NASA and Earth and space sciences and engineering.



Source: Library Post-Survey (n =118)

"[NASA@ My Library programs] did generate a lot of interest with kids. They enjoyed coming to the programs. It gave them a chance to see that the library can be something else than a book place. Everyone has a little interest in space to some extent, so this tapped into that."

~Library staff

"Our children's librarian put together a model of the James Webb Telescope in the front lobby of our library and it was amazing; many families interacted with the display and engaged with the activity. It was also so cool to see the initial images come back and know that we were a part of the NASA@ My Library program. It felt like being in the know before everyone else."

~Library staff

Weaknesses/Challenges

In the post-survey of all partner libraries, some library staff reported that patrons learned a moderate amount about NASA and seemed moderately engaged and interested in learning more, while for others engagement, learning, and interest varied by program (see Figure 15 above).

A few libraries reported, for example, that in-person programs saw more active participation than virtual or hybrid programs, and activity-based programs were more popular than lecture-based ones. For one staff member, program topic was thought to be a factor:

“I think it depended on the topic. When talking about the Webb Space Telescope, children definitely enjoyed seeing the rocket launch and find the simulation of the unfolding of the telescope interesting. All ages were fascinated by the first images. More detailed information about nebulae and the specifics of the workings of the telescope were not found to be as fascinating by some.”

Engaging Underrepresented Audiences

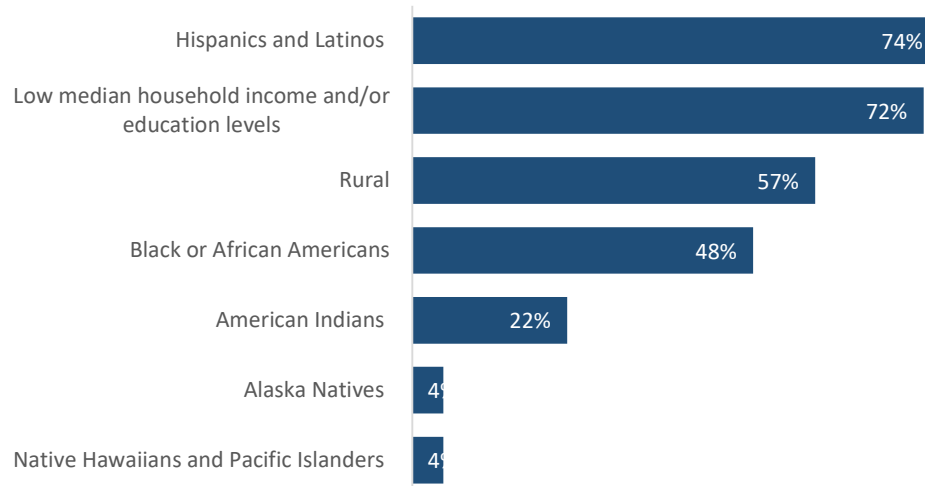
Implementation Overview

One of the goals of *NASA@ My Library* was to reach audiences who are underserved or underrepresented in STEM, including women and girls, low-income communities, and people of color. Evaluation data suggest that *NASA@ My Library 2.0* helped libraries engage new—and often underserved or underrepresented—audiences.

Strengths/Highlights

Libraries tried to engage audiences underrepresented in STEM through *NASA@ My Library* programming using a variety of strategies. The most common underrepresented audiences libraries tried to engage were Hispanics and Latinos (74%) and those with low median household income and/or education levels (72%), followed by rural audiences (57%) and Black or African Americans (48%) (see Figure 16).

Figure 16. Library staff most commonly reported that their library tried to engage Latinx and low-income and/or education levels through *NASA@ My Library*



Source: Library Post-Survey (n = 46)
Respondents could select all that applied

“When we had our program with the NASA engineer, kids were able to get up and ask lots of questions. ... I had one girl who was about 12 get up and say, ‘I love math. What jobs do you think would be good for me?’ Our engineer that we were matched with was a female, and to hear a woman who had made it to that level, talk to a young girl, at an age when many girls start to fall away from the sciences, about her possibilities at NASA and encouraging her to keep her love of math alive, was just special.”

~Library staff

Libraries reported using a variety of strategies to engage these populations:

- 74% of libraries held events specifically trying to engage one or more specific audiences
- 70% promoted programs directly to specific audiences
- 65% partnered with organizations/schools that serve groups with similar backgrounds to the specific audiences they were trying to engage
- 37% created or adapted materials to be more accessible to specific audiences (e.g., translated materials, incorporated materials from another culture)
- 20% hosted guest presenters or facilitators from underrepresented groups

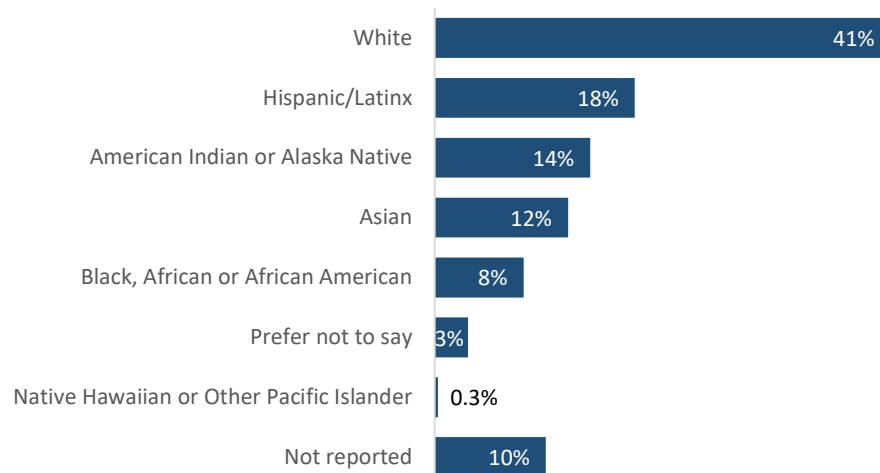
Library staff reported varying levels of success with engaging underrepresented audiences: 30% said they were *very successful*, 43% reported they were *moderately successful*, and 26% said they were *slightly successful*. In the ALA report, staff reported that partnering with schools and community organizations were the most effective strategies for reaching underrepresented audiences.

“We also created a poster session emphasizing women and minorities who have been to space. This was really well received and we sent out the posters to schools at the request of teachers who wanted their students to see adults who looked like them.”

~Library staff

Of the patrons who completed patron surveys at case study libraries following *NASA@ My Library* programs, 41% self-identified as White, followed by Hispanic/Latinx (18%), American Indian or Alaska Native (14%), Asian (12%), Black/African or African American (8%), and Native Hawaiian or Other Pacific Islander (.3%) (see Figure 17).

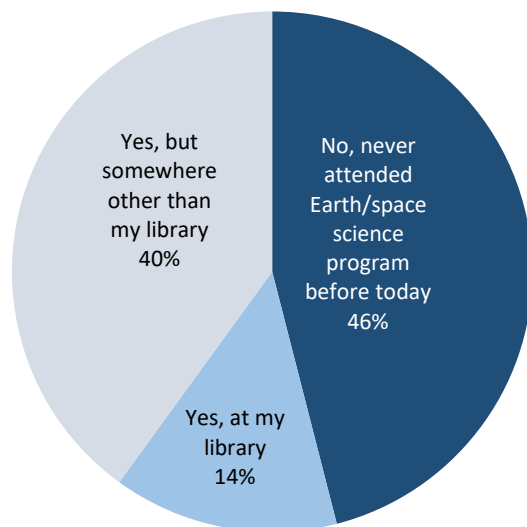
Figure 17. Patrons who completed post-program surveys most frequently identified as White, followed by Hispanic/Latinx, American Indian or Alaska Native, and Asian



Source: Patron Survey (n = 260)
Respondents could select all that applied

Just under half the patrons (46%) said they had not been to any other programs about Earth science and space science previously, while 14% had been to an Earth and space science program at their library and 40% had attended an Earth and space science somewhere other than their library (see Figure 18).

Figure 18. The largest group of patrons who attended a *NASA@ My Library* program reported that they had never attended a program about Earth or space science in the past



Source: Patron Survey (n = 239)

As shown in Table 3, 64% of patrons who identified as Hispanic/Latinx had not previously attended an Earth science or space science program, followed by 44% of patrons who identified as American Indian or Alaska Native, 44% who identified as Black/African/African American, 45% of patrons who identified as Asian, and 39% who identified as White.

Table 3. Patrons who identified as Black or Latinx were the most likely to report that a *NASA@ My Library* program was the first Earth or space science program they had attended

	Number of patrons who selected race/ethnicity	% of survey respondents who had not been to an Earth or space science event before
Native Hawaiian or Other Pacific Islander	1	100%
Hispanic/Latinx	30	64%
American Indian or Alaska Native	15	44%
Black/African/African American	8	44%
Asian	13	42%
White	38	39%

Source: Patron Survey (n = 109)

In the post-survey of all partner libraries, some libraries reported that partnering with schools had been an effective strategy for engaging underrepresented audiences, as well as hosting events outside of the library, including distributing kits and other materials at outreach sites. One library director explained:

“Overall, we found that programs held outside the library, at locations community members were already familiar and comfortable with, had greater attendance from Hispanic/Latino families than programs held inside the library. The two public programs with the greatest success at reaching our target audience were our two outdoor programs. By our estimates, at least half the attendees at those programs were of an audience underrepresented in STEM fields. We received a significant amount of positive feedback at these events. Working with our community partner, our town’s elementary school with the highest percentage of Hispanic/Latino families, enabled us to reach many students of an audience underrepresented in STEM fields, and some of their parents as well. By hosting classes throughout the school year, these students benefited from consistent quality STEM programming.”

Library staff also cited translating promotional materials and having bilingual staff as reasons for successful engagement with underrepresented audiences.

Weaknesses/Challenges

Some libraries reported that COVID restrictions presented challenges for engaging communities, as did staff changes at libraries and at partner organizations. One library cited families’ availability due to work schedules as a recurring problem with reaching underserved populations. Similarly, another library had success with engaging patrons from lower income areas through after-school and evening programming.

Recommendations

- ❖ Continue to encourage libraries to partner with organizations who are already engaged in their communities and serving individuals who are underrepresented in STEM.
- ❖ Support libraries in identifying and working with SMEs who come from communities that have been marginalized and are underrepresented in STEM.

Engaging Patrons Through Badges

Implementation Overview

NASA@ My Library utilized Beanstack—an online platform for libraries and schools to create, manage, and measure reading challenges—to design two challenges for exploring the science behind the James Webb Space Telescope through books, videos, games, and hands-on activities related to Earth and space science. The badge challenges were made available to any library with a paid Beanstack account. Users could earn activity badges for completing individual activities, as well as a completion badge for the entire challenge. NASA@ My Library’s two JWST challenges were:

[Look Up! Explore Our Universe: The James Webb Space Telescope Challenge](#) (December 2021)

This challenge offered four badges consisting of 22 NASA-focused activities.

[Look Up! Step Back in Time with The James Webb Space Telescope Challenge](#) (May 2022) This challenge offered five badges consisting of 35 NASA-focused activities.

Strengths/Highlights

More than 100 libraries across the U.S. participated in the first badging challenge (see Table 4), with almost 7,300 individual NASA-focused activities completed, and almost 3,000 badges earned. A smaller number of libraries (35) participated in the second badge challenge. For the second challenge, approximately 1,000 NASA-focused activities were completed and 171 badges earned. (Due to privacy concerns, Beanstack was unable to provide individual patron-level information to determine how many people participated in either badge challenge.)

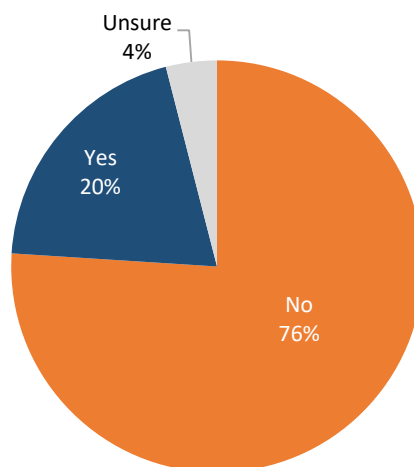
Table 4. Total number of participating libraries, badge completions, and individual activity completions for each of the Beanstack challenges

Beanstack Challenge Name	# of Participating Libraries	Activity Badge Completions	Individual Activity Completions
Look Up! Explore Our Universe with the James Webb Space Telescope	107	2,901	7,293
Look Up! Step Back in Time with the James Webb Space Telescope	35	171	1,005

Source: Data provided by Beanstack

Data provided by Beanstack showed 11 *NASA@ My Library* partner libraries on the list of participating libraries for the first challenge, Look Up! Explore Our Universe: The James Webb Space Telescope Challenge in December 2021. No *NASA@ My Library* partner libraries were listed as participating in the second challenge. In the post-survey, project directors were asked whether their library participated in either of the *NASA@ My Library* Beanstack challenges: 76% responded “No,” 20% responded “Yes,” and 4% were unsure (see Figure 19).

Figure 19. The majority of the *NASA@ My Library 2.0* partner libraries (76%) did not participate in either of the *NASA@ My Library* Beanstack challenges.



Source: Library Staff Post-Survey (n = 46)

The 20% of library staff who used the Beanstack challenges described the benefits as:

- Providing additional opportunities to promote *NASA@ My Library*
- Allowing the library to reach people who don't normally come to the library
- Promoting reading and STEM content
- Increasing participation in other reading challenges
- Helping the library connect with a local school

"A lot of people are motivated by [Beanstack]. Some want to do all of the activities even if you have to do one or two because they're 'completionists.' Others are technology averse. You couldn't track it on paper and it didn't offer any [physical] rewards; just digital badges and a certificate at the end saying you did it."

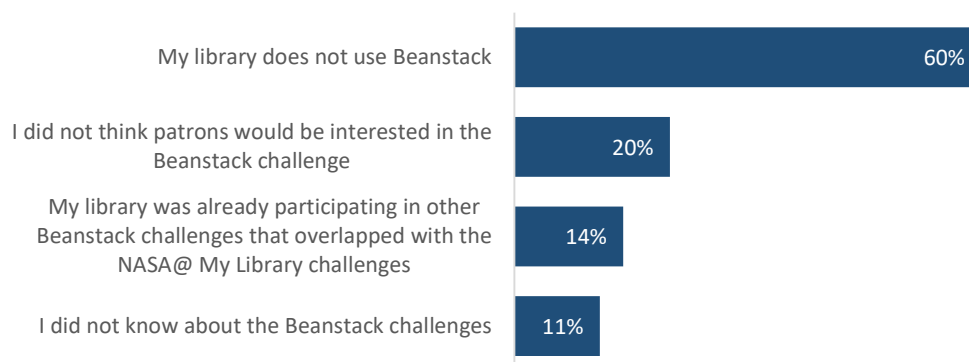
~Library staff

Weaknesses/Challenges

As noted above, fewer libraries and (likely) patrons engaged with the second of the two badging challenges. The reasons for this decline are unknown. Many of the activities that were developed for the first challenge were also included in the second challenge; it is possible that some libraries (and patrons) assumed the two challenges were not sufficiently different to be of interest.

One potential issue with offering an online badge program is access. While many libraries already use the Beanstack platform to offer reading challenges and other activities to their patrons, other libraries do not. As shown in Figure 20, the most common reason *NASA@ My Library* partner libraries said they did not participate in the badging challenges was because their library does not use Beanstack. One in five Project Directors said they did not think their patrons would be interested.

Figure 20. The majority of partner libraries participating in *NASA@ My Library 2.0* said the reason they did not participate in the badging challenges is that their library does not use the Beanstack platform.



Source: Library Staff Post-Survey (n = 46)

Recommendations

Library staff from *NASA@ My Library* partner libraries that did offer the Beanstack challenges to their patrons made some suggestions for how the *NASA@ My Library* team could improve the use of Beanstack or similar types of challenges in the future:

- Offer challenges in the summer when use of Beanstack is highest
- Provide more notice so that libraries can do more promotion
- Offer discounts on Beanstack license renewals

Library staff from *NASA@ My Library* partner libraries that did not participate in the Beanstack challenges offered some additional suggestions for how the *NASA@ My Library* team improve the use of Beanstack or similar types of challenges in the future:

- Create challenges for ReadSquared (another similar platform some libraries use)
- Provide funding for Beanstack

Conclusion and Recommendations

Summative data reveal that *NASA@ My Library 2.0* experienced many successes.

Library staff from partner libraries increased their confidence and ability to facilitate library programming related to Earth, space, and engineering.

Library staff reported that *NASA@ My Library's* resources and professional development provided them with resources and ideas that increased their confidence, knowledge, and interest in facilitating Earth and space-science-related library programming. The supports and resources they received helped them offer STEM and space science-related activities and programming to a greater extent and in different ways than they had prior to participation in *NASA@ My Library*. They also formed new partnerships to support their programming, such as partnerships with schools and SMEs.

Library staff expressed a strong desire to continue offering, and in some cases expand, Earth and space science-related programming at their libraries in the future.

All Project Directors who completed a post-project survey indicated that they are *likely* or *very likely* to continue offering Earth and space science programs in the future, with 84% saying they are *very likely* to do so. Library staff said they planned to continue offering some programs they set up during *NASA@ My Library* and create new ones. A few indicators suggest that staff turnover was higher during the second phase of *NASA@ My Library* than it was in the first phase—perhaps associated with the pandemic—which could present a challenge to continuation.

The new near-peer SME model (training university students to serve as SMEs) helped a number of libraries reach patrons in new ways.

According to data from partner libraries' final reports, 18 library programs involved NASA-funded university students. Project staff provided a high level of training and support for university students for their role as SMEs. Near-peer SMEs helped libraries offer high quality STEM programming. University student also gained valuable experience doing outreach. Patrons were exposed to scientists, and learned about scientific processes and careers.

Communicating and coordinating schedules between libraries and students was sometimes challenging. In addition, despite the multiple sessions of training offered, a number of university students serving as near-peer SMEs said additional training or support opportunities would have been useful.

Patrons reported that they enjoyed the *NASA@ My Library* programs they attended and that they learned about NASA science; a majority of patrons said they were interested in learning more about earth science, space science, or engineering.

The majority of patrons who completed post-program surveys said they found the programs exciting (86%), and that they learned something new about earth science, space science, and/or engineering (85%). A substantial majority (74%) of patrons said that the program made them interested in looking for more information about NASA.

NASA@ My Library helped libraries engage new audiences, including those from communities who are underrepresented in STEM.

Just under half the patrons (46%) who completed a patron survey after attending a *NASA@ My Library* said they had not been to any other programs about Earth science and space science previously. Patrons who identified as Black or Latinx were the most likely to report that a *NASA@ My Library* program was the first Earth or space science program they had attended at their library. On the final post-survey, almost three-quarters of libraries (73%) felt they had been *moderately* or *very successful* at reaching underserved audiences with *NASA@ My Library* activities and resources.

Many patrons engaged in two online challenges for exploring the science behind the James Webb Space Telescope through books, videos, games, and hands-on activities related to Earth and space science.

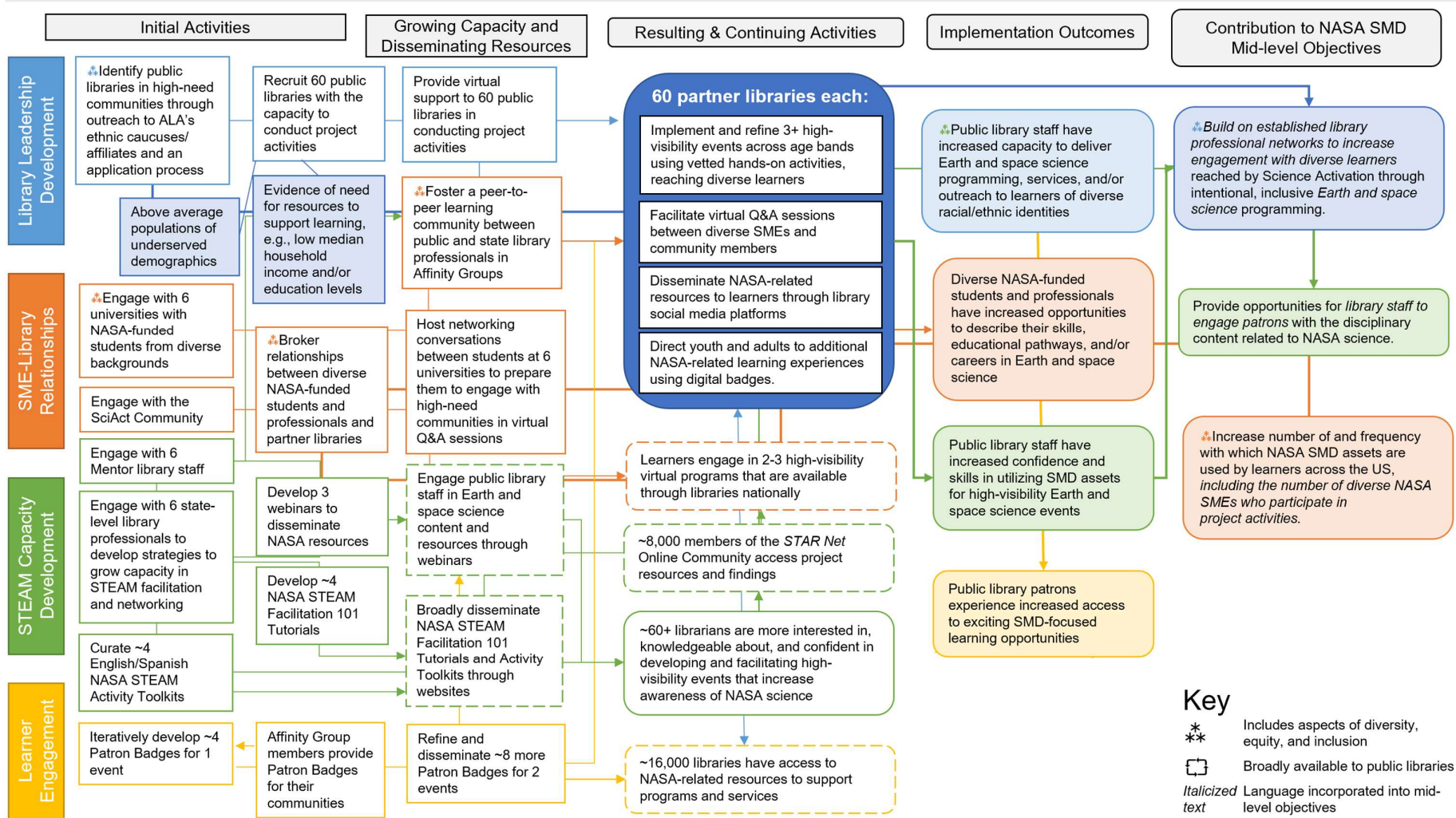
More than 100 libraries across the U.S. participated in the first badging challenge (including 11 *NASA@ My Library* partner libraries), with almost 7,300 individual NASA-focused activities completed, and almost 3,000 badges earned. A smaller number of libraries (35) participated in the second badge challenge. For the second challenge, approximately 1,000 NASA-focused activities were completed and 171 badges earned.

Based on these findings, the following recommendations emerged as *NASA@ My Library* continues its efforts:

- ❖ **Create an onboarding plan for new library staff and check in with library staff when Project Directors change.** When Project Directors left their libraries, sometimes the remaining or new library staff were not aware of the *NASA@ My Library* resources. The project team could create an onboarding plan for new staff to orient them to *NASA@ My Library* resources, and subsequently check-in with the current staff to make sure they are aware of resources and have the supports and information they need.
- ❖ **Continue offering ways for libraries to share with one another and consider developing additional ways to help them connect with other libraries similar to theirs.** Library staff appreciated the opportunities to connect with and learn from other partner libraries and mentor libraries. However, some library staff particularly wanted to connect with libraries similar to theirs (e.g., of similar size, serving similar demographics) to make discussions more relevant and useful.

- ❖ **Provide more training and support for near-peer SMEs—in ways that are feasible and cost-effective.** Although multiple training sessions were offered, a number of university students serving as near-peer SMEs said additional training or support opportunities could have been useful. Additional resources include program models for near-peer SMEs to use or adapt with libraries, as well as more opportunities for SMEs to learn or work together, share resources, and learn from one another.
- ❖ **Continue to support libraries in thinking critically about what underserved audiences they have not been engaging as much as they would like, and support libraries in identifying and implementing strategies to intentionally engage and reach these audiences.** One approach would be to continue to support libraries in identifying and working with SMEs who come from communities that have been marginalized and are underrepresented in STEM.

Appendix A: Logic Model



Appendix B: Methodology

Table X. NASA@ My Library 2.0 Instruments and Timeline for Administration

Instrument	Purpose	Administration Details	Responses Received
Library Staff from Partner Libraries			
Librarian Pre-Survey	Collect baseline data about partner libraries' and library staff members' prior experience with STEM programming	September 2021	207 responses from 60 partner libraries (89% response rate)
Librarian Post-Survey	Collect feedback about library staff members' experiences with the project and its impact on them, their libraries, and library patrons	September 2022	120 responses from 60 partner libraries (59% response rate)
Library Staff Interviews	Individual interviews with sample of libraries focused on gathering general feedback from library staff on all aspects of their NASA@ My Library experience	September - October 2022	Interviewed 5 library staff; 1 additional librarian submitted answers to questions in writing
Annual Report Form	Collect information about programming	ALA administered in September 2022	1 report from each of 60 partner libraries (100% response rate)
Mentor/Advisor Library Staff			
SLA Focus Group	Collect feedback about SLAs' experiences with the project	May 2022	5 SLAs participated in focus group; 2 SLAs were interviewed separately as they could not attend focus group
Mentor Library Focus Group	Collect feedback about mentors' experiences with the project	May 2022	5 mentor library staff participated in focus group; 2 additional mentor libraries who could not attend focus group submitted answers to questions in writing

Instrument	Purpose	Administration Details	Responses Received
Library Patrons			
Library Patron Survey for Programming	Collect information about the impact of <i>NASA@ My Library</i> programs on patrons' knowledge and interest in NASA science; patrons' demographic information was also collected	Library staff from 8 case study libraries were asked to administer a one-page paper survey (or online survey) to patrons at the end of each <i>NASA@ My Library</i> program (available in both English and Spanish)	260 surveys from 16 programs held by 8 libraries between December 2021 and September 2022
Beanstack badging data	Assess reach of badging program	Beanstack collected data during two badge challenges	Beanstack provided records regarding the names of participating libraries, badge completions, and individual activity completions
Virtual Programs with NASA SMEs			
SME Interviews/Focus Group	Gather feedback on engaging virtual SMEs	September 2022, following SMEs' facilitation of library programs	Individual interview with 4 SMEs
SME Reflection Survey	Gather feedback from SMEs about their reasons for participating, preparation, and experience with programs	August - September 2022, following SMEs' facilitation of library programs	19 out of 30 responded (63%)
Patron Focus Group	Obtain patrons' feedback about virtual SME program	Evaluators asked any willing volunteers (aged 18 and over or a child attending with an adult) to stay after the program to answer a few questions (library staff and SME departed the meeting link)	After 1 program with 3 individuals
Patron Post-Survey	Slight variation of standard <i>NASA@ My Library</i> patron survey was created for SME programs, asking what patrons liked and	SMEs were asked to share the link to the online survey in the chat box toward the end of their programs	13 responses from 5 different programs

Instrument	Purpose	Administration Details	Responses Received
	didn't like about the virtual connection to a scientist		
Program observation	Observe SME's program facilitation, activities and patron engagement	Evaluator joined online programs hosted by SMEs	3 online programs



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