Libraries as Community Hubs for Citizen Science
Final Summative Evaluation Report (IMLS)

Phase 1 and Phase 2 (Supplement) November 2017 – March 2022

University Office of Evaluation and Educational Effectiveness

Arizona State University

June 28, 2022

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Table of Contents

EXECUTIVE SUMMARY

The *Libraries as Community Hubs for Citizen Science* project team, including ASU faculty, researchers, practitioners and evaluators, librarians/staff, citizen science project leaders, web designers/developers, and advisors collaborated to 1) develop and evaluate citizen science toolkits available for and through six public library partners in the Phoenix, AZ area; 2) create associated resources to train, support, and communicate with librarians and citizen scientists; 3) work with stakeholders to create a plan to scale the model among interested libraries, statewide then nationwide; and 4) iterate and measure broad and targeted marketing/outreach efforts to promote the kits.

The project followed a three-phased approach for development and evaluation to develop content and resources for the toolkits. The project team successfully provided five unique citizen science kits to six Arizona partner libraries and facilitated pilot testing to 1) learn how kits/resources are used to build or support citizen scientists at the libraries; 2) measure if and how the kits are used by patrons; 3) identify potential impacts of the kit use for patrons; and 4) identify components (processes, tools, projects, instructions/resources) that are/are not working.

The evaluation team collected data from project leaders, librarians, and library patrons to provide feedback before, during, and after the development and implementation of citizen science kits. Within the first phases of work (2017 -2020), citizen science kits circulated across six Arizona libraries for a total of 223 times. During the next phase of testing (2021 - 2022), there were at least 162 kit check-outs across four Arizona libraries between Oct' 21 - Dec' 21 and 149 kit check-outs between Jan '22 - April '22. Patrons self-reported that participating in the citizen science projects increased their awareness, interest, and knowledge of citizen science, as well as confidence in their ability to collect and interpret data.

Citizen science kit materials and associated resources for librarians went through several iterations of pilot testing and improvements. In 2020, a new Observing Pollinators Kit was developed, implemented and distributed to partner libraries in Arizona (and in 2021, to ten national partner libraries). Additionally, the project team created and improved associated resources to train, support, and communicate with librarians and citizen scientists, available at https://scistarter.org/library-resources (i.e., the *Library & Community Guide to Citizen Science* available in English and Spanish; Kit Building Guides for Library Staff; the *Citizen and Community Science Library Network*; and downloadable digital, graphic, and print resources including booklists, stickers, buttons, bookmarks, posters, rack cards, press photos, print ads, digital ads, and Citizen Science Month promotional materials).

In 2021, the project team worked with stakeholders to create a plan to scale the model among interested libraries statewide then nationwide. Access to the kits was scaled throughout the state of Arizona through via grants administered by the Arizona State Library, Archives & Public Records (ASLAPR), and four Arizona libraries were initially granted $3K in funding under the LSTA program; two libraries applied for funding in 2022. Importantly, the project team secured funding and is successfully implementing the next phase of work: *Scaling, Supporting, and Sustaining Libraries (SSSL) as Community Hubs for Citizen Science* (Federal Award ID Number LG-246428). This three-year project (2021 - 2023) is making significant progress towards fostering a national impact on libraries in support of lifelong learning by maturing, sustaining, and nationally scaling this project piloted within Arizona libraries.

During January - March 2022, the project team and an external marketing consulting firm implemented their broad and targeted social media ad campaign. The external evaluation team measured the impacts of these outreach efforts.
Key findings include:

- The ads were targeted primarily to individuals underrepresented in scientific research and were seen by over 1.5 million viewers resulting in between ~4,600 and 6,400 visits to the SciStarter.org/library-kits webpage at the cost of approximately $29,000.00. Approximately 1 out of every 260 individuals who viewed an ad visited the webpage.
- There were more visits to the four kits featured on SciStarter.org/library-kits during the three months of the ad campaign than the three months before the campaign. Likewise, there were more visits during the ad campaign than during the same period a year earlier.
- There was some limited evidence that the ad campaign contributed to the circulation of the kits at libraries participating in the ad campaign.

Additional findings are reported in the Citizen Science 2022 Ad Campaign Evaluation Report.

METHODOLOGY

The UOEE provided external evaluation services throughout the duration of the grant period (2017 – 2022). The evaluation approach was 3-pronged and involved 1) acquiring continuous, rapid feedback from librarians about project processes via a weekly check-in survey; 2) assessing change in librarian knowledge, comfort, and skills via a pre-post librarian survey; and 3) investigating impact of marketing/outreach efforts and patron satisfaction with check-out processes and use of the kits via patron surveys. After considering feedback from the initial phases of work, improvements were made to citizen science kits and associated materials for librarians. Feedback was collected from national pilot libraries under the *Scaling, Supporting, and Sustaining Libraries as Community Hubs for Citizen Science (SSSL)* grant (LG-246428-OLS-20) and a new survey was developed and included within kit instructions (2020 - 2022).

Throughout 2017 - 2022, the UOEEE observed select activities and held community meetings with project advisors, librarians, and project teams to collect and share feedback about project processes and outcomes. Furthermore, the UOEEE leveraged data collected across related grant-funded projects to document overall progress and impact. Broadly, evaluation activities included:

- Developing a journey map and project logic model as well as the subsequent evaluation plan
- Using formative evaluation methods to ensure the feedback of the key stakeholders is integrated into the project design
- Working with project personnel to establish best practices from the experiences of the key stakeholders
- Providing evaluation reports at the conclusion of each phase of the project
- Providing ongoing, informal feedback throughout the funding period
- Facilitating community forums and the journey mapping activities
- Conducting ongoing monitoring and evaluation activities to document the progress toward meeting project goals, objectives, timelines, activities, deliverables, and outcomes
- Observing select activities
- Conducting interviews and/or surveys with a subset of key personnel and stakeholders
- Collecting experiential and perceptual data from participants

- Monitoring and providing critical feedback on the development and deployment of key project deliverables
- Leveraging evaluation data collected from the current Libraries as Community Hubs for Citizen Science project to continue to measure the impact and gauge scalability of the citizen science kits developed (Supplemental period only)
- Documenting the "Build-Borrow-Buy" model and resultant changes to processes / approaches
- Measuring broad and targeted marketing/outreach efforts to promote the kits

FINDINGS

The following table highlights the status of each project objectives and reports key evaluation data to support this conclusion. All project outcomes were completed or in progress.

Table 1. Progress Towards Libraries as Community Hubs Project Outcomes (2017 - 2022)

<table>
<tr><th>Objective</th><th>Status</th><th>Outputs, Outcomes, & Impact</th></tr>
<tr><td rowspan="2">Develop and evaluate citizen science toolkits available for and through six public library partners</td><td rowspan="2">Complete</td><td>Convened design team of citizen science project owners, citizen scientists, and librarians to develop prototype program including five new citizen science kits.

<table>
<tr><th>Phase I: In circulation ~34–39 weeks</th><th>Phase II: In circulation ~ 17 weeks</th></tr>
<tr><td>Exploring Biodiversity (aka iNaturalist): Use a smartphone, tripod, and five different smartphone camera lenses to document and identify plants and animals around you to help scientists create a living record of life on Earth.</td><td>Stream Mapping: Learn to use a water quality kit to collect important data from streams to help scientists better discover and analyze water quality issues at the source.</td></tr>
<tr><td>Globe at Night: Learn how to make observations and measure ski brightness with a Sky Quality Meter and use the Globe at Night website to report your data.</td><td>Monitoring Air Quality: Learn how to use an air quality monitor and collect important data to help inform communities about the air quality surrounding them.</td></tr>
<tr><td>Zombee Hunting: Learn how to collect specimens using a Zombee light trap and report your findings to help determine if the Zombie fly parasite population is on the decline.</td><td></td></tr>
</table>

Conducted & evaluated test offering in six Arizona libraries (2017 - 2022) and ten national partner libraries (2021 - 2022). 55 kits checked out with Arizona library partners for a total of 223 times between Phase II and Phase II (2017 - 2020). Exploring Biodiversity was checked out the most (n = 79), followed by Zombee Hunting (n = 68), and Globe at Night (n = 45).

Library-level statistics regarding project participation were available through SciStarter. According to analytics, the SciStarter library landing page where the kit projects are housed was viewed 5,695 times, with 603 unique project views, and 4,712 research contributions. Furthermore, users who used the library SciStarter page collectively made 17,239 views to other affiliate projects and 127 project saves. Moreover, these users joined affiliate projects 524 times and contributed data to projects 855 times. This data suggests some level of sustained engagement in Citizen Science by library communities.

During Phase III Scaling, Supporting, and Sustaining Libraries as Community Hubs for Citizen Science (SSSL) (LG-246428-OLS-20), there were at least* 311 kit check-outs at four Arizona pilot libraries between Oct' 21 - Apr '22.

162 checkouts between Oct - Dec 21
149 checkouts between Jan - Apr 22
TOTAL 311 checkouts across 4 AZ library systems:
● Measuring Light in the Night (Checked out Oct '21 - Apr '22) - 72</td></tr>
</table>

Objective	Status	Outputs, Outcomes, & Impact
		• Zombee Hunting (Checked out Oct '21 - Apr '22) - 71 • Exploring Biodiversity (Checked out Oct '21 - Apr '22) - 68 • Monitoring Air Quality (Checked out Oct '21 - Apr '22) - 53 • Stream Mapping (Checked out Oct '21 - Apr '22) - 35 • Observing Pollinators (Checked out Oct '21 - Apr '22) - 12 Feedback was collected from library partners, project leaders, and patrons who used the kits. Updates to kit and kit materials were made based on this feedback. *NOTE: Not all libraries submitted data about circulation; circulation statistics were reported by Maricopa County Library District, Apache, Scottsdale, and Avondale libraries.
Create associated resources to train, support, and communicate with librarians and citizen scientists	**Complete**	Alongside the development and implementation of the kits, the project team co-created the Librarian's Guide to Citizen Science. This comprehensive guide includes an introduction to Citizen Science and the SciStarter platform as well as a multitude of information and resources for bringing Citizen Science to the library. The Librarian's Guide is free and available to download from SciStarter. The project team developed turnkey training tools for participating in citizen science projects, and modeling citizen science participation for patrons: • *Library & Community Guide to Citizen Science* (available in English and Spanish) • Created the Citizen and Community Science Library Network; librarians and community partners can join the network and view past webinar recordings at https://scistarter.org/library-network • Libraries as Community Hubs for Citizen Science tutorial training available at https://scistarter.org/library-training • Kit Building Guides for Library Staff for six citizen science kits available at https://scistarter.org/library-build-a-kit • Free Citizen Science Training Modules available at https://scistarter.org/training • List of Libraries Offering Citizen Science Kits available at https://scistarter.org/library-map. • Download Digital, Graphic, and Print Resources (including booklists, stickers, buttons, bookmarks, posters, rack cards, press photos, print ads, digital ads, and Citizen Science Month promotional materials) from https://scistarter.org/library-resources Outcomes / Impacts During Phase I and II testing, the majority of librarians (n = 24; 67%) reported being "Satisfied" or "Very satisfied" with this project. Four librarians provided comments indicating that the circulation process was smooth and easy, and four other librarians provided comments suggesting difficulty with the process. There was not a pattern or theme indicating a more successful circulation process at some libraries and room for growth at others; conversely, both types of comments were evident across library locations. In general, librarians requested assistance with promotion and community engagement and for support troubleshooting kit materials and part-replacement.

Objective	Status	Outputs, Outcomes, & Impact
Work with stakeholders to create a plan to scale the model among interested libraries statewide then nationwide	**Complete**	Development and continued implementation of next phase of work: *Scaling, Supporting, and Sustaining Libraries (SSSL) as Community Hubs for Citizen Science* Federal Award ID Number LG-246428). This three-year project aims to make a national impact on libraries in support of lifelong learning by maturing, sustaining, and nationally scaling, this IMLS project piloted within Arizona libraries. Outcomes / Impacts As part of the SSSL project, 10 national partner libraries successfully implemented the "build a kit" model. Currently, the project team has coordinated grant opportunities through funds from Arizona LSTA Grants, the Network of the National Library of Medicine Regional Offices, and the Training and Engagement Center of the NIH at the University of Pittsburgh. These sources are published on SciStarter.org/library-network, in newsletters, and announced during webinars with the library network created under Phase III - *Supporting, and Sustaining Libraries (SSSL) as Community Hubs for Citizen Science,* Federal Award ID Number LG-246428).
Improve materials in the kits aimed at librarians to provide guides and programming connections to address higher than anticipated staff turnover	**Complete**	In 2020, a new Observing Pollinators Kit was developed, implemented and distributed to partner libraries. Associated electronic resources were added to the https://scistarter.org/library-resources page. Librarian facilitators and patrons were asked about the overall quality of the citizen science kits within evaluation surveys and follow-up interviews with librarians. Librarians who were interviewed felt that the quality of the kits was high as did patrons who completed the evaluation surveys. Outcomes / Impacts Twelve patrons submitted evaluation surveys from November 2018 to July 2019. Eleven of the twelve patrons (92%) reported some degree of likelihood that they would check out and use another Citizen Science kit in the future; all reported positive changes in their attitudes toward citizen science. In August 2019, the project team met with librarians from all seven libraries to discuss evaluation findings and sustainability of the project post-funding. Librarians felt that the evaluation findings were representative of their experiences, and that one of the largest challenges for project sustainability is increased and sustained community engagement. Accordingly, librarians and the project team brainstormed ways to promote the kits and bolster community participation such as promoting the kits through social media, identifying science content experts to deliver citizen science-related programming, and taking advantage of mini-grants available through the Arizona Library system. Under Phase III *Scaling, Supporting, and Sustaining Libraries as Community Hubs for Citizen Science (SSSL)* (LG-246428-OLS-20) (2020 - 2022), the project team has developed a suite of resources, supports, and updates to project materials: ● Kit building guides to support the creation, circulation and promotion of three citizen science kits (Exploring Biodiversity, Observing Pollinators and Measuring Light in the Night). These guides can be found on SciStarter.org/library-build-a-kit.

Objective	Status	Outputs, Outcomes, & Impact
		● Revised three existing kits to be less Arizona-focused, and is in the process of incorporating feedback that received from national community-based organizations (Girl Scouts, NASA Night Sky Network, Arizona State University Teachers College). ● Developed a two-part, self-guided online training for librarians and library staff to gain knowledge and confidence in speaking about citizen science projects and making their libraries community hubs for citizen science. An evaluation survey followed each part of the training. A total of 115 users provided feedback for the first hour and 7 users provided feedback for the second hour. ● The team designed new webpages on SciStarter.org to house and track analytics of citizen science resources, including a new landing page dedicated to libraries (http://scistarter.org/library-network) and a page for patrons to find where they can access kits (scistarter.org/library-map). ● The project team developed and strengthened collaborative partnerships with six community-based organizations. In July 2021, the project team began having individual calls with community partner liaisons to better understand how to operationalize key processes of scaling this project (i.e., customizing toolkits, trainings, resources, and promotional materials within each organization; training local facilitators; and partnering with libraries to engage their local members in citizen science). As part of the next phase of work (Phase III) *Scaling, Supporting, and Sustaining Libraries as Community Hubs for Citizen Science (SSSL)* (LG-246428-OLS-20) (2020 - 2022), the evaluation team updated the end-user feedback survey included as a last step of citizen science kit instructions. As of June 2022, eight respondents completed an end-user survey. Demographics of survey completers (*n* = 8) ○ 75.0% (n = 6) Librarian or part of a library staff; ○ 12.5% (n = 1) A parent who used the kit with your family; ○ 12.5% (n = 1) Did not respond; ○ 50.0% (n = 4) checked out a kit for the first time; ○ 37.5% (n = 3) checked out two kits previously; and ○ 12.5% (n = 1) checked out one kit previously. Kits checked out (*n* = 8) ○ 37.5% (n = 3) Exploring Biodiversity ○ 37.5% (n = 3) Measuring Light in the Night ○ 25.0% (n = 2) Observing Pollinators ○ 0.0% (n = 0) Monitoring Air Quality ○ 0.0% (n = 0) Zombee Hunting Satisfaction with experience using the citizen science toolkit (*n* = 8) ○ 100% were “Very” or “Completely” satisfied Ease of use (*n* = 8) ○ Locate the kits at the library: 100% Very easy or Easy ○ Check out the citizen science kit at the library: 100% Very easy ○ Understand the Activity Guide instructions included in the toolkit: 87.5% Very easy or Easy; 12.5% Somewhat easy (Exploring Biodiversity)

Objective	Status	Outputs, Outcomes, & Impact
		○ Use the kit to complete the citizen science project: 87.5% Very easy or Easy; 12.5% Somewhat easy (Measuring Light in the Night) ○ Follow the citizen science kit instructions on scistarter.org/library-kits: 87.5% Very easy or Easy; 12.5% Somewhat easy (Measuring Light in the Night) ○ Submit data collected for the citizen science project: 87.5% Very easy or Easy; 12.5% Very difficult (Measuring Light in the Night)
Iterate and measure broad and targeted marketing and outreach efforts to promote the kits to address lack of awareness of the kits	**Complete**	The project team worked with a media and graphics team to develop an advertising campaign to promote citizen science in partner library communities. The campaign was launched on Mar. 1, 2020 but was suspended on Mar. 12 as the COVID pandemic forced libraries to close. At the end of 2020, the campaign still remained on hold. Beginning fall 2021, an external marketing team (Lavidge) worked with project leaders to design and implement a social media marketing campaign that ran from January 4 – March 31, 2022. <u>Outcomes/Impacts</u> The 2022 Citizen Science Ad Campaign featured 18 ads (17 images and 1 video) advertised on the following social media platforms: • Facebook/Instagram (54% of ad campaign) ○ Images only targeted to (1) 55+ seniors, (2) parents of teens, and (3) parents of homeschoolers; retargeted ads to each of the three groups ○ Some ads for seniors and parents of teens were placed in a "carousel" that would show three ads that the viewer could scroll through • LinkedIn (8%) ○ Images only targeted to educators • YouTube (23%) ○ 30-second video • Connected TV (15%) ○ 30-second video (same one as for YouTube) Target Audience • The ad campaign focused on reaching underserved seniors (55+) and other underrepresented groups (e.g., Native American/Tribal populations, Hispanic/Latino/a/x populations, and Black/African American populations). • Secondary targets were adults 18 – 55, including educators and homeschoolers • Tertiary targets were families and teens • The advertising agency, LAVIDGE, targeted these individuals based on age (55+) and interests identified on social media. ○ Example interests include tribal art, African American culture, Latin American music, and Hispanic culture. ○ Also targeted gardening, pollination, and other topics related to kits. • In summary, ad campaign targets had to be the correct age, have relevant interests (largely linked to being from an underrepresented group), and be connected with the target zip codes to be presented with the ad. The ads were seen by over 1.5 million viewers resulting in between ~4,600 and 6,400 visits to the SciStarter.org/library-kits webpage at the cost of

Objective	Status	Outputs, Outcomes, & Impact
		approximately $29,000.00. Approximately 1 out of every 260 individuals who viewed an ad visited the webpage. Across all four kits featured on SciStarter.org/library-kits during the ad campaign, there were ~35 more visits/week during the ad campaign across all four featured kits than before. Across all four kits, the number of visits to the kit pages during the ad campaign (January 4 – March 31, 2022) was ~19 visits/week higher than the number of visits during the same period a year earlier (January 1 – March 31, 2021). There was some limited evidence that the ad campaign contributed to circulation of the kits at libraries participating in the ad campaign. Additional findings are reported in the Citzien Science 2022 Ad Campaign Evaluation Report.
Scale access to the kits throughout the state of AZ via grants administered by the Arizona State Library, Archives & Public Records (ASLAPR) and through a fully developed Build, Borrow, Buy option on SciStarter.org to address requests from librarians	**Complete**	Four Arizona libraries were initially granted $3K in funding under the LSTA program. Regularly scheduled remote meetings were held to onboard these new partners. ASLAPR provided three annual cycles of grants to AZ libraries participating in Libraries as Community Hubs for Citizen Science resulting in additional library involvement including those in Pima County (AZ) which enhanced kits and included Spanish language editions. Libraries in AZ participated in a new data entry feature on SciStarter to register their library and related kits in a searchable "build, borrow, buy" database interface. Meetings with new and existing AZ citizen science libraries were held between Sept - Oct. 2020; library staff discussed building and circulating kits, programming and the library's efforts to promote their citizen science project. Outcomes/Impacts: LSTA (for 3 years 2020 - 2022) offered $3k for creating citizen science within libraries (can be used for library materials, the kits, speakers, equipment). In 2022, two libraries applied for the grant. 10 national partner libraries successfully implemented the "build a kit" model. Project team aided in solving supply chain issues as needed as some components were no longer available due to the pandemic. The LSTA grant program also served to generate much more interest in the program at libraries throughout the state who did not receive grant funds. SciStarter lists each of the pilot libraries and those in AZ that offer kits on scistarter.org/library-map and created a form for additional libraries to register their libraries and types of kits they offer.

CONCLUSIONS

Overall, the *Libraries as Community Hubs for Citizen Science* project successfully completed or made progress towards its six objectives:

1. The project team developed five citizen science toolkits available for and through six public library partners; the evaluation team collected data from project leaders, librarians, and library patrons to provide feedback before, during, and after the development and implementation of citizen science kits. Within the first phases of work, citizen science kits circulated across six libraries for a total of 223 times. Patrons self-reported that participating in the project increased their awareness (M = 4.42), interest (M = 4.33), and knowledge (M = 4.17) of citizen science, as well as confidence in their ability to collect (M = 3.67) and interpret (M = 3.58) data (all based on a 5-point scale).

2. The project team created associated resources to train, support, and communicate with librarians and citizen scientists, including:
    - *Library & Community Guide to Citizen Science* (available in English and Spanish)
    - The *Citizen and Community Science Library Network* (librarians and community partners can join the network and view past webinar recordings at https://scistarter.org/library-network)
    - *Libraries as Community Hubs for Citizen Scienc*e online tutorial training available at https://scistarter.org/library-training
    - Kit Building Guides for Library Staff for six citizen science kits available at https://scistarter.org/library-build-a-kit
    - Free Citizen Science Training Modules for anybody interested in citizen science available at https://scistarter.org/training
    - A list of libraries offering citizen science kits at https://scistarter.org/library-map.
    - Downloadable digital, graphic, and print Resources (including booklists, stickers, buttons, bookmarks, posters, rack cards, press photos, print ads, digital ads, and Citizen Science Month promotional materials) from https://scistarter.org/library-resources

3. The project team worked with stakeholders to create a plan to scale the model among interested libraries statewide then nationwide. The project team secured is currently implementing the next phase of work: *Scaling, Supporting, and Sustaining Libraries (SSSL) as Community Hubs for Citizen Science* (Federal Award ID Number LG-246428). This three-year project aims to make a national impact on libraries in support of lifelong learning by maturing, sustaining, and nationally scaling, this IMLS project piloted within Arizona libraries.

4. Citizen science kit materials and associated resources for librarians went through several iterations of pilot testing and improvements. In 2020, a new Observing Pollinators Kit was developed, implemented and distributed to partner libraries in Arizona and in 2021, to 10 national partners. Associated electronic resources were added to the scistarter.org/library-resources page (reported in #2 in this list).

5. The project team and an external marketing consulting firm, LAVIDGE, implemented an ad campaign. The external evaluation team measured the impacts of this broad and targeted outreach effort. Conclusions regarding the extent of evidence that the ad campaign contributed to the target outcomes are provided in Table 2, below.

6. Access to the kits was scaled throughout the state of Arizona through via grants administered by the Arizona State Library, Archives & Public Records (ASLAPR) and through an updated "Build-a-Kit" model for librarians to build their own toolkits from SciStarter.org. Four Arizona libraries were initially granted $3K in funding under the LSTA program and two libraries applied for funding in 2022.

Table 2. Summary of Ad Campaign Outcomes (2022)

Objective	Component of Theory of Change/ Logic Model	Level of Evidence that Ad Campaign *Contributed* to Target Outcome (Options: None, A little, Some, Quite a bit)	Notes
Reach underrepresented individuals	All	• Quite a bit	• Ad campaign targets had to be the correct age, have relevant interests (largely linked to being from an underrepresented group), and be connected with the target zip codes to be presented with the ad. • 36.1% (*n* = 13 of 36) of zip codes included a larger percentage of individuals who were underrepresented in scientific research by age (55+) than the United States as a whole. • 44.4% (*n* = 16 of 36) of zip codes included a larger percentage of individuals who were underrepresented in scientific research by race/ethnicity (using the census categories: "Hispanic or Latino," "Black or African American alone," "American Indian and Alaska Native alone," or "Native Hawaiian and Other Pacific Islander alone") than the United States as a whole.
Increase awareness of the citizen science kits	Social media users view ads advertising	• Quite a bit	• The ads were viewed over 1.5 million times
	Social media users are directed by ads to the scistarter.org/library-kits site	• Quite a bit	• Between ~4,600 and 6,400 individuals visited the target SciStarter webpage
	Social media users visit kit pages on the website	• Quite a bit	• Across all four kits featured on SciStarter.org/library-kits during the ad campaign, there were ~35 more visits/week during the ad campaign across all four featured kits than before. • Across all four kits, the number of visits to the kit pages during the ad campaign (January 4 – March 31, 2022) was ~19 visits/week higher than the number of visits during the same period a year earlier (January 1 – March 31, 2021).

Objective	Component of Theory of Change/ Logic Model	Level of Evidence that Ad Campaign *Contributed* to Target Outcome (Options: None, A little, Some, Quite a bit)	Notes
Promote the use of the kits	Social media users check kits out from their library	• A little	• Across the reporting Arizona libraries, there was quite a bit of evidence that kit circulation increased during the ad campaign. While data are not sufficient to say that kit circulation increased *as a result of the ad campaign*, circulation overall did increase, which would be consistent with a positive impact of the ad campaign. That is, the evidence is consistent with the ad campaign contributing to increased kit usage. • Just over one-half of the 20 reporting AZ libraries (55.0%) experienced an increase in kit circulation during compared to before the ad campaign. • All five of the national pilot libraries that participated in the ad campaign and provided monthly circulation data experienced at least slightly increased circulation during the campaign (i.e., through March). In contrast, only two of the four pilot libraries that did ***not*** participate in the ad campaign but provided monthly circulation data reported increased circulation during the campaign. • Because pilot libraries were not randomly assigned to participate in the ad campaign and likely differed in terms of their preparedness to participate in the ad campaign, caution should be used when interpreting this finding. That being said, the finding that the pilot libraries that participated in the ad campaign may have seen increased circulation suggests that the campaign may have contributed to the circulation at those libraries. • None of the eight respondents to the Citizen Science Kit Feedback Survey reported learning of the kits through the ad campaign. Given the small sample size and alternative ways of learning of the kits, this finding provides no insight into the effectiveness of the ad campaign.

LESSONS LEARNED

During the Development Phase, a multi-method approach was taken to understand the needs of librarians and their communities. Program evaluators conducted a SWOT analysis with librarians and expert advisors to map the strengths, barriers, and needs of the project. The program team facilitated community dialogues at all six libraries to introduce communities to the concept of citizen science, learn about participatory research efforts in which communities are already engaged, learn what community concerns or interests exist, and surface existing or potential programs and partners to leverage support.

Based on these dialogues, the project team found that community members reported the most interest in citizen science projects around the categories of public health (including air and water quality), environmental health (including biodiversity and gardening), and astronomy. This information, along with in-depth consideration of material/financial logistics and project feasibility, led to the selection of kits to test during the Implementation Phase. The Implementation Phase also involved a multi-tiered approach involving informal user testing in the summer of 2018 followed by rolling out the refined kits in two phases (Phase I and Phase II). Phase I kits included Exploring BioDiversity (aka iNaturalist); Zombee Hunting; and Measuring Light in the Night (aka Globe at Night), and Phase II kits included Steam Mapping and Monitoring Air Quality.

Prior to Phase I and Phase II rollouts, respectively, sustainable inventory lists, potential check-out procedure guidelines/considerations, and in-library promotional materials were created for the kits. In addition, a designer was hired to brand materials, and a curated SciStarter webpage dedicated to the selected projects was created.

During informal testing, Phase I kits were tested by at least one volunteer participant, resulting in minor iterations to kit materials. These three kits were then rolled out for Phase I pilot testing at all partner libraries while the project team continued to iterate the kits for Phase II. In 2020 (Year 3), the “Libraries as Community Hubs for Citizen Science” project specifically focused on the objectives outlined for the Implementation and Reflection and Understanding Phases of the project plan as defined below.

Implementation Phase	Reflection & Understanding Phase
Provide libraries with materials to promote/facilitate citizen science (CS). Promote library events to draw CS participants and promote kits. Provide access to quality tools and projects that allow citizens to contribute to science. Increase interest and participation in CS. Increase positive attitudes toward CS. Increase patron knowledge of science and confidence in handling data.	Determine the characteristics that make an ideal toolkit. Develop lessons learned and best practices guide for scaling toolkits at more libraries, including ways to network citizen science kit libraries.

Figure 1. Evaluation objectives (Year 3: 2019-20)

In an attempt to better understand the preparation and training necessary to start circulating kits at the libraries, project evaluators and library staff created journey maps at six of the seven sites to identify relevant touchpoints between library staff and patrons in the kit circulation process as well as to identify goals, needs, and potential barriers across touchpoints (i.e., check-out/check-in). The journey mapping process helped to create a list of considerations for rollout at each site and also helped to identify key timepoints for evaluation.

Once the kit materials were finalized, site-specific considerations were addressed, and librarians were provided access to promotional materials, the Implementation Phase began with rolling out the first set of kits including iNaturalist, Zombee Hunting, and Globe at Night. Concurrently, two additional kits (Stream mapping and Monitoring Air Quality) were put through the development process. Evaluative data from librarians and patrons was collected throughout Phase I and Phase II pilot testing.

At the end of the piloting period (November 2018–May 2019), the project team scheduled a Wrap-Up All Hands Meeting with library partners to present and "ground truth" the evaluative data collected from patrons and librarians. This meeting not only allowed for a facilitated dialogue about the accuracy and representation of evaluation findings, but also provided the opportunity to discuss next steps in project sustainability. This meeting took place in August 2019 and incorporated library representatives from each site.

Librarians were provided with the opportunity to provide the project team with any additional information that they think would be helpful to know. The team learned that librarians experienced trouble with losing pieces or damaging pieces of the kits, that a central and easily accessible cloud storage of all related materials would be useful, and that there was significant concern about librarian staff turn-over. Similarly, library patrons were asked to share what they liked best about the citizen science kits and what they would change. The project learned key insights about aspects for the kits and uploading data within citizen science projects.

Multiple librarians suggested providing information about accessing speakers or videos related to the kits. Similarly, one librarian recommended that the project team "Visit the libraries and demonstrate the various kits."

After the pilot testing with Arizona libraries concluded, some emphasized a need for clarity around the role that the project team will play moving forward. In general, librarians requested assistance with promotion and community engagement while also wondering what type of support for troubleshooting and part-replacement will be available. Data collected resulted in making improvements to kit materials and processes for libraries to facilitate citizen science programming. The following recommendations were reported to the project team and have since been acted upon; changes fostered positive impacts (reported in "Noteworthy Impacts").

1. **Establish training and/or resources to promote librarian confidence with facilitating citizen science programming around the kit projects (in process with supplement):** Many supplemental resources were developed, including an updated page to house all resources: scistarter.org/library-resources.

2. **Explore specific tools for engaging underrepresented communities in citizen science (in process with the supplement):** The project team for the SSSL project includes a DEI-expert as an advisor. They have provided feedback on program materials, the new online tutorial trainings (scistarter.org/training and scistarter.org/library-training), and other resources developed (scistarter.org/library-resources).

3. **Assist libraries with increasing capacity for patron collaboration around citizen science**: The National Citizen and Community Science Library Network was created under the SSSL project and provides resources, trainings, and promotional materials (among other supports) for all members of the network.

4. **Establish direct communication with library supervisors (i.e., "higher ups") at the front-end of new collaborations**: This recommendation came from one librarian lead who noted that this approach could greatly enhance "buy-in from the higher ups." This feedback was incorporated when recruiting the 10 national pilot libraries, as supervisors signed MOUs outlining their and the project team's expectations.

5. **Sustained action planning as a result of weekly team check-ins**: It was recommended that each project meeting conclude with a brief summation of the meeting minutes and assignment of action items for the project team; the team has since done this and has a running-list of notes that guides each meeting.

6. **Continued consistent communication with librarians/library partners**: The AZ library partners are still engaged and in contact with the project team as the project scales nationally. Each of the library partners are a member of the National Citizen and Community Science Library Network.

Because of the challenges associated with COVID-19, a key phase of scaling this work (scaling at the state-level) was delayed and was carried out, simultaneously, as the project scales nation-wide (2020 - 2022). Stepwise phasing of this project was intentional, so the timeline adjustment limited opportunities to learn from operationalizing project goals across diverse communities in Arizona, before scaling nationally. To overcome this challenge, the project team was intentional about selecting

national pilot libraries that represent diverse library systems, constituents, and communities. Additionally, rapid cycle evaluation processes have been implemented to iteratively collect feedback from project stakeholders and inform project development/expansion.

Development of both the programmatic and evaluative components of the ad campaign required iteration and reflection. The following lessons were learned through the process:

- During project meetings, the ad campaign company, LAVIDGE, the project team, and the evaluation team came to meetings with their own expectations, processes, and vocabulary. During meetings, efforts were made to clarify campaign goals and needs, but difficulties in communicating were apparent. Developing a shared understanding is a natural and essential part of any successful collaborative project. A lesson learned from the ad campaign experience is that there is a greater need for purposefully establishing a shared understanding than may be needed for other projects.

- As noted by the PI during the final meeting with the ad agency, the citizen science ad campaign differed from other ad campaigns facilitated by SciStarter in that the message of the ad was more complex. In contrast to ads that directed the viewer to join an online citizen science event from their computer, the ads in this ad campaign tried to communicate three pieces of information: (1) what is citizen science, (2) citizen science kits exist, and (3) go to your library to check out a kit. In addition, evaluations note that a fourth piece of information is implied but not stated explicitly: go to SciStarter to find a participating library. Ads may be more effective if they clearly communicate and are tied to the target action.

- LAVIDGE staff noted during the final meeting that ad campaign analytics are less robust when the sample size is smaller. For example, per LAVIDGE analytics, there were only 22 actions (i.e., clicking on one of the kits' pages); other data suggest the total may be higher. LAVIDGE staff noted that 500 – 1,000 actions are really needed to have strong evidence on which to base claims of best- and worst-performing ads in terms of yielding actions. Thus, it would be misleading to compare ads in this campaign to one another in terms of their ability to produce actions.

- LAVIDGE staff recommended locating at the top of the webpage the part of the page directing the visitor to the target action because visitors may not scroll down.

- Collecting demographic information on individuals who view or click on ads is extremely difficult for a variety of reasons:
    (1) Out of concern for privacy and in response to increased scrutiny of data collection practices, social media platforms do not provide demographic information on campaign participants and will not provide even geographic data of participants if the number of individuals in a Designated Market Areas (DMA, a set of geographic areas that are quite large) is too low.
    (2) The geographic data provided by social media platforms is also returned in terms of DMAs, even if campaign targeting is done through zip codes.
    (3) Social media platforms rely on algorithms to target specific individuals, and these algorithms require very large samples, moreso if the target population is difficult to identify and requires a number of criteria to identify, such as was the case for this ad campaign. Thus, attempts to conduct the ad campaign on a smaller scale to trick the

platforms into providing more information could backfire. For example, if this ad campaign were conducted separately within each target zip code (thus allowing us to know exactly how ads perform in each zip code), there may not be a sufficient number of eligible people for the algorithm to identify potential targets, and the ads may not even be shown. Further, the algorithm would be limited in its ability to optimize and use the most effective ads over time.

    - In summary, campaigns targeting individuals using multiple criteria (zip code, demographics, and interests) are more complex, require campaigns of a larger scale to work effectively, and are more limited in their ability to identify the demographics of campaign participants than simpler campaigns. Collecting demographic information on ad campaign participants may not be particularly feasible; evaluation and monitoring efforts may be best spent on tracking how ads were targeted to specific populations.
- Librarians are under an extremely high level of stress due to increased challenges and responsibilities associated with the pandemic. The original evaluation plan called for data collection facilitated by library patrons, but this approach was not feasible. Evaluation and monitoring efforts may need to focus on alternatives rather than relying on the voluntary participation of extremely busy librarians.

NOTEWORTHY IMPACTS OUTSIDE OF THIS PROJECT

Scaling

- One Missouri astronomer who previously lived in Arizona has developed a full Citizen Science astronomy program based on the kits (see https://scistarter.org/darksky); this astronomer is working to inform MO libraries and librarians about the program to encourage participation and wide-scale adoption of the program;
- One of the partner libraries now hosts reoccurring bi-weekly Citizen Science meet-ups for community members and patrons. The first meeting was well attended (~12 attendees), and the second meeting involved one very enthusiastic patron with plans to engage in Citizen Science more. Per the meet-up lead: Kit check-out has seen an increase since meet-ups began. This same partner library independently scaled the Citizen Science kits to all 13 library branches;
- The Los Angeles County Public library system adopted a Citizen Science program including the circulation of kits and participation in Citizen Science Month 2020;
- Librarians from across the state of Arizona joined the monthly partner library calls which resulted in at least two additional libraries attending at least one meeting; invitation lists have been compiled from those expressing interest at public-facing online (webinar) and in-person (conferences, community outreach) events.
- Under the SSSL grant, the project team launched the National Citizen and Community Science Library Network in May 2021 through a series of newsletters sent to existing SciStarter library and community partners. The newsletters have included opportunities for citizen science engagement including professional development, mini-grants, web resources, and partnerships. As of October 2021, the newsletter had reached 371 people, 236 of those officially signed up to be a part of the national network, and 212 people registered for the Introduction to Citizen Science in Libraries webinar held August 25, 2021. Over 80 individuals attended the webinar live and an additional 103 people have viewed the recording on YouTube.

- The National Citizen and Community Science Library Network (created under SSSL grant) has hosted a series of webinars and professional development activities, including: "How to a Host a Citizen Science Program" webinar attended by 45 participants live and viewed by an additional 62 via Youtube (November 2021), January 26, 2022 "Diving Deeper into Citizen Science Kits", and February 10, 2022 "Professional Development for Libraries - Planning for Citizen Science Month".

Improving Materials

- Under the SSSL grant, the project team recruited and onboarded ten libraries across the country to participate in a pilot expansion to test the new and updated resources. The team determined that each library would receive $1,600 to build and test kits with their communities between September 2021- April 2022. In June 2021, the team developed and released a pilot library application and hosted an application webinar to inform applicants of the expectations and benefits. 61 libraries across 29 states applied for the pilot program. In August 2021, the team selected ten libraries to participate in the pilot. The criteria used to make the selection included geographic location (rural or urban), size of library, audiences served, strength of community-based partners and state of readiness to distribute citizen science kits. These libraries engaged in a multi-day webinar series to build their understanding and confidence in developing and disseminating citizen science kits with their communities in January 2022. The series included an "Orientation and Expectations" webinar, "Deep Dive on Kits" webinar, "Engaging Your Community in Citizen Science" webinar, and a "Dissemination Showcase" webinar. Each of the webinars were well-received.
- After consideration on a broad range of current citizen projects, the topic for a new Check-It-Out program kit was selected to be called "Mapping Mosquitos." Tied to NASA's GLOBE Observer project, this kit will enable citizen science participants to observe, record and share the locations where potential disease vectors are breeding and help project scientists using associated satellite data and computer models to predict disease outbreaks and epidemics. This kit was be made available to libraries in Dec 2021.
- Evaluation survey data identified the program's "Monitoring Air Quality" kit as problematic when trying to connect the included AirBeam 2 air quality sensor with a smartphone device. It was anticipated that updates to the sensor and its associated smartphone apps will alleviate this problem. In addition, the manufacturer is releasing an IOS-based app for the first time which will allow a much broader range of participants to utilize this kit. An updated version of the "Monitoring Air Quality" kit was be completed in the spring of 2022.
- Working with Cornerstones of Science (Brunswick, ME), the SSSL project helped promote and distribute a library kit developed for the citizen science project known as "Crowd the Tap." This EPA-funded project enables participants to investigate the materials used in their home drinking-water system and also allows them to monitor the overall quality of their tap water.
- The project's kit development team is currently exploring the potential of developing a "Heat Mapping" kit to allow participants to collect and submit local surface temperature data to project scientists studying conditions in "urban heat islands" and its impacts on vulnerable populations. If an appropriate project and sensor can be identified, the team's goal is to complete an associated kit by the end of 2022.

APPENDIX A: EVALUATION PLAN

Phase 1 Goal: Development (Years 1-2)

Develop content to create toolkits that can be readily accessible through libraries as Citizen Science hubs in order to increase participation in Citizen Science through libraries as community anchors for lifelong learning.

Project objective	Data sources	Data collection methods	Outputs	Outcomes
Conduct environmental scan to identify key Citizen Science projects and elements for participation; compare/contrast other CitSci kits.	• Librarians • Project staff • Advisors • Local citizen scientists • Library patrons w/ no Citizen Science experience	• Collaborating meeting with librarian to develop journey maps • Community meeting observations • Beta testing of kits	• Journey map developed addressing • Community issues/interests and patron interests • Key community challenges • Kit elements and instruments are identified – tested with patrons • Content is outlined for tool kits	• Users report the kits are usable and they are satisfied with the experience.
Identify key elements of the kits to promote usability among citizen scientists and librarians.	• Librarians • Project staff • Advisors • Local citizen scientists • Library patrons w/ no Citizen Science experience	• User survey	• Kits have necessary materials and instructions to be used by non-STEM experts • Kits are accessible to community needs	• Users report the kits are usable and they are satisfied with the experience.
Create a promotional strategy to advertise the availability of the kits to existing and potential citizen scientists.	• Librarians • Project staff • Advisors • Library patrons w/ no Citizen Science experience	• User survey	• Strategies to engage under-represented groups are developed • List of lending locations available on SciStarter website and ISLL partner sites •	• Users report learning about the kits from a variety of sources. • Users represent the community demographics.
Understand how librarians use toolkit resources.	• Librarians • Project staff • Advisors • Local citizen scientists • Library patrons w/ no Citizen Science experience	• Interviews with key stakeholders • Usability testing	• Key challenges are identified and strategies to address challenges are created • Key elements and topics are identified • Content is outlined for tool kits	• Librarians report being comfortable with facilitating the use of the kits.

Phase 2 Goal: Implementation (Year 3)

Provide the kits to the libraries and to test 1) how they are used to build or support citizen scientists at the libraries, 2) if and how the kits are used, 3) identify components (tools, projects, instructions/resources) that are/are not working, and 4) assess community engagement and impact.

Project objective	Data sources	Data collection methods	Outputs	Outcomes
Provide libraries with materials to promote/facilitate Citizen Science (CS).	• Library partners	• Interviews • Surveys • Document review	• Partners indicate kits have necessary documentation for patrons to easily utilize kits at home • Partners indicate they have necessary promotional materials for raising awareness	• Awareness of CS at library by patrons • Patron interest in participating in CS at local library
Promote library events to draw CS participants and promote kits.	• CS participants • Library facilitators	• Observation • Interviews	• # of events • # of people attending events	• Patrons intend to participate in CS • Perception of library as hub for CS by patrons
Provide access to quality tools and projects that allow citizens to contribute to science.	• Library partners • CS participants • Citizen Science project owners	• Interviews • Surveys • Document review	• Types and number of projects conducted by citizen scientists • Duration of participation	• Perception of quality of kit tools and materials • Perception of contribution to science
Increase interest and participation in CS.	• Library partners • CS participants • Project owners • SciStarter platform	• Interviews • Surveys • Document review • Website analytics	• # data contributions provided to projects • # times kits were checked out • # times kits lent to same patron	• Usability of the tools based on instructions and microsite provided • Representation of local population in kit users • Patron interest and engagement in CS • Perception of library staff on a sense of community around CS
Increase positive attitudes toward CS.	• CS participants	• Interviews • Surveys	• # times kits were checked out • # times kits lent to same patron	• Patron attitudes toward CS
Increase patron knowledge of science and confidence in handling data.	• CS participants	• Interviews • Surveys	• # times kits were checked out • # times kits lent to same patron	• Patron knowledge of science • Patron confidence in collecting and interpreting science data

Phase 3 Goal: Reflection and Understanding of Project and Impacts

Develop open, best practices for public libraries to consider adopting and informing to help scale Libraries as Community Hubs for Citizen Science nationally.

Project objective	Data sources	Data collection methods	Outputs	Explore Emerging Outcomes
Determine the characteristics that make an ideal toolkit.	• Librarians • Citizen scientists • Project stakeholders • Project documents	• Interviews • Document review	• # interviews conducted • # documents reviewed	• Based on key stakeholder experiences, what are the key pieces that should be included? • How can these kits be utilized in broader contexts (e.g., science museums)? • How can these kits be utilized in other counties, states, regions? • Checklist or guide is developed based on lessons learned from the project.
Develop lessons learned and best practices guide for scaling toolkits at more libraries including ways to network Citizen Science kit libraries.	• PIs and advisors • Library partners	• Interviews • Document review	• Guides are provided for individuals/entities interested in developing and circulating Citizen Science kits	• Libraries report local experiences and implementation efforts. • Lessons learned and “best practices” are available on SciStarter website or similar location.

APPENDIX B - PHASE III END-USER CITIZEN SCIENCE KIT FEEDBACK SURVEY - DATA TABLES (2022)

Table 1. Phase III - Total check-outs - Reported by Arizona Library Partners (n = 4) Oct '21 - Apr '22

	TOTAL KIT CHECK-OUTS							
	Jan '22	Feb '22	Mar '22	Apr '22	Oct '21	Nov '21	Dec '21	TOTAL
Exploring Biodiversity	7	7	15	2	6	6	25	**68**
Observing Pollinators	2	1	2	0	2	2	3	**12**
Measuring Light in the Night	9	14	12	1	12	8	16	**72**
Total Monitoring Air Quality	11	6	12	0	8	8	8	**53**
Total Stream Mapping	2	5	4	0	7	4	13	**35**
Total Zombee Hunting	10	10	17	0	6	5	23	**71**
TOTAL	**41**	**43**	**62**	**3**	**41**	**33**	**88**	**311**

Table 2. End-User Kit Feedback Survey (2022) - Information about respondents (*n* = 8)

ID	Kit	Respondent Type	# Kits checked out previously	Prior participation in citizen science?	Kit use	Completed the project?	Contributed data as instructed by the project?
1	Exploring Biodiversity	A librarian or part of a library staff	0	No	By myself	Yes	Yes
2	Exploring Biodiversity	A librarian or part of a library staff	1	No	By myself	Yes	Yes
3	Exploring Biodiversity	A librarian or part of a library staff	2	Yes	By myself	Yes	Yes

ID	Kit	Respondent Type	# Kits checked out previously	Prior participation in citizen science?	Kit use	Completed the project?	Contributed data as instructed by the project?
4	Measuring Light in the Night	A parent who used the kit with your family	0	No	With one or two others	Yes	No
5	Measuring Light in the Night	A librarian or part of a library staff	0	Yes	By myself	Yes	Yes
6	Measuring Light in the Night	A librarian or part of a library staff	2	Yes	By myself	Yes	Yes
7	Observing Pollinators		0	No	By myself	Yes	Yes
8	Observing Pollinators	A librarian or part of a library staff	2	Yes	By myself	Yes	Yes

Table 3. End-User Kit Feedback Survey (2022) - Respondent demographics (*n* = 8)

ID	Zip Code	Geographic Category	Age range	How do you identify?	Gender identity	"A person with condition(s) covered under the Americans with Disabilities Act"	Completed this survey before
1	85901 (AZ)	Rural	55-64 years old	White American, European American, White or European	Woman	No	No
2	27330 (NC)	Suburban	25-34 years old	White American, European American, White or European	Woman	Yes	No
3	27312 (NC)	Rural	25-34 years old	White American, European American, White or European	Woman	No	Not sure
4	86040 (AZ)	Rural	45-54 years old	Hispanic American, Latin American, or Hispanic/Latino/Latina/Latinx	Woman	None of the above	No

ID	Zip Code	Geographic Category	Age range	How do you identify?	Gender identity	"A person with condition(s) covered under the Americans with Disabilities Act"	Completed this survey before
5	27312 (NC)	Rural	25-34 years old	Prefer not to say	Woman		No
6		Rural	25-34 years old	White American, European American, White or European	Woman	Prefer not to respond	Yes
7	32064 (FL)	Rural	75 years or older	White American, European American, White or European	Woman	None of the above	No
8	27330 (NC)	Rural	25-34 years old	White American, European American, White or European	Woman	Prefer not to respond	Yes

Table 4. End-User Kit Feedback Survey (2022) - How satisfied were you with your experiences using the citizen science toolkit? (*n* = 8)

	Completely	Very	Moderately	A little	Not at all
Exploring Biodiversity	0.0% (*n* = 0)	**100.0% (*n* = 3)**	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)
Observing Pollinators	0.0% (*n* = 0)	**100.0% (*n* = 2)**	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)
Measuring Light in the Night	**33.3% (*n* = 1)**	**66.7% (*n* = 2)**	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)
Monitoring Air Quality	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)
Zombee Hunting	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)	0.0% (*n* = 0)

Table 5. End-User Kit Feedback Survey (2022) - How satisfied were you with your experiences? By respondent type (*n* = 8)

How satisfied were you with your experience using the kit? [Respondent type]		
Exploring Biodiversity	Very	A librarian or part of a library staff
Exploring Biodiversity	Very	A librarian or part of a library staff
Exploring Biodiversity	Very	A librarian or part of a library staff
Measuring Light in the Night	Completely	A parent who used the kit with your family
Measuring Light in the Night	Very	A librarian or part of a library staff
Measuring Light in the Night	Very	A librarian or part of a library staff
Observing Pollinators	Very	[Not Reported]
Observing Pollinators	Very	A librarian or part of a library staff

Table 6. End-User Kit Feedback Survey (2022) - Ease of use: Locate the citizen science kits at your library (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	100% (n = 2)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	66.7% (n = 2)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 7. End-User Kit Feedback Survey (2022) - Ease of use: Check out the citizen science kit at your library? (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	100% (n = 2)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 8. End-User Kit Feedback Survey (2022) - Ease of use: Understand the Activity Guide instructions included in the toolkit? (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	33.3% (n = 1)	33.3% (n = 1)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	50.0% (n = 1)	50.0% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	0.0% (n = 0)	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 9. End-User Kit Feedback Survey (2022) - Ease of use: Use the kit to complete the citizen science project? (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	66.7% (n = 2)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	50.0% (n = 1)	50.0% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	0.0% (n = 0)	66.7% (n = 2)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 10. End-User Kit Feedback Survey (2022) - Ease of use: Follow the citizen science kit instructions on scistarter.org/library-kits? (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	0.0% (n = 0)	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	50.0% (n = 1)	50.0% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	0.0% (n = 0)	66.7% (n = 2)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 11. End-User Kit Feedback Survey (2022) - Ease of use: Submit data you collected for the citizen science project? (n = 8)

Kit	Very easy	Easy	Somewhat easy	Somewhat difficult	Difficult	Very difficult	Not applicable
Exploring Biodiversity	0.0% (n = 0)	100% (n = 3)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Observing Pollinators	50.0% (n = 1)	50.0% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Measuring Light in the Night	33.3% (n = 1)	33.3% (n = 1)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	33.3% (n = 1)	0.0% (n = 0)
Monitoring Air Quality	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)
Zombee Hunting	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)	0.0% (n = 0)

Table 12. End-User Kit Feedback Survey (2022) - Summary: Usability data

Which kit did you check out?		How easy or difficult was it to do the following?					
		Locate the kits at your library	Check out the citizen science kit at your library	Understand the Activity Guide instructions included in the toolkit	Use the kit to complete the citizen science project	Follow the citizen science kit instructions on scistarter.org/library-kits	Submit data you collected for the citizen science project
A librarian or part of a library staff	Exploring Biodiversity	Very Easy	Very Easy	Easy	Very Easy	Easy	Easy
A librarian or part of a library staff	Exploring Biodiversity	Very Easy	Very Easy	Very Easy	Very Easy	Easy	Easy
A librarian or part of a library staff	Exploring Biodiversity	Very Easy	Very Easy	Somewhat Easy	Easy	Easy	Easy
A parent who used the kit with your family	Measuring Light in the Night	Easy	Very Easy	Easy	Somewhat Easy	Somewhat Easy	Very difficult
A librarian or part of a library staff	Measuring Light in the Night	Very Easy	Very Easy	Easy	Easy	Easy	Very Easy
A librarian or part of a library staff	Measuring Light in the Night	Very Easy	Very Easy	Easy	Easy	Easy	Easy
[Not Reported]	Observing Pollinators	Very Easy	Very Easy	Very Easy	Very Easy	Very Easy	Very Easy
A librarian or part of a library staff	Observing Pollinators	Very Easy	Very Easy	Easy	Easy	Easy	Easy