Discover SCIENCE with Dr. Bear®

Year 4 Evaluation Report

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Knology produces practical social science for a better world.

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Executive Summary

Discover SCIENCE (a Scientific Creative Innovative Engaging New Cool Experience) with Dr. Bear® (Discover SCIENCE) aims to promote a culture of STEM and health learning for children from kindergarten to fifth grade and their families in library-based, Out of School Time (OST) educational settings. Discover SCIENCE is in the fifth year of a five-year initiative founded on a partnership between the Center for Translational Science at the Children's Research Institute (CRI), within the Children's National Medical Center, and two area library systems, Washington, D.C. Public Libraries (DCPL) and Enoch Pratt Free Library (EPFL) in Baltimore. Since the third year of the grant, partnerships outside of DCPL and EPFL have been established, allowing for greater reach of the Discover SCIENCE programming.

During the fourth year of the Discover SCIENCE initiative, Knology evaluated activities with the Girl Scouts of Greater New York and librarian professional development in the DCPL system. Knology also attended partnership development meetings and supported on updates to the Discover SCIENCE website. Programming at DCPL in Year Four was minimal due to the ongoing closure of library buildings in Washington, D.C. due to the COVID-19 pandemic. In this report we explore the affordances and challenges of youth programming during a global pandemic and the adaptability of Discover SCIENCE lessons to different learning environments.

Findings show that the Discover SCIENCE curriculum can be taught in virtual settings by facilitators with different professional skills. Both librarians and Girl Scout troop leaders reported that some form of training (librarian professional development or general training for GSGNY troop leaders) helped them feel comfortable and confident in teaching Discover SCIENCE lessons. Librarians shared that the Discover SCIENCE programming resulted in an increased confidence in their own abilities to teach subjects outside their areas of expertise, and Girl Scout troop leaders modified lessons and activities to meet the needs of their group, demonstrating the capability of Discover SCIENCE lessons to support multiple learning outcomes.

Entering Year 5, Knology suggests an approach to summative evaluation that focuses on the doctorbearscience.com website and use of the Discover SCIENCE materials.

In order to assess the usability of the website and lessons, we recommend a focused, integrative summative strategy that shifts to recruitment of librarians or other facilitators in formal educational settings who have no prior-knowledge of Discover SCIENCE. We suggest that recruited facilitators use the website to facilitate pre-assigned lessons and other individually selected lessons. We could recruit 30+ various facilitators to provide feedback on the use of the website. Knology will review all instruments from Year 1-4 of the project to produce a comprehensive survey and focus group protocol.

This summative evaluation strategy will allow for a final review by facilitators of the website and its lessons and for continued assessment of the Discover SCIENCE activities.

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Introduction

Discover SCIENCE (a Scientific Creative Innovative Engaging New Cool Experience) with Dr. Bear® (Discover SCIENCE or "the project") aims to promote a culture of STEM and health learning for children from kindergarten to fifth grade and their families in library-based, Out of School Time (OST) educational settings. Discover SCIENCE is in the fifth year of a five-year initiative founded on a partnership between the Center for Translational Science at the Children's Research Institute (CRI), within the Children's National Medical Center, and two area library systems, Washington, D.C. Public Libraries (DCPL) and Enoch Pratt Free Library (EPFL) in Baltimore. The project is supported by cross-sector partners and by The National Institutes of Health R25 Award (5R25GM129225-03). Knology, a 501(c)(3) non-profit social science research organization, is evaluating Discover SCIENCE.

The project has four *general aims*:

- Expose learners to the fundamental interaction between the environment, health, and disease prevention through exposure to scientific thinking, asking and answering questions, and gathering and assessing data;
- Meet Next Generation Science Standards (NGSS), Common Core State Standards (CCSS), and local and other evolving national standards using art and manipulation to further scientific and health concepts;
- Ensure that computation, imaging, and engineering constructs are intrinsic to each module; and
- Evaluate our effectiveness and continuously improve our programming through external evaluation.

The work of Discover SCIENCE toward these aims is guided by *specific actions*: 1) Program modification, 2) Creation of specialized STEM programming for learners and families, and 3) Professional Development.

Year 4 Activities

Year 4 of Discover SCIENCE ran from September 1, 2020 – August 31, 2021. The original scope of Knology's evaluation covered the following activities:

- Discover SCIENCE Programming by DCPL library staff;
- Librarian Professional Development for DCPL library staff (Cohort 1);
- Librarian Professional Development for DCPL library staff (Cohort 2);
- Discover SCIENCE Programming by the Girl Scouts of Greater New York (GSGNY);
- Development of the doctorbearscience.com website;
- Online Youth Programming by New York Edge; and
- Youth Summer Camp at Children's National Hospital.

However, in response to the ongoing COVID-19 pandemic, all programming was held virtually. Thus, Knology and CRI continually reimagined the scope of work throughout the year. Ultimately, the Year 4 evaluation focused on GSGNY programming, follow-up from the

DCPL librarian professional development training session, continued review of the Doctorbearscience.com website, a pilot of our comparative case study survey, and the expansion of partnership networks. The analysis and discussion in this report is informed by frequent communications between evaluators and the project team. These conversations, which occurred either weekly or biweekly via email and video conferencing, enabled the project leadership team to respond to challenges based on evaluators' analysis and to update the evaluators on practical short- and long-term decisions facing the project team.

DCPL Programming and Professional Development

Programming

Discover SCIENCE programming in the DCPL system was expected to continue in a virtual setting throughout Year 4. Over the course of the project year, five library staff delivered at least one Discover SCIENCE program through video recording or a recorded presentation. No programming occurred inside the libraries during Year 4. Programming was hosted on DCPL's YouTube channel (*https://www.youtube.com/c/dcpubliclibrary*) and open to the public to view asynchronously at their leisure.

Knology had planned to observe any virtual programming that occurred during Year 4. All programming was done through pre-recorded YouTube videos, so no observations of live programming were carried out. One researcher from Knology watched all Discover SCIENCE related videos that were posted on the DCPL YouTube channel.

Professional Development

In Year 3, six librarians from the DCPL system participated in a professional development training aligned with DCPL's "SMART Goals" initiative (SMART = Specific, Measurable, Achievable, Realistic, and Timely). The professional development sessions built a cohort of library staff who expressed that they are confident in, knowledgeable about, and prepared for teaching health and STEM lessons to youth in the libraries. Librarians were expected to facilitate Discover SCIENCE activities in their libraries (or online, while library branches were closed to the public) during Year 4 of the project, and to train additional DCPL staff members as Discover SCIENCE program facilitators.

Librarians worked in pairs to develop their own STEM / health programming based on their experience in the DCPL "SMART Goals" initiative. This set of programming was hosted on the DCPL YouTube channel (*https://www.youtube.com/c/dcpubliclibrary*).

Knology had planned to develop new instruments to evaluate an expanded cohort of librarians participating in professional development in Year 4, as well as the librarians who returned from the Year 3 professional development to serve as trainers / mentors. However, due to ongoing closures at DCPL related to COVID-19, DCPL "SMART Goals" professional development training did not occur in Year 4.

Non-Library Out of School Time Programming

Girl Scouts of Greater New York

Discover SCIENCE expanded programming into New York City in Year 3 with the Girl Scouts of Greater New York (GSGNY) and continued this relationship into Year 4. On October 20, 2020, a third cohort of GSGNY troop leaders participated in a virtual training session with

Discover SCIENCE project leadership. An additional fourth cohort of GSGNY troop leaders participated in a virtual training session in March 2021. These trainings provided program demonstrations and knowledge about newly developed and updated set of health topics from the Discover SCIENCE curriculum. Program-specific supplies were not provided.

New York Edge

The Discover SCIENCE project team welcomed New York Edge leadership onto the project in November 2020. New York Edge is an afterschool network with a mission aligned with Discover SCIENCE programming: *The mission of New York Edge is* to *help bridge the opportunity gap among students in underinvested communities by providing programs designed to improve academic performance, health and wellness, self-confidence, and leadership skills for success in life.* In December 2020, the Discover SICENCE project team ran Round 1 of Discover SCIENCE training for New York Edge.

Development of doctorbearscience.com

CRI staff continued development of the project website, doctorbearscience.com. This website is the portal through which the public can access information about Discover SCIENCE. Throughout Year 4, Knology regularly spoke with the Discover SCIENCE team about the website. An evaluation to test usability and functionality was planned for Year 4, however this did not occur. An intentional shift in focus was made to consider user testing as part of Year 5 summative evaluation of the Discover SCIENCE project. In Year 5, Knology plans to recruit OST educators (Librarians, Girl Scout troop leaders, etc.) to review the website and facilitate lessons.

Expanding Programming and Partnerships

The CRI team, along with evaluators and external advisors, continued to think strategically about the future of the Discover SCIENCE Project. Collaboratively, we discussed next steps for programming under the current grant in order to maximize the program's impact. Conversations focused on the next phase of DCPL programming and professional development, Girl Scout programming, and building new partnerships with New York Edge (*https://newyorkedge.org/*) and New York Network for Youth Success (*https://networkforyouthsuccess.org/*). Other afterschool programs have expressed interest to the project team, including individual state affiliates in an afterschool network funded by the Charles Mott Foundation (*http://www.statewideafterschoolnetworks.net/*).

This Report: Year 4 Evaluation

Knology used a mixed-methods approach to evaluate the project components in Year 4, working closely with project leadership throughout the year on all evaluation activities.

The methods for each component of the evaluation are described in their individual chapters. The Year 4 Evaluation Report contains the following three chapters:

- Librarian Professional Development
- GSGNY Troop Leaders
- Comparative Case Study Pilot Study

Librarian Professional Development

Introduction

In Year 3 of the grant, six librarians participated in the Discover SCIENCE w/ Dr. Bear® "SMART Goals" professional development series. This series was designed by Discover SCIENCE project leadership and advisors to prepare librarians to teach STEM / health lessons in libraries. We followed up with these six librarians in the beginning of Year 4.

Methods

Participants

Two Knology researchers conducted a focus group with six librarians who participated in the DCPL "Smart Goals" Professional Development trainings coordinated by the Discover SCIENCE project team.

Instruments

Knology designed two instrument protocols: 1) a survey, distributed by email to the librarian cohort in June 2020 following the fifth training session; and 2) a focus group protocol for librarians who conducted their online STEM / health programs. The results of the survey were presented in the Year 3 Evaluation Report (Norlander et. al., 2020). The focus group was conducted on December 1, 2020. Findings for this focus group are included here. Direct quotes in this report may have been modified slightly for grammatical clarity.

Analysis

One researcher led the discussion based on the focus group protocol and the other took notes. The conversation was recorded and then transcribed. Analysis of the focus group generated themes regarding training goals, as well as suggestions for future professional development related to Discover SCIENCE.

Results

Overview

Overall, the six librarians who participated in Cohort 1 of the "SMART Goals" professional development series found the experience integral to their ability to develop and facilitate STEM / health programs at their libraries (although, throughout Year 4, all programming occurred virtually, as described above). The programs developed by Cohort 1 included

lessons focused on using emojis as an entry for talking about emotions; on regulating emotions when one feels scared or overwhelmed; and on heart health and the cardiovascular system. These lessons were distributed via the DCPL YouTube Channel (*https://www.youtube.com/c/dcpubliclibrary*).

While reflecting on the training sessions, participants appreciated how approachable the Children's National team was, as well as their commitment to integrate STEM / health topics into librarians' programming ideas. Participants agreed that it was meaningful to be in an environment with like-minded people that shared the goal of helping children learn about STEM / health topics. Furthermore, they looked forward to sharing what they had learned with other library staff members.

Experience Developing Programs

The time since these professional development sessions has been marked by COVID-19 uncertainty and upheaval, including continued closure of DCPL facilities. This has meant significant challenges for library staff beyond the ordinary and expected challenges related to new programming. Participants agreed that challenges during program development were mostly related to institutional uncertainty or job changes within the library, rather than any deficiency in the training resources. At some libraries this uncertainty led to trouble defining program goals and expectations around Discover SCIENCE programming.

Though it seemed that librarians were still adjusting to virtual programming, they indicated a need to keep in mind various options for the future, such as a hybrid approach. Everyone agreed that it isn't possible for virtual programming to reproduce in-person programming, and they acknowledged that it is unlikely that in-person library programs return in the near future. Even as some libraries have re-opened for certain services at the time of this report, not all libraries are facilitating in-person programming. One participant emphasized the collective desire to be better at virtual programming while reminding everyone that they are looking forward to implementing this program in-person: "*I think a lot of what we are doing virtually and online has a lot of creativity and possibility that we will keep, but we want to do it in person as well."*

Other than the logistical challenges presented by COVID-19 and the transition to exclusively virtual training, librarians enjoyed the process of developing their programs. One librarian shared their thoughts on the development of their programming as *"taking some of the knowledge from the trainings we had done with hospital professionals and using that to cruise the web and take activities that were out there and adding our own perspective to create the program."* Two other librarians emphasized that they enjoyed the time spent researching their topics and selecting resources to share with students. However, they added that they found the need to pre-record videos to be "*challenging and time-consuming."*

All librarians present in the focus group felt that their programs would help participants increase their knowledge of STEM / health topics. According to one participant, "*kids are curious, and kids at the target age like learning about themselves and their bodies."* Importantly, a few participants were conflicted about asking kids to spend more time in a virtual environment when they already spend so much time online for school – an observation also made in our Year 3 Evaluation Report.

Reflection on Professional Development Trainings

Librarians found the professional development beneficial, and most planned to share what they had learned with coworkers. One participant reported that the *"whole process was enlightening and challenged me to see how I can use this information and give it back to the people I work with."*

Focus group participants appreciated how dedicated the Children's National staff was in helping them include STEM / health concepts in their programming. They also expressed appreciation for being encouraged to move forward with their own unique ideas. Participants found value in working alongside other library professionals who were also dedicated to helping children learn about important health topics facing their communities.

Although some training sessions felt redundant to participants who were familiar with the topic (e.g., two participants considered the art therapy section to be a review of a topic they had previous knowledge of), those participants were grateful to have an opportunity to refresh their knowledge and skills.

Training participants found at least three sessions particularly helpful or memorable. The Robotics session stood out for its practical and specific information on how to integrate technology into in-person library programs. At least two participants found the "Tiger Woods Foundation Workshop – Fostering Curiosity in STEM" session useful due to the way it provided instruction about how to incorporate outside resources into library programs. Finally, we heard similar appreciation for the discussion focused on equity and disparities between communities, with participants saying that it felt relevant and important to their current work. As one shared, *"I work in an underserved community and this showed me what I can do as a librarian."* Another librarian said this discussion was a valuable reminder that many library visitors are facing more obstacles than meet the eye.

Confidence and Expectations

All librarians found the professional development useful for increasing their confidence regarding the design and facilitation of STEM / health library programs. A core benefit of the training was helping librarians overcome their fear of developing programs on subjects they felt underqualified to teach. As one participant shared, *"maybe we were not as confident about the health content and sometimes doubted ourselves when really we did have all the skills."* This shift in confidence maps to what we found in the post-training survey, results of which are detailed in the Year 3 Evaluation Report.

A variety of factors led to librarians' increased confidence in facilitating STEM / health programs. These included: step-by-step breakdowns, with examples, of how to plan a Discover SCIENCE program; allowing time for librarians to ask questions about health topics to help them overcome potential fear of facilitating content beyond their area of expertise; and encouraging, affirming leaders of the training sessions.

The increased confidence may not have occurred had participants not felt that goals were clearly laid out at the beginning of the professional development. From our analysis, it is clear that librarians knew that they were expected to create their own program based on the training sessions, and that this process encouraged the confidence they needed to meet expectations.

Some participants planned to share (or had already shared) what they learned with fellow library staff members who had not participated in the training. Specific topics librarians mentioned wanting to share included information about childhood trauma and making home-kits for Discover SCIENCE activities that families could take with them. One participant said they planned to share what they learned in the Robotics session. Another librarian, who changed positions within DCPL since the start of the pandemic, indicated that they were thinking of how to incorporate STEM / health and Discover SCIENCE programming into their new role.

Opportunities for Improvement

Most participants' hesitations about this initiative were centered around uncertainty and skepticism about virtual learning in general, rather than concerns about the professional development or the Discover SCIENCE program in particular. In the words of one participant, *"I think the program is solid, it's just the current life state of kids that complicates things."*

Multiple participants reported wanting future professional development to prepare them, as this program had, to apply information they learned in training to their own programming. One suggestion included asking participants to select a topic for their Discover SCIENCE program beforehand in order to help *"frame the trainings."* This would allow participants to more intentionally consider the context of their own library's resources and community's needs in advance of their training.

Another participant suggested that, in one session, everyone might collectively plan a program on the same topic. This would then serve as a useful example, allowing trainees to move on to their own individual topics with greater confidence. They also recommended that program planning be a thread running throughout the range of their professional development. We also heard that it would be particularly helpful for the group to review, collectively, the process of finding age-appropriate content information (e.g., resources targeting elementary school students, high school students, etc.).

Follow-up with librarians who had created STEM / health content

A follow-up conversation, led by CRI, took place with librarians who participated in the professional development training, along with others who developed STEM / health content during Year 4. One participant reported that, for a variety of reasons, including the effect of COVID-19 on the library's entire ecosystem, library staff are not always aware of support available to them. Another librarian, who did not participate in the "SMART Goals" training but did create at least one STEM / health video, mentioned not knowing how to incorporate Discover SCIENCE content into their own STEM / health virtual lesson, indicating a need for more widespread training of librarians on the resources available to them. Library staff, including library administrators but especially patron-facing librarians, continue to be stressed and stretched by the impact of COVID-19, indicating that there were a lot of other programs to compete with for audience time, with not much support or promotion from DCPL. It is worth noting that the partners working together in this project are operating in less-than-optimal circumstances. At least one librarian reported that these factors have influenced the participation and implementation of Discover SCIENCE lessons in the library after the professional development series.

Recommendations for DCPL and CRI

DCPL and CRI have spoken about potential options for the continued training of library staff regarding Discover SCIENCE and STEM / health programming. At the time of this report, future "SMART Goals" training has not been considered an option at DCPL, though discussions are ongoing. In the case of a future "SMART Goals" professional development trainings, we encourage the team responsible to take into consideration the recommendations from the first cohort, listed above in "Opportunities for Improvement."

Knology understands that DCPL and CRI have discussed, to varying degrees, the following potential activities in leu of a second cohort of "SMART Goals" professional development:

- *Training:* A large-scale training session in Discover SCIENCE activities for all librarians currently responsible for developing or carrying out virtual programming
- *Mentorship:* Pairing the six librarians who participated in the first professional development cohort with DCPL colleagues in a mentor – mentee relationship to support new understanding of how to develop STEM / health programming

These two options are a departure from the in-depth Learning Circle model described in this analysis. Yet our focus group findings and knowledge of the project indicate the grant aims can be met through both options offered by DCPL.

Providing a cohort of DCPL librarians with such a robust professional development experience was valuable to them and will ultimately benefit the DCPL community in as yet unknown and unknowable ways. Librarian trainees reported increased learning, skill development, and confidence. While this process took time and presented unique challenges, we feel librarians successfully integrated the core aspects of Discover SCIENCE into new and unique program ideas and, importantly, will continue to do so. However, we acknowledge that the value of this opportunity must be considered against the time and effort involved in the planning, coordination, and support required of CRI staff. Running a similar cohort would likely require a similar investment of valuable project resources.

Additionally, while trainees' ability to integrate the Discover SCIENCE lessons with their own ideas and build new programs is beneficial, we suggest that implementing existing lessons would be productive as well. This happened at DCPL in earlier years of the project, through drop-in sessions and Family Learning Events. Currently available lessons have been evaluated for effectiveness and include activities that have been designed, reviewed, and used by those experienced in STEM / health fields. SCIENCE lessons have also been modified to better suit children's home environments, using everyday materials.

Given the clarity of these lesson plans and additional supplementary material, we suggest that in-depth training may not be necessary for library staff to feel comfortable running Discover SCIENCE activities. Having CRI staff facilitate a brief, yet large-scale, training for any DCPL staff members involved in programming efforts would be an efficient and effective use of time. We suggest running *two sessions* to minimize scheduling difficulties for DCPL, and to maximize the ability of the group to interact directly with CRI or other STEM / health experts. Given normal staff turnover and the general passage of time, we suggest these training sessions would be beneficial on an annual basis. Ideally, this would give staff a number of

options around which lessons to implement as they build a foundation for Discover SCIENCE learning. Some participants may still choose to build on that foundation and develop their own new programming ideas. We gently encourage that new programming does not need to be an expectation for new trainees.

We also feel that a *mentorship model* can be considered a positive step toward more sustained efforts to run STEM / health programs at DCPL, especially those that address particular community needs. This would show evidence of investment by DCPL administration – proof that they value the Discover SCIENCE experience and will support it as a priority for staff.

GSGNY Troop Leaders

Introduction

Knology staff conducted six interviews with GSGNY troop leaders who had participated in either Round 3 or Round 4 of the virtual Discover SCIENCE training. We collected this data to answer two questions:

- Can Discover SCIENCE programs be adapted successfully to an online format?
- Can implementing programming in other OST settings help the Discover SCIENCE team achieve overall project goals?

In Year 3, Knology staff had planned to attend in-person meetings to observe and speak with the participating youth. In Year 4, because of the ongoing COVID-19 pandemic, we knew that we would be unable to do so. Knology considered observing virtual programming; however, obtaining consent from parents and caregivers to allow Knology staff to be on-screen with the Girl Scouts was discouraged by program staff and GSGNY leaders. Since we could not secure parental consent to speak with the youth participants or observe virtual programming, we did not collect data from them directly. The data analyzed in this section come from program facilitators.

Methods

Participants

We spoke with six GSGNY troop leaders, in addition to a Girl Scout who was the daughter of the one of the leaders. The individual Girl Scout's responses have been integrated into the overall narrative because of its resonance with the parent leader's comments. Among the adults, experience as a Girl Scout troop leader ranged from 2 to 30 years, with most having under 10 years of experience. Most troop leaders described working with a multilevel group of Girl Scout troops, i.e., from different grade levels; the rest worked with younger troops (Daisies, Brownies, and Juniors). One troop leader has not yet used the Discover SCIENCE materials. During Fall 2020 and Spring 2021 the five troop leaders who had used Discover SCIENCE materials engaged with the troops virtually or used a hybrid experience, including both in-person and remote experiences.

Instruments

Knology designed two updated and revised instruments for evaluation of non-library programming: 1) an observation protocol, and 2) an interview protocol. Discover SCIENCE leadership introduced the GSGNY troop leaders to Knology staff via email. Knology also developed a survey to be used as part of a comparative case study of users of the Discover SCIENCE activities. Results from this survey are detailed in the following chapter of this report. Direct quotes in this report may have been modified slightly for grammatical clarity.

Analysis

One researcher conducted individual interviews via Zoom. A second researcher transcribed the interviews and analyzed them to identify themes around troop leaders' experiences with Discover SCIENCE materials as well as impacts of the program on their troops. The interviewer-researcher examined a draft of initial findings and incorporated additional themes.

Results

Discover SCIENCE Lessons Used

Troop leaders had used most of the Discover SCIENCE lessons covering six health topics. The sessions they led ranged from 30 minutes to 2 hours. One leader said that they could fit in two of the less detailed topical lessons into a session. Another described how they had tried to learn from their girls to make the lesson more engaging:

> *"The session included an initial polling of the girls about their existing knowledge, and also what they don't know to hold their interest. We did a short lesson of key points. For instance, the DNA, Dr. Bear bracelets, they didn't know the scientific term; then they built the bear, they built the bracelet, and if they wanted to, they could stay longer. Lastly, they did a recap aligned with the Girl Scout model where they reflect on their hands-on activity, what they learned, other topics or approaches, just to generate ideas."*

Experience of Use

Most had found the lesson *easy and straightforward to implement*. They described the lessons as well-scripted and *relevant for the multi-level groups of troops* they led. Some teachers described specific materials, such as the "*storybook that was read virtually,*" as easy to use, while another appreciated that the materials were available through Google Drive so they were easily accessible. Others described the activities the troops enjoyed, including the crafting activity using Q-tips and building the skeleton.

They appreciated that the lessons were able to engage both older and younger girls at the same time. One leader described how they were able to shape the same lesson to engage differently aged troops:

> *"My high schoolers loved making blood vessels, blood cells, and models of viruses and vaccines as much as my little ones did … With the older girls, I would give them some vocabulary, the higher-level stuff that you would share more with the adults. And with the little ones, I broke it down a little bit simpler to their level."*

All leaders described how they had *supplemented the craft kits* available through Discover SCIENCE to encourage more active engagement for the troops at home. With continued virtual programming due to the pandemic, some troop leaders sent their troops takeaway materials needed to complete the activities. For the COVID-19 related module that included a one-page summary with probing questions about germs, takeaway materials included construction paper, beads, and info sheets. Troop leaders encouraged their troops' creativity by asking them to add to their craft kits with everyday material in their homes. One leader

asked troops to reach out if they needed anything (or were unable to locate replacement materials at home) so they could brainstorm how to ensure troops had what they needed. A couple leaders felt they, too, needed to use alternative materials (e.g., sticker mirrors to put on construction paper instead of creating tinfoil mirrors).

The one troop leader who had not yet used the Discover SCIENCE materials noted they would like to send materials to troops at home. Another leader thought it was easier to send materials home than to ask their girls to find materials at home due to limited family resources in some homes.

One leader had aimed to create more *equitable engagement* with the Discover SCIENCE materials through an in-person hiking opportunity she provided to her troops. They expressed concern that their troops may not have some of the materials needed for the activities at home (e.g., Play-Doh, construction paper, etc.). To address this gap, the leader made a package with the necessary materials in order to facilitate the lesson on lungs (or other activities) and handed them out in-person. In other cases, she had been able to be flexible with the materials troops already had at home.

Lesson Adaptations

Most leaders had been *flexible with the Discover SCIENCE materials* to most appropriately engage their girls. Only one leader described "*following the lessons to a tee*." In general, there was a sense that the lessons were quite *self-sufficient* and designed with adaptability and improvisation in mind.

To help with the *transition from in-person to virtual* programming, one leader focused on aspects that would make activities easier and most useful for their troops. The leader expressed that even though adapting when troops did not have necessary materials was challenging initially, they became more adept at it. Another leader, experienced with previous rounds of Discover SCIENCE lessons, had *combined old and new lessons*, including the COVID-related lessons, to create a more comprehensive experience.

Others made specific changes to create more *engaging and interactive* activities. One troop leader made a toy bear to introduce the Discover SCIENCE lessons. Other changes included printing out an image so troops could have a coloring activity to demonstrate how food moves through the body, creating *"glow in the dark versions"* of the skeleton and slime activities using black light, and adding to the COVID-19 materials with relevant and new information. Changes to the COVID-19 materials included expanding on topics such as hand washing and vaccines, as well as an activity to "make" red blood cells. This resulted in a "*global discussion*" on the value of vaccines, opinions on scientific fact, and healthy behaviors.

A couple of leaders *supplemented the materials* with additional information from online searches or by creating slides with links from the Google Drive resources.

Additional modifications included: implementing health topics in a different order to make stronger connections between them; covering topics not taught in school (e.g., how foods go down their digestive system); and leading a Q&A with Girl Scout staff and girls to learn about girls' experience and additional support they needed and suggesting something similar for all Girl Scout leaders.

The leader who had not yet used Discover SCIENCE anticipated needing *to tailor the materials for her troops' age level* and planned to offer a training to her co-leaders so more of the Daisies in their troop could be reached.

Perceived Value of Discover SCIENCE Lessons

Troop leaders had extremely positive views of the lessons. They found the information *comprehensive* (e.g., related to the immune system bone structure) and the *supplementary resources helpful*, especially when they needed additional support.

Leaders with varying levels of science-familiarity *felt comfortable doing the lessons* with their troops. One leader with little scientific experience would ask for and receive extra support from her co-leader. Another felt that the lessons, particularly the COVID-19 lessons, were good supplements to troops' learning in their school environment:

> *"The information in the lesson would be very easy for eight graders' regent's levels. It breaks it down in a way that's tangible … the students could really get their hands on it."*

The lessons were not only useful for the troops' learning, but also for that of the troop leaders. Those with relatively limited backgrounds in science emphasized the *learning opportunity* the lessons provided by adding to their scientific terminology, presenting a good introduction to science generally, and offering them a new perspective.

Helpfulness of training

Leaders were effusive about the Discover SCIENCE training they attended irrespective of the format (in-person or virtual). They felt the trainer had been *very efficient* in providing a quick overview of the lessons and their necessary materials. This efficiency was appreciated given the limited time they have as a volunteer group. One person felt that despite a speedy training, in-depth focus on the topics was not compromised. They felt that all the detail was necessary so that they could convey the topics to their troops more effectively than simply providing them with a package of information.

A couple troop leaders appreciated the opportunity to *learn by doing* during the training. One leader reflected on the *training's value for their troop leaders*, expressing that it helped them create an engaging experience. Overall, the troop leaders appreciated the value of the in-person format and its opportunity for social interactions with their colleagues. This allowed for idea sharing, spending more time discussing the lessons, and not needing to prep materials before their sessions. The latter was a challenge for one leader who had to view the training, rather than participate in the activities during the virtual training they attended, because they were unable to prep ahead of time. However, given their already busy schedules, most leaders also saw benefits to the virtual training format, including avoiding a commute and being able to attend from home.

Sessions with Troops: In-person vs virtual

Despite their strong preference for an in-person training, leaders felt that their virtual sessions with the troops provided similar learning opportunities as previous in-person sessions. One of them said that virtual sessions may actually be easier, with the ability to share info more efficiently.

While the virtual format did have caveats (e.g., unanticipated technology challenges, needing to prep materials online, taking longer than in-person sessions, and missing a general fund of resources), it did not appear to compromise troops' experience. One leader explicitly stated that they were trying to make their virtual sessions more interactive and discussion-based with the help of prep cards. Some did appreciate that the available resources, including the supply list, helped with the virtual format.

Troops' Learning

All leaders overwhelmingly affirmed the positive learning experiences Discover SCIENCE provided to their troops. They reported that the lessons were enjoyed by the troops and that they *piqued their interest in science*. One leader described the lessons as making science more accessible:

> *I think it's a really great program, a really good introduction to science and I think it does pique the girls' interest to see that science is not unapproachable and it's fun and it can be a little messy. They don't mind being messy. I think it's a really good gateway into science for girls. So, kudos on that.*

They also thought that the lessons were *relevant to troops' formal school experience* (e.g., the COVID materials, including information about how the immune system worked). On the other hand, another leader felt the lessons were valuable since they were not necessarily taught in school. Some felt the lessons *enabled hands-on learning*, especially at a time when school had transitioned to remote learning during the pandemic. One troop leader felt that it filled the gap in troops' learning by keeping them more actively engaged.

One leader shared that they were unsure about what the troops would remember, but felt they were learning during the session. In fact, another noted that beyond the session, troops were *applying the knowledge gained* in their everyday lives (e.g., building water bottle carriers with duct tapes). One leader mentioned that the water bottle carries were used on an in-person hike that the troop took. This leader also noted that the girls discussed the importance of hydration on their hike. One leader described how they encouraged continued learning beyond the session about DNA and blood types in this way:

> *"They left with having questions at the end of it – asking their mom about their blood type, and raising awareness of how women can also have heart problems. And I think that was the best thing for me. At the end of the day, I left them with a question to ask their parents."*

Sharing and communicating with others about the topics they learned was also common among troops. Not only were they able to share and discuss at a later point in time, leaders felt they clearly understood the materials as well. For example, handwashing often came up in conversation. One leader described sharing what their troops had created via pictures on a platform called Band (*https://band.us/band/81739065*), so that they could see and examine each other's work. One person emphasized how Discover SCIENCE had *helped develop a new identity* for troops by validating their activities, interest, and learning related to science.

> *"Dr. Bear gave them an opportunity to show their 'nerd girl' sides, their science sides, you know. Not the craftiness, not the social butterfly parts, but the parts where they learn things, and they're proud to know things and have this knowledge that sets them apart and makes them these little science experts."*

The most evident difference in engagement and learning among the troops was in older groups taking on *leadership and/or mentorship roles*. Leaders were actively trying to create opportunities in multi-level groups for more troop-led work. For example, one leader described how the older troops would have more detailed information about a topic, so that when they would facilitate a session, the troops would be asked to go over the details. As a result, older troops were often explaining and demonstrating specific activities for the younger troops.

One leader described how the same dynamic would happen during in-person Girl Scout sessions as well – when different aged girls were seated at a table, the leader knew they didn't have to be the expert; instead, the older troops could show the younger one how to, for example, tie knots. This troop leader appreciated that mentorship was built into the program, benefiting younger troops' learning and older troops' leadership skills. Similarly, same-aged girls helped each other in both virtual and in-person settings. When one girl finished their work, they would often share and offer suggestions to others.

A couple leaders described *differences in topics of interest* among younger and older troops. For example, younger troops enjoyed activities related to slime and poop, whereas some older troops thought the topics were "*disgusting,*" suggesting greater adherence to social norms. Another example was advanced discussion topics like women and heart disease that resonated more for older troops than younger ones.

One leader reported that it was hard to tell how learning was different among their differently-aged troops because of the session's virtual format. They added that everything was easy to do, even though the younger troops did need help at times.

Future Engagement with Discover SCIENCE

Most leaders were interested in future virtual lessons with Discover SCIENCE. They were interested in using the materials similarly in the Spring at least one more time or doing additional craft-based activities. One leader was eager to start a virtual troop dedicated to science, since STEM is one of their core areas, and was waiting to hear if that would be possible. Another troop leader would do the lessons with a new group of troops. A couple were hoping that they might facilitate the sessions in-person, or, possibly, in a hybrid format.

Generally, the leaders seemed assured about safety when they returned in-person. They felt the transition would be easy, individual packets would be used, no sharing would be allowed, and adequate space and supplies would be available. A couple were concerned about troops' attendance, especially since they may attend other OST activities instead.

Challenges

Overall, troop leaders felt that programming challenges were minor given the benefits of the Discover SCIENCE lesson. *Time needed for prep* was a common challenge. Troop leaders described having to spend time each week to find information and create presentations and that having to send materials in advance to troops at home was time consuming.

Others described that the sessions were sometimes difficult virtually because of *limited parental help*. One leader described how the activity with the DNA bracelet became stressful

for the troops without at-home support. When parents and siblings were able and available to help, troop leaders felt their lessons ran more smoothly. When parents or siblings were unable or unavailable, Girl Scouts and troop leaders felt the strain.

Some *activities were confusing or difficult*: making the DNA bracelet and putting balls into the balloons were tough activities. In another case, they weren't sure why they were building lipids when the focus was on RNA.

One leader was concerned that troops' participation did not earn them a badge, as is common in regular Girl Scout activities. Badges are awards girls earn by completing skill-building activities. Patches are given to Girl Scouts for participating in fun events, activities or other programs. They were interested in figuring out *how to integrate lesson achievement into Girl Scout badges, instead of patches*, as they described here:

> *The only downfall is that it's a lot of work for a fun patch. And they don't get a badge. I have to figure out what kind of badge it would match up to."*

Two additional challenges involved ensuring that lessons and activities were not too similar to what troops did at school and general time management during sessions.

Suggestions

The suggestions leaders made built on the challenges they encountered as well as unprompted mentions of additional support throughout the conversations. The following suggestions are organized in terms of resources; topical support; age appropriateness; evaluation; and other.

Additional resources

- Create a website with supplemental resources (e.g., videos, PowerPoint slides: the slides could be based on lesson's script).
- Provide recordings or how-to videos of each activity for leaders to use post-training.
- Provide a platform/forum to post comments, ask questions, and share pictures of troops doing activities (with parental and individual consent).

Topical support

- Provide information on other diseases and cures (e.g., breast cancer).
- Incorporate blacklight into slime activity to discuss germs that we can't see naturally.
- Facilitate more connections to content lessons through art.

Older troops support

- More age-appropriate materials for troops in higher grades (6th-grade and up).
- Engage older girls as guest speakers/leaders.
- Include older girls in lesson prep.

Evaluation opportunities

- Encourage all leaders to do Q&A events with Girl Scout staff and girls pre- and post-sessions to document what the girls learned and what additional support they need(ed).
- Use Kahoot to facilitate Q&A to make it more interactive and engaging.

Other

- Identify ways to incorporate Discover SCIENCE lesson achievement into Girl Scout badges.
- Encourage off-screen time by building in physical exercise in a safe spot outdoors.

Comparative Case Study Pilot Survey

Introduction

During Year 4 and Year 5 of Discover SCIENCE, Knology aims to measure the relationship between different training approaches and the ability of educators to identify with and implement SCIENCE lessons in out-of-school time (OST).

This far into the project we have already seen various approaches to training educators or facilitators. Librarians working in Washington, D.C. engaged in a robust and multi-faceted training program in Spring 2020 ("SMART Goals"), while briefer training opportunities were provided to educators in New York.

It is possible to download lesson plans directly from the Discover SCIENCE project website and use them across a range of OST learning settings with no training whatsoever. The comparative case study will not compare specific locations or individual trainees but will compare groups of facilitators based on their degree of involvement.

Through this study we hope that we can identify the most important aspects of training or support that are necessary, as well as differentiate between what different types of facilitators need. Ultimately this will allow the project to scale and the SCIENCE activities to be implemented by the widest range of OST educators, thereby having an impact on as many children as possible.

Methods

Participants

We piloted the survey in Year 4 of the grant. Nine individuals responded to the survey. Seven of the nine were Girl Scout Troop Leaders; one was from New York Edge; and one was from DCPL. Of the nine, only the DCPL respondent had not been trained with a Discover SCIENCE team member on the lessons.

Analysis

One researcher reviewed the pilot survey data. Due to low response rate, no advanced statistical analysis was done. For the purposes on this report, only counts are presented. Direct quotes in this report may have been modified slightly for grammatical clarity.

Results

The survey asked respondents to review the Lessons page on the Discover SCIENCE website (*https://doctorbearscience.com/lessons/*) and indicate which lessons they had used during their sessions. Table 1 below shows the breakdown in lessons used.

Table 1.   List of activities used by responding facilitators

Activity	Number of Facilitators
Germ Swarm	4
Mucus Madness	4
An Air Affair	6
Brush Up on Breathing	4
The Nose Knows	0
From Fork to Stomach	1
Let's Make Poop	4
It's Great to Hydrate	1
Deep in Sleep	3
Socktopus	4
Starry Night Light	1
Print Sprint	2
Blood Breakdown	2
Address That Stress	5
Mindfulness Jars	0
Bubble Breathing	0
Wear a Bear	3
I did an activity that I don't see listed.	2
N/A (I haven't done any of these activities)	1

Note.   Many of these lessons were part of a suite of lessons provided to GSGNY leaders in rounds 1-4 of training.

For the two individuals who selected *I did an activity that I don't see listed*, one mentioned that they did the lesson named Q-tip Skeletons and the other mentioned that they did multiple lessons: "*Covid 19 model and immune system model game with play dough. Q-tip bone skeleton. Positive affirmation reflective surface mirror.*" To gauge the universality of the lessons, we asked respondents to report which lessons they used with which age groups. Table 2 presents data on which lessons were used with which age group. Most lessons were used with troops in Kindergarten – Grade 5, while a few lessons were used with troops in Grades 6 – 9+.

Table 2.   Lessons used by age group

Activity	Kindergarten - Grade 2	Grades 3 - 5	Grades 6 - 8	Grades 9+
Germ Swarm	3	4	2	0
Mucus Madness	4	3	0	1
An Air Affair	5	5	0	0
Brush Up on Breathing	3	4	1	0
From Fork to Stomach	1	1	1	0
Let's Make Poop	4	4	1	1
It's Great to Hydrate	1	0	1	0
Deep in Sleep	3	3	1	0
Socktopus	4	4	1	0
Starry Night Light	1	0	1	0
Print Sprint	2	2	1	0
Blood Breakdown	2	2	2	1
Address That Stress	4	4	1	0
Wear a Bear	3	3	0	1

Note.   None of the respondents used the materials with learners younger than Kindergarten

Use of lessons

Five of the nine respondents noted that they had adapted their lessons. One mentioned specifically talking *"about other way to dealing with stress. Like play a favorite song or Playlist, breathing in and out, etc.,"* while another mentioned that they *"made adaptations for completing the activities virtually – modified some of the materials for 'easy to find at home.' I also made some changes based on the age of group involved."* This resonated with the findings from interviews with GSGNY troop leaders and the adaptations they made to develop the topics within their specific troop's context.

Five of the nine respondents also noted that they had shared the lessons with others, including other troop co-leaders, parents, and co-workers. One reported that *"I shared with my sister who is a school teacher. She works with special needs high school students."*

Previous STEM / Health Experience

Facilitators rarely had experience with STEM / health topics, with eight of the nine respondents indicating this. One facilitator reported that they had an academic background and profession experience with STEM / health topics.

Training Satisfaction

Eight respondents (from GSGNY and Edge) were asked to rate the training on a -1 (*Strongly Disagree*) to 1 (*Strongly Agree*) scaled slider in response to four separate statements. Table 3 presents the median responses to these statements.

Table 3.   Satisfaction with the training

Activity	*n*	Median
In general, I was satisfied with the training I received.	7	0.95
Without the training, I would not have been able to successfully run a Discover SCIENCE program with kids	8	0.18
The training provided me with valuable resources on health topics.	8	0.84
I would like additional training related to Discover SCIENCE.	8	0.55

While the sample size is small, it is clear that respondents found the training adequate, useful, and valuable. Notably, all respondents were interested in additional trainings.

One respondent noted that more training could focus on different topics, such as *"Genetics would be cool even for the little kids. In Spring you can put it in terms of flowers and flower colors or even gardening and breeding to make them less susceptible to pests and diseases, better harvest."* while another respondent noted that *"A PowerPoint presentation to use with the students would be useful for virtual meetings. I copied and pasted the info onto the slides for my meetings. The training was great. We did the projects hands on, so I have a sample to show the girls."* This second statement echoed thoughts shared in an interview by this troop leader.

Confidence in Facilitating Lessons

Respondents were also asked about their confidence in facilitating the lessons they used on the same -1 (*Strongly Disagree*) to 1 (*Strongly Agree*) scaled slider. Table 4 presents the median value in response to each of the following six statements.

Table 4.   Confidence in facilitating lessons

Activity	*n*	Median
I am capable of facilitating a successful children's program about a STEM or health topic.	9	0.54
I am interested in facilitating STEM or health activities for kids.	9	0.57
I would like to learn more about the health issues facing my community.	9	0.71
I could download any lesson on the SCIENCE website and easily teach the activity to a group of kids.	9	0.58
I am confident I could train someone else to be able to teach one of the lessons on the SCIENCE website.	9	0.38
I think of myself as a STEM person.	9	0

The nine respondents expressed moderate agreement that they were interested in and capable of facilitating STEM / health programming. Additionally, they wanted to learn more about the health issues facing their community. The group neither agreed nor disagreed that they are a "STEM person." Of the nine, three respondents rated themselves lower than -0.5, indicating a moderate disagreement with this statement. Unsurprisingly, the one respondent with academic and professional STEM experience rated themselves 1 on the scale. Removing this individual from the median calculation changes the overall rating of the grouping from 0 to -0.2.

Current Status of Project Work

Table 5 presents the project team's progress toward Discover SCIENCE's specific aims, which focus on measurable actions toward the project's goals. The left-hand column displays what was included in the original grant proposal. The right-hand column displays the current status of work toward these objectives. We also attempt to capture the ways that the project has exceeded expectations or gone beyond its original aims. In some cases, this represents a shift in project direction due to unforeseen circumstances (such as COVID-19); in others, it is simply the culmination of decisions made by project leadership to respond to the needs of various stakeholders. *All text in blue italics represents additions that go beyond original project scope.*

Table 5. Discover SCIENCE's specific aims and the status of work toward those objectives

Specific Aim	Status of Discover SCIENCE Work
1. Program Modifications	
1.1 Modify the 5 modules of "Being Me", ensuring compatibility with NGSS and CCSS for OST settings.	Modules have been updated and are being used effectively with K-5 audiences. *The relationship between Discover SCIENCE lessons and NGSS standards is not currently part of the website. It will need to be made more apparent to educators in the final phase of website development.*
1.2 Expand each module to emphasize computation/imaging/engineering constructs and behavioral health/emotional well-being.	Modules have been expanded accordingly, including to adaptations to lessons for virtual settings.
1.3 Add new modules on home, school, and sports injury prevention, cardiometabolic risk reduction, bone health, and genetic diseases.	Many new modules have been added that have resonated with the target audiences. Additional modules continue to be created, adopting the same format as existing modules. *A module focused on COVID-19 was created in March 2020 and is currently being used by facilitators. It is also available on the project website.*
1.4 Adapt modules for K-2 with a focus on cultural sensitivities and ESOL learners.	We do not have data about ESOL learning specifically, but modules seem to be effective across a wide range of youth. *Evaluation with Girl Scout troop leaders in NYC show that modules are indeed effective with culturally diverse youth, and a much wider range of ages than intended (K-High School), particularly when older youth facilitate learning for their younger counterparts.*
2. STEM Programming for Learners and Families	
2.1 Create FLEs that are family-centric, interactive, and encourage family engagement.	FLEs are accomplishing these objectives. In addition to FLEs and other library-based programming, programming is now occurring with Girl Scout troops in NYC, which data have shown to be very effective. *While FLEs were intended to occur in person, virtual programming will occur in Y5 of the*

	project (after being on hold during Y4) and eventually will be capable of reaching audiences outside the DC area.
2.2 Continue Dr. Bear®'s Cubs Summer Science Experience.	Dr. Bear®'s Cubs Summer Science Experience has been cancelled for 2020 and for 2021, due to the situation with COVID-19. *In last year's report we suggested partnering with other youth-serving networks that also run camps, so that additional future camp opportunities (either virtual or in-person) can be made available to greater numbers of kids, beyond what Children's alone can accommodate. This suggestion is reiterated here.*
2.3 Create two websites www.CreateSTEM.com and www.Dr.BearsCubs.com	A variety of resources, including lesson plans for each module, have been added to the current project website: *https://doctorbearscience.com/. The website has undergone extensive analysis and a complete overhaul, making it a more intuitive, valuable, and sustainable project output. Knology will continue to support on the development of website assets through Y5 evaluation.*
2.4 Offer Dr. Bear®'s University.	Library staff from DCPL were initially invited to join Dr. Bear®'s University in spring 2020, however, the event was ultimately cancelled due to COVID-19. No Dr. Bear®'s University has been run during the time of this report.
2.5 Evaluate, improve, and modify programming using metrics and evidence-based approaches	Evaluators and project leaders discuss evaluation findings and recommendations on a regular basis. *Given various challenges over the course of Year 3 and Year 4, evaluators have been in frequent contact with project leadership and the broader project team. Leadership has been extremely receptive to evaluators' input and recommendations, seeking to make informed decisions about the future direction of the project.*
3. Professional Development	
3.1 Develop in-person training for librarians and informal educators.	Professional development has been occurring with six DCPL librarians through Learning Circles. *Additional trainings have been run with facilitators of GSGNY troop leaders (one in-person and another virtual), afterschool teachers with NY Edge, and other OST networks.*
3.2 Provide webinars for the librarians and informal educators.	We continue to explore the potential for virtual training via webinars or other video-based tools integrated into the project website. Year 4 evaluation will focus, in part, on the usefulness and effectiveness of virtual training approaches. *Additionally, partnering with other youth-serving organizations can scale the reach and impact of training by leveraging existing networks of OST educators.*

Discussion and Recommendations

The Year 4 Evaluation Report contains plenty of evidence that the Discover SCIENCE program continues to meet most of its goals, even while the COVID-19 pandemic restricts or interrupts programming efforts. As Table 5 shows, program leadership has consistently modified programming given the ongoing effects of the COVID-19 pandemic. Our Year 4 evaluation finds that the project remains flexible and has demonstrated important new impacts for program participants. The rest of this section contains a focused discussion on Year 4 Discover SCIENCE Programming and recommendations for Year 5.

Discussion

The Discover SCIENCE curriculum can be taught in virtual settings by facilitators with different professional skills. Both librarians and Girl Scout troop leaders reported that some form of training (librarian professional development or general training for GSGNY troop leaders) helped them feel comfortable and confident in teaching Discover SCIENCE lessons by providing important resources and essential information about the lessons. Most librarians indicated that they planned to share what they had learned with co-workers and were grateful for being encouraged to pursue their own ideas in lesson planning. Librarians reported that the conversation around equity and their communities was especially relevant to their current work. Finally, librarians shared that the Discover SCIENCE programming resulted in an increased confidence in their own abilities to teach subjects outside their areas of expertise.

Girl Scout troop leaders remarked that they appreciated the hands-on, learning-by-doing training sessions. In general, troop leaders found the lesson content engaging for all levels, an important factor when troops contain girls of different ages. They reported that the Discover SCIENCE program made science accessible to their troops and that their girls were applying knowledge from lessons in everyday life. Mentorship and intra-troop support proved a valuable component of the lessons, as troop leaders successfully encouraged older girls to teach lessons and model activities for younger girls. Finally, it seemed that Discover SCIENCE had a powerful effect on the identities of the Girl Scouts, with one troop leader reporting that her troops were *"proud … to have this knowledge that sets them apart and makes them little science experts."*

Significantly, troop leaders were consistently able to modify lessons and activities to meet the needs of their group, demonstrating the capability of the Discover SCIENCE lessons to support multiple learning outcomes, as well as the potential of the program to reach multiple audiences when used by committed facilitators. Important modifications included linking content to what was happening in the girls' and troop leaders' worlds, including making connections to the impact and effects of COVID-19. Another important modification centered on the materials girls used at home during their virtual sessions. Multiple troop leaders expressed concern about asking girls to find materials for the Discover SCIENCE lessons at home, citing the difficulty some girls had in doing so and the sensitivity troop leaders had about inequities in home resources among the girls and their families. While activity kits were not provided to troop leaders by project team staff, it is clear that many

troop leaders felt the need to provide starter materials to their troops in an effort to make learning equitable amongst their troop. When starter materials were not provided, leaders were creative in helping their girls find alternatives to the suggested materials when needed.

Suggestions for Year 5 Evaluation

Knology suggests an approach to summative evaluation during Year 5, the final year of the project, that focuses on the doctorbearscience.com website, and use of the Discover SCIENCE materials.

As noted in the Librarian Professional Development chapter, no additional "SMART Goals" professional development will occur in Year 5, and we cannot guarantee in-person programming will return to DCPL. Knology suggests that evaluation shift away from a focus on DCPL librarians' ability to run programming at DCPL.

Through Year 3 and Year 4 evaluations, we know that the Girl Scouts model works well and we recommend one final focus group with the troop leaders participating in Round 5 to close out the evaluation of the Girl Scout programming. No observations will be conducted.

In order to further assess the usability of the website and lessons, we recommend a focused, integrative summative strategy that shifts to recruitment of librarians or other facilitators in OST settings who have no prior knowledge of Discover SCIENCE. We would suggest that the recruited facilitators are asked to use the website to facilitate pre-assigned lessons and other individually selected lessons. We could recruit 30+ various facilitators to provide feedback on the use of the website, and the translation of website information into facilitated programs. All facilitators would take a follow up survey and participate in a short interview. Compensation will be provided for all facilitators recruited. Knology will review all instruments from Year 1-4 of the project to produce a comprehensive survey and interview protocol.

A separate set of recruited participants would only take the survey to assess their confidence in leading STEM / health lessons. Additionally, we suggest recruiting a panel of parents and caregivers of Discover SCIENCE-aged youth, to assess the need for Discover SCIENCE lessons in their community. All respondents would be paid for their time.

This summative evaluation strategy will allow for a final review by facilitators of the website and lessons and assess continued need for the Discover SCIENCE activities.

Conclusion

Discover SCIENCE remains an evolving, impactful program. Throughout the challenges presented by the ongoing COVID-19 pandemic, both educators and learners in out-of-school settings developed their scientific fluency. The Discover SCIENCE team continues to offer relevant lessons and supplemental materials on its updated website and has positioned the program for both present and future learning successes. Our Year 4 evaluation offers future-facing steps to strengthen this educational program and support a culture of STEM / health learning among a diverse set of educators and learners alike.

References

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