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Reimagining Family Engagement:

How Out-of-School Time STEM Programs “**CARE**”

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Million Girls Moonshot

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EXECUTIVE SUMMARY

The Institute for the Study of Resilience in Youth (ISRY) at McLean Hospital and Harvard Medical School, in partnership with the STEM Next Opportunity Fund, created and studied a virtual national learning community to understand how out-of-school time (OST) programs in the U.S. are choosing, adapting, and applying strategies from the [STEM Family Engagement Planning Tool](#). This resource introduces strategies and examples from family engagement research and practice to help OST programs engage youth and their parents, extended family, and other supportive adults in science, technology, engineering, and mathematics (STEM). The Planning Tool encourages focus on families that have the fewest resources to access STEM learning opportunities and the greatest chance of being left out (or pushed out) of STEM opportunities. The study was designed to discover how OST STEM programs use and apply the Tool, so we can most effectively support equitable, effective family engagement in STEM.

At the heart of the STEM Family Engagement Planning Tool is the CARE framework for equitable family engagement: Connect-Act-Reflect-Empower. Connect refers to building relationships by fostering an inclusive, collaborative community. Act refers to engaging youth, families, and staff in STEM activities to foster a growth mindset. Reflect involves practices to improve learning and awareness. Empower encourages programs to inspire youth, families, and staff to shape STEM experiences and pursue STEM learning and careers. CARE for families is an adaptation of the [Clover Model](#), a research-based developmental model that maps youth social and emotional resiliencies onto four clover plant “leaves”: Active Engagement (physical connections between self and world), Assertiveness (using voice and self-control to negotiate boundaries), Belonging (positive relationships, empathy, and support), and Reflection (using emotions and thoughts to create identity). Family engagement research and practice, together with this developmental theory, informed the creation and refinement of the CARE framework.

This report describes the rationale, methodology, and findings of our implementation science study. Simply put, implementation science addresses the research-practice gap by making evidence-based/evidence-informed research practices more useful in educational practice. We conducted a scientific study of methods that promote learning and application of CARE strategies to increase family engagement, which we hypothesize will increase program outcomes and youth outcomes in STEM. This study was guided by three research questions: (1) How is the Planning Tool understood and implemented by program practitioners? (2) How and why does the implementation of the Planning Tool succeed or fail? (3) What were the outcomes of programs’ plans, and is there evidence that programs succeeded at increasing family engagement?

Twenty-two staff (Program Directors/Managers, Coordinators, and Educators/Learning Guides) from nine OST STEM programs (in eight U.S. states) were given training and support as they implemented strategies from the Planning Tool. Over five months (Sep. 2022–Jan. 2023), program teams participated in two 90-minute trainings, a planning meeting (60 mins), a post-project interview (60 mins), and a 32-item survey to estimate knowledge gain, reach, impact, and professional development needs (<10 mins). All program teams completed a family engagement project, and their plans and lessons are featured in supplemental “Program Spotlights” that accompany this report.

Evidence from this study shows that a compact, interactive training approach that adds a community exchange of ideas to the Planning Tool can transform family engagement practice quickly. Nearly all participants reported trying a new strategy or idea because of this project, and two-thirds reported engaging more/many more families in ways that align with CARE (e.g., Connect: more families feeling welcomed and supported; Act: more families practicing STEM together hands-on; Reflect: more families making meaning of STEM together minds-on, Empower: more families given voice and choice in decisions that impact STEM learning). From the beginning to the end of the project/study, staff perceived the greatest gains for CARE strategies that promote Empowerment (Voice and Navigation), Reflection (Continuous Learning), and Equity, respectively. And while equity was an important growth area, it requires more attention as Empower strategies were least often attempted.

Programs stated that the Planning Tool helped ensure their family engagement approaches were intentional and comprehensive. It also helped staff communicate with potential partners early in the planning process, and gave staff more confidence and credibility as leaders. Programs reported that the Planning tool helped them center equity, inclusion, and access. As detailed in the Program Spotlights, program teams focused on addressing social, cultural, and economic challenges by supporting families from groups underrepresented in STEM (including Black, Hispanic, and immigrant families), lower-income families residing in public housing or in rural areas, families with lower literacy levels and who may not be native English speakers, and “grandfamilies” (in which children reside with/are raised by grandparents).

This report concludes with a summary of opportunities and challenges encountered, and recommendations for family engagement in STEM. Although programs valued the Planning Tool, they reported wanting more guidance and a sounding board of peers for feedback on the validity of new strategies. The evidence suggests that transformational change requires scaffolding and accountability. This study also shows that simplicity is key: the CARE framework was easy enough for program staff to understand, regardless of role or experience, and it helped programs be more intentional when choosing family engagement strategies.

INTRODUCTION

In fall 2022, the Institute for the Study of Resilience in Youth (ISRY) at McLean Hospital and Harvard Medical School, in partnership with the STEM Next Opportunity Fund, created and studied a national learning community to understand how out-of-school time (OST) programs choose, adapt, and apply strategies from the [STEM Family Engagement Planning Tool](#). This resource introduces a simple way of organizing strategies from family engagement research and practice. Our study's goal was to discover how programs are using and applying the tool to better support program's efforts to increase equitable and effective family engagement in STEM. The three central tenets of this project, inspired by STEM Next's family engagement advisor Dr. Linda Kekelis, are described below.

THERE IS POWER IN FAMILY ENGAGEMENT

Encouraging children to engage in STEM learning does not require staff, parents, or caregivers to know STEM concepts or how to practice STEM. More important is that staff, parents, and caregivers show confidence. Modeling a positive attitude when learning and doing STEM—by showing enthusiasm, curiosity, and persistence—can promote the value of STEM and improve children's own confidence and attitudes toward STEM. Programs can support parents and caregivers by understanding their fears, building their confidence, and providing opportunities for families to engage in STEM together. Families can engage in the program, at home, or in the community.

FAMILY ENGAGEMENT IS A LEVER FOR EQUITY & INCLUSION

Family engagement is the lever for supporting all children and closing opportunity gaps in STEM education. It is essential to consider which families have the most need, the fewest resources to access STEM learning opportunities, and the greatest chance of being left out (or pushed out) of STEM opportunities, and then to listen and learn with those families to understand their wants and needs. In this way, families not only have access but also understand that they are valued. Programs can support equity and inclusion by meeting families where they are and by partnering with families to find or design resources and programs based on their interests, needs, and talents.

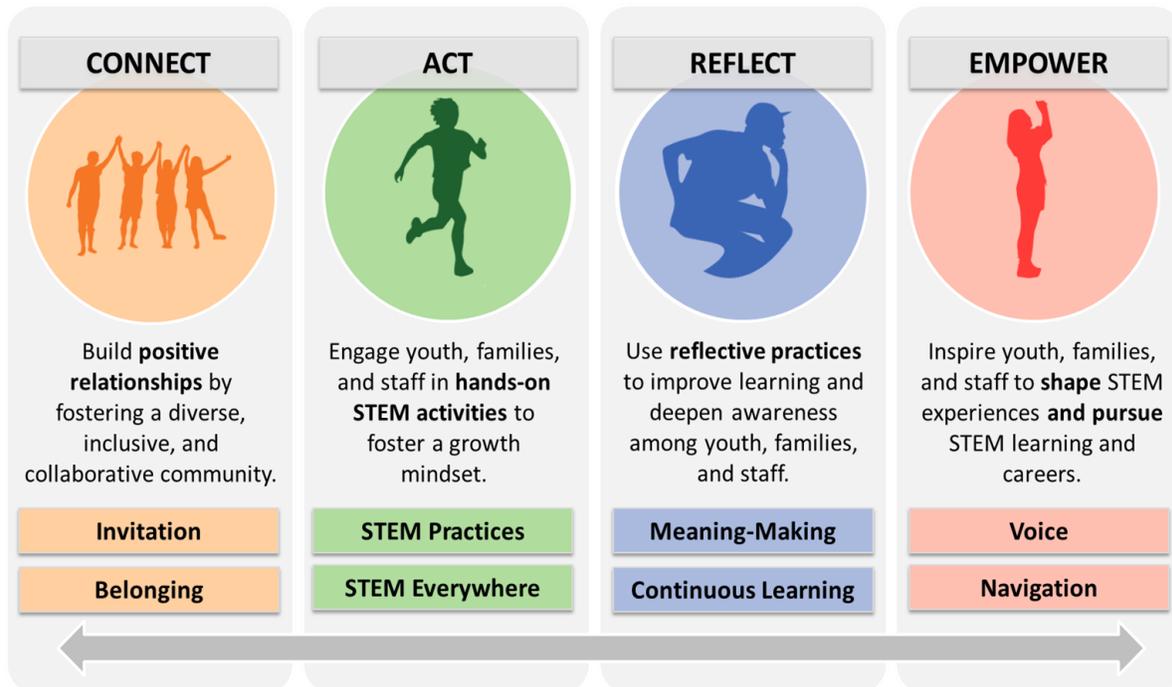
IMPACTFUL TRAINING SUPPORTS IMPACTFUL FAMILY ENGAGEMENT

Impactful family engagement involves strategic thinking, ongoing training, and long-term planning. There are many ways to engage families, and there are many examples from research and practice to help staff engage families successfully. This report describes how programs learn and plan family engagement strategies, how this knowledge is adapted to the programs' context and culture, and whether there are factors that enable or prevent the implementation of Planning Tool strategies.

CARE FRAMEWORK

The STEM Family Engagement Planning Tool introduces a framework for equitable family engagement known as CARE: **Connect-Act-Reflect-Empower** (see **Figure 1**).

Figure 1. The CARE Framework from the STEM Family Engagement Planning Tool

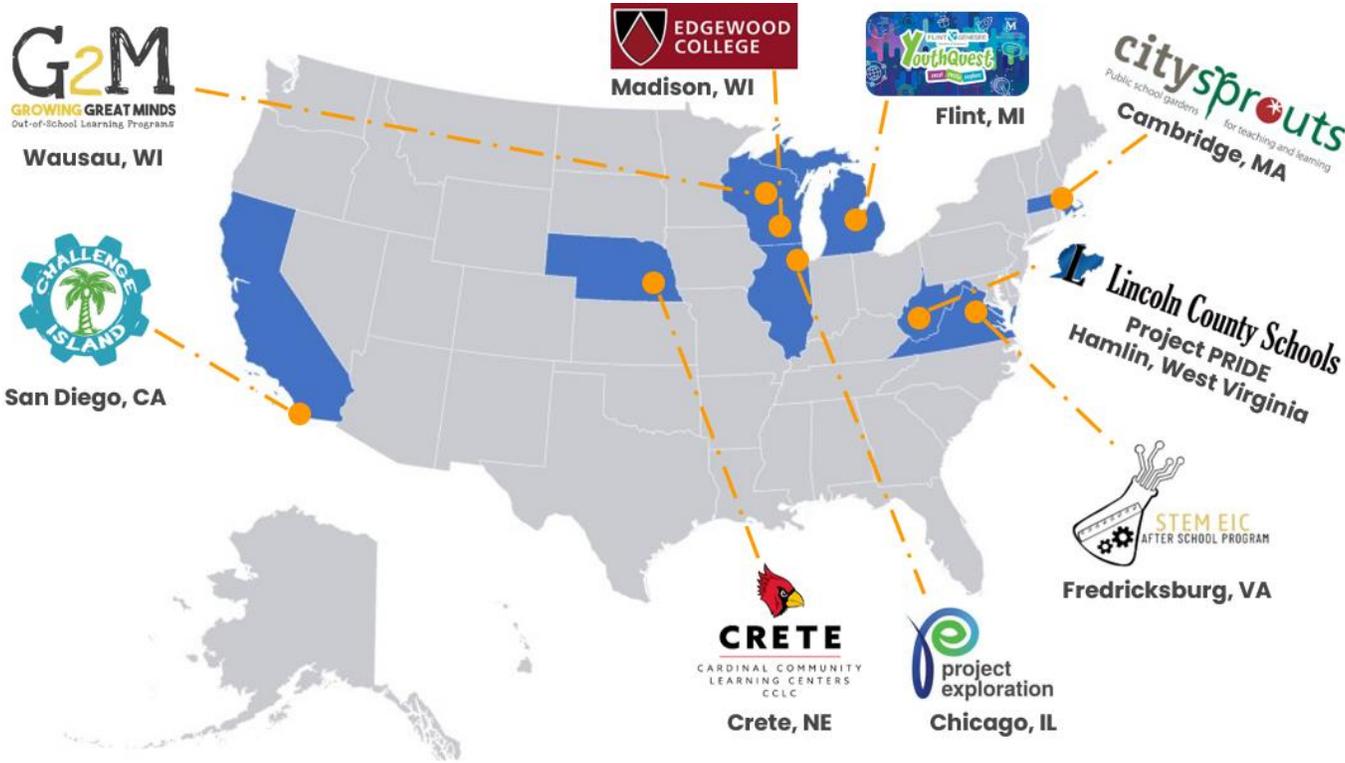


- **Structure:** The CARE framework, with four domains and eight attributes, was designed to guide programs to empower families as partners in STEM learning and pathways. CARE expands upon familiar ideas from research and practice.
- **DEIA:** Rather than thinking about diversity, equity, inclusion, and access as separate considerations, we have intentionally woven these ideas through CARE.
- **Audience:** CARE was designed with OST programs but draws on family engagement ideas that come from (and apply to) other contexts, including in school and at home.
- **Application:** While the letters conveniently spell “CARE” (like caregiver), prior work has shown that family engagement strategies are not always linear in practice. The starting point depends on program context, goals, and priorities.
- **Philosophy:** CARE is informed by theories of social, emotional, and cultural development and takes a strengths-based approach, emphasizing that efforts be done *alongside* (and not *to*) families, to promote collaboration with parents and caregivers. CARE advises against making assumptions about families that do or do not engage in programs or events.

STUDY OVERVIEW

This project provided family engagement training and support to a cohort of nine OST programs representing eight states and four U.S. regions (see **Figure 2**). Following a competitive application process, selected programs engaged in an implementation science study of how program staff choose and translate strategies from the Planning Tool/CARE, and whether their efforts are increasing family engagement in STEM.

Figure 2. Participating OST Programs



PROGRAM CHARACTERISTICS

The cohort was geographically and culturally diverse (See **Figure 2**, and **Tables 1** and **2**, below). One third of programs were in rural areas. Seven programs (78%) enrolled >50% girls and non-binary youth, and seven programs (78%) enrolled >50% youth of color. All programs provide activities designed to engage participants in some aspect of STEM. Most of the programs focus on STEM or STEAM broadly (77.8%), while a few focus on a specific discipline like botany/gardening and coding (22.2%). Most programs serve youth in Elementary School (77.8%, Grades K to 5) and Middle School

(66.7%, Grades 6 to 8). A little more than half of the programs (55.6%) require enrollment for their STEM/STEAM offerings, whereas the rest (44.4%) provide both enrollment-based and opt-in/drop-in STEM/STEAM activities. Two-thirds of these OST programs (66.7%) are school-based, or community-based with established partnerships with local public-school districts.

STAFF CHARACTERISTICS

Family engagement teams represented a range of roles, backgrounds, experiences, and interests. Participating staff came from three categories: Program Directors/Managers (50.0%), Coordinators (31.8%), or Educators/Learning Guides (18.2%). In their current role, staff reported spending an average of 50.0% (and a range of 10% to 80%) of their time interacting with parents, grandparents, or other caregivers (in-person or electronically). About half (50.1%) reported six or more years of experience engaging families in educational settings in general (ranging from 6 to 29 years), and about one-third reported six or more years of experience engaging families in STEM/STEAM specifically (ranging from 6 to 29 years). Staff were racially and ethnically diverse—Asian or Asian American, Black or African American, Hispanic or Latinx, and White. Half of staff (50.0%) were from groups underrepresented in STEM disciplines and the STEM workforce.

Table 1. Diversity of OST cohort (# programs serving underrepresented youth)

| Race/Ethnicity Categories | 2020 US Census Values (%) | # Programs Greater than U.S. Census | # Programs Less than U.S. Census |
|--|----------------------------------|--|---|
| American Indian and Alaska Native | 1.3% | 2 | 7 |
| Black or African American | 13.6% | 6 | 3 |
| Hispanic or Latinx | 18.9% | 5 | 4 |
| Native Hawaiian and Other Pacific Islander | 0.3% | 1 | 8 |
| Two or More Races | 2.9% | 6 | 3 |

Table 2. Participating Programs

| Program Name | Locale | Org .Type | Grades | Program Description & Mission | Mission/Vision |
|---|----------------|------------------------------------|----------------|--|---|
| Cardinal Community Learning Centers (Crete, NE) | Rural (Fringe) | School-based | Grades K to 12 | CCLC is an OST program that provides academic enrichment opportunities, including STEM programs/events, to families residing in the Crete Public Schools District (including home school, charter school, private school). | To contribute to the closing of achievement gaps by facilitating a profound enrichment learning environment where students are supervised, safe, and fed |
| Challenge Island San Diego Coastal (San Diego, CA) | City (Large) | Proprietorship | Grades K to 6 | Challenge Island is an OST program that offers hands-on interactive workshops, camps, and programs that incorporate STEAM, social-emotional learning/21st-century skills, reading, and fun. | To meet the comprehensive social, emotional, and intellectual needs of both today's playful, creative child and tomorrow's globally successful adult through cross-curricular STEAM education |
| CitySprouts (Cambridge, MA) | City (Midsize) | Community-based, school-affiliated | Grades 6 to 8 | CitySprouts is a botany/garden-focused OST program that partners closely with public elementary schools (in Boston and Cambridge, MA) "to provide opportunities for children to learn by exploring the natural world as part of their school journey." | To cultivate curiosity and wonder with hands-on science learning through urban gardens. |
| Edgewood College Office of Science Outreach (Madison, WI) | City (Large) | University-based | Grades 1 to 9 | The ROSE (Resources and Opportunities in Science Education) Project at Edgewood College partners with community centers and schools in the Madison, WI area and hosts several nighttime events for families participate in, and learn about, science/STEM. | To provide parents from under-represented backgrounds with resources and opportunities in science for themselves and their children. |
| G2M: Growing Great Minds (Wausau, WI) | Rural (Fringe) | School-based | Grades K to 5 | G2M is an OST program that provides academic enrichment opportunities, including STEM programs/events, to families residing in the Wausau School District (including home school, charter school, private school). | To provide a range of high-quality services to support student learning and development, and to provide a safe environment for students. |

| | | | | | |
|---|------------------|------------------------------------|----------------|---|---|
| Project Exploration (Chicago, IL) | City (Large) | Community-based, school-affiliated | Grades K to 12 | PE is an OST program with three main programmatic efforts: Youth-Science Pathways (YSP) at two STEM Learning Centers, school-based programs (including public school, charter school, private school), and virtual STEM@home opportunities. | To change the face of STEM by dismantling the barriers that prevent underrepresented students from experiencing the wonder and discovery in STEM. STEM education is an imperative social justice issue, and our mission is to right this injustice. |
| Project Pride Extended Day Programs (Hamlin, WV) | Rural (Distant) | School-based | Grades K to 8 | Project Pride is an enrichment program that offers several STEM learning opportunities to students enrolled in Lincoln County Schools, including a Robotics and Drone program and Coding for Girls. | To provide the highest quality education for all students. To develop responsible adults who are productive citizen and who are prepared to learn throughout their lives. |
| STEM Education and Innovation Center (STEMEIC) (Fredericksburg, VA) | Suburb (Midsize) | Community-based | Grades 6 to 8 | STEMEIC is an OST program that engages youth in a variety of hands-on STEAM learning activities and challenges "that will encourage their young minds to investigate different careers and dream beyond their neighborhoods" | To give back to the community. To be dedicated to youth to bridge gaps and ensure workplace readiness, strategic career and post high school development, and to improve the community at large. |
| YouthQuest (Flint, MI) | City (Small) | Community-based, school-affiliated | Grades K to 6 | YouthQuest is an afterschool enrichment program that offers several STEM learning opportunities to families with students enrolled in participating schools in the Flint and Genesee County area. | To provide youth with engaging after school experiences to excel, excite and explore! |

METHODOLOGY

GUIDING QUESTIONS

- How is the STEM Family Engagement Planning Tool (“Planning Tool”) understood and implemented by program practitioners?
- How and why does implementation of the Planning Tool succeed or fail? (What factors will lead to/away from positive change in family engagement?)
- What were the outputs/outcomes of programs’ plans, and is there evidence that programs succeeded at increasing or strengthening family engagement?

TIMELINE

Twenty-two staff members from the nine OST programs (two to three staff per program) received training and support over four to five months (**Figure 3**).

Figure 3. STEM family engagement training, planning, and action timeline



STUDY ACTIVITIES

Programs received a stipend, professional development, and consulting support.

- Training: All participants attended two interactive virtual training sessions (90 min. each) organized around the Planning Tool/CARE. Each session was followed by a brief exit survey to measure participant learning and support needs.
- Planning Meeting: All program teams attended a planning meeting (60 min.) with an ISRY researcher to discuss family engagement opportunities and challenges.
- Post-Project Interview: All program teams completed a semi-structured interview (60 min.) with an ISRY researcher to share the story and outcomes of their family engagement project, including struggles and successes and what training/resources might further support their efforts.
- Post-Project Survey: All participants were invited to complete a 32-item online survey to estimate their knowledge gain, reach, impact, and professional development needs (using 29 Likert-type and 3 open-response questions).

KEY FINDINGS

We applied principles of implementation science to document and describe the process taken by different programs to enact knowledge from the Planning Tool. In this section, we describe key findings from the family engagement cohort/learning community and conclude with a spotlight on each participating program team, including their STEM family engagement plan, the logic behind their plan, and examples of CARE implementation.

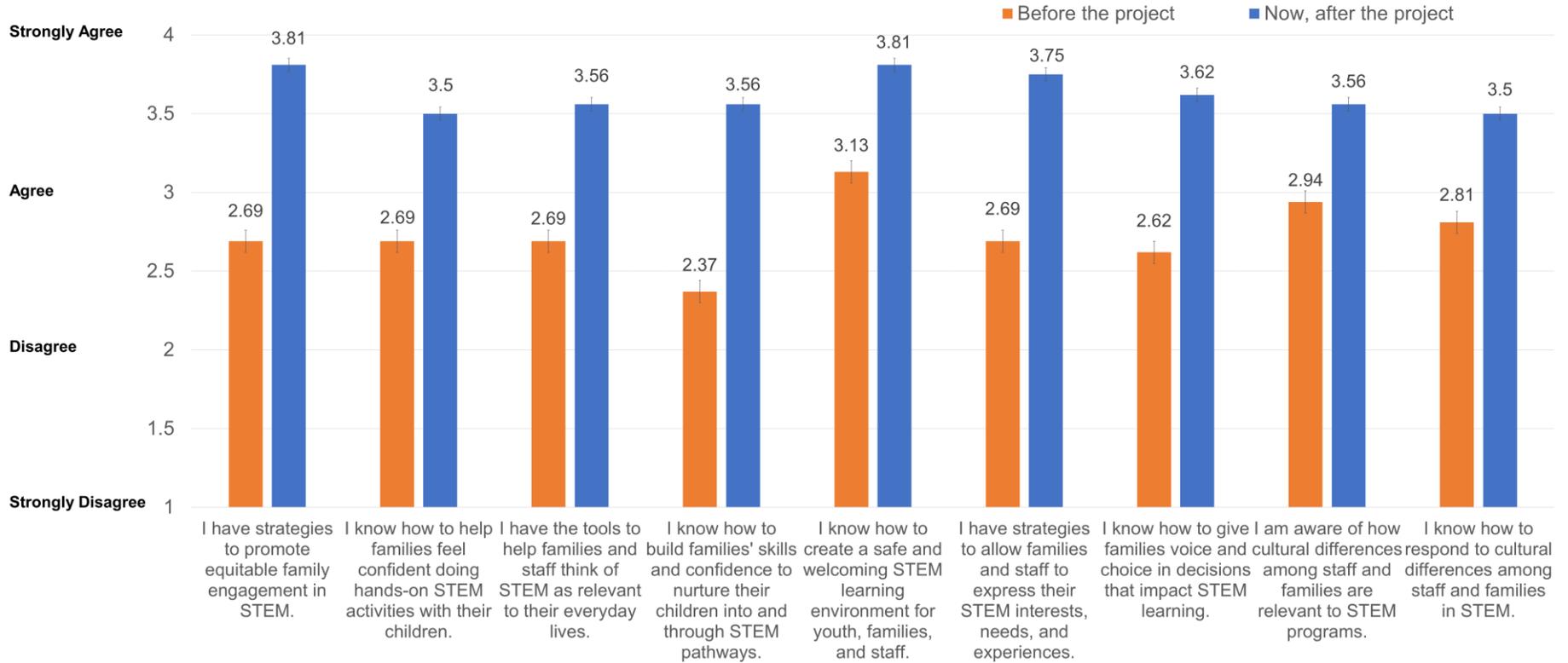
UNDERSTANDING OF CARE STRATEGIES

We first examined knowledge gains of program staff regarding the Planning Tool and CARE strategies. Staff were surveyed at the end of the project to estimate their learning about family engagement over the project's duration (September to January 2023). The results are shown in **Figure 4**, below.

Before the project, program staff were most confident in their abilities to foster positive relationships and belonging among youth, staff, and families (aligning with Connect). For example, survey responses ($n = 16$) showed that more than 75% of program staff somewhat/strongly agreed with statements about knowing how to create a safe and welcoming STEM learning environment (81.3%) and how to respond to cultural differences in ways that are appropriate and make connections between culture and STEM (81.3%). However, survey responses also showed that, before the project, staff were least confident in their understanding of strategies to help families practice STEM together (aligning with Act) and to help parents/caregivers navigate their children through STEM learning and pathways (aligning with Empower). For example, between 50.0% to 69.0% of staff somewhat/strongly agreed with statements about knowing how to build families' skills and confidence to nurture their children into and through STEM pathways (50.0%), having the tools to make STEM relevant to staff and families' everyday lives (62.5%), and giving families voice and choice in STEM programming (68.8%).

After the project, 100% of survey respondents ($n = 16$) somewhat/strongly agreed with all the statements related to equity, cultural sensitivity/responsivity, and CARE strategies. When examining change over time, from before the project to after the project, results were significant and positive for all statements/outcomes. However, we observed the greatest perceived gains for CARE strategies that promote Empowerment (Voice and Navigation), Reflection (Continuous Learning), and Equity, respectively.

Figure 4. Mean level of agreement with CARE and equity statements on staff exit survey



PLANNING OF FAMILY ENGAGEMENT STRATEGIES

We next examined the process by which programs selected and applied ideas from the Planning Tool. In team interviews and individual survey responses, program teams confirmed their use of the Planning Tool and CARE to guide their strategies at different points during the project. On the staff exit survey, nearly all program staff (93.8%) reported that they generally (50.0%) or definitely (43.8%) used the Planning Tool/CARE to plan their fall projects. Additionally, most program staff (87.6%) reported that the process of taking and applying Planning Tool/CARE ideas was easy (43.8%) or somewhat easy (43.8%).

Through check-in calls and post-project interviews, we found that programs developed a driving question or identified a problem that they wanted to solve related to their community and used this reasoning to guide their use of the Planning Tool when planning and implementing. Each program emphasized different domains of CARE in their planning, depending on their question/problem. Programs then integrated CARE strategies into their program practice after considering their local context and culture. For more about these questions and practices, see Program Spotlights.

Using examples that align with CARE, programs were interested in: addressing language barriers and supporting multilingual STEM (Connect), setting expectations for hands-on parent/caregiver participation in STEM activities (Act), listening and learning with families in a new neighborhood (Reflect), and supporting a cohort of parents/caregivers to lead and to educate another cohort of parents/caregivers in STEM (Empower). Also, woven within CARE are equity considerations, which programs also integrated into their plans. For example, program teams focused on addressing social, cultural, and economic challenges by supporting families from groups underrepresented in STEM (including Black, Hispanic, and immigrant families), lower-income families residing in public housing or in rural areas, families with lower literacy levels and who may not be native English speakers, and “grandfamilies” (in which children reside with/are raised by grandparents).

Some program teams found that having a well-defined family engagement goal helped to direct their focus within the larger Planning Tool, which then gave them additional ideas to achieve their goal. For example, a Program Director from a rural community in the Midwest shared: “How do we engage these families purposefully? ...We realized there were a lot of resources out there that we weren’t aware of that we are just recognizing that we are going to bring into our everyday opportunities.”

Some program teams used the Planning Tool to ensure their family engagement approach was intentional and comprehensive. For example, one Program Director

from an urban community in the Midwest shared: “I am excited to leverage the tool...to be extremely intentional about checking boxes as we engage families. Did families have opportunities to tell us what they want to do with us? Did families have the opportunity to tell us what they are interested in? Have our resources been translated? Have we elevated the fact that expertise is not required in STEM? That they [parents/caregivers] can do STEM alongside their child without that [expertise]. Did we elevate that expertise [in STEM or family engagement] is not required to join [our organization]?”

The Planning Tool helped program teams make planning decisions and elevate equity and access considerations. For example, a Program Coordinator from a rural community in the Midwest shared: “I was overlooking the Tool, and it made me think about access. I was going to do [the event at] the planetarium, but a big concern was that we were only going to be able to serve a small number of students. I really thought about space, availability, and opportunities to do multiple events.”

Program teams also described how the Planning Tool and related resources (like the “CARE At-A-Glance” document) helped them think about, and communicate with, potential partners early in the planning process. According to a Program Director from an urban program in the Midwest: “With the Planning Tool, I find myself flipping back to it. Especially the shorter version is just a really good thing to have on hand, especially as we are thinking of new initiatives. We’re thinking of a rural outreach program that is still focused on families. We’ve used this, mostly between me and one of our colleagues...the colleague has been using that document and we’re referring to it as we are considering ideas. How have these elements been met? We’ve also given a shoutout to the Planning Tool at a couple of conferences now. We’ve done workshops on family engagement in science, and we finished them by saying this is a fantastic tool for others to use...we’ve gotten really good feedback from those attending those workshops.”

Program teams also described how the Planning Tool gave them credibility as leaders and helped strengthen commitment from collaborators. According to one Program Director from a rural community in the South: “Being able to use some of the key points out of the toolkit [Planning Tool]...I became a leader because I put a framework around it [family engagement in STEM]. ‘Who are we going to include?’ People didn’t even think of themselves as a partner until I told them they were a partner. They were sitting at the table, and never considered themselves a partner. Then they showed up with their lead physicist, they showed up with their workforce development, they showed up with their students who were going to be engineers... And they donated. I didn’t even think of this when we were planning the event in October.”

Additionally, the Planning Tool transformed some of the programs' thinking about parents'/caregivers' roles in the planning process. According to an Educator of an urban program in the Northeast: "We started involving parents in the planning process [for our field trips]...they really became more committed to what their children are doing...families helped us to figure out carpooling, made sure we had everyone's cell phone numbers...now we're thinking of parents as partners, rather than info dumping on them." An additional point made by this program was that it changed their thinking about "meaningful" family engagement—they now understand that families do not need to be present during program activities or at an event to be meaningfully involved, and it is important to find opportunities to include and engage all families regardless of their ability to attend.

EVIDENCE THAT PRACTICE CHANGED

A key question for this study is whether, and to what extent, the Planning Tool and supports provided to the learning community/cohort can lead to meaningful change in family engagement practice. On the staff exit survey, most staff (87.5% "yes") reported trying a new idea or strategy from the Planning Tool/CARE that they had not tried before. **Table 2** below shows how most new or revised strategies aligned with Connect—suggesting programs went deeper where they were most comfortable from the start—but that there were also efforts made to try new approaches for Act and Reflect. Empower was least often attempted and viewed as aspirational by most, with several staff sharing that Empower was too difficult on a five-month timeline, underscoring the need for a longer runway to plan and implement Empower-related strategies. For example, one survey respondent shared: "I planned and implemented a new unique field trip into the program [Act] that strengthened relationships with families [Connect], was very engaging and inspiring for youth [Connect], and built a new relationship with a relevant business in the community [Connect]." Some staff shared that the ideas weren't necessarily "new," but that they developed them more deeply or thought about old ideas in new ways. For example, a Program Director from an urban community in the West shared during her interview: "These things have all been there piecemeal. I didn't have them all together. I started to see how these different pieces fit together....The biggest thing for me...was to reflect on the pieces we had and to put them into a package that was much more structured, deliberate, intentional about promoting STEM family engagement, rather than just a one-off workshop."

Table 2. Examples of Planning Tool/CARE strategies new to staff and tried in fall 2022

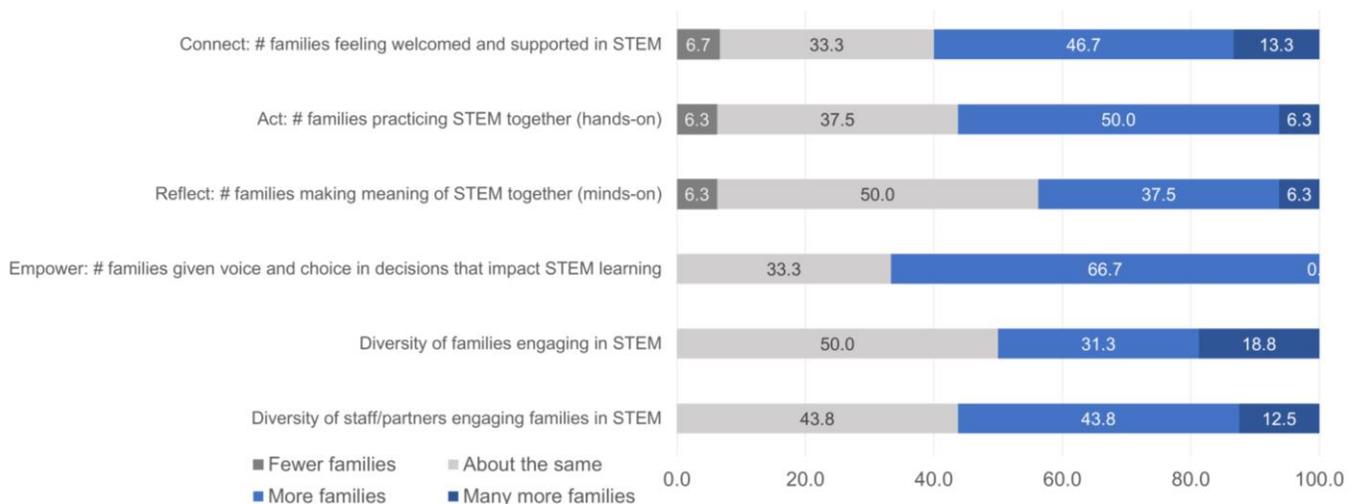
| Domain | Strategies New to Program Teams |
|----------------|--|
| Connect | <ul style="list-style-type: none"> • Being more intentional and inclusive when inviting families to participate in events/workshops, to increase the number of families who can/want to engage (e.g., being “more hyperaware of diversity and cultural/language needs”) • Inviting parents and caregivers to participate at every opportunity (not making assumptions about their ability to join) • Increasing outreach to parents/caregivers and students in ways that meet families at their level • Simplifying what “STEM” means (in the program, for the community) and highlighting “take aways” that connects STEM to families’ everyday lives • Showing how STEM can be fun, interactive, and engaging on many different levels (to reduce the stigma/fear that is sometimes associated with “STEM”) • Reaching out to district staff and local community organizations when planning family engagement programs or events • Including a new elementary school partner to organize and implement an event • Working with other organizations that have strong family engagement skills and commitment • Building new relationships with a relevant business in the community • Expanding family engagement to new populations, including tailoring outreach, messaging, and packaging of program offerings for younger children |
| Act | <ul style="list-style-type: none"> • Adding a workforce development component to highlight STEM careers for youth and parents/caregivers (in ways that connect to STEM learning) • Doing science “mini-projects” (families starting at home and then bringing back to workshop) • Adapting format of workshops to solicit more family participation • Increasing the number of STEM activities for families to engage in together at all family events, and connecting STEM activities to the family event theme (even if the event is not billed as a “STEM” event) • Going on unique field trips and including both youth and their families |
| Reflect | <ul style="list-style-type: none"> • Adapting format of workshops to solicit more family discussions around science being learned (e.g., families doing a science activity during first session and at home [Act] but then families making meaning of results at the second session) • Inviting families to complete surveys at events (instead of later, by mail) • Reflecting on and applying families’ input in the design of ongoing programming • Discussing with staff how to make science more culturally relevant for families • Using the CARE framework as a science leadership tool to support staff and parent/caregiver trainings |
| Empower | <ul style="list-style-type: none"> • Inviting parents/caregivers who have leadership experience in STEM to provide professional development to other parents/caregivers who want to be leaders in STEM. • Allowing a parent to assume a leadership role for the planned STEM event (cooking cultural food), and supporting the parent with resources (budget to purchase food, transportation to get food, space to cook food) |

EVIDENCE OF SUCCESS

Another important question is if program practice has changed, does this equate to positive changes in family engagement outcomes? It is important to note that this study is correlational and not casual—the latter requires a more rigorous intervention design with comparison group. In this study, program teams used one or more data sources to judge their success. Quantifiable sources included attendance (# youth/families), funding (amount of dollars), partnerships (# partners/organizations), and youth or parent/caregiver surveys (self-created rating scales). Qualitative sources included informal conversations with youth or parents/caregivers during or after the engagement, and youth or parent surveys (open response questions). Surveys typically focused on levels of interest and satisfaction with the activities/event, and what families did or did not enjoy.

Because family engagement capacity, goals, and implementation strategies/practices differed across programs, staff collected and used different sources of information to estimate their success. For this reason, it was not possible to aggregate findings. However, it was possible to measure staff members' perceived impact of family engagement efforts in a way that can be aggregated across programs, using the staff exit survey. When asked to rate the level of impact that programs' family engagement efforts may have on CARE-aligned outcomes (from Sept. to Dec. 2022), between 43% and 67% of staff respondents felt that they engaged more families and had engaged families in different ways. The greatest perceptions of change were found for Empower (66.7% felt that more/many more families were given voice and choice in decisions that impact STEM learning) and Connect (60% felt that more/many more families were feeling welcomed and supported in STEM), respectively (see Figure 6).

Figure 6. Staff perceptions of impact on CARE-aligned outcomes



It is important to note that one survey respondent reported engaging fewer families for three outcomes related to Connect, Act, and Reflect. The survey was anonymous, but interview discussions suggest the potential reason is the need to build back capacity and participation, which were reduced by the COVID-19 pandemic, especially to re-establish trusting relationships with families (Connect) and to provide more opportunities for hands-on (Act) and minds-on (Reflect) engagement. Survey respondents were also asked to estimate and quantify their reach in the next six months (see **Table 4**). These estimates represent eight of nine programs.

Table 4. Estimated impact, in next six months, by family engagement experiences

| Target of Impact | <i>n</i> | Range | Mean | Median | Mode |
|--------------------------|----------|------------|-------|--------|------|
| # Program Sites | 14 | 1 to 20 | 6.92 | 4 | 3 |
| # Program Staff | 12 | 1 to 75 | 27.4 | 25 | 25 |
| # Families | 12 | 8 to 800 | 188.6 | 100 | 100 |
| # Children/Youth | 12 | 8 to 1,000 | 391.6 | 250 | 150 |
| # Girls/Non-binary Youth | 12 | 4 to 550 | 126.0 | 75 | 76 |

**Note:* The number of respondents varied as certain estimates were not applicable to all staff roles.

Although for evaluation purposes it is helpful to examine perceptions of impact at the aggregate level, in practice success should be defined in the context of the program. The goals set by each program team are developed based on their own community's strengths, needs, interests, and practices. To show how different programs succeeded at increasing or strengthening family engagement, we spotlight each of the nine programs in our learning community/cohort on the following pages. For each program team, we describe their rationale, plan, lessons learned, and indicators of success.

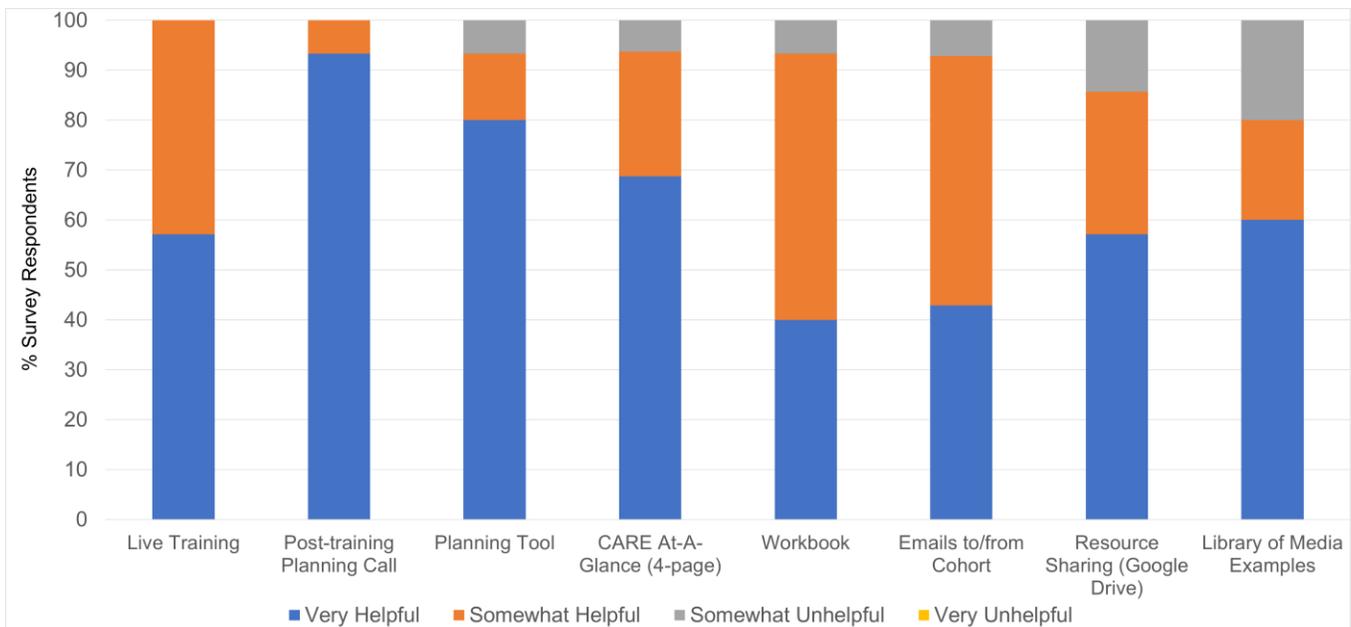
TRAINING INTERESTS AND NEEDS

To understand what could help programs elevate their family engagement practice, the exit survey asked questions about training and supports that would help staff keep up or increase their momentum. Based on survey responses, of the various supports and technical assistance provided to program teams, the live trainings (with presentation and breakout room discussions) and post-training check-in calls (where teams met individually with ISRY) were found to be most helpful overall, with

100% of staff rating these supports as somewhat/very helpful. The items that received the highest endorsement of “very helpful” were: post-training planning call (93.3%), Planning Tool (80.0%), and CARE At-A-Glance document (68.7%). See **Figure 5**.

Considering family engagement plans in the next six months, 100% of survey respondents reported that they were somewhat (31.3%) or very likely (62.5%) to reference back to the Planning Tool to guide their efforts. One respondent shared: “I will definitely be referring to the planning guide and the CARE Domain for all future events – large or small. This was a great tool as we thought about our approach and focused on specific goals.”

Figure 5. Helpfulness of STEM family engagement supports reported by program staff



Considering potential professional development opportunities, when asked which STEM family engagement topics staff were most interested in learning more about, most (62.5%) chose making STEM relevant for families (aligning with Act-STEM Everywhere). Staff were also interested in strengthening community partnerships to build family engagement capacity (43.8%, Connect), and creating pathways for families to lead and make decisions that impact STEM learning (37.5%, Empower). See **Table 3** for a complete list of professional development options and the level of interest in these topics.

Table 3. Program staff’s professional development interests for family engagement

| Professional Development Topic | Description | % Staff |
|---------------------------------------|--|----------------|
| Act – STEM Everywhere | Making STEM relevant for families anywhere, at any time (program, home, beyond) | 62.5% |
| Connect – Partnerships | Nurturing community partnerships to build family engagement capacity | 43.8% |
| Empower – Voice | Creating pathways for families to lead and make decisions that impact STEM learning | 37.5% |
| Reflect – Evaluation | Evaluating the success of family engagement plans (data collection, interpretation, and reporting) | 31.3% |
| Act – STEM Practices | Act: Helping parents/caregivers and their children practice STEM skills hands-on together | 31.3% |
| Cultural Responsivity | Reaching out to families and staff in culturally competent and respectful ways | 25.0% |
| Connect – Belonging | Building positive and trusting relationships with youth, families, and staff | 18.8% |
| Reflection – Meaning-making | Guiding parents/caregivers and their children to reflect (or talk STEM) together | 18.8% |
| Empower – Navigation | Helping parents/caregivers negotiate and advocate for their children in STEM | 18.8% |
| Reflect – Continuous Learning | Listening and learning continuously with staff and families engaged in STEM | 6.3% |
| On-Site Support/Coaching | Something Else: Program visits during family engagement activity/event or in-person workshop | 6.3% |

SUCCESSSES & LESSONS

CATALYSTS FOR FAMILY ENGAGEMENT

From meetings, surveys, and interviews, we learned that there are many factors that can lead to positive changes in family engagement in STEM.

- **Combining compact and interactive trainings (which balance Planning Tool content and peer discussion) with individualized planning sessions were more enlightening and made the translation of CARE strategies easier.** Programs often referred to discussions with peers (during trainings) as a source of inspiration for bringing ideas in the Planning Tool to life in their own program communities. Programs also appreciated having a dedicated post-training check-in time because it helped hold them accountable and provided a sounding board to test the likely success of their plans before forging ahead. As an example, a Program Facilitator from an urban community in the Midwest shared: “For me, what I found most helpful...it was the connection. The breakout groups in the meetings, and hearing what other people were doing, was helpful for me and a little inspiring. It’s good to know what challenges other people are facing. It might be similar or different, or how different family populations are in different parts of the country...other thing is meeting with you [ISRY] holds us accountable a little bit, keeps an awareness of what we’re doing with families.”
- **Having an evidence-informed reference source (the Planning Tool) helped programs communicate with partners about family engagement.** Staff shared how the Planning Tool increased their confidence to talk about family engagement in different ways, and they provided examples of how it seemed to increase their partners’ confidence in their ability to lead family engagement efforts. For example, one Program Director from a rural Southern program described how when she shared the Planning Tool at an event planning meeting, the group asked her to be in charge and make family engagement the central focus—a challenge she accepted.
- **Receiving recognition from outside organizations, including STEM Next and ISRY, raised awareness of the OST programs and their partners.** Programs often included a reference to ISRY and STEM Next in their outreach to families, partners, and funders. In a few cases, this allowed programs to attain extra funding to support their family engagement efforts, and a few programs believed this increased attendance at their events.

- **Reaching outside of the program and forging new partnerships—with other school districts, businesses, community organizations, STEM expert institutions, etc.—helped programs build more capacity for family engagement.** For example, programs partnered with businesses to bring in STEM career role models and technology, with school districts to bring in STEM teachers and other support staff to facilitate activities during events, with faith-based organizations where families feel a strong sense of community, and with cultural centers that raise awareness of language and culture.
- **Shifting mindsets about the roles and expectations of families in children’s STEM learning—from families dropping children off to programs inviting families in.** One Program Director gave the example of how she started noticing that parents/caregivers would drop their children off and wait outside, and so she talked with her partners and then started inviting parents and younger siblings in to participate in activities, rather than waiting on outside. Parents/caregivers happily accepted the invitation.
- **Personalizing messaging of STEM, by putting STEM in the context of families in the program and connecting STEM to their everyday lives, was an effective way of making families feel more comfortable.** Programs found simple ways of explaining how STEM learned in their programs is similar to what families do at home and out in the community, e.g., “...here are five reasons STEM is important for our community...”

CHALLENGES TO FAMILY ENGAGEMENT

From meetings, surveys, and interviews, we learned of several factors that can steer program teams away from goals or progress in family engagement in STEM.

- **Not having enough time—either not enough time to dedicate to planning and reflecting on the results, or not enough of a planning “runway” to organize and enact family engagement strategies to the best of the programs’ abilities.** This was especially true for strategies related to Voice and Navigation (Empowerment). Most programs recommended at least six months of planning time (whereas this project provided less than three months for planning).
- **Scheduling difficulties or planning at the “wrong” time, such as trying to reconcile conflicting availability among staff and families, or planning events during holidays or seasons with inclement weather.** For example, two programs had organized outdoor family engagement activities—one planned an event that coincided with a substantial drop in temperature that reduced attendance, and

another planned an outdoor gardening activity during an unexpectedly dry season that did not yield enough of a crop for families to take home and cook).

- **Bridging the distance divide between sites and across the community, which can make it difficult to unite families across the community.** This is typically related to timing and transportation and results in using more capacity and resources to plan and offer separate events.
- **Coping with high staff turnover rates, which make it challenging to cultivate staff talents in family engagement over time.** When a staff member leaves, the knowledge and experience that benefits the program and families is lost and needs to be restored.
- **Continuing disruptions from the pandemic, which affect staff recruitment, youth/family attendance, and youth/family engagement in science.** According to a Program Director of an urban community in the Midwest: “Because of the pandemic, we have to scale back up to full blast programming....We have seen a decline or dip in getting kids involved in afterschool programs...” Additionally, this program experienced substantial behavioral management challenges connected to the aftermath of the pandemic: “We ended up having a behavioral management specialist at the location...he really helped the staff work through challenges staff may be having with students, and to figure out how to communicate those things with parents and students. Believe it or not, we have had more challenges with younger learners and had a lot of conversations with their parents... after two and a half years, especially in a Black community, can bring in a lot of behavior we weren’t expecting.” Additionally, a Coordinator from a rural community in the Midwest noted: “Post-COVID,...[family engagement] is so different now than it was before. It is so important on that STEM level...There is a need for education on what family engagement looks like post-COVID. We’ve all seen the effects of COVID on school. Math and reading [scores] have gone down, SEL [social-emotional learning] is affected. Family engagement—with that trifecta of schools, families, and staff—is needed to be successful.
- **Building partnerships and capacity to apply for, and succeed at getting, funding.** Some examples include the costs to register and/or travel to annual conferences or workshops. Programs were interested in getting connected with more organizations that provide funding opportunities for family engagement, or being connected with partners who could help them build capacity to apply for larger grants. “A lot of this comes down to the ability to get funding. If we can’t afford to provide [xyz], then the success is limited.”
- **Not having standardized methods of measuring family engagement outcomes in OST, resulting in programs having to create measures (e.g., surveys) from scratch or not collecting data at all.** Some proposed a researcher-practitioner

collaboration to “sit down nationally.... and mock something up together” to create reliable, timely, and practical tools to gauge success. An Educator from an urban program in the Midwest shared: “It would be very meaningful, especially for small organizations, to have tangible [measurement] tools...an interest survey that is readily available. Something other organizations have used, that you can get good data from...for someone who does not have time to create a survey, but I can use this to help plan family engagement... the hardest thing was quantifying what we did, because we don’t necessarily have those tools developed or utilized yet.”

- **Lacking clear benchmarks or criteria for successful family engagement, which would help programs to set reasonable goals and expectations.** The Program Director of an urban program in the West shared: “I don’t have very crisp criteria [for success] yet...I don’t know how much [our success] was our own effort and how much it was just a great community. We will be repeating [our family workshop] a couple of times with different setups.” This also underscores the need for more careful study of family engagement impacts with iterative testing and redesign.
- **Having few examples of studies/evidence that can provide evidence to demonstrate the impact of different family engagement strategies.** Programs are interested in data that show which strategies would lead to the greatest return on investment, and using this information to communicate the value of their efforts to stakeholders—including families and funders. According to the Program Director of an urban program in the Midwest: “The primary thing we’re always thinking about...we don’t have the capacity at our office to carryout a study of whether or not our programs are useful. There’s always this talk of whether our programs are beneficial to the community. What is the overall effects on STEM programs in the future? Does it change the career paths for families? We would love the capacity to participate in a study. Then we can have that information—something more concrete than anecdotal.”
- **Not having guidance to differentiate family engagement strategies to better meet the needs of families.** Some programs noted the developmental differences in family engagement, based on their observations that families of older children are less likely to attend or participate together with their children. This underscores a need to differentiate strategies for different age groups. For example, one program experienced challenges with engaging families of middle school students and will be trying a new tactic: bringing in partners that can link STEM programming and events to STEM careers in the community in ways that appeal to all family members (e.g., advertising and hosting a job fair or providing workshops for parents/caregivers and children that can build STEM job skills).

- Knowing when to stand back versus when to lean in to support parents when working on Empowerment strategies.** Programs described the difficulty of balancing partnerships with parents/caregivers when elevating parents/caregivers to a leadership role. The program staff need to stand down to allow allow parents and caregivers to grow leadership skills, but need to standby to help them when they need help. Programs do not want parents/caregiver to fail, but they also do not want parents/caregivers to think the programs do not believe in their ability, which can leave program staff in an uncomfortable position. According to a Coordinator from an urban program in the Midwest: “There’s this balance that needs to be achieved... Clearly, they can do it, they can think of it, but sometimes they needed that extra push. Been a balance of how much freedom to give...”
- Successfully implementing family engagement strategies can lead to an immediate increase in demand, with more families signing up for programming and events than programs can accommodate.** This may seem like a good problem to have, but if the program is not prepared (in terms of staff, space, resources) to accommodate more families following a successful offering, there is a risk in having to turn families away. “You don’t want to discourage them. We raised their expectations...[I told the planning committee] we had such a high turnout, make sure you’re ready for the after response. They had so many kids show up to the robotics club at the next session [following the STEM event], they had to turn families away. Before hardly anybody was participating, now so many showed up, they didn’t have enough space for them.”

CONCLUSIONS

Evidence from this study show that a compact and interactive training approach, which balances the Planning Tool content with a community exchange of ideas, can transform family engagement practice in a short period of time. Nearly all program staff reported trying a new strategy or idea because of this project, and two-thirds of program staff reported engaging more/many more families than before this project. However, the evidence also suggests that transformational change of family engagement planning requires scaffolding and accountability through follow-up. Programs valued the Planning Tool but wanted more guidance and feedback. They wanted a place to test the validity of their ideas and get feedback from peers, especially when trying out new strategies. This study also shows that simplicity is key: the CARE framework was easy enough for programs to understand, regardless of role

or amount of experience, and it served as an organizer that helped programs be more purposeful and intentional when choosing family engagement strategies.

To support sustainable family engagement, programs recommended the following:

- Lighter touch learning/reflection opportunities (e.g., monthly or quarterly drop-in or follow-up meetings with similar programs from different contexts/locations, 60–90 mins, to check-in on CARE plans and reflect together on new strategies and approaches that they and their peers are considering/attempting);
- In-depth learning opportunities that dive deeper into specific family engagement topics/content over time (such as a series of workshops that describe recent research and practice examples to help unpack Relevance and Empowerment strategies, or that go into more depth on differentiated strategies to engage families of younger and older children);
- Additional funding opportunities (e.g., stipends to pay for registration and travel to family engagement conferences/workshops)
- Implementation resources (e.g., written or visual examples showing how other programs enact family engagement strategies successfully).
- Data and measurement resources (e.g., standardized methods of measuring family engagement outcomes from the student, staff, and parent/caregiver perspectives; family engagement studies that demonstrate the strategies that provide the best return on investment for youth and families).

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Final Words from the Field

When asked if they could put their most important learning on a billboard, members of our learning community shared the following:

“STEM is Everywhere and **Parents are the Secret Sauce.**”

“Try not to make any assumptions and be as clear with your communication as possible.

It's all about progress, not perfection.”

“The CARE Planning Tool! Specially the abbreviated version serves as a **fantastic reference for ongoing and new project development.**”

“**STEM Can be implemented AS non-intimidating** through that is engaging, hands on opportunities, and connections to everyday life.”

“**STEM doesn't need to be complicated.... Just fun and engaging!** Look around your environment!”

“**Families can be the best Champions that Children and Youth can ask for.** Be the catalyst they need!”

“We need to **build awareness around the impact that families working together can have** on overall development of youth and children.”

“The Work of Today is The History of Tomorrow and We are its Makers!”

“**Families are seeking to learn together,** and STEM opportunities are an amazing tool!

Communication is Key”

“It was **very helpful to discuss our family engagement experiences in groups with other educators across the country,** and it was also very helpful to have check in meetings...to reflect on family engagement, come up with new ideas, and continue to keep it in my awareness.”

“We must do our best to **lower the language barrier for students and their families to truly make them comfortable, connected and confident advocates.**”

“**The ability to broaden participation in STEM must begin early and engage families and communities.** More so now than ever, families in low-income and underrepresented communities have experienced significant challenges during COVID and are still recovering. **The practices involved in the STEM Family Engagement Project reinforce and provide a context for how and why family participation is valuable.**”

“Consistency is key!”

“**It takes a village!** STEM is everywhere. Be intentional about connecting families to STEM and resources. **The project has opened our eyes to new possibilities that will help shape our students.**”