Photo Credit: Greene Scholars Program

Family Engagement: Taking it to the Next Level

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What started out as a pile of cardboard, straws, tape, and other recycled materials came to life as dinosaurs. This design challenge—build a dinosaur at least six inches tall that can balance on two legs—sparked imaginations and engineering skills in kids and parents alike in a summer science workshop. In one family, the parents got so engaged that the project had become a competition between mom and dad. They were focused on who could make the biggest and strongest dinosaur while their daughter was pleading, "I want to make mine." This preschool-age daughter was on the sidelines watching her parents. They were motivated by good intentions but in their excitement missed an opportunity to encourage their daughter's interests.

It would seem that an activity like this, equally as compelling to parents and their kids, would be a win-win. However, imagine the impact had the activity been presented with encouragement for parents to collaborate with and encourage their children. What if, along with the instructions for putting the dinosaur together, parents were offered examples of questions and comments that they could ask their child to support deeper thinking on the project?

How can organizations integrate parent education into their STEM programs? With support, parents can learn to engage in positive interactions that spark and maintain their child's interest in STEM.

In this STEM Next Opportunity Fund case study, we highlight the Greene Scholars Program and Digital Youth Divas—two programs that are exemplary in their approach to empowering parents with research, education, and resources. While their program models, participants, and STEM-focus are quite different, these organizations offer promising practices that can benefit all communities.

Program elements to deepen parent engagement

There are many reasons that family STEM engagement might be challenging. Parents have to manage a balancing act with work, dinner, homework, and extracurricular activities. We've heard that parents don't have time for family nights at school or for take-home STEM activities. The leadership of the Greene Scholars Program and Digital Youth Divas acknowledge that their families are busy too. So how do they defy the odds and draw parents in? They make participation worthwhile and design programs for and with the families they serve. They inform, guide, and empower parents to support their children.

With support, parents can learn to engage in positive interactions that spark and maintain their child's interest in STEM.

This case study focuses on the following program elements of successful family engagement:

- Bridging research and practice
- Supporting parents as learning partners
- Listening to parents and accommodating their interests and needs
- Holding high expectations for parent involvement

Each of these generates effective family engagement and strengthens family assets. Ultimately, the result is better programming and improved youth outcomes.

We hope you become as inspired as we are by the programs described in this case study and come away with ideas to deepen your engagement with parents and caring adults. Imagine how much more we can bolster youth's engagement in STEM—by deepening parents' engagement in STEM.

Greene Scholars Program

The Greene Scholars Program supports African American youth in grades 3-12 from dozens of San Francisco Bay Area school districts. Named after Dr. Frank S. Greene, Jr., one of the first African-American pioneering technologists of Silicon Valley, the Greene Scholars Program operates in Santa Clara, CA, and offers hands-on learning, leadership training, academic planning, and career exploration. *Participants meet monthly on Saturdays, and over the course of their participation in the program engage in 500-1,200 hours of hands-on STEM enrichment and college preparation.* Since its beginning in 2001, the program has served over 375 youth and their families with sixty percent from low to moderate income.

Photo Credit: SLAC National Accelerator Laboratory

The curriculum evolves to meet the developmental needs of youth and keep up with new technologies. Through experiential projects, students learn about circuits, chemistry, mechanical engineering, biomedical applications, and coding. The Scholars—as the youth participants are called—also participate in an annual Science Fair in which they demonstrate their creativity, scientific knowledge, and presentations skills.

Knowing the importance of role models, the program also creates opportunities for the Scholars to meet with mentors in a variety of STEM fields. Mentors don't just talk about their work. They engage in meaningful activities that include resume development, workshops on social skills, and mock interviews. That's a lot of support and work for the youth. The program's evaluation results show that these intensive efforts pay off—100 percent of Scholars who successfully complete the program graduate from high school and continue their education, primarily through 4-year universities and 60 percent major in STEM at college.

The Greene Scholars Program provides a space that is culturally affirming to its students and parents. Unlike most of the Scholars' educational experiences as youth of color in predominantly white schools, in this program they are among students who share similar backgrounds and interest in STEM. This feature plays an important role in developing their STEM identity. Executive Director, Dr. Ayodele Thomas explains that this normalization of Black youth doing STEM is an important and differentiating element from other STEM opportunities for the Scholars: "No one is asking, 'Why are you doing that?' or 'What is wrong with your hair?'"

Likewise, Thomas notes the program aims to create a similar sense of community among the Scholars' parents by fostering culturally relevant conversations around issues faced while raising Black children. For example, questions around available resources, common challenges and possible solutions, and ways to extend the community outside of Saturday classes inform the parent program.

Parents as Learning Partners

From its beginning 17 years ago, parent participation has been a significant element of the Greene Scholars Program. Its founder, Debrah Watkins, was a classroom teacher and saw firsthand how important parent engagement was to her students' success in school and in life. Watkins made parent engagement a core component of the program model. By deeply engaging parents, Watkins believed, the program would successfully engage youth. So, what does parent involvement mean for a family in Greene Scholars Program?

The Greene Scholars Program provides a space that is culturally affirming to its students and parents... This feature plays an important role in developing their STEM identity.

Photo Credit: Greene Scholars Program

Parents in the Greene Scholars Program are responsible for every aspect of the program's operations. They help develop curriculum, run an annual science fair and awards event, chaperone events, supervise a summer camp, and write grants. Whether a parent has a background in STEM or not, Thomas notes, "Everyone has something to give." This model allows the program to do much with limited funding and has the added side benefit of presenting parents with opportunities to develop their own leadership skills along the way.

For example, a small committee of parents hosted a panel for other parent participants on summer opportunities. This supplemented the list of summer programs in their newsletter. So that options weren't too numerous or overwhelming, the Greene Scholars parents highlighted a select few programs with high credentials. Parents who had experienced these selected programs provided personal testimonials to help other parents determine which might be the best fit for their child. During the panel, one mother whose daughter had attended Get SET by the Society of Women Engineers attested, "I've seen how they've done it." She also offered a story about the program's impact on a girl who was on the shy side and advocated "all girls find a space and voice [in Get SET]." The promotion of vetted summer programs by known and trusted parents is a powerful and effective recruiting tool when conveyed parent-to-parent.

Thomas encourages parents to volunteer for jobs that stretch their skills and ambitions. She advises, "If you're willing and capable, go try it. Go for it." While not intentionally planned for, parents benefit from their own volunteer efforts. For some, the professional rewards are quite dramatic. For example, one parent indicated that chairing a committee gave her the chance to lead, gain confidence, and develop skills that helped her own career path—in fact, she had to step down as chair due to a new job she got partially because of the committee experience!

This long-term, in-depth commitment creates a supportive community among parents. If parents need a recommendation, there are other parents who can help. If someone is facing a challenge and needs support, there are parents who can help.

High expectations for parent engagement

The program asks a lot of parents. Parents are expected to contribute 40 hours per year to the program and attend three workshops.

What helps parents agree to this major commitment? Thomas explains that parents value what the program offers their children—a supportive space with caring staff and a positive peer group who challenges them to persist in STEM. Their commitment makes this possible. Thomas notes, "They really see the benefit of their children having this kind of long-term community. That these are adults and people who care about your child who are not kin to your child but who will be looking out for your child—for them—for years."

Thomas admits that the program isn't for every family. And, she clearly communicates that if parents are looking for a drop-off program, the Greene Scholars Program isn't the right fit. However, if parents are willing to contribute, Thomas is willing to find jobs that will accommodate their schedules, needs, and interests. And there are increasingly more opportunities for parents to contribute remotely. The program has even included parents with four children and single-parents successfully.

Photo Credit: Greene Scholars Program

While the Greene Scholars Program encourages significant parent participation, the program also makes accommodations. Thomas recognizes that "life can get in the way" and offers leaves of absence for families. Some families have taken this option when a family member is ill, a parent has taken on a new job, or other mitigating circumstances intervene. This option gives parents time to get their personal lives settled and to decide if they can recommit the following year.

Listening to parents: Creating program elements with parent input

Thomas also considers learning from parents an important part of her job, and actively creates opportunities to really listen. She wants to make certain that parents are getting the information and resources they need, and that the program remains relevant during these rapidly changing times. During informal conversations, Thomas notes helpful feedback and ideas, and reflects these points back to parents. She elicits parent input in surveys upon completion of the program. Thomas also makes a point to relay to parents the value of their ideas and input.

Within the formal survey, parents are asked to give specific feedback on new program elements, possible programmatic changes for future years, impressions of program impact, and future changes they'd recommend. Thomas then does her best to incorporate ideas into the program. For example, when a previous parent cohort expressed their interest in academic guidance about STEM pathways and how they could help their child be "college ready," the Program developed courses and presentations to help parents take a deep dive and support their children from elementary through middle and high school.

In addition to the formal parent survey, parents are encouraged to provide informal input on the program through various opportunities. Thomas has faced challenges in eliciting input and feedback from parents, and often reflects on how parents vary in their willingness to share input. Some are very vocal and share at every meeting while others are more reserved. To address this dynamic, the program dedicates time for parents to give feedback in small groups, which report thoughts back to Thomas.

Sometimes feedback initiates with casual conversations. In committees, members share what they've heard parents talking about in informal conversations, and how those points can help improve Greene Scholars curriculum and parent workshops. These examples illustrate the diverse ways in which family input is incorporated throughout every program element and reflect the Greene Scholars Program's strong commitment to organizational learning.

Digital Youth Divas

Digital Youth Divas is a 20-week program run by the Digital Youth Network in Chicago, IL, that has served more than 300 middle school girls since 2013. The program engages girls, particularly those from communities underrepresented in computer science and engineering, with projects that are both technically challenging and appealing to girls, such as computational circuitry and programming through fabrication. Over one third of the girls were from single-parent families, while the

socioeconomic status of families was more distributed. Program design and research, supported by the National Science Foundation, is led by faculty at **Northwestern University** and **DePaul University**.

The program is multi-faceted and includes engagement in projects with mentors, an online social learning network, and access to opportunities around the city. Lead Researcher for the Digital Youth Network, Caitlin Martin, notes the **program's positive results**, which include developing girls' confidence, interest and identity in STEM, increasing domain-specific content knowledge, and creating a sense of community. These goals are achieved as girls design, create, and re-imagine everyday artifacts like jewelry and hair accessories, and through youth activities like dancing and conversations with friends.

Photo Credit: Digital Youth Divas

Family engagement has evolved in Digital Youth Divas, moving from more basic communication elements, to in-depth workshops. Communication with parents has always been important at Digital Youth Divas. Staff share information about upcoming opportunities along with updates on the girls' work through email and website updates. Emails contain questions parents can ask to prompt conversations along with highlights and photos of the girls' projects.

Photo Credit: Digital Youth Divas

When the Digital Youth Divas team was ready to more fully integrate parent engagement into their programming, they developed parent workshops. These workshops address a variety of parent needs: they address parents' questions on continued opportunities for the girls, they better equip parents to support the girls' participation during the program, and they show parents how they can help sustain their girl's engagement in technology upon completion of the program. The parent workshop series is known as the **Digital Youth Divas Caring Adult Network**.

Through these additional programming elements that go beyond the once-a-week activities, the program fosters an integrated approach to families supporting their daughters in STEM. This helps ensure that the program's impact doesn't end upon completion. These commitments resonate with the design principles for all the programs hosted by the Digital Youth Network—an appreciation of learning ecologies and desire to help connect experiences across time and place for more powerful learning. The program involves parents and other caring adults in the girls' lives (e.g., grandparents, adult siblings, aunts) as learning partners to support the girls' STEM knowledge and confidence, to connect them with resources in the community, and to learn from them. These workshops are described in detail below.

Bridging research and practice: Empowering parents

There is a rich body of research on parents' impact on youth's early interest in STEM and eventual career choices.[1] This research reveals that parents can spark and sustain their child's interest in STEM in lots of different ways.[2] Building on research led by **Brigid Barron**, the team at Digital Youth Divas focused on several roles through which parents support their children in STEM.[3] These include teaching skills like how to use a power tool or sewing machine, working and learning alongside their child, sharing resources like library books, finding and enrolling their child in STEM afterschool and summer programs, and learning from their child.

The team at Digital Youth Divas intentionally decided not just to present this work as experts but involve parents directly with the research. Martin reflected on their approach, "Let's not pretend we're doing all these things in a vacuum. Let's say straight up this comes from research we've done. What do you all think of it?" The team wasn't certain how parents would respond to this new element and were pleased to find that parents were overwhelmingly positive.

Parents as learning partners

Research provides background for active discussions among families and staff. For example, after they learned about the **various roles that parents play in supporting youth learning,** parents broke up into small groups and shared examples of the roles they play. This helped parents affirm all the work they were already doing to support their daughters and also validated the roles played by other people including grandmothers, teachers, aunts, and coaches. Especially for parents without a STEM background—who aren't sure what they need to do to best support their daughters—this self-affirmation that they are on the right track can be a vital tool to help *parents persist* in guiding girls along STEM pathways. The group also discussed the roles in which they needed additional support.

In another example, in a workshop that highlighted summer opportunities, parents were given time to reflect on their needs (e.g., schedule, transportation, costs) and their goals for the girls (e.g., deepening girls' existing interests or creating new ones), and then worked in small groups to research and identify relevant programs using a networked city resource. Once they identified programs of interest, they saved them and emailed them to themselves, shared with others, or bookmarked them to follow up on. Martin notes that discussions are most animated when parents have the chance to share resources and ideas in small groups. Digital Youth Divas builds community and creates a safe and supportive space to engage in small group discussions around the research. The team also offers different ways to participate, including drawing and making activities, so that everyone can comfortably contribute. By providing time and a variety of ways for parents to learn together, Digital Youth Divas creates social networks in which parents become resources for one another.

Parents and children learning together

Photo Credit: Digital Youth Divas

Parents also get the chance to experience first-hand some of the projects that their daughters are working on. Because of the developed community bonds, parents are empowered to jump into an activity that might have been out of their technical comfort zone, like making e-cards. Through this type of active participation, parents acquire some of the same skills and knowledge as their daughters. This gives them new appreciation for their girls' efforts troubleshooting, persevering and maintaining a positive attitude. Staff offer questions and reflections about these projects that help guide parents' conversations with their daughters about the activity. This approach with project-based learning for parents and youth provides families with a common language and shared experience so that they can learn side by side.

Listen to parents: Create program elements with parent input

By inviting feedback, Digital Youth Divas discovered ways to support families, especially those who had difficulty participating in the program. For example, they learned that child care was a major hardship for many families. While Digital Youth Divas hadn't budgeted for this in the program, they were able to accommodate this need, which positively impacted family turnout.

Similar to the challenges that Thomas ran into in the Greene Scholars Program, Martin acknowledges that it is hard to elicit feedback from families. Most parents express appreciation for the program in parent surveys. She and the team would like to gain deeper information, especially around the parent workshops, but acknowledges that the team doesn't have the bandwidth to conduct parent interviews. It can be challenging for nonprofits to secure funding to do the intensive work necessary for gathering the type of feedback that will enhance programs.

Challenges: Encouraging participation while supporting families who can't participate in workshops

Working out expectations for parent participation has been a complicated and thoughtful process for Digital Youth Divas. On the one hand, they would like every family to engage in every workshop to get the most benefits. On the other hand, they also recognize the feasibility of this request, and that even making it may alienate parents who are unable to attend every session because of work schedules or other commitments.

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The team has found a balance to parent participation that seems to work—at least for now. Digital Youth Divas asks parents to attend an orientation during the first week of programming, which addresses expectations for girls and parents along with activity schedule. There, they also encourage further participation in at least one of the three parent workshops. While the workshops build on one another, they are also designed to be modular so that participation does not depend on attendance at the previous event. This flexibility around attendance requirements enables a wider range of families to participate. Nonetheless, staff acknowledge the "costs" for families who aren't taking full advantage of the program.

For the families who aren't able to participate in all workshops, Digital Youth Divas is building up alternate resources for outreach. For example, the program offers resources on its website, including an **extensive set of videos and online activities** organized along the major workshop themes. Based on suggestions from parents, staff are also exploring the development of take-home kits with simple technology activities for families. Thinking outside the traditional workshop model, Digital Youth Divas is working to accommodate more families and expand its reach in the community.

Take Action for Your Program

1. **Make space for families and staff to put research into action**. Keeping up with research needs to be a priority. Consider designating a team "research officer" responsible for staying up-to-date on research and discussing it with program staff to support their work. Setting a Google Alert for a topic of interest is an easy way to monitor trends. Furthermore, think creatively about how to share research with parents in helpful and actionable ways.

2. **Start with a plan to listen to parents and invite their input into your program design**. Don't let preconceived notions that parents are too busy hold back an ambitious family engagement plan! Ask parents and guardians what they want and how they can contribute.

3. **Learn about the barriers and engage them in brainstorming ways to overcome challenges to participation**. Make the impacts valuable enough so parents want to put in the time. Parents in the Greene Scholars Program and Digital Youth Divas recognize the significant benefits these programs offer them and are thus, are more likely to make the necessary commitment. This parent turnout—largely from communities often categorized as "hard to reach"—illustrates that when programs are truly able to enrich parents' lives, they will participate.

Giving thanks to the Greene Scholars Program and Digital Youth Divas

We thank the Greene Scholars Program and Digital Youth Divas for sharing their work and leading by example. While both programs have gotten a lot right with their family engagement, they also strive to

confront program challenges head on through redesigning elements, trying new strategies, and looking for new resources. This work is hard, and no one, including these innovative programs, has it all figured out. By sharing challenges candidly, we are all able to improve our work. We deeply appreciate the willingness of the Greene Scholars Program and Digital Youth Divas staff to share their lessons learned.

Both organizations have made a tremendous commitment to family engagement. We hope that you will be inspired by these programs and consider how to deepen your engagement with families. If you are wondering how you can take up these promising practices with limited resources, we encourage you to envision family engagement as a marathon. By this we mean taking a long-term approach with two sets of goals—some that allow for quick successes and others that will take more time and resources. What matters most is to dive in and work together with families in your community!

Linda Kekelis, PhD, is a consultant with a longstanding commitment for ensuring that all youth, particularly girls and youth of color, have access to STEM opportunities. Family engagement has been a passion for Linda and at the center of the research and programs she has led. She is an advisor at STEM Next Opportunity Fund. lkekelis@gmail.com @LindaKekelis

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We welcome your feedback on this case study.
Send us your comments and questions to info@stemnext.org.

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