



# Children and Parents Learning Side-by- Side to Acquire STEM Knowledge:

A Case Study of the Chicago  
Pre-College Science and  
Engineering Program

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## **W. K. Kellogg Foundation Family Engagement Case Study Series**

In 2014, the Foundation invested \$13.7 million to support a cohort of 30 grantees to implement a wide range of family engagement projects in the field of early childhood education. As part of an evaluation commissioned by the Foundation, ICF conducted in-depth case studies with six of the 30 family engagement grantees. The purpose of the case studies was to illustrate diverse approaches to building institutional and systems capacity and developing family leadership. In addition, each case study presents implementation facilitators and challenges encountered by each program as well as lessons learned for the wider family engagement field.

## Children and Parents Learning Side-by-Side to Acquire STEM Knowledge: A Case Study of the Chicago Pre-College Science and Engineering Program

The Chicago Pre-College Science and Engineering (ChiS&E) program's mission is to increase the participation of historically under-represented, low-income minority students (primarily African American and Latino) in the science, technology, engineering, and mathematics (STEM) fields and strengthen the capacity of their families. The program's long-term goal is to motivate and prepare participants to complete higher education programs and pursue careers in STEM fields.

**This case study illustrates how delivering innovative STEM education to low-income minority children and their parents in Chicago increased their confidence and knowledge about pursuing higher education and careers in STEM fields.**

ChiS&E provides Saturday classes in STEM concepts throughout the year, including during summer, for children in kindergarten through eighth grade. Grade-level sessions are held in classrooms on the University of Illinois at Chicago (UIC) campus. The W. K. Kellogg Foundation (the Foundation) supported ChiS&E's K-3 program, which requires a parent or other family member to attend every session with their child as partners in hands-on, interactive learning. Along with ChiS&E's academic goals for children who participate, the program also seeks to educate parents about STEM concepts, share with them techniques for increasing their child's desire to learn, and provide them the knowledge and skills to advocate for their child's education with schools and districts.

### History of ChiS&E

The inspiration for ChiS&E came when its founder, Kenneth Hill, was teaching calculus and physics to high school students in the Republic of Zambia in the early 1970s. Mr. Hill noticed that his students in Zambia received more hours of math over the course of their education and achieved higher math scores than his African American students in the United States. This observation led him to believe that more exposure to math and science among low-income minority students in the United States would also result in higher performance in those fields.

After returning to Michigan to pursue a graduate degree, Mr. Hill learned of a grant opportunity to provide Detroit public school students with extra math and science instruction on Saturdays, supplementing what they were learning during the school week. In 1976, he founded what became the Detroit Area Pre-College Engineering Program (DAPCEP) and led the program until his retirement in 2004. Mr. Hill left DAPCEP with strong support from the local government and school board as well as from large local corporations such as Ford, General Motors, and Chrysler. This support has provided the program with the sustainability to continue operating and to serve 6,000 K-12 students annually in Detroit.

After his retirement, Mr. Hill met a philanthropist from Chicago with a strong interest in improving educational opportunities for low-income minority students. The philanthropist invited him to replicate DAPCEP for children in Chicago Public Schools (CPS). Mr. Hill agreed to launch a K-3

program in Chicago, and ChiS&E was formed in 2008 with \$370,000 funding over three years from the Chase Bank Foundation. The ChiS&E program started by serving first grade students in 2009 and added kindergarten students the next spring. The program has added a new grade level each consecutive year as the first cohort of students advance to the next grade. In 2010, the ChiS&E program received \$1.2 million from the National Science Foundation (NSF) to continue expanding the program.

With these early funding sources, ChiS&E served families from seven public schools on the South and Southwest sides of Chicago. As participating families moved their children to other schools in Chicago, they shared information about the program with parents from those schools, thereby generating increased interest in ChiS&E. This led to the program's expansion and recruitment from more Chicago schools. The ChiS&E program currently serves about 400 K–8 students from over 80 Chicago schools each year.



**Mr. Hill addressing supporters of ChiS&E**

In 2014, ChiS&E received funding from the Foundation for its K–3 program. With this funding, the ChiS&E program added two new goals: (1) to demonstrate that a family engagement approach to early, accelerated math learning leads to improved student academic achievement and (2) to build support for the program model among key stakeholders, including school and district administrators, civic leaders, and funders. Foundation support also enabled the program to integrate algebraic concepts into the K–3 engineering curriculum.

## The ChiS&E Program

The main components of the ChiS&E K–3 program include a STEM curriculum for children and their parents delivered on Saturdays, trainings for parents to become co-learners and advocates for their children's education, and professional development for teachers to improve their skills in delivering STEM education to children and families. Students and families are recruited into the ChiS&E program through presentations, promotional materials, and word of mouth among parents and teachers. Orientation sessions are held for interested families to learn more about the program and decide whether to commit and register for the program.

### STEM Curriculum

At the core of ChiS&E is a grade-specific STEM curriculum for students in kindergarten through eighth grade. The curriculum is taught to students during three-hour sessions on Saturdays in lecture hall classrooms on the UIC campus on the city's Southwest side. Each grade-level course is focused on a different engineering field, consisting of eight to 12 lessons per school year, except kindergarten, which is

### ChiS&E K–3 Curriculum

- Kindergarten – Little Civil Engineers, plus algebraic concepts (four classes)
- First Grade – Little Chemical Engineers, plus algebraic concepts (eight classes)
- Second Grade – Little Electrical Engineers, plus algebraic concepts (eight classes)
- Third Grade – Little Mechanical Engineers, plus algebraic concepts (eight classes)

comprised of four lessons during the summer. Parents or other family members of K–3 students are required to participate in the entire lesson, sitting side-by-side with their children, learning the material, and participating together in hands-on experiments and activities.

Examples abound of the types of hands-on lessons children and their parents experience in ChiS&E. For instance, Little Electrical Engineers in second grade learn about atoms, electrons, and the periodic table of elements, along with algebra, while doing experiments to learn how various household products conduct electricity. Little Mechanical Engineers in third grade learn about slopes, circumferences, and diameters by partnering to design and construct a complex machine (a car) using parts like wheels, axles, and screws. Students then use three different inclines (slopes) to determine which slope makes the car travel farthest. The program also includes hands-on field trips to sites such as the Chicago Science and Industry Museum, which ChiS&E's K–3 families have visited each semester since the program's inception.

### Support for Parents

The ChiS&E K–3 program requires the active participation of a parent or family member in every three-hour Saturday session. Parents who have registered their children for the program are required to attend parent orientation sessions each semester. During orientation sessions, staff describe the program for that grade level and remind parents of their commitment to attend the program with their children. Program staff hold a parent symposium during each course, as well as a cyber-learning seminar afterward.

A notable component of the parent orientation is digital technology instruction, enabling parents to create video essays, for instance, to document and share their experiences with students, teachers, and other family members involved in the program. The ChiS&E program also includes a family support team comprised of teachers and other professionals trained in psychology, counseling, and social work.

### ChiS&E Program Objectives

- **Accelerated Learning** – Boost participating students' academic achievement as shown in classroom grades (first through third grades) and standardized tests (third grade).
- **Family Capacity** – Increase parents' understanding of math concepts and math learning processes as well as their knowledge of and skills for advocating for their child at the classroom, school, and district levels.
- **Systems Change** – Increase the number of Chicago public elementary schools in low-income and minority communities that take steps to implement the district's Algebra Initiative and incorporate parents as co-educators in STEM learning.
- **Broader Impact** – Seek partnerships with school and district leadership, civic leaders, education policymakers, and philanthropists to ensure program sustainability.

### Case Study Methods

The ICF evaluation team collected data for this case study during four phone interviews followed by a two-day site visit to the South side of Chicago. During the site visit in July 2017, the evaluation team interviewed the program director and members of the board of directors, conducted focus groups with teachers and a group of parents whose children have participated in ChiS&E for multiple years, and observed the classroom activities of ChiS&E for multiple grades. The evaluation team also reviewed program documents and reports to inform the case study. The team conducted a thematic analysis of the data to identify themes and lessons learned for the field of family engagement.

## Professional Development for Teachers

To jumpstart the ChiS&E program in 2009, staff hired master teachers from DAPCEP in Detroit to travel to Chicago on weekends to implement the program while training and mentoring CPS teachers on the program philosophy, curriculum development, instructional content and pedagogy, and program coordination. The first cohort of Chicago teachers involved in the ChiS&E program were recruited by the program founder, school administrators, or through word of mouth among teaching colleagues. After two years of the ChiS&E program being led primarily by Detroit teachers, Chicago teachers were ready to take over the teaching, curriculum development, and program coordination responsibilities. Participating teachers brought backgrounds in math and science instruction, but many nonetheless needed to learn new content and skills in STEM topics; hands-on, participatory teaching methods; and methods for teaching parents alongside their children.

### ChiS&E's Focus on Child Learning Outcomes

#### ChiS&E Gives Children the Confidence to Speak Up as Learners

Many parents pointed out that the ChiS&E program enhanced their child's confidence in the classroom. Program teachers encouraged children to speak up and reminded them that wrong answers are part of the learning process. Parents and teachers alike reported that the positive encouragement made students more enthusiastic about learning.



When describing changes they observed among ChiS&E participants, teachers used words like "confidence" and "grit." They said that children were more willing to "roll up their sleeves and dig in" and persevere even if their first answer was not correct. Instead of giving up, participating children learned to problem solve to find a better answer.

#### ChiS&E Teaches Children Life Skills and a Positive Outlook on Education

Many parents reported that their attendance in the Saturday sessions demonstrated to their children that they believe education is important. At the same time, all parents agreed that it was their children who were most enthusiastic about attending ChiS&E and who told their parents "come on, let's go" to make sure they arrived on time. Asked what nonacademic skills their children acquired by attending ChiS&E, parents repeatedly mentioned communication, public speaking, teamwork, problem solving, project management, time management, and listening.



Positive attitudes toward education also resulted from ChiS&E sessions on the UIC campus. Teachers frequently reminded children that they are learning on a college campus and that college is a place they belong. Parents agreed that this experience bolstered children's confidence and allayed their anxieties about college. Additionally, teachers reported that the experience also prepared parents for the idea that their child can attend college.



## Introducing an Organizing Framework for the Case Study Series

Recognizing that there are numerous ways to effectively engage families in their children’s education while applying a racial equity lens, the Foundation emphasizes two strategies—building institutional and systems capacity and developing family leadership—to serve as a framework for describing a diverse landscape of family engagement projects. Firmly grounded in the family engagement literature<sup>1-7</sup>, the framework includes a list of possible approaches for achieving each strategy. The ChiS&E case study illustrates five of the approaches highlighted in the framework below.

### W. K. Kellogg Foundation’s Family Engagement Strategies and Approaches

#### Building Institutional and Systems Capacity

- [Actively Recruit Marginalized Communities and Address Power Dynamics](#)
- [Recognize Families as Assets, Valued Partners, and Experts About Their Children](#)
- Identify Goals and Resources in Partnership With Families
- Integrate Family and Community Culture Into the Early Learning System
- Develop Continuous Two-Way Communication
- Commit to Co-Governance and Shared Leadership
- [Institutionalize Structures and Processes That Strengthen Families and Organizations](#)

#### Developing Family Leadership

- Build Strong Networks Among Families and Communities
- [Mobilize Family Skills and Knowledge to Increase Their Control Over Resources](#)
- [Support Families to Develop and Assert Their Role as Leaders and Agents of Change](#)
- Coordinate Family Engagement Efforts Within and Across Different Systems

## ChiS&E’s Approaches to Building Institutional and Systems Capacity

The ChiS&E case study reflects three approaches from the organizing framework related to building institutional and systems capacity.

### Actively Recruited Marginalized Communities and Addressed Power Dynamics

The ChiS&E program intentionally focuses on delivering STEM education to under-represented minority children mainly from the South and Southwest sides of Chicago. Because African Americans and Latinos are under-represented in postsecondary STEM programs and careers, the program aims to demonstrate to children and their families from these communities that they are capable of both learning STEM content and pursuing STEM college degrees and careers.

According to many ChiS&E participants, the program raised children’s awareness of STEM careers; they noted that, prior to participation, children tended to envision a train conductor when they heard the phrase “black engineer.” After the program, children were able to envision an African American technical specialist working in the field of engineering.

To overcome a lack of knowledge about the opportunities for careers in STEM fields, the program invited African American and Hispanic engineers and scientists to speak with the families during orientations and classroom sessions and to participate as program team members. This provided role models for young minority students and their parents, demonstrating that STEM careers are attainable for people of color. Through the program, parents discovered, sometimes by surprise, that their child had an aptitude for learning and applying STEM concepts. This insight further augmented their support for their child’s STEM abilities and interests.

Through orientation sessions and parent trainings, family members became better informed about the STEM concepts that their child should be learning throughout their school years. Studying such concepts through the ChiS&E program helped low-income minority families ensure that their children keep pace academically with students from higher-income neighborhoods. In addition, ChiS&E sessions are conducted in lecture halls on a college campus, providing participants with positive learning experiences in a postsecondary environment and enabling them to envision their child attending such an institution as a student.

Parents also reported that the ChiS&E program exposed their child to cultural diversity by recruiting and welcoming African American, Hispanic, and White students. Additionally, ChiS&E provides all written session materials in Spanish and English and provides a translator for Spanish-speaking parents. African American parents noted that this helped their children embrace other cultures and sometimes inspired an interest in learning to speak Spanish. Together, these program components ensured that families from marginalized communities participated in positive STEM instruction experiences that built their capacity to support their child's academic goals.

### **Recognized Families as Assets, Valued Partners, and Experts About Their Children**



ChiS&E integrated parents and other family members into every aspect of its K–3 classroom sessions and other activities, demonstrating the program's recognition of families as assets, valued partners, and experts about their children. Numerous program administrators and teachers pointed out that, irrespective of their socioeconomic status, education, and/or personal challenges, all parents want the best for their children and are willing to sacrifice and give their time to ensure that their children receive the best

education possible. As such, ChiS&E teachers found that their experiences as instructors helped them improve their family engagement skills and enabled them to help parents become better teachers for their own children.

In contrast to more conventional parent-teacher interactions typical in school settings, the ChiS&E program directly involved parents and other family members in every aspect of their child's education in the classroom setting. Specifically, parents learned subject material alongside their child, participated as partners in experiments and other hands-on activities, served as teaching assistants by keeping children on task and monitoring behavior, and helped their child with homework in preparation for the next week's session.

The ChiS&E model—with large classrooms of young children (K–3) participating in hands-on activities and experiments throughout sessions—is possible because parents partner with their children in the activities. As one parent said:



*I just had to wrap my brain around it, because I needed to get it. This program, initially, you're like, "Okay, am I going to be able to help my kid?" The way that it's set up, it's not insulting, the simplicity of the presentations, but it's not intimidating, and the instructors welcome your questions.*

As a result, the parents learned the material and pedagogy ChiS&E teachers used, making them better teachers for their child while taking some of the pressure off the teachers for individual-level attention and classroom management. Parents reported that their attendance at the Saturday sessions improved their ability to help their children with homework, and teachers gave many examples of parents who learned how to better encourage their children to work through problems rather than telling them they are wrong or giving them the correct answer too quickly.

As co-learners with their child, adult family members' knowledge and understanding of STEM improved, as did their recognition that their young child has the capacity to learn STEM concepts. The ChiS&E program taught parents to support and encourage their children's creativity and problem-solving skills, to advocate for their children's STEM education within their schools, and to recognize their child's potential capability of attending STEM college programs and of pursuing careers in STEM fields.

### **Institutionalized Structures and Processes That Strengthen Families and Organizations**

Although ChiS&E operates as an independent non-profit organization, most of the ChiS&E teaching staff work full-time in other schools and thus are in a position to cross-fertilize their skills across education settings and recruit eligible students from their home school to ChiS&E. ChiS&E teachers learned to teach STEM concepts in more participatory, hands-on ways; develop curricula that are engaging for young children and their parents simultaneously; and integrate technology into instruction.



Although teachers came to ChiS&E with existing relevant content knowledge, many ChiS&E teachers reported that they needed to improve their knowledge and understanding of particular STEM concepts in order to teach them effectively and answer questions from students and parents. Teachers learned new STEM content from the curriculum, self-study, and their fellow ChiS&E teachers. For example, one elementary math teacher may learn physics, chemistry, or engineering from other ChiS&E teachers who specialize in those disciplines, broadening the entire ChiS&E teacher cohort's STEM base. Many teachers reported that their work with ChiS&E was valuable to their overall professional development.

Over time, participating teachers employed new knowledge and teaching strategies from ChiS&E in their regular classrooms and shared them with colleagues. As one teacher said, "I always say when I'm doing lessons, 'What would I do with ChiS&E?' or 'What would ChiS&E do?'" Some ChiS&E teachers even provided professional development on STEM teaching to their fellow CPS teachers. Although not all CPS students can participate in ChiS&E, the program's teaching philosophy and innovative approach has a positive effect on STEM instruction in Chicago schools.

### ChiS&E's Sustainability Efforts

ChiS&E has sustained itself over the last nine years through grants and in-kind contributions. The program has successfully acquired funding over its lifetime (e.g., from Chase Bank Foundation and NSF) for implementation and expansion to new grades each year. Funding from the Foundation has sustained the K–3 program for the past four years and enabled the program to incorporate more math training into its curriculum. However, the program's growth (in terms of the number of children it can serve and its future expansion into new grade levels) is limited by the challenges associated with maintaining and increasing its funding base.

ChiS&E partners with CPS and receives in-kind support from UIC and the Museum of Science and Industry, which allow the program to use their facilities free of charge. ChiS&E has received some funding from local corporations but not as much relative to DAPCEP. To achieve sustainability similar to that of DAPCEP, which serves 6,000 K–12 students annually, ChiS&E will need larger, longer-term, and institutionalized funding streams.

To build a larger and more sustainable funding stream for the program, ChiS&E's leaders regularly write proposals requesting grant funds, meet potential funders, and network with local corporations and universities. Board members established a fundraising committee and are considering forming a public organization to be called Friends of ChiS&E that could involve more parents and community organizations. ChiS&E has also received positive media coverage in the last year, with coverage in the *Chicago Defender*, *Chicago Crusader*, *Chicago Citizen*, *Hoy* (a Spanish-language publication), and a recent television news story on the local CBS affiliate. Ongoing plans also include incorporating more representatives from local major corporations to serve on the board of directors to ensure wider access to resources for the organization.

More robust data on ChiS&E's effects on participants' grades and academic advancement could help board members and others better advocate for the program's value. ChiS&E's leaders recently secured funding from the Boeing Company to develop a database where they will be able to track these types of data on education achievement and better demonstrate program effectiveness.

### ChiS&E's Approaches to Developing Family Leadership

The ChiS&E program benefitted parents by enhancing their knowledge, expectations, and skills related to their children's education and the education system.

#### **Mobilized Family Skills and Knowledge to Increase Their Control Over Resources**

ChiS&E developed family leadership in their children's education by informing parents about the opportunities available and the steps necessary for their children to advance to a college program in STEM education and eventually to STEM careers. Parent sessions clearly laid out STEM content knowledge that children should acquire at each grade level and raised parents' expectations for the quality of education their children should receive at each grade level.

Parents noted that the ChiS&E program helped both parents and children understand the level of math and science students should learn at each grade level as well as what STEM preparation is required for success in STEM majors in college. Participating parents and teachers noted that parents may not have been aware of such expectations before program involvement, and their children likewise may not have understood the STEM preparation needed to pursue their goals. By starting early—often in kindergarten or first grade—students can take the early steps needed to stay on track for college throughout middle and high school.

ChiS&E often invited African American and Latino professionals such as engineers, university professors, and the head of a university engineering department to speak to parents and children during orientations. Speakers discussed their own backgrounds, served as role models for participating children, and described STEM education and career opportunities. These experiences offered children and their parents additional information they can use to advocate for themselves. One parent described the words of a program speaker:

*Heads up, parents, this is what your children should be learning. If you don't have it in your schools, request it, because this is what you're going to need in order to prepare to compete nationally or internationally.*

Knowledge of what their children should be learning, along with positive attitudes among parents about their child's capacity to learn STEM content, motivated children to work toward acceptance into Chicago's selective enrollment (gifted and talented) and magnet secondary schools. ChiS&E parents also gained knowledge about colleges and universities that provide support for minority STEM students as well as information they can employ to ensure that their children seek and obtain additional support.

### **Supported Families to Develop and Assert Their Role as Leaders and Agents of Change**

After experiencing the hands-on, activity-based curriculum and teaching methods of ChiS&E, parents reported that they had higher standards and expectations for teaching and became increasingly vocal advocates for high-quality teaching in their children's schools. Voicing the views of many parents, one mother said, "I would say, these teachers here set a standard. It's what you would expect at other—at your schools, of how they teach, and how involved they are, and how excited they are." ChiS&E teachers provided many examples of parents becoming more active in their children's schools. Parents were able to compare their children's science or math curriculum with that of ChiS&E and, as a result, demanded better-quality academic materials and instruction in schools.

#### **Summary of Positive Changes Achieved by ChiS&E**

- Low-income minority children and families learned that they are capable of academic and professional careers in STEM fields.
- Children developed confidence to speak up as learners.
- Parents and children learned of requirements for advancement to college.
- Children learned life skills and developed positive attitudes toward education.
- ChiS&E contributed to racial equity by improving opportunities for low-income minority children and families.
- Parents learned teaching techniques to support their children's learning.
- Parents raised their standards and expectations for their children's education.
- Teachers improved their ability to engage and teach parents.
- Teachers improved their knowledge and ability to teach STEM concepts.
- Teachers applied the skills they gained from ChiS&E in their home schools.

Note: Positive changes are based on observations reported by staff and parents and do not reflect measured outcomes, unless otherwise noted.

## Implementation Facilitators

- ***ChiS&E's founder inspired others to champion the program.*** ChiS&E's founder and director was instrumental in mobilizing others to support the program. In the program's first year, teachers from Detroit commuted to Chicago on the weekends to teach classes until teachers in Chicago were recruited and trained to take over curriculum development and teaching. Leadership also recruited board members, led fundraising efforts, and inspired families to believe that they can succeed in STEM education and professions.
- ***Enthusiasm among children, families, and teachers propelled ChiS&E forward.*** The children's enthusiasm to attend ChiS&E sessions drives the continuation of the program. Although it can be a sacrifice for parents to attend the Saturday sessions due to competing family and work schedules, they made the commitment to do what was required for their children to participate. The teachers who delivered the Saturday sessions also expressed enthusiasm, devoting their personal time on the weekends to develop curricula and teach children and parents, all for the love of teaching.
- ***Parent participation in education sessions with their K–3 children facilitated the program's success.*** Parents' participation demonstrates their commitment to education for their children, which in turn promotes their children's commitment to the program. In addition, having parents in the sessions increases support for hands-on learning activities and assists teachers in managing individual behavioral issues among the students.
- ***ChiS&E teachers reflect the racial/ethnic diversity of the student population they serve.*** The diversity of ChiS&E's leadership and teaching staff demonstrates to participating minority children and families that people who look like them and come from their neighborhoods can master STEM material. Similarly, inviting African American or Hispanic engineers and scientists to speak at program events presents children and their families with additional role models of minority STEM professionals.

## Implementation Challenges

- ***Lack of financial support from the school system and corporate sponsors has constrained expansion and sustainability of the program.*** Although CPS school administrators market the program to families and teachers, the district cannot provide financial support to ChiS&E due to budget constraints. A high turnover rate in CPS leadership has also limited the district's ability to support the program over time. ChiS&E has not achieved strong, committed, and ongoing relationships with local corporations and foundations to the same degree as the longstanding DAPCEP in Detroit.

## Lessons for the Field of Family Engagement

- ***Parents of all backgrounds can acquire skills to support their children's learning.*** One of the key lessons expressed by program leaders, teachers, and others was that all parents want the best for their children's academic achievement. No matter what obstacles and struggles parents face, they will do what they can to facilitate their children's academic success. By showing parents that their young children are capable of learning STEM concepts and that they have a path to academic and career success in STEM fields, the program inspires parents to do what is necessary to get their children to ChiS&E sessions and to advocate for their education.

- ***Parents' direct involvement in their children's education has a positive effect on attitudes toward education as well as parent-child relationships.*** Asked what they liked best about the program, participating children most frequently reported that they liked spending time with their parents. During each Saturday session, children had three hours of uninterrupted one-on-one attention from their parents, communicating and solving problems together. As several teachers noted, one participating father reported at the close of a program year that he did not know how to interact with his son before ChiS&E but that the program pushed and challenged him to do better, providing him the opportunity to build a stronger relationship with his child.
- ***Early STEM education establishes a strong foundation for academic success among low-income minority students.*** Most people involved with the ChiS&E program believed strongly that it is important to begin STEM education early to ensure that low-income minority students in Chicago succeed in their STEM studies. The ChiS&E program engages young children in fun and interactive STEM instruction. These formative experiences encourage children (and their parents) to recognize that they are capable of learning STEM content, increase their enthusiasm for learning, provide them with new academic goals, and orient them toward the pursuit of careers they may not have otherwise considered. More broadly, regardless of whether participating children eventually elect to pursue STEM studies and careers, ChiS&E prepares them for success in whatever academic path they choose.
- ***Family engagement programs need institutional support from education and funding partners to be sustained long term.*** ChiS&E has struggled to match the same level of institutional sustainability achieved by DAPCEP. To ensure continuity, program leaders should cultivate partnerships with stakeholders who support the program's mission and can contribute funding, participate in cost-sharing, and provide services. Another strategy is to join advocacy groups with representatives from other like-minded programs, both to stay informed of new funding opportunities and to collaborate with similar programs elsewhere. Finally, family engagement program leaders should recognize that sustainability planning is an ongoing endeavor given that funding sources, relevant policies, and potential partners are likely to change over time.



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