



# Science as a Platform for Family Engagement:

A Case Study of the Early  
Childhood Hands-On Science  
(ECHOS<sup>®</sup>) Program

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

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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.

## Science as a Platform for Family Engagement: A Case Study of the Early Childhood Hands-On Science (ECHOS®) Program

The ECHOS® program is a comprehensive, interactive science program for preschool children. Developed and implemented by the Phillip and Patricia Frost Museum of Science (Frost Science) in Miami, Florida, ECHOS® is designed to increase teachers' ability to introduce basic science concepts to preschool children through the use of a guided inquiry-based curriculum and to engage families in supporting school readiness among children enrolled at Head Start centers in low-income areas of Miami-Dade County, Florida. With support from the W. K. Kellogg Foundation (the Foundation), the ECHOS® program was implemented in three Head Start early childhood education centers located in three areas of greater Miami-Dade County: (1) the urban Little Haiti/Wynwood neighborhood of Miami; (2) the small city of Opa-locka in the northeastern area of the county; and (3) the rural/agricultural city of Homestead located in the far southern area of the county. ECHOS® program participants reflect the ethnic, racial, linguistic, and economic diversity of Miami-Dade County, where more than half of the county's population is foreign born, primarily from Latin America and the Caribbean.<sup>1</sup> The long-term goal of ECHOS® is to improve equitable access to science education opportunities for preschool children in Head Start programs across the county.

**This case study illustrates how a museum successfully engaged low-income minority parents to co-teach science while strengthening the organizational capacity of Head Start centers serving diverse racial and ethnic communities.**

### Phillip and Patricia Frost Museum of Science

Frost Science is rooted in local efforts to improve science education for underserved families living in poverty in Miami-Dade County. In 1949, the Junior League of Miami, recognizing the need for a science museum in Miami, established a nonprofit education organization that would eventually become the Frost Science of today. As demand for services increased, the museum outgrew its previous location in the historic Vizcaya complex in the Coconut Grove neighborhood of Miami. In November 2004, Miami-Dade County voters passed a bond to create a new Miami Science Museum; in 2009, the City of Miami agreed to lease the museum four acres in downtown Miami's Museum Park. Longtime supporters of South Florida's arts and cultures, Dr. Phillip and Patricia Frost committed \$35 million dollars in 2011 to support the museum at its new home. Now named the Phillip and Patricia Frost Museum of Science, the new, 250,000-square-foot, four-building campus housed in downtown Miami's Museum Park opened its doors to the public in May 2017. It now includes a three-level aquarium, 250-seat planetarium, and several galleries that house permanent and rotating exhibits.<sup>2</sup> Consistent with the mission of Frost Science "to inspire and connect people of all ages and backgrounds to enjoy science and technology, and to better understand ourselves and our world," one goal of Frost Science is to raise awareness of the museum as a community resource for all families in Miami-Dade County and the surrounding region.

## History and Development of ECHOS®

A team of early childhood educators from Frost Science developed the ECHOS® program to provide a strong start for early learners to access lifelong learning opportunities, education pathways, and workforce development. Initially created in 2005, ECHOS® consisted of a comprehensive early childhood science program, including a core curriculum and professional development program for teachers and teacher assistants.

In 2006, the Institute for Education Sciences (IES) provided a three-year grant to Frost Science, in partnership with the University of Miami, to refine the ECHOS® curriculum.<sup>3</sup> During this funding period, the curriculum was updated with clearer instructions and photographs to illustrate, for example, the materials needed to prepare the lessons and how to set up the science area in the classroom. In addition, the program was expanded to include hands-on mathematics and creative arts activities to reinforce the science lesson concepts. It was pilot tested at selected Head Start preschool centers in Miami-Dade County. Results from the pilot test showed that, to have an impact, the ECHOS® curriculum should include activities that reinforce both science concepts and school readiness.

In 2011, IES provided an additional grant to assess the efficacy of the ECHOS® curriculum.<sup>4</sup> With this funding, Frost Science together with researchers from the University of Miami conducted a two-year, full-scale efficacy study of the ECHOS® professional development model. In the 2011–2012 school year, 91 classrooms (45 classrooms randomly assigned to the ECHOS® program group and 46 assigned to a control group) participated in the study. Results indicated that teachers involved in the program felt more comfortable teaching science and children earned higher scores on an assessment of preschool science concepts compared to those in the control group.<sup>5</sup>

In 2014, the Foundation funded Frost Science to incorporate a new family engagement component into the ECHOS® model and to expand the museum's capacity to implement the program in additional Head Start centers. Teachers nominated and selected two parents from each ECHOS® Head Start classroom—based on parents' availability and interest—to serve as parent leaders for the class. Parent leaders were required to teach 36 classroom hours and received a stipend for their work.

## ECHOS® Program Components

The ECHOS® program includes four components: (1) a comprehensive early childhood science curriculum; (2) professional development workshops for teachers, teacher assistants, and parent leaders; (3) field trips to Frost Science for all participating classrooms; and (4) an annual Family Day at Frost Science. Each component aims to empower low-income parents to partner with teachers in delivering hands-on science lessons.

### Case Study Methods

The ICF evaluation team collected data for this case study during three telephone interviews, followed by a three-day site visit to Frost Science and two Head Start centers in Miami-Dade County. During the site visit in May 2017, the evaluation team observed classrooms implementing ECHOS® at two participating Head Start centers and a Family Day event at the museum, conducted focus groups with Head Start teachers and parents, and interviewed program administrators and program partners. ICF also reviewed program documents to inform the case study. The evaluation team conducted a thematic analysis of the data to identify themes and conclusions for this report.

## Science Curriculum for Preschool Children

The ECHOS® curriculum consists of nine thematic science units designed to provide children with a foundation of knowledge about science upon which to build the skills they will need later in their schooling. As a complement to Head Start’s Child Development and Early Learning Framework and the Florida Early Learning and Developmental Standards for Four-Year-Olds, the ECHOS® curriculum employs a research-based learning framework known as Excite, Introduce, Explore, Interact, Outcomes (E-I-E-I-O). The curriculum is delivered by teachers, teacher assistants, and parent leaders in a structured sequence of lessons to promote learning by thinking and doing.

Each science unit is characterized by a life science, physical science, or earth science theme—such as Beginning Botanist, Feathered Friends, or Magnificent Magnets—presented over one month through a series of four 20-minute lessons. Typically, each class of 20 children is divided into smaller groups of four to six children for the science lessons, which the teacher instructs. Teachers, teacher assistants, and parent leaders use “integration cards” (iCards), available in English and Spanish, to guide delivery of the hands-on language and literacy, mathematics, and creative arts activities to groups of 10 children. The activities are designed to be easy to set up and teach. Parent leaders may also make copies of the iCards to conduct activities with their children at home. Additionally, each unit includes a culturally relevant storybook that corresponds to the unit’s theme. All the printed materials for each unit are laminated for durability, and all necessary supplies are provided as part of the materials toolkit. The curriculum is designed to include the use of low-cost, everyday materials (e.g., paper clips, rubber bands, and cotton balls) for the science experiments. Replacement supplies are also available for purchase on Frost Science’s Web site.



**Student project posted in an ECHOS® classroom**

Each classroom has a designated science area to feature the program materials and student projects associated with each unit. At the conclusion of each unit, children are provided with “Ask me about...” stickers designed to prompt discussion with families about what the child is learning in the unit (e.g., “Ask me about bees”). After each science lesson is complete, the teachers place materials related to ECHOS® in the classroom science area for children to explore during free-choice time.

### **Professional Development Workshops for Teachers and Parents**

ECHOS® includes a series of four intensive professional development workshops—delivered throughout the school year—to prepare teachers, teacher assistants, and parent leaders to deliver the ECHOS® curriculum in participating Head Start classrooms. Workshop participants receive the entire ECHOS® curriculum at the first workshop before the school year begins. The curriculum includes all the materials needed to implement the program, including iCards, “Ask me about…” stickers, and storybooks. In addition, each classroom also receives a materials toolkit for each unit. ECHOS® staff train teachers, teacher assistants, and parent leaders to implement the curriculum, lead small-group activities, and set up the dedicated science area in the classroom. Teachers and teacher assistants are also trained to conduct simple pre- and post-assessments for each unit. Subsequent workshops during the school year focus on the next group of science units and include time for teachers and parent leaders to practice teaching the concepts and using the iCards to lead the activities. Beyond the workshops, ECHOS® program staff members are available as needed to provide support and resources to teachers and parent leaders upon request. Also, teachers and parents can view video clips of a science lesson for each science unit on the ECHOS® Web site. To promote implementation fidelity, a classroom observation instrument is used to measure adherence to the ECHOS® program model, quality of implementation, and children’s use of science process skills.

### **Class Field Trips to Frost Science**

Parent leaders and educators introduce children to Frost Science during each participating Head Start center’s museum field trip. Teachers use pre-field trip materials to instill children with curiosity and assess prior knowledge before visiting the museum. In total, 660 children and 106 adults (teachers, teacher assistants, and parent leaders) participated in class field trips to the museum in May 2017. Each field trip group included between 60 and 100 children, with a total of eight events in May 2017 to accommodate all the classrooms. Project partner Miami-Dade County Head Start provided bus transportation for all eight field trips.

### **Family Day at Frost Science**

The ECHOS® program culminates at the end of the school year with a family-centered visit to Frost Science. Family Days typically take place on a Saturday or Sunday and last half a day. Bus transportation to Frost Science is provided to participating families as part of the ECHOS® program to facilitate attendance. ECHOS® staff commented that Family Day has been held with each cohort of children and their parents that participated in ECHOS® programming. Because the new Frost Science museum opened this year, one of the professional development workshops focused on preparing parent leaders and their families for what to expect during Family Day. Parents and partner staff members reported that the visit to Frost Science was fun and reinforced the insight that learning can take place outside of a traditional classroom. Members of the case study evaluation team attended a Family Day at Frost Science during the site visit. They observed families interacting with a wide range of hands-on exhibits, including a hydrology exhibit using locks and dams to illustrate the impact of changes in water levels on the Everglades ecosystem. Parents, children, and grandparents were observed in mutual learning and discovery of the features of the interactive River of Grass exhibition, which is an indoor virtual journey about the ecosystem and animals found in the Everglades.

## 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>6–12</sup>, the framework includes a list of possible approaches for achieving each strategy. The ECHOS® case study is particularly illustrative of the eight approaches highlighted below in the framework.

### 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](#)

## ECHOS®’ Approaches to Building Institutional and Systems Capacity

ECHOS® program administrators built on the program’s lifelong tradition of engaging all types of families, especially underprivileged families, in children’s science education. They forged strong connections with various organizations to scale up and sustain the program. As a result of the training teachers and parents received through the ECHOS® program, their skills in teaching science to children improved.

### Actively Recruited Marginalized Communities and Addressed Power Dynamics

Frost Science aimed to inspire and connect people of all ages and backgrounds through science. One goal of the program was to increase awareness of the museum as an education community resource, particularly for low-income families in South Florida. Through implementing ECHOS®, Frost Science strengthened its connection to low-income families at Head Start centers across Miami-Dade County. Families involved in ECHOS® learned about Frost Science through a variety of communication channels, including parent newsletters, parent meetings, and events (e.g., Family Days). Parent leaders also worked to raise awareness of the museum and ECHOS® through informal channels of communication, such as by word of mouth and informal gatherings. Program administrators anticipated that awareness of Frost Science and its role as an education resource in the community would increase over time as families visited the new museum location. Parent leaders were awarded a one-year family membership to Frost Science at the end of the project to recognize their contributions and to encourage them to return to the museum often with their families.

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

Program administrators and partner staff emphasized the important role that parents play in the program in addition to supporting their child’s education. They believe that all parents, despite language barriers or a lack of formal education, have ideas and perspectives to contribute that can support the program, even if they do not have the time to participate as parent leaders. For instance, parents shared examples of how science concepts presented in ECHOS® lessons can be applied in real-life settings, such as the linkages between precipitation and the agricultural industry. Program administrators continue to seek ways to more broadly engage parents, caregivers, and family members in ECHOS®, such as through informal gatherings and events.

### **Integrated Family and Community Culture Into the Early Learning System**

Parents and Head Start staff stated that the ECHOS® program team treated parents as valued and respected partners and acknowledged the cultural diversity of the community. Without directly addressing issues of structural racism, the ECHOS® program promotes equity in early education settings by enabling low-income parents from diverse racial and ethnic communities to learn about science and become engaged in their children’s education. As several stakeholders phrased it, the program makes it clear that “science is for everyone.” In addition, the ECHOS® curriculum reflects the children’s local environment. For example, the mathematics and creative arts iCards are available in Spanish, and the unit storybooks are culturally relevant. Parents reported they felt included and honored and discussed how Miami is highly diverse culturally and racially.

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

During the case study site visit, stakeholders reported that teachers who participated in ECHOS® were better prepared to teach science concepts, more confident as teachers, and more comfortable assessing students. Teachers reported that the ECHOS® program workshops provided the opportunity to ask questions, connect with each other as educators, and strengthen their capacity as teachers. Additionally, the curriculum’s close alignment with Head Start domains enabled teachers to meet Head Start standards. Teachers benefited from having a comprehensive science curriculum with a variety of supplies and supporting materials provided to them. Teachers noted that the curriculum was easy to grasp and that the scripted lessons and activities were easy to follow and refer back to if needed. The structure of the curriculum made teachers feel comfortable teaching the concepts and activities, and they were given the flexibility to “add their own flair” as educators once they had a solid understanding of how to present the lessons.

#### **ECHOS® Classrooms Had Higher Than Average Teacher-Child Interaction Scores**

As part of an evaluation of the ECHOS® program, the research team analyzed Classroom Assessment Scoring System (CLASS) scores for teachers participating in ECHOS® and compared them to local and national averages. CLASS is an observation tool that assesses the quality of teacher-child interactions at the classroom level in Head Start center preschools. The analysis showed that ECHOS® Head Start classrooms had slightly higher average scores in instructional support compared with other Head Start classes in Miami-Dade County and the rest of the nation.<sup>13</sup>



ECHOS® program administrators described efforts to sustain the program after Foundation funding ended. For example, an ECHOS® program partner in Homestead, Florida recently received funding from the National Head Start Program, which will enable local Head Start centers to adapt the ECHOS® curriculum for children up to three years of age. In addition, Frost Science recently received a new grant from the Foundation to expand the ECHOS® program into 35 preschool classrooms at 15 elementary schools located throughout the Miami-Dade County Public Schools district. As part of Frost Science's commitment to family engagement and to extend their understanding of learning environments, the museum has undertaken a new partnership with the National Science Foundation, Wellcome Trust, and the U.K.'s Economic and Social Research Council focused on science, technology, engineering, and mathematics (STEM) engagement and lifelong learning.<sup>14</sup> The goal of this effort is to investigate how application of the principles of embodied cognition to the design of informal learning environments can enhance young children's engagement with and understanding of science topics and concepts.

Frost Science has forged strong partnerships with a range of federally funded organizations operating in Miami-Dade County, such as Head Start, Upward Bound, and several professional organizations. These partnerships have allowed the community to achieve shared goals around family engagement through science-based instruction in diverse, low-income communities. Program stakeholders reported that alignment between organizational interests and goals supports program facilitation over the short and long term.

### **ECHOS®' Approaches to Developing Family Leadership**

Findings from the case study indicate that ECHOS® positively impacts families and children by providing opportunities for family engagement among low-income families. Stakeholders reported that the program empowers parents as educators, improves parenting skills overall, increases social support for families, and prepares children to be more successful in school.

#### **Built Strong Networks Among Families and Communities**

As a result of their involvement in ECHOS®, parent leaders indicated that they gained a social network and increased social support among fellow parents. Parents connected with each other outside of the classroom through informal gatherings and community events. A Head Start partner noted that participating schools and family events became places for families to socialize.

ECHOS® parents reported that they formed relationships with other parents through the program. Further, they developed a support system to help each other. For example, they drove each other's kids to school or picked them up afterward. Many parent leaders also appreciated the opportunity to learn from each other as a result of the program, noting, "We all need help as parents." One parent put it this way: "ECHOS® provides the opportunity to let our hair down and be real and say, 'I'm struggling with this. Does anyone have any ideas?'" Additionally, parent leaders served as role models for other parents in their community and helped provide them with support and information they learned through ECHOS®.

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

Parents involved in the program reported that they gained tools and strategies to become better and more resilient parents, such as increased confidence, patience, and the ability to serve as advocates for their children. Parents reported that the skills they learned from ECHOS® have made them more committed to ensuring that their children have high-quality education opportunities over the long term.

Several parent leaders noted that they learned to ask and listen to questions differently, which ultimately improved communication with their children, family members, and teachers. One parent stated:

*ECHOS® opened my eyes to see how important it is to talk to your family, even [children] as young as three and four years old. It's important to make sure you communicate and have that back and forth with your child.*

Similarly, another parent explained that, before she participated in ECHOS®, she often felt annoyed with her daughter's constant questions and did not know how to channel her child's curiosity constructively. From her experience with ECHOS®, this parent learned how to have a dialogue with her child, which gave her the patience to work with her child on activities. As the parent summed it up, "Now I feel like, 'I got this.' I have patience. I can sit with her until she understands."

One parent leader shared that, as an immigrant and a parent, she was uncertain how to get involved in the education system or how she could support her children's education. Through her involvement in ECHOS®, she said she "found her voice," which strengthened her leadership skills at home and in the workplace. As a result of her participation in ECHOS®, she now has higher expectations for her children's education attainment and actively advocates for her older children to achieve more.

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

Parents reported that ECHOS® gave them a way to interact with their children through the concepts and activities they were learning, both in the classroom and at home. Many parents indicated that participating in ECHOS® provided them an opportunity to learn alongside their children and be involved in their education. By introducing a common vocabulary for discussing concepts and activities in the ECHOS® units, parents can interact with their children about what they are learning in school. In addition, the program gave parent leaders the opportunity to serve as peer mentors to other parents whose children were in the classroom. A few parents noted that they also appreciated the opportunity to support the teacher in the classroom.

### **Coordinated Family Engagement Efforts Within and Across Different Systems**

Although Frost Science and Head Start included family engagement strategies before ECHOS® was developed, the collaboration allowed both to make science more accessible to underserved families. Parents admitted that, before their involvement with ECHOS®, they found science and math to be intimidating topics. As one parent stated, "Before ECHOS®, I never thought that science was fun and easy."

Many parents shared that ECHOS® increased their whole family's engagement in their children's education. For example, parents reported that their children often discuss classroom activities and want to replicate them at home. The "Ask me about..." stickers that their children wear home spur dialogue about the concepts they learned during that unit. By engaging in ECHOS® through the hands-on science activities alongside their children, they realized that "anyone can 'do' science."

Additionally, parents learned that everyday tasks, such as cooking and grocery shopping, involve math and science concepts and provide opportunities to engage with children around learning. Parents commented that, through ECHOS®, they learned that even very young children are capable of learning and applying science concepts. One parent shared that ECHOS® increased her awareness that children learn through play and that play is a natural part of a child's intellectual development.

In addition, ECHOS® facilitated the Head Start partner's program mission. Head Start partners described the ECHOS® program as a mechanism to educate children, engage with parents, and provide professional development opportunities for teachers and parents. ECHOS® aligns with and supports organizational goals, particularly in relation to its early childhood education learning domains and indicators and parent involvement services for low-income families.

Parents involved in ECHOS® were more engaged with their children's education. As one partner noted, "Parents involved in ECHOS® are not only engaged in the science, they're engaged across the board in the classroom."

A partner noted that implementing the ECHOS® program in their early childhood centers allowed them to provide a value-added program to families. Staff noticed that a growing number of parents wanted their children to attend Head Start centers that offer ECHOS® as part of the curriculum. Partners reflected that early childhood education is a competitive market and ECHOS® is a way to recruit families to participating Head Start centers.

### Summary of Positive Changes Achieved by ECHOS®

- ECHOS® boosted teachers' knowledge of, comfort with, and interest in teaching science.
- ECHOS® classrooms had higher than average teacher-child interaction scores on the CLASS.
- Frost Science forged partnerships with a range of organizations across Miami-Dade County, which allowed the community to achieve shared family engagement goals through science-based instruction in diverse, low-income communities.
- ECHOS® is making science accessible for underprivileged families.
- ECHOS® created social supports for parents.
- Parents involved in ECHOS® were more engaged in their children's education and advocated for their child(ren).
- Parents involved in ECHOS® reported more resilience, confidence, and patience.
- Participation in ECHOS® provided parents an opportunity to learn alongside their children and be involved in their education.
- Parents reported that their children were more excited to learn and found science to be fun and interesting.
- Parents said that ECHOS® helped prepare their children for kindergarten because the program gave them a strong foundation in science and acclimated them to a classroom setting.

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

## Implementation Facilitators

- ***The ECHOS® program model has been tested and shown to work.*** The comprehensive early childhood science program was developed by science educators with expertise in early childhood education and has been extensively researched and tested at targeted Head Start centers in Miami-Dade County. The two-year research study generated evidence that ECHOS® is effective in improving the early science knowledge of young children. When the results of the study were shared with the community, more Head Start centers were eager to participate. Stakeholders reported that the program model is well-defined and that future plans involve expanding and scaling up the existing program.
- ***Strong, well-aligned partnerships are vital to success.*** Frost Science has established strong partnerships with a range of organizations across Miami-Dade County, including Head Start, Upward Bound, and several professional organizations. These partnerships enabled the community to achieve shared family engagement goals through science-based instruction in diverse, low-income communities. Program stakeholders noted that alignment between organizational interests and goals facilitates program implementation over the short and long term.
- ***The curriculum is packaged in an easy-to-use kit.*** Teachers and parent leaders reported that the curriculum kit is well-organized, durable, easy to understand, and simple to teach and the materials toolkits for each unit include all of the supplies necessary to deliver the program. Parent leaders found the step-by-step instructions on the iCards especially helpful to follow, which built their confidence in the classroom when guiding the hands-on activities for each lesson. After teachers and parent leaders became comfortable with teaching the activity, they could refer to the iCards as needed. The iCards were also available in Spanish, which was beneficial when instructing students whose primary language was not English. Parent leaders also appreciated that they could make copies of the iCards to use at home.
- ***The program requires modest investments of funds and resources.*** The ECHOS® program is designed to be affordable for schools to implement, which is a priority particularly in resource-constrained early childhood centers. The comprehensive curriculum package, which includes the complete kit and all necessary supplies for the nine units taught over the course of the school year, is available for about \$1,800 per classroom. Consumable supplies from the kit can be replaced with inexpensive, common household items or purchased through an education supply company. Teachers appreciate the option to order replacement materials from a supply company rather than having to maintain the supply stock themselves. Because the curriculum is designed to be easy to follow, ECHOS® workshops provide sufficient time for teachers and parent leaders to learn about and practice how to teach the lessons and conduct activities. Additionally, the workshops are not dependent on external funding.

## Implementation Challenges

- ***Academic gains from the program may be difficult to sustain without continued science education.*** Program stakeholders are concerned about sustaining the benefits of ECHOS® into children’s school-age years and beyond. To address this challenge, program administrators are leveraging relationships with local community agencies and the public school district to create new opportunities to sustain what children learn in preschool and to promote lifelong learning. Frost Science is supported in this effort through a grant it recently received from the Foundation, which will be used to expand and eventually extend the ECHOS® program to preschool classrooms throughout the Miami-Dade County Public Schools district.
- ***The new museum location and higher admission fee may pose barriers to access for low-income families.*** The newly constructed Frost Science museum has a higher admission fee than the previous location, which may be too expensive for many families to afford, in particular the low-income families targeted by the ECHOS® program. To address this barrier, program administrators have discussed the possibility of providing museum memberships to families participating in ECHOS® to increase accessibility to Frost Science.

## Lessons for the Field of Family Engagement

- ***Parents of all backgrounds are an asset to education programs for children.*** All parents, regardless of income and education level, have something of value to offer education programs that serve their children and family. ECHOS® demonstrates that parents can contribute successfully in substantive roles, such as serving as co-teachers of a science curriculum.
- ***Science provides a platform for all children to learn and positions them for academic success in the future.*** Programs that promote equitable access to science for children from diverse communities help children succeed in early childhood and prepare them for kindergarten. By engaging children through hands-on activities that reflect their daily environment, ECHOS® makes science accessible and demonstrates that “science is for everyone.” By leveling the playing field for children from low-income families, ECHOS® prepares these children to achieve further academic success.
- ***Nontraditional organizations can be effective agents in improving early childhood education and supporting the STEM workforce.*** While science museums have traditionally been viewed as a supplemental resource for education, this project demonstrates that museums can serve as key partners in efforts to address gaps in science education and to help build capacity in STEM education and workforce development. By engaging nontraditional partners in education initiatives, stakeholders can share research, evaluation, best practices, and other resources to expand access to science for underrepresented populations.

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