

CHILDREN AND PARENTS LEARNING SIDE-BY-SIDE TO ACQUIRE STEM KNOWLEDGE: A CASE STUDY OF THE CHICAGO PRE-COLLEGE SCIENCE AND ENGINEERING PROGRAM BY KENNETH GOODMAN, DANA KEENER MAST, SHEFALI PAI-SAMANT, AND CAITLIN HOWLEY.

Children learn best when parents and teachers partner and the lessons extend far beyond STEM. Case study on the Chi S&E program, recruiting parents and families on Saturdays to learn and apply science, technology, engineering and math side by side with their student.

This report provides information from the Chicago Pre-College Science and Engineering Program (ChiS&E), an initiative to increase minority and low-income (primarily African American and Latinx) participation in STEM education and careers—built on an earlier and still operating model in Detroit. The program is supported by the W.K. Kellogg Foundation which employed ICF consultants to conduct interviews with parents and teachers, as well as observe classroom interaction with and by students. The case study was prepared by members of ICF staff—Kenneth Goodman, Dana Keener Mast, Shefali PaiSamant, and Caitlin Howley—with assistance from Howard Walters and Jenefer O’Dell of the Kellogg Foundation.

This program provides Saturday classes in STEM concepts throughout the year, including summers, for children in kindergarten through eighth grade. Grade-level classes are conducted in classrooms at the University of Illinois at Chicago (UIC) campus. A parent or another family member is required to attend every session with their children, learning as partners. This feature helps educate parents about STEM concepts, facilitates sharing techniques with parents for increasing their child’s desire to learn, and provides them with knowledge, skills, and desire to advocate for their child’s education with school officials and teachers.

The program began in 2009 with a kindergarten class and has added a higher grade level year by year as students move forward. The Kellogg Foundation began supporting the K-3 program in 2014, and helped ChiS&E add two new goals: to demonstrate that the family engagement model leads to improved student achievement, and to build institutional and systems capacity for the program among all key stakeholders.

ChiS&E has four key objectives:

- Accelerated Learning (boost participating students’ academic achievement)
- Family Capacity (increase parents’ understanding of math concepts and learning processes as well as gaining skills in advocating for the child’s education)
- Systems Change (increase the number of Chicago Public Schools in low-income and minority communities that are implementing the district’s initiative for math and STEM learning)
- Broader Impact (seek partnerships with education and civic leaders and philanthropists)

Special support for parents includes teaching parents to create video essays to document and share their experience with their children and teachers. The program also has a family support team of professionals in psychology, counseling, and social work. Many parents report that they have developed higher standards and expectations for teaching and have become more vocal advocates for high-quality teaching.

A key lesson for many many educators is that all parents want the best for their children’s academic achievement. Teachers also experience professional development through ChiS&E. The teachers come to the program with relevant content knowledge but many indicate they learned new parts of STEM. Most of the ChiS&E teaching staff work full-time in other schools, and this results in cross-fertilization across settings.

Children learn more than STEM in this program. They develop the confidence to speak up as learners. With the positive encouragement of teachers and parents, they become more enthusiastic about learning. And they receive support in learning new life skills, including public speaking, teamwork, problem solving, project and time management, and listening. The direct involvement of parents also helps create stronger parent-child relationships.

ChiS&E is committed to building institutional and systems support through active recruitment of marginalized communities, and drew upon participation of African American and Latinx engineers and scientists to create awareness of STEM careers for all the students. Participants are also exposed to cultural diversity; all written materials are in English and Spanish and translators are provided for Spanish-speaking parents. Some parents report that the exposure of their English-speaking children to Spanish encouraged them to begin learning that language.

Critical is the emphasis ChiS&E places on seeing families as assets, valued partners, and experts about their children. Their direct involvement in each lesson helps them understand educational content. They also are better equipped to help their children keep pace economically with students from higher income areas. The location of the classes—on a university campus—helps parents and students to see the potential of college enrollment.

One important outcome for many students is motivation to work toward admission into Chicago's selective enrollment (gifted and talented) and magnet secondary schools.

The program faces challenges in obtaining more financial support from the public school system and corporate sponsors.

The report contains a brief summary of the methods used by the ICF evaluation team through phone interviews and a two-day site visit.

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Thanks to generous support from the Carnegie Corporation of New York, *Our Neighborhood*, is a compilation of stories and research from the family engagement field. It is intended to be a living repository and guide for STEM Learning Ecosystems and other communities interested in cultivating strong community partnerships to prepare the next generation.

This annotated bibliography was compiled by TIES for *Our Neighborhood*.