

Demanding Academic Excellence: The Algebra Project

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Abstract

Florida International University's Center for Urban Education and Innovation in the College of Education and the Algebra Project have created a model for accelerated learning for disenfranchised children. The program includes mathematics instruction using university researchers in high school classrooms, supplemented with after-school enhanced reading and writing instruction. Tutoring, mentoring, experiential learning and an intensive residential summer institute provide a model for engaging low-performing high school students.

For decades, a multitude of educators, local and state governments, foundations, and public school systems have been concerned about creating more effective learning environments for disenfranchised students. However, as Charles Payne discovered during his five-year study of the massive Chicago School Reform Effort, there has been “so much reform, so little change” (2001).

This lack of progress was sadly evident in the nation's fourth-largest metropolitan school system, Miami Dade County Public School System (MDCPS), home to 398,000 students and, until the arrival of the current superintendent, home to thirty-nine chronically low-performing elementary, middle and senior high schools (Center for Urban Education and Innovation 2006). The state of Florida holds the dubious distinction for having the second-largest number of high school dropouts in the nation (The Associated Press 2007). Nevertheless, the superintendent's leadership has positively impacted the improvement of Miami's failing schools (American Association of School Administrators 2008). During his first year in the city, he began building coalitions with universities, businesses, and other community agencies to join him in demanding more for children of color.

Collaboration for Change

It was within this context of low achievement and often low expectations, especially for Miami's poor students of color, that Florida International University's Center for Urban Education and Innovation in the College of Education (COE) began a five-year partnership with Dr. Robert Moses and the Algebra Project (AP) to help create programs and schools of excellence for urban children. Florida International University (FIU) is the twenty-fifth largest public university in the country and a minority institution with two-thirds Latino or Hispanic students. The Center is dedicated to collaborative efforts to produce academic success for urban students. It is anchored in the empowerment of students and parents to demand quality education.

In the Algebra Project the Center found both a philosophy for significant change and a track record of results. Founded in 1982 by the Harlem-born and Harvard-educated Moses, AP has grown from a single school in Cambridge, Massachusetts to serving more than two hundred schools across the country. AP uses mathematics education to build coalitions that create systemic, educational change (Algebra Project 2008). Its work is a deliberate attempt to demonstrate that all children, no matter how poor or how alienated from society at large, can and will learn higher-level mathematics, given an appropriate curriculum, pedagogy, and support. Its central belief is that the “only ones who can really demand the kind of education they need and the kind of changes needed to get it are the students, their parents, and their community” (Moses and Cobb 2001).

A five-year study by the National Science Foundation found that students engaged in the AP program perform at a higher level than the general population, that ninth- and tenth-grade students enroll in mathematics courses at a significantly higher rate, and that they pass state mathematics exams at significantly higher rates (West and Davis 2004).

The FIU-AP Partnership

The Center and AP partnered with MDCPS’s Edison Senior High School located in Miami’s “Little Haiti,” home to predominantly Haitian but also some African American and Latino students. Because the College of Education at FIU had developed strong partnerships with MDCPS over many years and because of the reputations of the Center’s Eminent Scholars, Moses and Lisa Delpit, this new partnership was welcomed by the district’s administration. The Center and Moses became the driving force of the collaboration acting as liaison for the college, the university, funding agencies, the Algebra Project and area businesses with Miami Edison High School.

The mission of the collaboration is to create accelerated learning for disenfranchised children that can become a national model. The intention is to change public policy by demonstrating that with the appropriate scaffolding all children can achieve academic excellence and that as participants in a democratic society, they deserve quality education in order to pursue that excellence. The major components of this cohort model are:

- accelerated mathematics instruction using university researchers in high school classrooms;
- enhanced reading and writing instruction after school and during a summer institute;
- after-school tutoring and mentoring experiences for the cohort with elementary school children, using mathematics games and experiential learning activities led by the Young People’s Project; and
- a six-week residential summer institute which includes courses in mathematics, reading and “writing circles,” in addition to electives such as Spanish, videography, drama, drumming, ceramics, sports, and the visual arts.

During its initial start-up, the college and university supported the project by providing staff during the school year and classroom and meeting spaces for the summer

institute, as well as offering assistance with public relations and technical support. The John L. and James S. Knight Foundation; The Children’s Trust, Inc.; and Wachovia Bank have been major contributors to the effort, especially toward the operation of the summer institutes and the after-school Young People’s Project.

The College of Education furthered its support of the collaboration by hiring a mathematics researcher who was experienced with the work of the Algebra Project to work alongside Moses in the classroom with the cohort; to mentor professors of mathematics education in the pedagogy and curriculum of AP; and to assist in applying for grants to support the research associated with the project. University and college leadership also championed the project by hosting meetings with the Chamber of Commerce and receptions with major funders and journalists to publicize the collaboration, rallying community support for the work.

Two key phases of the program—a half-year of classroom instruction during the first year of 2006-2007 and a six-week summer residential institute—are described here.

In the Classroom. In the fall of 2006, twenty-four ninth-grade students from the bottom quartile of their class at Edison were assigned to the AP class. Moses and a teaching fellow joined the classroom teacher. Initial attempts to engage parents—a core feature of AP’s focus on empowering students and families—were hampered by incomplete contact information; it took months to obtain reliable addresses and to make one-on-one home visits. In addition, school administrators required the first six months of class be devoted to preparing students for the “high-stakes” Florida Comprehensive Assessment Test—a situation familiar in many urban classrooms. By mid-March, 2007, however, the AP program was finally initiated.

The Algebra Project’s curricular sequence begins with a shared student experience that forms the basis for the abstract mathematical concepts to be learned. Edison’s ninth graders took a bus fieldtrip to FIU as their collective experience. Students took careful notes about the trip, then back in the classroom drew iconic representations of the experience (the places they visited and how they moved between them) before being exposed to the symbolic representation of mathematics. Moses contends that many students have difficulty understanding the abstractions represented by the symbols of a specific discipline until they experiment with creating their own symbols for their ideas.

In subsequent sessions, students discussed and wrote about the trip in their everyday language before learning the more technical language of algebraic symbols. Once students worked through the picture making, writing, and discussion of symbols to represent their ideas, they began to understand the nature of symbols associated with mathematics. The instructors helped students not only to think abstractly but also how to apply what they learned.

Results of Classroom AP. Despite only three months of AP instruction, the twenty-four students demonstrated clear improvement, not only in their levels of classroom participation and positive group dynamics but also in improved attendance (average

daily attendance rose from nineteen to twenty-three) and homework completion (completed daily assignments increased from two to ten). This leaves much to be done in regard to homework completion habits, but represents a significant improvement over a relatively short period of time.

Residential Summer Institute. For six weeks in the summer of 2007, eighteen of the twenty-four students from Edison joined twenty students from another Miami high school, Booker T. Washington, at a residential institute on the FIU campus. This program component was funded by the Children's Trust, Inc. In addition to a ninety-minute mathematics class each weekday, students received reading, writing and language arts instruction, social and conflict resolution skill building, and participated in elective courses. Instructors included Algebra Project Mathematics & Engineering professors in addition to FIU and Miami Dade College professors, local teachers and student advisors. Instruction typically was tactile and hands-on with students learning geometry principles, for example, by designing their own pop-up books or creating a huge hyperbolic soccer ball out of one-dimensional shapes.

Results of the Institute. In addition to enthusiastic acclaim by all participating students, the summer institute reinforced the importance of academic enrichment activities outside the regular school schedule for underserved students. Besides the emphasis on raising the level of achievement in mathematics, the institute also demonstrated the importance of attending to the need for reading and other academic skill building. At the summer institute, for example, only three of the forty students were reading at grade level, with most somewhere between the third- and sixth-grade levels. This obviously negatively impacted the ability of students to solve problems and read instructions.

In addition, the presence of college faculty in the classroom was invaluable, enabling high school math teachers to learn from active researchers as well as raising the level of content knowledge available to the students. When the College of Education hired one of the AP researchers to link the theoretical and pedagogical work in the high school classroom with the research and instruction in the college it illustrated how colleges can effectively connect their institutions to their local communities while at the same time advancing their research agenda. Efforts to connect the AP students to the university faculty also helped to build awareness with students about possibilities for college.

In 2008, the Center and COE partnered with AP in applying for a National Science Foundation (NSF) grant to study the cohort model's possibility of replication across the nation. As part of that grant, which was awarded in September 2008, the Center and COE directed the effort of four FIU researchers to examine each component of the program's process. Before the grant award, however, during the 2008 summer institute, pre- and post-surveys and tests in reading, mathematics, and school attitudes were being administered by the Center staff as well as individual and focus group interviews. The NSF award enabled the AP, Center, and COE researchers to gather and analyze data for the remaining high school years of the cohort members and their first

year in college. Plans to begin another cohort in the district, using this collaborative model, are already in the making. As a result of the initiation of the Mississippi and Miami cohorts, NSF is also funding the implementation and research of four other Algebra Project cohorts around the country in Los Angeles; Mansfield, Ohio; southern Illinois; and Detroit.

Preliminary Lessons Learned

While the project has not been in place long enough to fully assess student learning outcomes, there are some important implementation lessons for university leaders who are collaborating with public schools to better prepare urban students for high school graduation to college entry.

1. ***Provide university leadership.*** The role of the university is crucial to sustaining community collaboration, not only for the resources that it can offer but also for its perceived credibility as an agent of academic expertise. FIU's provision of space for the collaboration and its public relations campaigns rallying support for the project were essential. FIU's reputation in the local community greatly enhanced the willingness of the district to entertain the possibility of collaboration. Continued leadership will be necessary to find ways to provide financial support for the cohort's students to attend college.
2. ***Build commitment.*** During the first years of building the initiative, FIU's College of Education had three different deans. Shared commitment to the collaboration and its goals helped the partners weather the leadership transitions and benefit from the different skills each dean brought to the partnership.
3. ***Work within the system.*** Both universities and school systems are complex organizations and may impose unanticipated policy and procedural barriers (obtaining permission from MDCPS for the bus trip to FIU was one such challenge). Flexibility as an essential part of the collaboration along with a united focus on the desired outcomes is critical. Each partner will encounter situations that require accommodations to other partners. For example, when new policies at Edison threatened the availability of a daily mathematics class, the AP program stood firm and worked with administrators to change the schedule.
4. ***Create a financial network.*** The collaboration would not have been possible without institutional support by COE, the university and school district as well as its community and philanthropic champions. Without external donations, the *residential* component of the summer institute would have been eliminated. While it was the most expensive item in the summer program, every student on the final evaluation stated that it was vital to the total learning experience.
5. ***Connect with parents.*** Visiting the parents in the homes of the students created a support system for the teachers as well as the students in furthering the goals of the program. Home visits are essential in building the demand side for the academic achievement of urban students.
6. ***Pay attention to student needs.*** Attention to raising the level of achievement in mathematics is not enough. Through the success of the language arts and nonacademic support systems offered during the summer institute, the partnership

learned that alongside the cognitive, the affective domain must also be addressed. The group counseling, peer mentoring, team-building exercises, action-research empowerment skills instruction featured during the summer institute all had an impact on the learning of the students. Disenfranchised children, due to lack of family resources, rarely have opportunities for important after-school enrichment, which must be built into programs serving urban students.

7. Link the partnership with teacher preparation. Bringing the Edison students to the FIU campus to speak to two different classes of undergraduate pre-service teachers were powerful experiences, not only for the high school students, but also for the pre-service teachers. Important and candid discussions resulted when these high school students shared their perceptions on effective teaching and when pre-service teachers explored their concerns about urban schools.

We have many more lessons to learn as we work with the Edison cohort and begin to expand the AP program to other MDCPS schools. Our goal remains, however, that all our students not only can but *will* succeed academically.

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Before joining Florida International University, Dr. Wynne taught at Morehouse College where she designed and directed The Mays Teacher Scholars Program, and at Georgia State University where she was the associate director of the Crim Center for Urban Educational Excellence. Her research and writing include language literacy; the instruction of urban children, teachers, and parents; university-affiliated/school-based collaborative educational reform; and the impact of racism in schools and communities. She received The MLK Torch of Peace Award for the Promotion of Racial Harmony in 2001.

In the 1960's Dr. Bob Moses left his job at a New York private school to become the field director of Mississippi's Student Nonviolent Coordinating Committee. Twenty years later he returned to teaching math, developing The Algebra Project, an organization of more than three hundred teachers across the country serving ten thousand students. The Project Curriculum makes math accessible by basing it on "physical events" that students translate into conversational "people talk" and finally mathematical expressions. He is author of *Radical Equations: Math Literacy and Civil Rights*.

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