

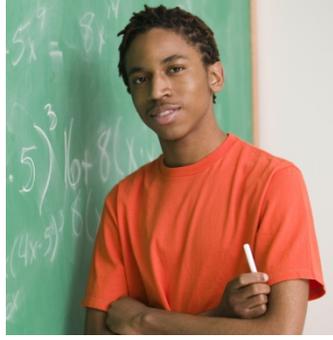
High School Success Pilot Programs

Mathematics Instructional Coaches Pilot Program: Case Study Reports, 2008 - 2010

June 2011

Submitted to:

Texas Education Agency



High School Success Pilot Programs

Mathematics Instructional Coaches Pilot Program: Case Study Reports, 2008 - 2010

June 2011

Submitted to:

Texas Education Agency

CREDITS

ICF International ICF International (NASDAQ: ICFI) partners with government and commercial clients to deliver consulting services and technology solutions in the social programs, health, energy, climate change, environment, transportation, defense, and emergency management markets. The firm combines passion for its work with industry expertise and innovative analytics to produce compelling results throughout the entire program life cycle, from analysis and design through implementation and improvement.

For additional information about ICF, please contact:

ICF International

9300 Lee Highway
Fairfax, VA 22031-1207
USA
Phone: 1.703.934.3603 or 1.800.532.4783
Fax: 1.703.934.3740
E-mail: info@icfi.com

Contributing Authors

Stacey Merola, PhD
Thomas Horwood
Robert Leos, PhD (Robert Leos Consulting)
Amy Mack, PsyD
Kelle Basta

Prepared for

Texas Education Agency
1701 North Congress Avenue
Austin, Texas 78701-1494
Phone: 512-463-9734

Research Funded by Texas Education Agency

COPYRIGHT NOTICE

Copyright © Notice The materials are copyrighted © trademarked ™ as the property of the Texas Education Agency (TEA) and may not be reproduced without the express written permission of TEA, except under the following conditions:

Texas public school districts, charter schools, and Education Service Centers may reproduce and use copies of the Materials and Related Materials for the districts' and schools' educational use without obtaining permission from TEA.

Residents of the state of Texas may reproduce and use copies of the Materials and Related materials for individual personal use only without obtaining written permission of TEA.

Any portion reproduced must be reproduced in its entirety and remain unedited, unaltered and unchanged in any way.

No monetary charge can be made for the reproduced materials or any document containing them; however a reasonable charge to cover only the cost of reproduction and distribution may be charged.

Private entities or persons located in Texas that are not Texas public school districts, Texas Education Service Centers, or Texas charter schools or any entity, whether public or private, educational or non-educational, located outside the state of Texas *MUST* obtain written approval from TEA and will be required to enter into a license agreement that may involve the payment of a licensing fee or a royalty.

For information contact: Office of Copyrights, Trademarks, License Agreements, and Royalties, Texas Education Agency, 1701 N. Congress Ave., Austin, TX 78701-1494; email: copyrights@tea.state.tx.us.

High School Success Pilot Programs Mathematics Instructional Coaches Pilot Program: Case Study Reports, 2008 – 2010

Table of Contents

Introduction...	1
Case Study: Grantee A (Cycle 1).....	3
Case Study: Grantee A (Cycle 1) Revisit.....	15
Case Study: Grantee B (Cycle 1).....	27
Case Study: Grantee C (Cycle 1).....	39
Case Study: Grantee D (Cycle 1).....	53
Case Study: Grantee D (Cycle 1) Revisit.....	65
Case Study: Grantee E (Cycle 1).....	77
Case Study: Grantee F (Cycle 1).....	89
Case Study: Grantee G (Cycle 1).....	101
Case Study: Grantee H (Cycle 2).....	113
Case Study: Grantee I (Cycle 2).....	127
Case Study: Grantee J (Cycle 2).....	139
Case Study: Grantee K (Cycle 2).....	151
References.....	161
Appendix A: MIC 2010 Cycle 2 Site Visit Interview Protocols and Focus Group Protocols.....	163
Appendix B: MIC 2010 Cycle 1 Return Site Visit Interview Protocols and Focus Group Protocols.....	182
Appendix C: MIC 2009 Cycle 1 Site Visit Interview Protocols and Focus Group Protocols.....	205

Introduction

This report provides detailed overviews of case studies conducted as part of the evaluation of the Mathematics Instructional Coaches (MIC) pilot program. The goal of MIC was to provide eligible grantees with assistance in developing the content knowledge and instructional expertise of teachers who instruct students in math at the middle school, junior high school, or high school level as a way to improve college and workforce readiness of students that might otherwise have dropped out of school. Between 2008 and 2010, case studies were conducted with 11 MIC grantees across the state of Texas. In 2008–09, seven Cycle 1 MIC grantees were visited. Two of these Cycle 1 grantees were revisited in 2009–10 along with four Cycle 2 MIC grantees. These visits were one component of the data collection conducted as part of the evaluation of the MIC program. This report contains a compilation of the results from the site visits and the findings from each individual visit, along with a brief discussion of the case study methodology. For a discussion of the overall results of the evaluation and more details about the MIC program itself, please see the February 2011 Evaluation Report.¹ The February 2011 report also integrates findings from the case studies with other data that was collected for the evaluation.

Overview of the MIC Grantee Site Visits

2008–09 Site Visits

As part of the evaluation of the MIC program, 7 of the 29 MIC Cycle 1 grantees were selected to participate in a site visit by the evaluators to collect additional data about the impact of the MIC program in select schools. Case studies of these seven projects representing school districts and charter schools were included as part of the evaluation to provide valuable, in-depth information about the:

- Characteristics of grantees' students, teachers, and MIC coaches (e.g., demographics, experience)
- Program structure of the various MIC projects (e.g., research model, activities)
- Barriers and facilitators of the program implementation process
- Perceived effects of the projects on the teachers and students (e.g., confidence, content knowledge)
- Participants' thoughts about the future of the project (e.g., changes, sustainability)

To develop a comprehensive profile of each of these seven grantees and their implementation of the MIC pilot program, data were drawn from multiple sources:

- The grantee action plan submitted as part of the MIC grant application
- TEA's Academic Excellence Indicator System (AEIS)

¹ This report, titled *Evaluation of the Mathematics Instructional Coaches Pilot Program: A High School Success Pilot Program: February 2011 Report* can be found [here](#).

- Phone interviews about the implementation of the MIC projects with MIC grant coordinators and Approved Service Provider (ASP) representatives that took place between December 2008 and January 2009

Individual interviews and focus groups conducted during a two-day site visit with key project personnel and participants in each of the seven MIC projects at their school district/charter school. To ensure confidentiality, the case studies do not identify individual school districts/charter schools

The site visits at Cycle 1 schools were conducted by a two-person team during the months of February and March 2009. These sites were selected to ensure that: 1) seven different education service center (ESC) regions in Texas were included; 2) rural, suburban, and urban school districts were included; 3) ASPs that were regional ESCs and universities were represented; and 4) programs serving middle schools, junior high schools, and high schools were included. In addition, we included one of three MIC grantee charter schools to visit.

Semi-structured interview/focus group protocols were developed for the MIC grant coordinators (individual interviews), ASP representatives (individual interviews), campus principals/school administrators (individual interviews), teachers (focus groups/interviews), and MIC coaches (focus groups/interviews). Individual interviews were conducted with the following key personnel: campus principal/school administrator, MIC grant coordinator, and the ASP representative. In most cases, focus groups were conducted with MIC coaches and teachers. In certain situations in which focus groups with teachers and MIC coaches were not possible, interviews were conducted instead.

2008–2010 Site Visits

Six two-day site visits were conducted by a two-person team during the months of April and May 2010. For districts with three or more campuses participating in MIC, the evaluation team worked with the grantees to select which schools to visit. The data collection activities that occurred during the site visits remained consistent between 2008–09 and 2009–10.

Included in the six site visits were two return visits to Cycle 1 grantees. Cycle 1 grantees were selected from those visited in Year 1 based on their success in implementing MIC. Similar to the Cycle 1 schools selected in 2009, the four Cycle 2 grantees selected for visits were chosen to ensure that: 1) each of the four MIC program types were represented;² 2) multiple ESC regions in Texas were included; 3) rural, suburban, and urban school districts were included; 3) ASPs that were ESCs and universities were represented; and 5) programs serving middle schools, junior high schools, and high schools were included. In addition, we included one of four Cycle 2 MIC grantee charter schools to visit.

Along with gathering information about the implementation of the programs, one of the goals of the site visits was to identify potential best practices for successfully implementing the MIC program. Two Cycle 1 grantees were selected from the seven that were visited in spring 2009. The selected grantees were identified as “high implementers” who were successfully implementing the MIC program at the time of the 2009 site visits. One selected program was notable for its strong partnership with a University, and the other program was very well coordinated, with clear goals.

² See the full MIC evaluation report [here](#) for a description of the MIC program types.

Case Study: Grantee A (Cycle 1)

Methodology

In February 2009, a site visit took place at Grantee A, a small, suburban, independent school district located in Texas on the Texas-Mexico border. Within this district, teachers from one middle school, one high school, and one alternative academy for students in Grades 9–12 were participating in the MIC pilot program. The site visit team conducted individual interviews with the ASP representative, MIC grant coordinator, middle school principal, and high school principal. The team also invited all participating teachers to attend a focus group and conducted focus groups with 7 of 11 high school mathematics teachers and 6 of the 7 middle school teachers who receive coaching and professional development through the MIC pilot program. A focus group also was conducted with the four MIC coaches who provide professional development to the mathematics teachers.

The alternative high school, a credit recovery/dropout recovery school, had one teacher participating in the MIC pilot program. Following the site visit, a telephone interview was conducted with the teacher from this high school because this teacher was not able to participate during the site visit.

Characteristics of Grantee A

Table 1 provides a summary of Grantee A’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 1
General Characteristics of Grantee A’s MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	1
Grades Served	7-12
Number of Schools Served	3
Type of Schools Served	1 middle school, 1 high school, 1 alternative academy (high school level)
Number of Teachers Served	19 (7 middle school, 11 high school, 1 alternative)
Number of MIC Coaches Participating	4
Grant Amount	\$180,000
Grant Start Date	05/20/2008
Grant End Date	06/30/2010

Source: Grantee A’s Cycle 1 Application and Action Plan

Students

The Grantee A student population was 100% Hispanic and included approximately 3,400 students. Some students in this district are referred to as “commuters” because they stay in the area for the school week and return to Mexico for the weekend. More than 90% of students qualified for free and reduced-price lunch and were considered economically disadvantaged. In the district overall (including elementary schools), approximately 56% of students were limited English proficient (LEP) and 72% were considered at-risk,³ as reported by AEIS for the 2007–08 school year. However, of the students whose teachers participate in the MIC pilot program, the grant coordinator and ASP representative estimated that approximately 26% (a smaller but still substantial number) of students were LEP and at least 50% were at-risk. This discrepancy was likely due to higher proportions of LEP and at-risk students at the elementary level compared to the middle and high school levels.

At baseline during the school year prior to the site visit (2007-08), Grantee A students were struggling with performance in mathematics on the Texas Assessment of Knowledge and Skills (TAKS-Math), especially students in Grades 9–11. Table 2 shows the percentage of students in the district at Grantee A meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 2

Percentage Rates of Students in the District in Grantee A by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee A	75%	77%	60%	60%	65%
Texas	80%	79%	64%	66%	80%

Source: Academic Excellence Indicator System (AEIS), 2007–08

Teachers

Of the 14 Grantee A MIC teachers who participated in the teacher focus groups, experience levels ranged from being a first-year teacher to being a Texas-certified master teacher with more than 16 years of teaching experience. Subjects taught by participating teachers included middle school mathematics to Algebra I, Algebra II, Geometry, and Calculus.

Coaches

The Grantee A MIC pilot program has four staff members who serve as MIC coaches for participating teachers. One of the MIC coaches was certified in mathematics, holds a master’s degree in educational leadership, and has 30 years of experience as a teacher and administrator. This MIC

³ At-risk students are defined by TEA as students who exhibit at least one of 13 risk factors. A complete listing of risk factors can be found online [here](#).

coach was also the assistant principal of the high school. Another MIC coach was an eighth grade math teacher with 11 years of middle school teaching experience, who was certified in general education and bilingual education. The third participant was referred to as the secondary math instructional coach whose duties were the same as those of the other MIC coaches, but has a different title because this MIC coach was hired specifically for the MIC pilot program. The secondary math instructional coach has 12 years of teaching experience, was certified for Grades 6–12 reading and kinesiology and Grades 4–8 mathematics, and holds a master’s degree in educational leadership. The fourth MIC coach was also the MIC grant coordinator, has 10 years of teaching experience with a certification for Grades 1–8, and holds a master’s degree in educational leadership.

Overview of Grantee A MIC Pilot Program

Goals

According to the grant coordinator and ASP representative, the overall purposes of the Grantee A MIC pilot program were to:

- Promote effective math instruction by all secondary math teachers
- Improve the mathematical content knowledge of the MIC coaches (the district was providing the MIC coaches who were being trained by the ASP)
- Provide research-based strategies, coaching practices, and instructional techniques MIC coaches can use in their work with teachers

Program Structure

During a phone interview in January 2009, the grant coordinator and ASP representative were both asked to describe the overall structure of their MIC pilot program. As a follow up to this question, the grant coordinator and ASP representative were each asked one month later during the site visit to elaborate on specific aspects of the program, including the role of the ASP and the types of activities that have been implemented thus far.

The ASP was responsible for delivering professional development to the four Grantee A MIC coaches. According to the ASP representative and MIC grant coordinator, professional development sessions were taking place at ASP offices and were tailored to needs identified by the school district. According to the ASP representative, the ASP staff members were always trying to provide “the newest, research-based strategies that were out there.” The MIC coaches then were working with the district’s participating middle school and high school math teachers to implement the concepts and training presented at the professional development sessions.

“..[Grantee A] is different because they have the four coaches [who come to the trainings]. In my other districts, the teachers come and we do coaching.”

-ASP representative, describing the structure of the Grantee A MIC pilot program

The distinction between coaching and professional development activities often was unclear; the MIC coaches believed that a small group professional development activity dealing with lesson

planning, for example, can also be considered a coaching session. A clearer distinction between professional development activities and coaching activities was made when MIC coaches were working one-on-one with teachers following a classroom observation.

Grantee A used two program models to create their MIC pilot program:

1. *Training Learning Model* from the ASP. Training was received by the MIC project personnel and transmitted to teachers.
2. *Jobs for the Future (JFF)*. JFF is a career exploration program that the district selected for professional development. According to the MIC coaches, the program includes a coaching component that has assisted them in developing a solid coaching experience with participating teachers. JFF “believes all young people should have a quality high school and postsecondary education, and that all adults should have the skills needed to hold jobs that pay enough to support a family... Through partnerships with states and communities, national and local foundations, and other organizations, JFF accelerates opportunities for people to advance in education and careers...” (Jobs for the Future, n.d.). Overall, Grantee A MIC coaches reported they were very pleased with the JFF program and felt the program’s coaching component greatly improved their work with teachers.

“I think they’ve been very open minded... They feel they can make a difference.”

-ASP representative, remarking on the MIC coaches

Coaching and Professional Development Activities

Coaching Activities and Teacher Participation

Activities. Through pre-coaching interviews, Grantee A MIC coaches were assessing teacher needs; follow-up interviews were planned to take place at the end of the school year. Coaching was being provided twice a week in small group sessions. If a teacher or MIC coach felt that one-on-one coaching would be more effective, additional time was being scheduled for that activity. Meetings between MIC coaches and teachers generally were taking place during planning periods, typically for 45 minutes.

“...Coaching and staff development go hand in hand. Yes, we’re providing the math content, but at the same time, we include instructional strategies.”

-ASP representative describing the professional development provided to coaches

Coaching activities included discussions and offering suggestions on planning, grading policy, and standardizing lesson plans. Coaches were modeling lessons and providing teachers with opportunities to share effective teaching strategies with the rest of the group. Since the Texas Instruments TI-Navigator™ system was introduced, coaching activities had been focusing more on technology. TI-Navigator™ is a tool that wirelessly connects students’ graphing calculators to the classroom computer. One of the participating teachers was taking the lead in learning how to use the system and was training the other mathematics teachers in effectively using the TI-Navigator™ system in their classrooms.

“The instructional coach doesn’t seem like an evaluator, but someone who will support you all along the way.”

-Participating teacher, when asked about the impact of the program

Participation. Teachers were receiving a weekly schedule with the dates and agenda for the coaching and professional development activities. All teachers participating in the MIC pilot program were attending coaching sessions. If a teacher was unable to participate in a session, the MIC coach was working one-on-one with the teacher to cover the missed content.

Professional Development Activities and Teacher Participation

Activities. The Grantee A MIC program structure allowed both MIC coaches and teachers to participate in professional development. Some professional development sessions were being conducted by the ASP and implemented with the MIC coaches, while others were being conducted by the MIC coaches and implemented with the teachers.

When the grant was first awarded, the ASP provided a one-time training to the four MIC coaches that dealt with coaching and mentoring. The four MIC coaches also were regularly attending professional development sessions at the ASP offices. Professional development topics covered by the ASP included use of the TI-Navigator™ system, specific algebra topics, geometry, assessment, math for English language learners, cooperative grouping of students, and modeling of lessons. As the school district clarified needs throughout the first year of the grant, the ASP was making changes in the professional development topics.

At the school, teachers also were participating in MIC professional development activities that usually were being conducted by the four MIC coaches. These half-day and full-day group professional development activities with all members of the math department participating were intended to enhance teachers' abilities to prepare students for college and career success.

Professional development activities were content-specific. For example, teachers were participating in training on forms of number representation (e.g., fractions and decimals) and how to effectively present the concepts in the classroom. Some sessions were dealing with use of the TI-Navigator™. Other professional development activities were taking place twice weekly during the common planning period for math teachers.

Participation. The ASP was maintaining records of MIC coaches' attendance at professional development activities at the ASP offices. The MIC grant coordinator was maintaining records of participating teachers' attendance at professional development activities held at the schools. All teachers were participating in all scheduled MIC professional development activities except for an occasional illness or other excused absence.

District/Campus Administrator Participation in Program Activities

As two of the school administrators were also MIC coaches, their participation was consistent with that of the other MIC coaches. Other than their required participation in MIC pilot program activities, principals and assistant principals were participating occasionally by conducting observations. Both principals who were interviewed were supporting the MIC pilot program and were optimistic it would make a difference in student performance and teacher quality. Although both principals acknowledged little direct involvement in either professional development or coaching activities, MIC coaches and participating teachers were keeping them abreast of program developments.

MIC Pilot Program Implementation

Barriers to Program Implementation

When asked about barriers to implementation of the MIC program, the primary barrier identified by participants was time constraints. For example, after MIC coaches participated in professional development activities provided by the ASP, they originally had difficulty finding time to convey the training content to the participating teachers. However, this barrier was addressed by developing a master calendar showing training and coaching schedules.

Another barrier reported was that MIC coaches were required to participate in a four-day training with the ASP to learn about coaching. However, the MIC coaches found this training to be of little value. The MIC coaches thought the ASP was not prepared to provide the training, most likely because of a transition from the original ASP representative who was involved with writing the grant to a new ASP representative. However, the open relationship between the ASP and the school district allowed MIC coaches to provide feedback directly to the ASP so the quality and relevance of future training sessions could be improved. Additionally, the district identified the JFF program to create a model for the coaching component trainings.

From the MIC coaches' perspective, another barrier was trying to adapt the material from the professional development session to make it relevant to their coaching activities with the mathematics teachers. This was necessary because teachers have limited time to participate in professional development, and MIC coaches did not want to waste teachers' time by offering material that was not relevant. To resolve this issue, the MIC coaches met to discuss the professional development session content, and then decided which components were most relevant and useful to provide to the district for implementation with participating mathematics teachers.

The current ASP representative was not part of the original program design, which had caused some difficulty for program implementation because of the disconnect between the original design and the current ASP representative's ideas for implementing the program. However, ASP and district representatives reported they were working together to plan for smoother implementation in the second grant year.

Facilitators of Program Implementation

The MIC coaches developed a daily schedule that called for common planning periods for all participating teachers and allowed for almost daily interaction between MIC coaches and teachers. Both MIC coaches and teachers identified this daily schedule as being helpful in implementing the MIC program.

Hiring a teacher specifically to serve as a MIC coach, with no teaching or administrative responsibilities, also had facilitated successful implementation of the program. The district coach was providing resources, was helping with lesson planning, was conducting training, and was acting as a liaison between the middle school and the high school. A major function of one MIC coach was to align the curriculum between the middle school and the high school, as well as within each of these schools. In addition, MIC coaches reported that using the JFF program coaching component greatly

enhances their ability to implement training when working directly with participating mathematics teachers.

Relationship between Grantee A and the ASP

A cooperative agreement between the ASP and Grantee A specified that the MIC coaches must participate in professional development sessions at the ASP offices. The professional development activities were tailored to the needs identified by the MIC coaches. According to the MIC coaches, communication and activity between the school district and the ASP were ongoing. The excellent rapport allowed the MIC coaches to provide their opinions about the quality and relevance of the training they received, and the ASP used the feedback to change the professional development offerings. In fact, during the site visit interview the MIC grant coordinator described the relationship between the district and the ASP by stating, "There was a lot of communication...[and] there has been a good partnership between us." When talking about the relationship between the district and the ASP, the ASP representative stated, "I think the staff interaction is great. We're being flexible with [the trainings]. We want to provide [the district] with what their students need." Lastly, the ASP representative discussed the excellent communication they have with the district and highlighted that "[The MIC coaches] are giving us [good] feedback [and] are telling us how they are training the teachers. [The MIC coaches] give feedback for changes [and] tell me some things they would like to see done differently."

"There has been a good partnership between us."

-Grantee A grant coordinator, on the district's relationship with the ASP

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and MIC coaches discussed their perceptions of the effects of program activities on teachers. All stakeholders who were interviewed were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

"Teachers are implementing what we teach them 100%."

-Grantee A grant coordinator, on teacher's role in making the grant successful

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: Innovative Techniques and Peer Support

The site visit team asked the MIC coaches, the grant coordinator, and the principals to describe how they believed the MIC pilot program activities had affected teachers' beliefs about teaching

mathematics. There was consensus that the program activities had increased teachers' confidence to teach mathematics, and that the program had provided teachers with new supports for teaching. They were learning from the expertise of MIC coaches and mastering techniques they could use with students in the classroom. Teachers were also asked about the impact of the program on their beliefs about teaching mathematics. They reported increased confidence and feelings of support, both from MIC coaches and fellow teachers. Additionally, teachers reported that program participation had fostered a belief that there were many different ways to deliver effective instruction, and teachers could share with each other successful techniques and strategies.

Participants reported the following effects of the MIC professional development activities on teachers' beliefs about teaching mathematics:

- There are ways to teach math besides the more traditional lecture methods.
- Learning math can be fun. Group activities keep students engaged.
- Teachers should not feel overwhelmed by the task of understanding and teaching math. Help is available.
- Teachers are more comfortable with using technology in the classroom for teaching math.
- Teachers themselves are more engaged during meetings and discussions.

"The traditional way of teaching mathematics: the teacher works a problem on the board and the students copy it. Here, teachers have to be more prepared...but because they are more prepared, it motivates the students. It's not, 'Here's a handout, do 30 problems.' All you need is five or six problems and the calculator and there's your mini-assessment. The kids are encouraged by that."

-High school principal, on the effects of the MIC pilot program on teachers' beliefs about teaching mathematics

Participants reported the following effects of the MIC coaching activities on teachers' beliefs about teaching mathematics:

- Students are more engaged when teachers use a variety of strategies to teach concepts.
- Coaching reinforces the belief that all students can learn.
- Coaching and support strengthen the belief that teaching math is not as difficult as it once seemed.
- Sharing ideas and collaborating with colleagues is more important than considering oneself a subject matter expert. Allowing other teachers into a classroom to observe is beneficial to learning and teaching.

Making a Difference in Student Learning of Mathematics

The MIC coaches, grant coordinator, and principals commented on how program activities had affected teachers' sense that they could make a difference in their students' learning of mathematics. They reported that teachers appeared more confident and had the tools to help students learn as a result of participating in MIC pilot program activities. The middle school principal reported that teachers were now more likely to believe they could help *all students* (even those who struggle) learn the material and were willing to spend extra time with struggling students to find techniques that

work. Teachers again noted increased confidence and feelings of support, and reported feeling that being a successful instructor was more attainable.

Participants interviewed during the site visit reported the following effects of the MIC professional development activities on teachers' sense that they can make a difference in their students' learning of mathematics:

- Professional development enables teachers to keep abreast of new teaching strategies, as well as barriers to learning and how to overcome them. Teachers gain more confidence that their students can learn mathematics.
- Trying different teaching strategies can help students who are having difficulty learning. Different learning styles call for different teaching strategies.
- Technology adds a great deal of credibility to the learning process. Students are more likely to believe they can learn when using technology successfully.

Participants also reported the following effects of the MIC coaching activities on teachers' sense that they can make a difference in their students' learning of mathematics:

- Teachers have learned that some students need more time than others and it is the teacher's responsibility to identify their needs.
- Teachers believe that students learn better if students are actively engaged in classroom activities.
- Teachers are now making sure to observe students' engagement level in classroom activities.

Teachers' Math Content Knowledge and Eagerness to Learn

The MIC coaches, grant coordinator, and principals all noted positive effects of program participation on teachers' content knowledge. The ASP representative reported frequently using up-to-date mathematics textbooks with the MIC coaches, and giving MIC coaches access to improved content knowledge they could use in their interactions with teachers. The teachers could, in turn, use this new knowledge during classroom activities. The MIC coaches and middle school principal reported that many teachers were already quite experienced and knowledgeable before the grant, but the focus on content was particularly helpful for newer teachers. Coaches also noted the enthusiasm teachers had for learning and reviewing content, and for acquiring new skills and techniques to introduce content to their students. The high school principal reported that teacher content knowledge had increased during coaching activities that involved differentiated instruction through which all participating teachers could learn regardless of their learning style or abilities.

"We are teaching kids that will teach in fields that we don't even have yet. [Participating in this program] keeps us on our toes and moving forward with our students."

-Participating teacher, when asked how the MIC pilot program has influenced his/her mathematics content knowledge

Participants interviewed during the site visit reported the following effects of the MIC professional development and coaching activities on teachers' content knowledge in mathematics:

- Increased confidence that teachers' content knowledge is keeping up with rapid developments in the field and the math-relevant job market
- A better understanding of and facility with mathematics technology that could be transferred to more productive and engaging classroom time
- Knowledge of how to tailor content to the needs of the classroom

Student Engagement and Performance

At the time of the Grantee A site visit, students had not yet taken TAKS for the 2008–09 school year, so any effects of MIC pilot program participation by teachers were unknown. However, the materials the ASP presented to the MIC coaches, including strategies to help students on the TAKS, were tied to the Texas Essential Knowledge and Skills (TEKS) state standards. As a result, the ASP representative reported that students would be “very prepared” for the TAKS. Further, students had been taking district benchmark tests that were created from items released from previous TAKS released tests. Students across the district were performing better on these district benchmark tests than in previous years, and participants believed the MIC pilot program was contributing to this improvement.

“We compared scores on this year’s high school benchmark with last year’s. The scores were higher this year. We were up at least 30 points at every grade level. The middle school had gains, especially in seventh and eighth grade. At sixth grade, we are still working with those teachers a bit more, but there have been positive gains.”

-MIC grant coordinator, regarding impact of the MIC pilot program on student achievement

The MIC coaching and professional development activities also focused on engaging students. Teachers reported that students' engagement in classroom activities had increased from previous school years. Specifically, one teacher stated, “I observe that [students] respond more and they participate more. [Students] can answer the conceptual questions faster than before.” Additional teacher feedback to the ASP representative indicated, “The students are eager to learn and are receptive to anything that is presented to them.” Participants did not believe that the program would affect future dropout rates since district dropout rates were already very low; effects of the MIC pilot program on graduation rates could not be measured after only one academic year.

Sustainability and Enhancement

Participants believed the program should continue beyond the grant award period, although they expressed some concerns about future funding. The MIC coaches felt the district could continue the program with the three MIC coaches who were working in the district prior to the grant, and were optimistic that the fourth coach (who was hired specifically for the MIC grant) could remain as a math coach beyond the grant period using a mixture of local and federal funds. However, if it was not possible for that MIC coach to continue in the pilot program, the district planned to use existing internal staff to fill that role and/or seek additional funding from another source.

“I hope we can have a mentor like this all the time. Sometimes I wonder, why are the kids struggling with math? I was a principal at the elementary level for 10 years and I think we need to go down to the elementary level to make a difference. Overall, I’ve seen a lot of growth in our benchmarks. The kids are doing much better.”

-Middle school principal, final comments on the MIC pilot program

Participants recommended the following program changes:

- Schedule more visits by the ASP to participating schools.
- Extend teacher planning periods from 45 minutes to 60 minutes.
- Incorporate a teacher stipend into future MIC pilot program funding.
- Include more math content in the coaching sessions.
- Continue the annual campus needs assessments.
- Increase the number of MIC coaches who serve the high school/alternative school.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. One teacher stated, "I think it has been a really good program. The [MIC coach] has done a great job [and has] been an advocate for us." The MIC grant coordinator described the sustainability of the program by explaining, "What we're doing was making a difference... If the funding continues, we'll keep doing what we're doing. If it does not continue, we'll look for alternate funds and building capacity from within." Lastly, the ASP representative shared thoughts about how the ASP staff were preparing for the second year of the grant and explained, "Now we're talking about the next cycle. We'll do more site visits, working with teachers themselves, visiting with the MIC coaches on an individual basis, doing more modeling and debriefing. I want to be out there with them."

Summary/Conclusions

Grantee A, a suburban school district located near the Texas-Mexico border comprises a 100% Hispanic student body. Three schools in the district were implementing the MIC pilot program; one middle school and two high schools. Most students in these schools were at-risk of dropping out of school and had consistently performed poorly on standardized mathematics exams. Thus, the need for an MIC pilot program was in high demand. Grantee A's MIC pilot program was based upon two models; 1) *Training Learning Model* which was developed by the ASP and provided to the MIC coaches who in turn work with their school mathematics teachers, and 2) *Jobs for the Future (JFF)* which was a career exploration program that the district selected for professional development activities. There were 19 mathematics teachers receiving coaching and were participating in professional development activities provided by the MIC pilot program. There were four MIC coaches, all employed by the district, who were working directly with the teachers to provide them with professional development and coaching activities. The ASP was providing the training and professional development to the four MIC coaches, who in turn, were teaching these new skills and methods to the mathematics teachers during planning periods lasting about 45 minutes.

Time constraints were the primary barrier to successful implementation of the MIC pilot program in the district. That is, it had been difficult for MIC coaches to find the time needed to provide the professional development and coaching to the mathematics teachers. A master calendar had been developed that listed the training and coaching schedules for all participants, and this helped to address this issue so that it was no longer a barrier. In addition, MIC coaches found it difficult to adapt the materials they received from the ASP's professional development training for the mathematics teachers because teachers had a limited amount of time and thus the emphasis was on

only providing them with materials that would be useful and relevant. Despite these barriers, there had also been several facilitators for the implementation of the pilot program. For example, creating a daily schedule with common planning periods had helped MIC coaches and teachers find times to meet. In addition, there was one MIC coach who had been hired to specifically function as a MIC coach without having any teaching or administrative obligations. This helped significantly with program implementation. Lastly, the use of the JFF program had enhanced the MIC coaches' ability to implement the techniques they learned directly to the teachers they coach. The positive partnership between the district and the ASP had been the keystone to successful implementation.

Grantee A's MIC pilot program appeared to be making a positive difference for both the mathematics teachers as well as their students. Interviewees from the site visit indicated that teachers have an increased confidence to teach mathematics because teachers now had a support system for teaching and the ability to learn from experts about new ways of working with students in the classroom. Teachers validated this sentiment, stating that they now were able to share successful techniques and strategies with each other. There was a belief now that teachers can help all students, even those who are struggling, because they were willing to spend extra time with them and find techniques that work. This had primarily been a product of their *professional development activities*. The *coaching activities* had also had a positive impact on teachers and students. Teachers believed that all students could learn and that students were now more engaged in class when teachers used a variety of strategies to teach concepts. Thus, teachers realized that some students need more time to master certain skills and that by also observing students' level of engagement in classroom activities, they could determine how best to interact with the students in the class when teaching them concepts/skills. Lastly, teachers' mathematics content knowledge had also improved; teachers felt more confident that they had information that is current and relevant, are more comfortable using technology in the classroom, and knew how to tailor the content for each class.

Since this was the first year of the MIC pilot program, at that point in time it was difficult to determine the full impact the program was having on mathematics students. However, interviewees from the site visit indicated that students were performing better on district benchmark tests that year and attributed the change to the MIC pilot program. Teachers also believed that students were more engaged in mathematics classes and activities than previous years as a result of the MIC pilot program. However, there were mixed feelings as to whether the MIC pilot program would affect dropout rates or graduation rates.

Although the MIC pilot program was only funded for two years, participants in the Grantee A MIC pilot program hoped that additional funds could be found to continue the program. It was seen as worthwhile program and was having a positive impact on teacher effectiveness and student outcomes. Based on the site visit and other data collected, Grantee A was selected as a successful MIC grantee and was revisited in 2009–10. A thorough discussion of information gathered during that visit is presented in the next chapter.

Case Study: Grantee A (Cycle 1) Revisit

Methodology

In April 2010, evaluators conducted a second site visit to Grantee A, which was visited initially in February 2009. The 2010 site visit team conducted individual interviews with the MIC grant coordinator, the representative of the ASP, the teacher from the alternative high school, and principals of the junior high school and high school.⁴ The site visit team also held focus group sessions with teachers from the junior high school and high school and with the MIC coaches for the school district. The purpose of the second site visit was to document program or other changes in the second year of implementation.

Characteristics of Grantee A

As noted in the prior chapter, Grantee A is a small, suburban school district, adjacent to the Texas-Mexico border, with a student population of 3,519 students. The MIC program includes teachers from the junior high school, the high school, and an alternative high school. The alternative academy was a credit recovery/dropout recovery high school. One teacher from the academy was participating in the MIC program. Table 3 provides a summary of Grantee A’s MIC pilot program including schools, grade levels taught, the number of teachers served, and details of the award.

Table 3
General Characteristics of Grantee A’s MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	1
Grades Served	7-12
Number of Schools Served	3
Type of Schools Served	1 middle school, 1 high school, 1 alternative academy (high school level)
Number of Teachers Served	19 (9 middle school, 10 high school)
Number of MIC Coaches Participating	4
Grant Amount	\$180,000
Grant Start Date	05/20/08
Grant End Date	06/30/10

Source: Grantee A’s Cycle 1 Application and Action Plan

⁴ In 2009, the MIC grant coordinator and the researchers agreed that the principal of the alternative high school would not be interviewed because only one teacher there participated in the program. Efforts were made to keep the 2010 site visit itinerary as comparable as possible to the 2009 itinerary; therefore, the principal of the alternative high school was not interviewed this visit.

Students

Of the 3,519 students in Grantee A, more than 99% were Hispanic. There were a number of risk factors among Grantee A's students, with approximately 90% of students considered economically disadvantaged and approximately 56% classified as LEP. High rates of mobility were also prevalent in the district. Mobility was a greater risk factor among students at the alternative academy than among students at the other two participating campuses. Grantee A had an average attendance rate of 96%, which was approximately the same as the statewide average.

Table 4 shows the percentage of students in the district at Grantee A meeting the standard on TAKS-Math compared to the percentages statewide for the year prior (2008-09) to the follow-up site visit.

Table 4

Percentage Rates of Students in the District in Grantee A by Grade Who Met the 2008-09 Standard on TAKS-Math

School Name	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee A	70%	75%	63%	58%	76%
State of Texas	82%	82%	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008-09

Compared to 2007-08 TAKS-Math results, results in 2008-09 were lower for all grades except Grades 9 and 11. The decreases varied from 2% (Grades 8 and 10) to 5% (Grade 7), while the largest increase was 11% for Grade 11 students' results.

Teachers

All 19 secondary math teachers from Grantee A were participating in the 2009-10 MIC program. Nine were teaching at the junior high school, nine were teaching at the high school and one was teaching at the alternative academy, also a high school. Two of the 19 teachers were serving as MIC coaches in addition to their teaching duties. At the time of the visit, seven of the 19 teachers (37%) had 1-5 years experience, three (16%) had 6-10 years experience, three (16%) had 11-15 years experience, and six (32%) had 16 or more years of teaching experience. Of the ten high school teachers, two held master's degrees and one (10%) held a Ph.D. One of the nine junior high school teachers had a master's degree in education. All but one of the teachers participating in the 2009-10 MIC program was also participating in the MIC grant during the 2008-09 school year.

MIC Coaches

Grantee A's MIC program consists of four MIC coaches, including one replacement MIC coach. All were recommended by principals for their math expertise and approved by the executive director for curriculum and instruction. Two of the four MIC coaches were also classroom teachers and two MIC coaches were working as central administration staff. The new MIC coach was both a teacher and

department head, and was continuing to teach while serving as an MIC coach during Year 2 of the program. The MIC coach that was replaced served a dual role as an assistant principal at the high school and as an MIC coach. Administrators felt that an MIC coach who did not have any administrative duties would be able to devote more time to the coaching aspect of the MIC program. In addition, administrators felt that a MIC coach who was not responsible for teacher evaluations would be more effective. One of the two central administration staff members was hired full-time using MIC grant funds to work as an MIC coach. Two of the four MIC coaches had 12 years of teaching experience, one had 15, and the fourth had 17 years of experience.

Overview of Grantee A's MIC Pilot Program

Goals

According to teachers in the Grantee A's MIC program, the goals were to:

- Use coaching to help teachers become more efficient
- Increase students' success in school
- Increase students' college preparation

The school district's action plan also included developing effective MIC coaches through professional development training provided by the ASP.

Program Structure

The ASP for Grantee A's MIC program was providing regularly scheduled professional development sessions for teachers and MIC coaches participating in the MIC program. Staff from the ASP were working closely with the MIC coaches from Grantee A to determine teachers' professional development needs and were creating professional development activities to address those needs.

One major change in the second year of the grant had to do with teachers' participation in the professional development sessions. In the first year, the 2008–09 school year, only the MIC coaches were attending the professional development sessions sponsored by the ASP. Coaches would be using the information from the professional development sessions to work with teachers in locally held professional development sessions and coaching activities. In Year 2, the grant coordinator and MIC coaches felt that teachers would derive greater benefit from direct participation in the content-specific professional development activities.

Math Coaching and Professional Development Activities

Math Coaching Activities and Teacher Participation

All junior high school and high school mathematics teachers were participants in the coaching activities. According to participating high school teachers, the coaching activities were focused more on instructional strategies and classroom activities than on content. Most coaching involved classroom observation, one-on-one consultations with the teachers, and modeling teaching, with

the classroom teacher either observing or participating in a team teaching approach. The coach was providing recommendations as needed on classroom organization and management and instructional strategies. Team meetings with the coach and teachers were also part of the coaching component of the MIC program. Alternatively, junior high teachers cited content as one of the areas that MIC coaches focused on, in addition to expanding the repertoire of instructional strategies.

According to the MIC coaches, a major change in the coaching activities in the second year of the grant was the inclusion of more modeling by the MIC coaches. The role of the teacher/coaches (i.e., MIC coaches with teaching responsibilities) expanded to include more direct coaching with their colleagues.

In the first year of the MIC grant, the ASP's role involved planning and delivering the professional development sessions to the MIC coaches from Grantee A. In the second year, the ASP was playing a greater role in the coaching component of the program by coming to campus and providing coaching demonstrations for MIC coaches.

Professional Development Activities and Teacher Participation

All junior high school and high school mathematics teachers also were participating in the professional development activities. There were several changes noted in professional development during the MIC grant period. One of these changes involved a shift from mathematics content being a major component in professional development activities, to including a focus on special needs students. This modification was made based on teachers' feedback after the first year of the program. In addition to greater emphasis on special needs students, a special education coordinator was also included in the professional development activities.

Another change in the MIC program during the grant period included allowing teachers to directly attend professional development sessions. In the first year of the MIC grant, the four MIC coaches were the primary participants in professional development activities sponsored by the ASP. The MIC coaches would then be working with school district teachers to convey the information through group meetings and coaching activities. During the second year, however, participating MIC teachers were having the opportunity to attend professional development sessions with the ASP. Examples of professional development sessions included working with special needs students, mathematics journaling, incorporating writing into mathematics, using graphic organizers, formal and informal assessment, and the use of manipulatives in the classroom.

District/Campus Administrator Participation in Program Activities

Administrators from the junior high school and high school were participating occasionally in the professional development sessions. The principals were supporting the activities on campus, were staying aware of the schedules for professional development and coaching, and were receiving feedback from teachers and the MIC coaches on the project's progress. The junior high principal also was collaborating with the MIC coach to plan activities. There were no issues relating to participation by administrators in any of the activities and most teachers said they were welcoming participation by the administrators.

MIC Pilot Program Implementation

Barriers to Program Implementation

Participants cited scheduling difficulties for professional development and coaching activities and not having enough time to complete activities as challenges rather than barriers. One high school teacher felt that the coach did not have sufficient time to work with all the teachers.

A major change in the second year of the MIC grant included assigning a different coach at the high school. The new coach had been a mathematics department head and had a good working relationship with the high school mathematics faculty. The previous coach, an assistant principal, was continuing to serve as an assistant principal at the high school. Program administrators made the change because they felt that MIC coaches could devote more time to the coaching component of the program if they did not also have administrative duties. In addition, administrators felt that an MIC coach without teacher evaluation responsibilities would be more effective. Some adjustment time was needed to continue the progress made in the first year.

Facilitators of Program Implementation

According to the MIC coaches, facilitators to implementation of the MIC program in the second year included defining more specific roles for MIC coaches and having MIC coaches participate in a coaching academy sponsored by the ASP. One teacher from the alternative high school cited the principal's support of the program and each teacher's motivation and effort as facilitators. Other teachers cited the knowledge and experience of the MIC coaches as facilitators for their work in the classroom. The MIC coaches' organization and scheduling of professional development and coaching activities made it easier for teachers to plan their activities. Another factor that improved implementation of the MIC program was replacing one of the MIC coaches with a math department head who could devote more time to coaching and who did not have teacher evaluation responsibilities.

Relationship between the District and the ASP

Participants reported that the coordination of activities between the school district and ASP was excellent. As a result of good communication and planning between the school district and ASP, changes were made in the second year of the grant. For example, the professional development needs expressed by teachers, MIC coaches, and school administrators formed the basis of the professional development activities in the second year.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinator, ASP representative, principals, and MIC coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Teachers' instructional strategies
- Teachers' use of assessment or assessment data
- Student engagement and performance

"As they work as a team and encourage each other, their belief systems are changing and they are becoming more collaborative."

-Principal, commenting on the positive effects of the MIC coaching activities on teachers' beliefs about teaching mathematics

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics

Effects of Math Coaching Activities

Through classroom observations, the MIC grant coordinator had noted changes in teachers after coaching sessions in which the teachers see successful teaching. The success teachers were having when they were teaching seemed to give them a sense of power, a feeling that they can be successful. This observation was echoed by the ASP representative, adding that feedback from the teachers and MIC coaches indicated that teachers have higher levels of confidence as a result of math coaching. According to another participant, teachers' belief systems were changing and they were becoming much more collaborative.

"One of the things I've emphasized this year is to slow down. That was one of the things the coaches have said. You can talk really fast because you know the subject, but the kids don't think as fast because they don't know the subject."

-High school teacher, commenting on the effects of coaching on instructional strategies

The high school principal had observed that math coaching had enabled teachers to see the benefits of using alternative approaches to teaching, such as using a calculator. According to the MIC coaches, teachers were seeing that teaching included starting at concrete levels before moving into abstract concepts. Math coaching helped to reinforce this concept.

Effects of Professional Development Activities

The MIC grant coordinator noted that teachers had learned that the lecture method of teaching mathematics was not effective for all students. A principal described how, although teachers knew that all students could learn, they had become more positive when they saw their students achieving the math standards. Additionally, teachers noted an enhanced feeling of camaraderie as they were sharing in their discussions about what was working and what was not working in the classroom.

Teachers Making a Difference in Students' Learning of Mathematics

Effects of Math Coaching Activities

An observation made by teachers was that math coaching was having an unexpected consequence in the classroom and a positive result in students' learning mathematics: having another teacher in the room was greatly reducing discipline issues. Students were more willing to concentrate on the activities and seemed to enjoy the additional attention paid by the MIC coach.

Another observation teachers made was that coaching was providing an opportunity for teachers to receive immediate feedback on instructional style such as the speed at which they teach and methods for delivering content. These observations by the coach were enabling teachers to adjust to the students and the subject matter they were teaching.

According to the high school principal, a main focus of the MIC coach when working with teachers was to keep them abreast of the latest research on effective teaching. This, combined with recommended instructional strategies and classroom management techniques, had given teachers confidence that they could make a difference in their students' learning of mathematics. The junior high school principal noted that the group meetings with the MIC coach and sharing of effective strategies for teaching mathematics had been integral parts of the coaching activities. This was adding to the teachers' confidence that they could make a difference in their students' learning of mathematics.

MIC coaches viewed the question of teachers making a difference in their students' learning of mathematics differently. The MIC coaches believed that the attitude among teachers was varying from "My students can learn" to "My students just don't get it." The focus of the math coaching, therefore, was to emphasize strategies that would result in successful learning and greater self-confidence on the part of the teachers.

Effects of Professional Development Activities

Professional development activities like math journaling, writing, and interactive participation did "wonders," according to junior high teachers. This was evident in the students' responses to teachers' questions. It was particularly evident with lower achieving students. According to an MIC coach, the professional development activities that introduced teachers to the use of manipulatives in the classroom had also been very effective. Teachers had taken note of the success of strategies learned in professional development and had employed them frequently in their classroom.

The high school principal noted that professional development activities on the English Language Proficiency Standards, now part of the curriculum, had been especially helpful to teachers and students. Teachers were beginning to see that the strategies involving student and teacher collaboration and incorporating writing into mathematics activities were effective and lead to a deeper understanding of content by students. Teachers were becoming much more positive in thinking that students could achieve the mathematics standards.

Effects of MIC Activities on Teachers' Mathematics Content Knowledge and Eagerness to Learn

Participants in Grantee A's MIC program agreed that the focus in the second year of the grant had been more on effective instructional strategies than on learning mathematics content, as it was in the first year of the grant. Professional development activities had included some mathematics content during the second year of the program, but most participants felt that the content knowledge among participating teachers was strong and the change in focus to instructional strategies had been appropriate.

Effects of MIC Activities on Teachers' Instructional Strategies

Effects of Math Coaching Activities

In the second year of the grant, the focus of the math coaching and professional development activities had been on improving and expanding the teachers' instructional strategies. Teachers were participating in professional development activities, and the math coaching was reinforcing the concepts taught in those sessions. Math coaching activities had included working with teachers on strategies such as mathematics journaling, incorporating writing into mathematics, and using manipulatives in mathematics classes. One of the MIC coaches was working with another teacher on instructional strategies designed to increase the sense of inclusion among special needs students. Overall, teachers at the high school and junior high school had a positive view of the effects of math coaching activities on their instructional strategies.

Effects of Professional Development

According to the MIC grant coordinator, teachers learned a variety of instructional strategies from the professional development sessions. The MIC coaches' role was to reinforce the concepts and strategies that teachers were learning during professional development. A strategy new to teachers in the second year of the program was called "entrance and exit tickets," an activity in which students would give feedback in writing directly to teachers about whether they were learning the mathematics content. One of the principals believed that teachers were making the connection between the strategies taught in professional development sessions and how they could be successfully implemented in the classroom. Junior high school teachers were enthusiastic about the topics in professional development and the opportunity to try out the strategies in the classroom.

"The math journaling did wonders. The kids responded well. That opened our eyes, especially with the lower achieving students."

-High school teacher about the effects of MIC professional development activities on teachers' sense that they can make a difference in their students' learning of mathematics

Effects of MIC Activities on Teachers' Use of Assessment or Assessment Data

Grantee A was a data-driven district, according to the MIC grant coordinator and MIC coaches. The MIC professional development and math coaching activities was continuing and reinforcing the

district's commitment to using data for diagnostic and prescriptive purposes. In the second year of the grant, the school district had been using DMAC, a software program for data management. All teachers and administrators were using the program to pinpoint areas that needed attention and further instruction. Teachers noted that one of the MIC coaches was particularly helpful in working with teachers on interpreting the results of benchmark tests. Professional development activities had included assessment strategies that were in addition to the multiple-choice tests that were frequently employed to prepare for TAKS.

"Students are not only learning math skills, but also social skills because they are working together with each other in groups."

-MIC coach, commenting on the positive effects of the professional development and coaching activities on student performance in mathematics

The professional development sessions in the second year of the grant had included more focus on the use of assessment data than in the first year, according to a participating principal. In the second year, teachers had learned to compare assessment data from school districts with demographics comparable to Grantee A's.

Student Engagement and Performance

MIC interviewees and focus group participants felt that the MIC activities were having a positive effect on TAKS preparation and that students were becoming more prepared for TAKS in the second year of the grant than the first year due to the different instructional strategies they learned through MIC. Teachers had discussed TAKS preparation in coaching sessions and among themselves. Students' grades in mathematics courses had improved in the second year and teachers cited a greater level of student engagement in mathematics activities. Teachers credited the emphasis on hands-on activities and manipulatives in MIC activities, and the implementation of those types of activities in the classroom as having a positive effect on student engagement. Interviewees also credited the professional development and math coaching activities that stress collaboration and group work for increasing the students' level of engagement in math activities. In addition, the professional development activities had a focus on techniques for improving classroom management and teaching difficult students. Teachers noted that students' group work was having the additional benefit of helping students improve their social skills which had facilitated the teaching/learning process.

Although Grantee A did not have a serious dropout problem, MIC participants gave credit to the MIC program activities for helping students to improve in mathematics and helping teachers to be confident that they were delivering effective instruction. Most high school students were attending the Early College High School program where, according to teachers, the expectation was that all students will go to college. The Early College High School was designed to allow students to earn college credits while completing the high school graduation requirements. All students were encouraged to take college entrance exams.

Sustainability and Enhancement

All MIC coaches were staff members of Grantee A and would remain with the school district beyond the funding period, except the full-time coach hired with MIC grant funds. Plans were underway to

continue using the resources of the ASP for professional development. School district staff were seeking additional grants to continue the math coaching program that was implemented with MIC grant funds.

Depending on the school district's success in acquiring additional funds, one major change that teachers would like to see was the assignment of an MIC coach specifically for the junior high school. This would enable the coach to work more closely with the teachers at the junior high school. The current arrangement under the MIC grant had required the MIC coach to split time between both the high school and junior high school campuses. Another change recommended was an increased focus on Algebra I at the junior high school.

Summary/Conclusions

Grantee A is a small school district on the Texas-Mexico border whose student population is almost 100% Hispanic each year. The school district's MIC pilot program was completing the second year of the grant and appeared to have successfully followed the action plan set forth at the inception of the program. The professional development activities in the second year of the MIC grant had focused more on instructional strategies than on mathematics content, the focus of first-year activities. The professional development activities in the second year also had a focus on teaching students with special needs. Coaches continued to receive training on effective math coaching and during the second year of the grant, and there was more presence by staff from the ASP in classrooms than in the first year.

A major change in the second year of the MIC grant was the inclusion of participating teachers in the professional development sessions held at the ASP. In the first year, the MIC coaches were the only direct participants in the ASP-sponsored professional development activities. The teachers received professional development activities from the MIC coaches following the MIC coaches' participation at the ASP.

"A math expert at a campus does wonders, especially in an area that's in need of improving."

-Principal, commenting on the need to continue the MIC program

The program had only two changes in personnel from the first to the second year. One of the MIC coaches was replaced with a mathematics department head.

Grantee A staff felt very confident that the MIC program activities would contribute to improved results for the 2009–10 school year. Teachers credited a number of MIC program activities as having contributed to increased student achievement. Among the program activities that made a difference were the introduction of hands-on activities and manipulatives in professional development and coaching. Teachers were receptive to the concept of using more hands-on activities and manipulatives when they witnessed increased interest and engagement on the part of the students.

Teachers also cited the use of collaborative exercises and increased group work as increasing students' interest in mathematics and helping to improve social skills. Improvement in students' social skills and teachers' use of more effective classroom management techniques were among the positive results of the MIC program.

The ASP was a resource for school districts throughout the region. During the two-year collaboration on the MIC grant, the two entities had developed an effective working relationship which had expanded in the second year. In the first year of the grant, the ASP was solely responsible for working with the district to deliver professional development tailored to the needs of the school district. In the second year, the ASP took a much more active role in the coaching aspect of the MIC program, offering training in effective coaching and modeling of effective coaching practices.

Grantee A's MIC program had great potential for sustainability due to the internalization of the program over the two-year period. Utilizing existing staff as MIC coaches and hiring only one coach using grant funds assures the district of continuity with the three remaining MIC coaches. As the district considered funding options for the future, they did so with the goals of optimizing their internal resources, drawing upon available resources from the ASP, and continuing the working relationship established through collaboration on the MIC grant.

Case Study: Grantee B (Cycle 1)

Methodology

In February 2009, a site visit took place at Grantee B, a small, suburban independent school district serving approximately 2,750 students located in Texas. Teachers from one intermediate school (Grade 6), one middle school (Grades 7-8), and one high school (Grades 9-12) were participating in the MIC pilot program. The site visit team made every effort to meet with as many participants from these campuses as possible. Interviews were conducted with the ASP representative, the MIC grant coordinator, and the principal from the intermediate school. In addition, one joint interview was conducted with the principal and assistant principal from the middle school, and another joint interview was conducted with the principal and assistant principal of the high school.

Numerous focus groups were also conducted to ensure that as many mathematics teachers and MIC coaches could participate. All participating teachers were invited to these focus groups, and five teacher focus groups were conducted: one with the four participating teachers from the intermediate school; one with two of the six participating high school math teachers; one with the remaining four high school math teachers; one with three of the six participating middle school math teachers; and one with the two participating special education teachers from the middle school. In addition, a focus group was conducted with the MIC coaches. That group comprised three of the four MIC coaches, as well as the Director of Teaching and Learning at the ASP who was overseeing the activities of the MIC coaches.

Characteristics of Grantee B

Table 5 provides a summary of Grantee B’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 5
General Characteristics of Grantee B’s MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	12
Grades Served	6-12
Number of Schools Served	3
Type of Schools Served	1 intermediate school, 1 middle school, 1 high school
Number of Teachers Served	18
Number of MIC Coaches Participating	4
Grant Amount	\$160,000
Grant Start Date	07/01/2008
Grant End Date	05/31/2010

Source: Grantee B’s Cycle 1 Application and Action Plan

Students

The diverse Grantee B student population was 27% African American, 42% Hispanic, and 30% White. Approximately half (54%) of Grantee B’s students were classified as “at-risk” and 84% of students were classified as low socioeconomic status (SES), as reported by AEIS for the 2007–08 school year. The high school dropout rate for Grantee B was 7% as compared with the state average of 4%, and the on-time graduation rate was only 62%. When asked to describe the students in the district, the principals added that many students have been retained, were coming to the school with a weak academic foundation, or lack mathematics skills in particular. The student population was also growing quickly, with enrollment at about 100 students higher than expected at the high school this year.

At baseline (2007-08), Grantee B students were performing below the state average on TAKS-Math, with as few as 36% of students meeting the standard on TAKS-Math in Grade 9. Table 6 shows the percentage of students in the district at Grantee B meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 6

Percentage Rates of Students in the District in Grantee B by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 6*	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee B	76%	65%	55%	36%	47%	60%
State of Texas	83%	80%	79%	64%	66%	80%

Source: Academic Excellence Indicator System (AEIS), 2007–08

Teachers

Four intermediate school mathematics teachers, six middle school mathematics teachers, two middle school special education teachers, and six high school mathematics teachers were participating in the Grantee B MIC pilot program. Of the 15 teachers who were participating in the teacher focus groups, experience ranged from first-year teacher to a teacher with 36 years of teaching experience. Five other teachers had between 16 and 28 years experience teaching mathematics. One teacher was certified as a master mathematics teacher and serves as the math chair at the middle school. Subjects that they teach included middle school mathematics, Algebra I, and Geometry. Seven of the teachers who participated in the focus groups were either serving as a resource teacher, special education teacher, or had a degree or certification in special education.

“Our teachers need to do a better job engaging students through manipulatives [physical objects used to aid in mathematics instruction] and integrating technology into their classroom.”

-MIC grant coordinator, remarking on the need for the MIC pilot program

Coaches

Four MIC coaches, all of whom were mathematics specialists, were provided to the Grantee B MIC pilot program by the ASP. Three of the four MIC coaches were present for the focus group. One coach also was functioning as the ASP representative and was working closely with the MIC grant coordinator. This MIC coach was assigned to the high school and was a Texas-certified master mathematics teacher. The second coach was also assigned to the high school and has 12 years of teaching experience. The third coach had 34 years of teaching experience and was certified to teach Grades K-8. The fourth coach, who was not present during the focus group, was certified in elementary mathematics and special education. In addition to the three MIC coaches, the Director of Teaching and Learning from the ASP participated in the focus group. The Director was supervising all four MIC coaches but was not providing direct coaching to Grantee B teachers. She had 27 years of teaching experience and had worked for the ASP for the past 11 years.

Overview of Grantee B MIC Pilot Program

Goals

According to the grant coordinator and ASP representative, the overall purposes of the MIC pilot program were to:

- Improve student learning through effective instruction.
- Provide for teacher development in the classroom
- Develop teachers' skills and knowledge in effective math instruction

Program Structure

During the phone interview in January 2009, the grant coordinator and ASP representative were both asked to describe the overall structure of their MIC pilot program. As a follow-up to this question, they were each asked one month later during the site visit to elaborate on specific aspects of the program, including the role of the ASP and the types of activities that have been implemented thus far.

As mentioned previously, all four of the MIC coaches were employees of the ASP. The MIC coaches were responsible for planning the coaching sessions and working with school administrators to implement the program according to their action plan. The school district's Director of Secondary Education was serving as the MIC grant coordinator and was responsible for coordinating schedules with MIC coaches and teachers, reporting progress to both the school administration and to the Texas Education Agency, and maintaining regular contact with the ASP.

"We are available to give teachers the help they need and ideas to make the materials more engaging. We emphasize the questioning technique that teachers can use to engage the [students]."

-MIC coach, describing the coaches' role in the MIC pilot program

Grantee B was using a *cognitive coaching* model to guide its MIC pilot program. This model involved asking teachers questions that guide their thinking about math pedagogy. The model also was helping teachers think through and successfully navigate a number of common processes that arise during instruction, including: (a) making decisions about the effectiveness of their instruction, (b) planning for making adjustments, (c) identifying what was needed to move forward, and (d) correcting any issues that raise concern. The team also was using a number of associated resource materials that was supporting and informing the MIC pilot program (Feger, Woleck, & Hickman, 2004; Felux & Snowdy, 2006; Hasbrouck & Denton, 2005; Knight, 2007). These resources were providing information about developing relationships in an environment that supports teachers and shows them how to be comfortable with the dialogue and classroom observations. The goal was to facilitate collaboration and for teachers to support each other.

Coaching and Professional Development Activities

Coaching Activities and Teacher Participation

Activities. During the early implementation stage of the MIC grant, coaching sessions with teachers were being conducted in a small group format at the campus level. In addition, teachers were meeting with their respective MIC coaches for brainstorming sessions during which they would work together to explore various teaching

strategies. These meetings were an important component of the campus-level sessions when the program first began. However, at the request of the school district administration, the small group meetings with teachers were being replaced with monthly, three-part coaching sessions between

"We constantly try to maintain a focus on building relationships with the teachers and being viewed as a resource...."

-MIC coach, describing the coaches' role in the MIC pilot program

"I think it's a great idea. I'm a former coach so I recognize how important coaching can be. I like the idea of an outside person coming in to see how things can be improved."

-High school administrator, commenting on the value of coaching

individual MIC coaches and teachers. The first phase of the coaching activities involved an initial meeting between a teacher and his/her respective coach. The main purpose of the meeting was to select a lesson or classroom activity to be delivered by the teacher in the classroom. During the second phase, the classroom observation was taking place, where the coach had the

opportunity to observe the teacher's implementation of the selected classroom activity or lesson during scheduled class time. Finally, for the third phase, the teacher and coach would hold a post-observation conference where the coach provides feedback to the teacher using a *cognitive coaching* model, and makes suggestions for improvement of the lesson or activity. The three components for each coaching session were to be completed within a seven-day period. Coaches reported a great deal of communication with teachers by e-mail and telephone during the period between coaching sessions.

Participation. Participation in coaching was mandatory for all teachers assigned to the MIC pilot program. According to the MIC coaches, the level of engagement varied, with less experienced teachers showing the most enthusiasm for the program. The nature of the topic also was influencing the level of engagement. For example, MIC coaches and teachers reported a favorable response to coaching that dealt with student engagement in math activities and the use of manipulatives, or physical objects used to aid in mathematics instruction, in the classroom.

Professional Development Activities and Teacher Participation

Activities. Teachers had not participated in professional development activities as part of the MIC program. The program was emphasizing coaching rather than professional development.

Participation. Teachers were encouraged to participate in professional development activities that were taking place outside of the Grantee B MIC pilot program.

District/Campus Administrator Participation in Program Activities

At the intermediate school, administrators were taking an intentional “back seat” so teachers could view the program as non-threatening. Administrators were being kept abreast of the MIC pilot program’s progress by speaking with teachers and MIC coaches about the activities. Coaches would check in with school administrators on every campus visit. Similarly, administrators at the middle school were not attending any of the coaching or observation sessions. They were of the belief that teachers needed to consider the coaching as developmental rather than evaluative. Like the intermediate school administrators, they also would speak with teachers and MIC coaches regularly about the MIC pilot program’s progress. One of the high school administrators, who was a former coach and recognizes the importance of coaching, was attending all the sessions with teachers and MIC coaches. Coaches and teachers would provide the high school administrators with progress reports on a quarterly basis.

“I take an intentional back seat so the program is seen as non-threatening...and teachers can feel open and honest...”

-Intermediate school principal, describing administrator participation in the MIC pilot program

Other Mathematics Programs in the District

To more fully understand the context under which the MIC pilot program was being implemented, it was helpful to know what other mathematics enrichment programs, if any, students may be attending within the district. At the intermediate school, before school and after school math tutorial sessions were offered to students. There was also a Saturday mathematics enrichment program, another program that has math interventionists from other grades assisting math teachers, and students would have access to mathematics computer software programs during school hours. At the middle school, teachers were being encouraged to take advantage of professional development opportunities that they feel will help their instruction. According to the principal and assistant principal of the high school, students were being offered before school and after school mathematics tutorials, a Saturday mathematics tutoring program, and a program they refer to as “blitzes,” which were three-hour concentrated courses that each focus on one math objective. In addition, high school students and teachers were to have access to a computer software program and a TAKS-specific class. Administrators at the high school were encouraging teachers to take advantage of professional development opportunities.

MIC Pilot Program Implementation

Barriers to Program Implementation

According to MIC coaches, a primary barrier was that it was difficult to implement the pre-observation meeting, the classroom observation, and the post-observation meeting within seven days. However, because the school district and the teachers had preferred the seven-day schedule, MIC coaches were working to implement the coaching sessions within the preferred timeframe. Several teachers also commented that the program activities would be more successful if district program leaders were better organized and the content was synchronized with their teaching schedules.

"There is really a lack of planning and organization on the part of the program. [The district program leaders] need to get us ideas in advance. It's all too rushed."

-Intermediate school teacher, describing a barrier to successful program implementation

An additional barrier, from the ASP representative's perspective, had involved the interpretation of the concepts of *coaching* and *professional development*. School district administrators interpreted the small group sessions held by MIC coaches at the beginning of the grant period as professional development. It was the district's wish, however, that the program focus on coaching. Coaches felt that the small group sessions were part of the coaching experience but agreed to follow the district's directive and eliminate the small group sessions.

Coaches believed that eliminating the small group sessions created an additional barrier by removing an activity that had previously served to boost participating teachers' morale, among other things. The small groups allowed teachers to share ideas, build camaraderie, generate trust among each other and with their MIC coaches, and stimulate collaboration. The small group meetings set the stage for the three-part, one-on-one coaching sessions. Coaches believed that the MIC pilot program's focus on classroom observations had led teachers to feel the observations were actually evaluations of their teaching rather than sessions in which MIC coaches could offer support and suggestions for improvement. This belief was confirmed in one of the focus groups with teachers.

Finally, the MIC coaches' efforts to build trust and rapport with teachers had been an ongoing challenge. Coaches believed that to some extent, teachers viewed them as outsiders and not well received because the MIC coaches were not part of the school district staff. The intermediate school principal noted difficulty gaining buy-in from teachers in the early stages of the project because they initially saw it as another evaluation of their performance. The principal believed that although it had taken time, teachers' commitment to the project was increasing, and the MIC coaches believed they were overcoming teachers' resistance and were beginning to be viewed as resources rather than evaluators.

Facilitators to Program Implementation

The school district personnel believed that these same barriers will be worked out as the program continued, and they would be making efforts to involve all stakeholders in the planning meetings to address the issues of concern. The school district and ASP both reported an improvement in their relationship, and both MIC coaches and school district personnel had taken positive steps to

overcome the difficulties experienced during the implementation stage. Thus, open communication had facilitated the process to move forward.

One clear facilitator to program implementation from teachers' perspective was the high quality and clear commitment of the MIC coaches. Even when teachers criticized the implementation of the MIC program, they almost always came back with a positive comment about the MIC coaches. Comments often involved the success teachers had had with activities and teaching techniques suggested by MIC coaches. One teacher, for instance, remarked, "[The coach] reminds me to gear my lesson to the [students'] level. This is very helpful." Another teacher stated, "Some of the games [the coach] suggests have been great in helping the [students] learn." Teachers were also very satisfied with the high level of responsiveness MIC coaches have displayed with regard to questions and follow-up communications, such as one teacher who commented, "[The coach] has been great getting back to me on questions and prompt on e-mails. [The coach] is very positive and pleasant. I know if we ask, [the coach] can provide more resources."

"[Our coach] is very enthused. She's very good at offering suggestions. She encourages hands-on activities and I'm very appreciative of that. It's really useful for a young teacher like me."

-Grantee B high school teacher, remarking on helpful aspects of the MIC pilot program

Relationship between Grantee B and the ASP

The ASP and the grant coordinator interpreted the goals of the MIC program differently, but had worked together to form a unified approach to implementation. Initially, the school district's goal was to emphasize the coaching aspect of the program rather than to provide professional development. However, the ASP implemented a coaching program that included small group sessions with the MIC coaches and teachers that were comparable to professional development activities. There were also differences in the timeline used to complete each coaching session. The teachers and school district believed that it was much more meaningful to have the pre-observation meeting, the classroom observation, and the post-observation meeting within a seven day period. The ASP initially did not agree with this, but started to adhere to the request that all three components be completed within seven days. As a way to foster an effective working relationship with school administrators, MIC coaches would meet briefly with them each time they would visit the campus for a meeting with teachers or for a coaching session. Despite the differences in opinion regarding program activities and timelines, the MIC grant coordinator reported that the relationship between the district and the ASP was favorable. In addition, the middle school principal was quite satisfied with the level of feedback provided by the ASP. He explained that the ASP "provides a lot of communication with what's going on in the classrooms and what [the MIC coaches] were seeing in the observations."

"[The ASP staff] really have been wonderful."

-Middle school principal, commenting on the district's relationship with the ASP

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and MIC coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics

- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: A New Sense of Ownership and Confidence

The site visit team asked the MIC coaches, the grant coordinator, and the principals to describe how they believe the MIC pilot program activities have affected teachers' beliefs about teaching mathematics. The middle school principal noted a renewed sense of ownership for teachers in that the teachers were more willing to take on the responsibility of ensuring that students were learning rather than just presenting the content. The high school principal observed that teachers seem to be gaining new perspectives on teaching, a sense of encouragement from MIC coaches, and the confidence to share their love of math with students. Many of the teachers thought either it was too early to tell or they did not feel the program had really changed their own beliefs about teaching mathematics. A few teachers, however, did report gaining new ideas, a new sense of freedom, and a feeling of support during feedback from the coach after a classroom observation. In sum, participants reported the following effects of the MIC coaching activities on teachers' beliefs about teaching mathematics:

"I've seen more confidence in my students because I'm more confident. The game ideas [the coach] has given me have really helped me. I definitely have a positive outlook on the program."

-Intermediate school teacher, commenting on how the coaching has helped her teaching

- Teachers reported that the coaching activities had helped them feel free to shape classroom activities as they wish if the activities have been shown to be effective.
- Teachers have taken more ownership of what is happening in their classrooms.
- The MIC pilot program had reinforced teachers existing beliefs to put the students first and give the students the best education possible.
- The coaching had given teachers a sense of encouragement and support for their teaching needs.

Making a Difference in Student Learning of Mathematics

The MIC coaches, grant coordinator, and principals provided observations of how program activities had affected teachers' sense that they can make a difference in their students' learning of mathematics. Among these site visit participants, there was consensus that things were moving in a positive direction. For example, the high school principal remarked that the mathematics expertise of the MIC coaches was essential to providing

"[The coaches] have more current ideas. They are not restricted. Instead of saying, 'Here's this, this, and this,' the coaches have given us more freedom and more choices. [They] have come up with ideas that I really haven't thought of."

-Middle school teacher, on how the MIC pilot program has affected her sense she can make a difference in her students' learning

teachers with effective tools for student learning. Teachers were enthusiastic about the extent to which the MIC coaching activities had affected the extent to which they could make a difference in their students' learning. One teacher commented that initial hesitation about the program turned into positive feelings about teaching after seeing the activities and receiving feedback. Other teachers commented that the program had given them a sense that their efforts were being rewarded in the form of enhanced student success and engagement. Finally, one of the resource teachers indicated familiarity with mathematics-specific learning techniques that could be used with students due to the coaching. Teachers reported that the engaging activities they use in the classroom were resulting in increased student engagement. In sum, participants reported the following effects of the MIC coaching activities on teachers' sense that they could make a difference in their students' learning of math:

- Teachers have access to more engaging activities to help students learn.
- Feedback from MIC coaches is reinforcing and positive. It had boosted teachers' morale, which had boosted student morale in positive ways.
- Teachers reported a new sense of efficacy in the classroom, as they saw visible student progress and increased student engagement.
- Teachers had become more open to suggestions from MIC coaches with regard to effective teaching practices.
- Resource and special education teachers had been gaining new math-specific teaching skills and activities and had been using these skills with students.

Teachers' Math Content Knowledge and Eagerness to Learn

The principals at the three Grantee B schools reported that their teachers were already strong in mathematics content knowledge before the MIC pilot program began, so the program was instead focusing on enhancing delivery of instruction. According to MIC coaches, the program was filling some content knowledge gaps among teachers but the true opportunities to review math content were during the professional development sessions that were eliminated during the early stages of the project. The most positive effects of coaching activities on teachers' self-reported content knowledge in mathematics occurred at the intermediate school level (Grade 6); however, middle school and high school teachers reported minimal effects of coaching activities on their content knowledge. Responses were based on feedback from teachers to MIC coaches and principals, or on teacher self-report to the interviewer.

Although participants did not report many program effects on teachers' content knowledge, teachers at all levels remarked that participation in the MIC pilot program had positively impacted their enthusiasm for learning new content and instructional techniques in some way. One middle school teacher noted that the coaching sessions were just the push needed to properly implement the curriculum adopted by the school district. She remarked, "The coaching was the [motivation] that I need to actually use this stuff in class." One of the MIC coaches also expressed the teachers' eagerness to learn in stating, "We have several teachers who were very 'gung-ho.' [The teachers] were just eating this stuff up. They really want to hear techniques." In sum,

"We have several teachers who are very 'gung-ho.' They are just eating this stuff up."

-MIC coach remarking on teachers' eagerness to learn

participants reported the following effects of the MIC coaching activities on teachers' mathematics content knowledge and eagerness to learn new material:

- Because there was already a strong baseline level of teacher mathematics content knowledge when the MIC pilot program began, the district chose to instead focus on enhancing delivery of instruction.
- Though some teachers reported increased content knowledge, most reported that it is minimal.
- Teachers at all levels reported an eagerness to learn new material and had demonstrated enthusiasm during participation in MIC pilot program activities.

Student Engagement and Performance

At the time of the Grantee B site visit, students had not yet taken the TAKS for the 2008–09 school year, so any effects of MIC pilot program participation by teachers were unknown. Participants were unsure if the MIC pilot program would make a difference in test scores after such a short period of implementation, but they did express that the program was showing teachers how to deliver engaging mathematics content and activities, and that the enhanced instruction was related to a notable increase in student engagement. An MIC participant from the high school reported that students' class participation has been higher and attributed this to the coaching program. Overall, participants did not feel the MIC pilot program would affect dropout rates, and the possible effects on other academic indicators such as graduation, promotion, course completion rates, or SAT/ACT scores were unknown. However, both the grant coordinator and the intermediate school principal had observed reduced failure rates in mathematics courses. They felt the MIC program would positively influence promotion and course completion rates, though they will not have hard data until the end of the school year.

"The kids are definitely involved."

-Middle school teacher, commenting on students' engagement since MIC pilot program activities began

Sustainability and Enhancement

The ASP and the grant coordinator had not discussed continuation of the MIC pilot program beyond the grant award period, but most participants were in favor of continuing the program in the school district. The district administrators were unanimous in their belief that the district should build its coaching capacity to continue the program with existing staff. They were planning that transition now by training a teacher to become an MIC coach. Intermediate school teachers were pleased with the program but believed it should have more emphasis on coaching and less on evaluation of teachers' performance. Participants in one of the high school teacher focus groups reported they did not believe the program should be continued as it was currently structured because it consumes too much of their instructional time. They recommended that the program instead include professional development at the ASP and visits to successful school districts. Participants recommended the following program changes:

"I can see the program running beyond the grant period in the form of an internal coach. We would carry it on that way."

-Intermediate school principal, on the sustainability of the MIC pilot program beyond the grant period

- Continue the program with an internal coach from the district.
- Reconstitute the small group coaching sessions with teachers.
- Include small group sessions by grade level that involve best practices and lessons learned, and then build coaching sessions around the best practices discussed in small groups.
- Hold coaching sessions twice a month rather than once a month.
- Enhance the organization of the program so it makes better use of time.
- Structure the program so the coaching topics coincide more with the content being covered in the classroom.
- Include more opportunities for communication and collaboration between teachers.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. The intermediate school principal shared thoughts about what the MIC pilot program had brought to the district. The intermediate school principal explained, "I'm just thankful we are able to have the opportunity. Sixth grade math scores have always been a concern for us so it's so great to have a resource to build on." The middle school principal also expressed sentiments about the MIC pilot program stating that, "I think it's a great program because it gives us more people to promote the concepts that [school leaders] think are important." Lastly, an intermediate school teacher remarked that, "I've seen more confidence in my students because I'm more confident. I definitely have a positive outlook on the program."

Summary/Conclusions

Grantee B is a diverse, suburban school district composed of 27% African American students, 42% Hispanic students, and 30% White students. Three schools serving students in Grades 6-12 in the district were implementing the MIC pilot program. The district typically has a high rate of high school dropout and many students were characterized by a weak foundation in math and/or perform below average on standardized math assessments. The MIC pilot program was being implemented to address these issues by enhancing the quality of mathematics instruction in the district. Grantee B's MIC pilot program was using the *cognitive coaching* model, which involved asking teachers questions that guided their thinking about math pedagogy. There was also a focus on facilitating support and collaboration among teachers through collaborative dialogue. In total, there were 18 teachers and 4 MIC coaches participating in the MIC pilot program. In the early stages of the project, the teachers were attending professional development sessions at the ASP where they discussed content and shared ideas. The district felt this format did not allow for enough coaching and these professional development sessions were replaced with monthly, one-on-one coaching sessions. The current format involved a three-step coaching process that consisted of an initial meeting between a teacher and his/her respective coach to discuss a lesson plan, a classroom observation, and a post-observation meeting where the coach and teacher reviewed the lesson and discuss areas for enhancement. All three steps of each coaching session took place within a seven-day period.

In general, teachers and MIC coaches reported that this seven-day timeline was a barrier to program implementation because it made the coaching feel "rushed" and somewhat unorganized. They also remarked that removing the small-group professional development sessions removed some positive impact of the program, namely the opportunity for teachers to share ideas, build camaraderie,

generate trust amongst each other and with their MIC coaches, and stimulate collaboration. Finally, participants report that teacher buy-in has been a challenge because MIC coaches were seen as outside evaluators of their performance rather than useful resources, especially since the program re-focused on the classroom observations. At the time of the site visit, however, both administrators and teachers reported that trust and buy-in had improved, and all were having more positive feelings about participating in the MIC pilot program. This positive change was attributed largely to open communication between stakeholders and the high quality and commitment of the MIC coaches themselves. Teachers reported that the suggestions and support from MIC coaches were helping engage students in the classroom, and they were pleased with the level of responsiveness MIC coaches display to follow-up communications between coaching sessions.

Participants reported positive changes for both teachers and students because of Grantee B's MIC pilot program. Teachers had a new sense of ownership over their teaching and can shape classroom activities using the new and engaging activities and techniques they have acquired during coaching sessions. Although teachers reported only minimal affects of program participation on their content knowledge, they did report feeling more supported, encouraged, and confident in their teaching. Teachers could also see their stronger commitment and morale translating into increased participation and engagement from their students. Since students had not yet taken the TAKS at the time of the site visit, it was difficult to determine what the effect of the MIC pilot program would be on standardized mathematics testing. However, principals from the schools noted that failure rates had been reduced in mathematics classes, and this could, in turn, translate to higher promotion and graduation rates at the end of the school year.

Responses were somewhat mixed with regard to whether the program should be continued and in what form. District administrators felt strongly that the program should continue with internal MIC coaches from the district. Some teachers supported continuation of the program under certain conditions, namely that it be better organized, coaching made more frequent, and the small-group professional development sessions that were initially part of the program be included. The remaining participants were very pleased with the program and the positive effects they saw on teaching effectiveness and student outcomes. They supported the MIC pilot program and felt it would be beneficial to continue it beyond the two years of the grant.

Case Study: Grantee C (Cycle 1)

Methodology

In February 2009, a site visit took place at Grantee C, a large, urban, independent school district in Texas. Teachers from one middle school, eight high schools, and one alternative academy for students in Grades 9-12 were participating in the MIC pilot program. The site visit team made efforts to meet with as many participants of Grantee C’s MIC pilot program as possible. The site visit team conducted interviews with the principal of the participating middle school, principals from three of the eight participating high schools, and the principal of the academy. The team also interviewed the MIC grant coordinator and conducted a telephone interview with the ASP representative. Finally, the site visit included focus groups with MIC coaches and teachers. One focus group was conducted with 6 of the 8 MIC coaches and a second focus group was conducted with 4 of the 14 participating mathematics teachers.

Characteristics of Grantee C

Table 7 provides a summary of Grantee C’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 7
General Characteristics of Grantee C’s MIC Grant Program

Category	Characteristic
Setting	Urban
ESC Region	20
Grades Served	7–12
Number of Schools Served	10
Type of Schools Served	1 middle school, 8 high schools, 1 academy
Number of Teachers Served	14
Number of MIC Coaches Participating	8
Grant Amount	\$225,000
Grant Start Date	06/01/2008
Grant End Date	06/30/2009

Source: Grantee C’s Cycle 1 Application and Action Plan

Students

Grantee C was a large, urban school district serving almost 55,000 students. According to AEIS indicators for the 2007–08 school year, the ethnic distribution of the district was 89% Hispanic, 8% African American, and 3% White. Almost three-quarters (68%) of students in the district were considered at-risk for dropping out of high school and the majority (88%) was considered economically disadvantaged (low socioeconomic status.) In fact, the AEIS recorded high school dropout rate for Grantee C in 2007 was 8%, double the state average, and the on-time graduation rate was only 61%. Because the MIC pilot program was designed to target the most at-risk schools and students, it does not come as a surprise that principals at participating schools reported even higher percentages of students with risk factors, including 73-94% economically disadvantaged and 90-100% considered at-risk for dropping out of school at the high schools. The middle school principal cited 98% of students in the school as economically disadvantaged and 93% at-risk, according to AEIS indicators, and the principal at the academy (Grades 9-12) reported that all academy students (100%) were considered at-risk. Other common risk factors cited by participants include a high percentage of students from single parent homes, poor attendance, teenage pregnancy, high mobility, limited English proficiency (LEP), and overall lack of motivation and/or academic success. With the highest concentration of struggling students, the academy (as described by its principal), provides a “small, nurturing environment” that uses “individualized, differentiated instruction” with students who cannot thrive in the traditional high school setting.

“The majority of our students have a hard time staying motivated and focused. We have to work to make the lessons exciting.”

-MIC pilot program high school teacher, describing Grantee C students

“We have a large group that comes to 6th grade with no confidence in their ability to do math.”

Middle school principal, describing the math ability of students at her school

At the baseline (2007-08), Grantee C students performed below the state average on TAKS-Math. Table 8 shows the percentage of students in the district at Grantee C meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 8

Percentage Rates of Students in the District in Grantee C by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee C	64%	67%	48%	47%	62%
State of Texas	80%	79%	64%	66%	80%

Source: Academic Excellence Indicator System (AEIS), 2007–08

When asked to describe students in the district, the Grantee C grant coordinator confirmed the students were struggling in math, and added that data from the Student Success Initiative (SSI) show

that freshman high school students promoted from middle school had gaps in their algebra knowledge. The principal at the middle school explained that the campus had “inherently been a low performing campus” and also reported that one-quarter (25%) of their students had not passed the Grade 5 TAKS but were promoted to Grade 6 anyway. This can happen when after a third time of not passing the Grade 5 TAKS, a student’s case was sent to the Grade Placement Committee (GPC) committee and a decision was made to promote the student. It was clear that difficulties in the math competencies of high school students in Grantee C’s district were widespread and start as early as the primary grades.

Teachers

The MIC grant coordinator provided an overall description of the 14 Grantee C teachers participating in the MIC pilot program. This overview was helpful because many of the principals/teachers were not able attend the site visit interviews/focus groups themselves. According to the grant coordinator, all participating teachers were considered novice, either because they were in

“Teachers are honored and excited to be included. They bring enthusiasm to the project.”

-MIC grant coordinator, remarking on participating teachers

their first three years of teaching or because they were teaching a new subject or grade level for the first time. Approximately one-third of these teachers had alternative teaching certifications (not gained through the traditional undergraduate college teacher education program route for certifying teachers). Most of the participating teachers were also Latino/Hispanic, which corresponds well to the ethnicity and culture of the majority of the student body. Two high school teachers and two middle school teachers participated in the teacher focus group. The middle school teachers both

“First year teachers...are like sponges. They have needs all over the place. They have content [deepening] needs, instructional strategy needs, and they need to better understand the vertical piece - how [the] 6th grade [material] relates to the 7th and 8th grade [material].”

-Middle school principal describing the needs of middle school teachers participating in the MIC pilot program

had bachelor’s degrees and were in their first years of teaching. The principal at the middle school reported that both teachers had participated in professional development before but still have many professional development needs, as do many first-year teachers. One of the high school teachers had a master’s degree in science education with eight years of teaching experience and was in the first year of teaching mathematics. The other high school teacher had two years of teaching experience. Both high school teachers were teaching Grade 9 Algebra, and one was teaching Geometry as well. The high school principals who participated in site visit interviews also reported on the experience and needs of their teachers (some of whom were not

present at the teacher focus group). Experience ranged from a first-year math teacher to one teacher with four years of math teaching experience. One participating teacher had just returned from retirement and was hoping to benefit from the MIC pilot program because it would help him become more familiar with TAKS. Finally, one high school principal noted that a participating teacher had strong content knowledge and classroom management skills but would benefit from the MIC program because the teacher struggles with differentiating instruction for students at varying ability levels.

Coaches

The Grantee C MIC pilot program has eight MIC coaches working with teachers to fulfill the goals of the grant. All MIC coaches were Level 5 mathematics teachers (math experts) from participating schools. At the time of the site visit, the six MIC coaches who participated in the focus group had from 4 to 39 years of teaching experience. Two of the six teachers were department chairs at their high schools and one teacher was a math coordinator. Four of the MIC coaches had master's degrees and all were certified to teach secondary mathematics. The courses the MIC coaches were teaching include Algebra I and II, Geometry, Pre-Calculus, and pre-Advanced Placement (AP) Geometry.

Overview of Grantee C MIC Pilot Program

Goals

According to the grant coordinator and ASP representative, the overall purposes of the Grantee C MIC pilot program were to:

- Reduce teacher attrition, especially among new teachers
- Provide support for new teachers
- Build and increase teachers' content knowledge in mathematics

Program Structure

During a phone interview in January 2009, the grant coordinator and ASP representative were both asked to describe the overall structure of the MIC pilot program. As a follow up to this question, they were each asked one month later during the site visit to elaborate on specific aspects of the program, including the role of the ASP and the types of activities that have been implemented thus far.

During the early stages of the Grantee C MIC pilot program, the district had selected 10 schools to participate in the program. The district had asked the schools' principals to select at least one Level 5 teacher (an expert in the content area) to serve as an instructional coach. Each coach then had selected one or more novice teachers at the school who were struggling in the content area to serve as a "mentees" during MIC activities. The Grantee C program had been designed to provide MIC coaches with training (through the ASP) in content and instructional strategies so the MIC coaches could use this training in coaching sessions with participating teachers.

The MIC program in Grantee C's district included both a professional development component and a coaching component. The professional development component, developed and delivered by the ASP, was being attended four times a year by MIC coaches. There was also an online community message board, managed by a mentor at the ASP, where MIC coaches could interact with a mentor from the ASP and post suggestions for lesson plans. Coaching sessions between MIC coaches and teachers were occurring a minimum of twice monthly, although MIC coaches and teachers reported interactions that were more frequent. The MIC coaches' role was to share the knowledge and training they were receiving from the ASP with their teachers through the coaching component of the

program. The ASP had also assigned a mentor who comes out to the campuses to facilitate the implementation of lessons.

The district provides funding for substitute teachers so MIC coaches could have time off to conduct classroom observations and debrief lessons with participating teachers. The MIC coaches also were receiving a stipend to offset additional time spent on the project. One of the MIC coaches' responsibilities was to meet with the grant coordinator every quarter and to provide the grant coordinator with the debriefing notes from each coaching session. The grant coordinator reported that attendance from MIC coaches at these meetings had been good. During the meetings, the grant coordinator and coach discussed whether coaching sessions had involved co-teaching, observations, or lesson planning. The coach also reported observations of progress, challenges, and accomplishments with regard to coaching activities that have taken place over the quarter.

Coaching and Professional Development Activities

Professional Development Activities and Teacher Participation

Activities. The ASP was developing and delivering a professional development program that was focusing on lesson planning and deepening content knowledge in mathematics. Grantee C's MIC coaches were to attend the training sessions four times a year. At the time of the site visit, MIC coaches had attended sessions in September and December of 2008. The professional development provided by the ASP also included one-on-one follow-up sessions with a mentor, a summer institute, and an online component to assist with lesson planning. Grantee C's MIC coaches were scheduled to participate in the summer institute in June 2009. The two-week institute was to include math modeling, probability, and statistics. Participants were evaluating all professional development activities and the ASP was using the feedback for continuous improvement of their services.

"Teachers stay in dorms and live and breathe math and science correlation instruction."

-ASP representative, describing the 2-week summer institute coaches will participate in as part of the MIC pilot program professional development

Additionally, each month a mentor from the ASP would post material on an online community blog where MIC coaches could share ideas about math instruction. Specifically, the mentor would post a new mathematics lesson and the MIC coaches were required to review the lesson plans and provide feedback. The posted lessons were aligned with the TEKS. The goal was for MIC coaches to use the lesson plans in their classrooms and share them with the teachers. Although the MIC coaches were reading the lesson plan postings, the ASP reported only minimal feedback to date on the postings' usefulness in the classroom and the extent to which they were being shared with the teachers. Use of the internet-based lesson plans was expected to increase as Web cameras enhance the program's videoconferencing capabilities.

Participation. Teachers had not been participating in the professional development activities developed by the ASP. The program design called for MIC coaches' participation in the MIC professional development activities with the goal of sharing new knowledge and instructional strategies through the coach-teacher relationship. Other opportunities existed outside the MIC program for teachers to attend professional development. For example, numerous teachers from Grantee C were participating in a professional development activity sponsored by a local university.

Coaching Activities and Teacher Participation

"I introduce them to state requirements, bring new ideas from workshops, and give suggestions in teaching but [also] empower them to use their knowledge. A lot of it was empowerment."

-Grantee C coach, describing her role in the MIC pilot program

Activities. Coaching sessions could consist of co-teaching, classroom observations, debriefing sessions, lesson planning, or instructional modeling. For instance, MIC coaches were working with teachers on adapting curriculum and instruction to students' ability levels, particularly with students in special education. Through coaching, teachers also were learning how to engage students, how to develop TAKS-related activities, and how to use manipulatives (physical objects used to aid in mathematics instruction) for hands-on activities. Other valuable topics of

discussion between MIC coaches and teachers included working with parents (especially those who were hard to reach), teaching material in a number of different ways, developing lesson plans that integrate math and science, and accomplishing effective classroom management. Coaches also were stressing the importance of increasing novice teachers' confidence in the classroom and empowering these teachers to utilize their content knowledge in new and interesting ways.

The program called for a minimum of two coaching sessions per month. The frequency varied, however, depending on a number of factors. One factor was the size and layout of the school. Interactions between coach and teacher were more frequent when MIC coaches' and teachers' classrooms were close together. Another factor was the planning time assigned to coach and teacher. Coaches and teachers with common planning periods were meeting more often, sometimes daily, and MIC coaches sometimes were meeting with teachers on their own time.

Participation. The MIC coaches reported full participation in the coaching sessions and enthusiasm on the part of teachers. Most of the teachers were novice teachers who were welcoming the mentoring and the assistance with content and instructional strategies.

District/Campus Administrator Participation in Program Activities

Respondents indicated there was limited participation by administrators in MIC pilot program activities. Administrators sometimes would conduct "walk-throughs" in teachers' classrooms and MIC coaches reported that MIC coaches and teachers generally viewed these walk-throughs, sometimes occurring during the coaching sessions, positively. Administrators also were keeping tabs on the program's progress through regular updates and feedback from MIC coaches and teachers and were supporting the program by approving substitutes when MIC coaches were away from the campus for training. One principal was having regular meetings with participating teachers to discuss better ways to identify students who were at risk of failure in mathematics.

Other Mathematics Programs in the District

To understand more fully the context under which the MIC pilot program was being implemented, it was helpful to know what other mathematics enrichment or professional development programs, if any, students and teachers in the district may be participating in. For students, the district was implementing a program that allows them to earn college credit in physics and calculus by attending classes taught at the local university. Individual campuses also use an assortment of software and Web-based programs, including video games, to assist students with tutorials, increase student

performance on tests, and complement the classroom instruction students receive. For teachers, the Grantee C school district works with the local university on a teacher quality grant. Through this grant, forty teachers from the school district participated in a program that emphasized strengthening content knowledge and developing more effective lesson plans.

MIC Pilot Program Implementation

Barriers to Program Implementation

One of the elements of the professional development component provided by the ASP included the use of a Web camera for videoconferencing between MIC coaches and the ASP. This had not occurred due to the fact that the infrastructure was not in place. This delay was to be resolved by the beginning of the second year of the grant and the technology would enable MIC coaches to interact with the trainers and include lesson modeling without the need to travel to the ASP's location.

The frequency of interaction between coach and teacher was affected by both planning schedules and the proximity of coach and teacher classrooms or offices. One coach described how difficult it was to meet with the teacher due to the size and layout of the school. Other MIC coaches confirmed that meetings were easier to schedule when coach and teacher have classrooms or offices that were near each other and have the same scheduled planning periods.

The school district was eager to involve MIC coaches in more intensive training that covers how to be an effective coach. Scheduling conflicts due to TAKS testing, however, had been barriers that the district hoped to overcome in the second year of the grant. The district was going to continue to look at several options for training and dates that would not conflict with TAKS administration. The principals of the school had been flexible and had released teachers for professional development on Fridays, despite the district's policy that teachers were not to be released for training on Mondays or Fridays.

Finally, the ASP representative also reported that the program had experienced some barriers that were typical for any teacher professional development program, such as modest initial motivation and self-efficacy from teachers. The ASP recognized this and was implementing the professional development so the relevance to daily instruction was high. Another way the ASP had addressed these issues was to provide time for lesson planning within the coaching sessions so teachers did not have to use their own free time to improve their teaching.

Facilitators of Program Implementation

According to the MIC grant coordinator, there were multiple facilitators to Grantee C's MIC pilot program implementation worth noting. First, a "kick off" meeting with MIC coaches, principals, and district personnel was held when the project began, and the grant coordinator felt this helped MIC coaches and teachers see participation in the project as a valuable opportunity. Second, the quarterly meetings conducted between MIC coaches and the grant coordinator had been helpful because

"[Coaches] are enjoying the opportunity to learn, grow, and share the knowledge gained with other coaches and teachers."

-MIC grant coordinator, remarking on the benefits of a professional development stipend provided to coaches by the MIC grant

MIC coaches could discuss the strengths and challenges of the program and share what they had learned from the professional development. The grant coordinator reported that MIC coaches “have enjoyed this opportunity and this aspect [of the program] has been successful.” Finally, the grant coordinator felt the monetary incentives provided to MIC coaches for their time and effort toward the program had been key in keeping motivation and buy-in high, and reducing the sacrifices MIC coaches had to make to participate. For instance, the district was paying for travel/mileage for MIC coaches when they would travel to the ASP for professional development, was providing an allowance/incentive (supplemented with campus funds) for MIC coaches to attend a math workshop or conference of their choosing, and a \$4,000 stipend was to be paid to MIC coaches who completed all the components of the program including attending all trainings, meetings, debriefings, and professional development.

“What has been most helpful is meeting every day and having constant communications [with my coach].”

Middle school teacher, discussing
MIC pilot program coaching
activities

Teachers and MIC coaches also noted elements of the MIC pilot program they felt were facilitating implementation. Overall, teachers were grateful for the constant communication the program afforded them with coaches, but common planning periods and classroom proximity allowed for even more opportunities for informal coaching and questioning. A supportive department chair could also be a facilitator, particularly in cases where the coach was not available and the teacher needed immediate feedback on a classroom or student situation. A department chair who was knowledgeable about the MIC pilot program, the teachers’ needs, and the coaches’ objectives could be beneficial to both an MIC coach and teacher. Coaches also reported that the lesson plans, probes, and activities provided by the ASP had been very helpful for the coaches’ work with teachers. These lesson plans would be enhanced by the use of videoconferencing once the Web cameras were in place. Because coaches had their own teaching responsibilities, the fact that the program was allowing them one class period per day to meet with teachers had enhanced the coaches’ ability to provide effective coaching.

Relationship between Grantee C and the ASP

The MIC grant coordinator and representatives from the ASP were holding meetings to discuss coaches’ training needs and the progress of the professional development sessions provided by the ASP. The grant coordinator felt the district made a good choice in choosing this particular ASP. The support had been beneficial for coaches and teachers and the grant coordinator was appreciative of that. The grant coordinator also expressed the feeling that math teachers can sometimes think they already knew it all, but the ASP had been able to tap their interests and make them enthusiastic about increasing their content knowledge. The grant coordinator was optimistic about continuing a relationship with the ASP beyond the MIC grant funding period. Frequent interactions would also occur between the MIC coaches and the ASP and this relationship included regular communication and planning. Coaches and ASP personnel were using e-mail and telephone to communicate during periods between the professional development sessions. MIC coaches also were providing feedback on the quality and relevance of training following each professional development session provided by the ASP.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' and MIC coaches' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: Confidence and Enhanced Instructional Techniques

The site visit team asked the coaches, the grant coordinator, and the principals to describe how they believed the MIC pilot program activities had affected teachers' beliefs about teaching mathematics. Teachers reported that participating in the MIC pilot program had strengthened their belief that mathematics instruction needed to be hands-on and interactive to be effective. It had also reinforced the notion that although the math content may be easy for the teachers to understand, it did not always come so easily to students, so the teachers needed to be capable of breaking complex ideas down into simpler, easy-to-grasp components. MIC coaches confirmed this was an aspect they were working hard on with teachers who were very fluent in math content knowledge. MIC coaches had also observed that the ideas and activities being gained by teachers through coaching were increasing teachers' confidence to handle large class situations. One coach reported that a first-year teacher was considering leaving the mathematics profession, but the program had encouraged the teacher to be more creative with lessons, giving the teacher more reason to stay. Another MIC coach shared that one teacher came into the profession thinking teaching math was easy, but now this teacher had a more realistic idea of the challenges math instruction brings. Finally, principals had observed ways in which participating in the program had changed teachers' beliefs about teaching mathematics, including instilling the belief that a math teacher *could* reach every student during a single class period, engendering confidence that teaching math did not have to be hard and could be fun, and enhancing receptivity to the benefits an MIC coach could bring to the teaching environment. In sum, interviewees reported the following effects of the MIC pilot program activities on teachers' beliefs about teaching mathematics:

"The effect of the professional development for my coaches has been fantastic in that it has increased their efficacy and leadership skills."

-Middle school administrator, commenting on the effects of the MIC professional development activities on participating coaches

- Teachers were valuing more the importance of hands-on activities and student engagement to improve mathematics instruction.
- Teachers were learning that they need to divide complex concepts into smaller, simpler components to enhance student learning, and were gaining the tools to do so.

- Teachers had grown more confident and creative in their teaching and had a better understanding of the challenges of mathematics instruction.
- Teachers were understanding that they need to differentiate instruction in order to reach all students.
- There was more trust developing between coaches and teachers.

Making a Difference in Student Learning of Mathematics

"I have seen myself improved. In the beginning, I knew the content, but she [the coach] is there to give us different ways of presenting the information.

-Middle school teacher, explaining how she has benefited from coaching activities

The MIC coaches, grant coordinator, and principals provided observations of how program activities had affected teachers' sense that they could make a difference in their students' learning of mathematics. Overall, there was consensus that a combination of increased confidence and support, as well as an enhanced repertoire of instructional techniques provided by coaching had positively affected teachers' sense they can make a difference in their students' learning. The middle school principal noted that without a support system, teaching mathematics

could become overwhelming. This principal cited one teacher, however, who was "beaming" after a benchmark test on which the teacher's students did exceptionally well. The teacher's feedback indicated that the students' strong performance had "increased her resolve to keep moving up that ladder." Other principals had noted (through teacher feedback) an increased ability of teachers to reach the highest and lowest performing students, increased engagement of students during walk-throughs, and improved scores on mathematics benchmark assessments. Teachers had provided feedback to MIC coaches indicating that sharing best practices was enabling them to be more successful with students who were struggling in math. Teachers themselves reported resolve that, "everyone can learn mathematics," and teachers were learning how to identify students before they "fall through the cracks" academically. The teachers also noted that a discussion with an MIC coach might enable them to better understand how to approach a specific student or problem. In sum, interviewees reported the following effects of MIC pilot program activities on teachers' sense that they could make a difference in their students' learning:

- Teachers and administrators had seen improvement in students' performance on benchmark tests, and for some, this had increased the teachers' resolve to continue their professional development.
- Sharing best practices enabled teachers to see what was working and what was not working with students who are struggling in math.
- A discussion with an MIC coach may enable a teacher to understand better how to approach a specific student or problem.
- Teachers felt they were becoming better at identifying students who are at risk for failure and had learned that using differentiated instruction and modifying instructional strategies could enable a struggling student to be successful.

"They are in a box. By giving [the teachers] activities, it helps them to build confidence, take steps out of the box, and learn that they can control large class situations. They learn from it and improve for next time."

-MIC coach, on the effects of MIC coaching activities on teachers

Coaches' and Teachers' Math Content Knowledge

The coaches, grant coordinator, and ASP representative all noted positive effects of program participation on MIC coaches' content knowledge, though they sometimes expressed uncertainty at how much of the content knowledge gained by coaches during professional development was getting passed down to teachers. However, because coaches for Grantee C were mathematics teachers themselves, gains in their content knowledge were still quite relevant to enhancing student learning at each campus. Coaches themselves reported they were gaining knowledge in using different forms of technology to aid with instruction, including Microsoft PowerPoint and Geometer's Sketch Pad®, and the coaches were passing this knowledge on to the teachers with whom they work. The grant coordinator reported that at a recent quarterly meeting, the high school coaches expressed their appreciation for the professional development because it was giving the coaches the tools they needed to correct errors they were observing in teachers' content knowledge. Research being conducted at the ASP indicated that the professional development was successful at helping coaches and teachers recognize and fill gaps in their content knowledge so they could better assist students.

Although respondents reported positive effects of professional development on coaches' mathematics content knowledge, teachers and administrators reported minimal effects on teachers' content knowledge. This was attributed to the following factors: (1) Many of the teachers were perceived by administrators as already possessing strong content knowledge; (2) Most coaching sessions involve instructional strategies, lesson planning, classroom management, and lesson modeling; (3) A very small percentage of the coaches' time was being devoted to helping increase teachers' content knowledge. In sum, interviewees reported the following effects of MIC pilot program activities on teachers' mathematics content knowledge:

- Coaches were gaining facility with mathematics instructional technology and were introducing the technology to teachers.
- The professional development was giving coaches the tools they need to address gaps in their own mathematics content knowledge and correct errors they observe in teachers' content knowledge.
- It was not clear that the content knowledge being gained by coaches through professional development was translating into increased content knowledge for participating teachers.
- Participants perceived that increasing the mathematics content knowledge of teachers was not a main goal of the MIC program, and consequently, coaches were structuring coaching sessions to emphasize enhancing instruction instead.

Student Engagement and Performance

There was limited information that could be used to measure effects of MIC program activities on TAKS preparation. One source of information was performance on school district benchmark tests. Benchmark tests were used to predict performance on TAKS since many were fashioned after TAKS and use released TAKS items. Coaches, teachers, and principals all reported improvement on students' district benchmark tests over the previous year's scores. The MIC grant coordinator was attempting to get a global sense of the MIC pilot program's effect on student benchmark tests, but

reported challenges in disaggregating student data by teacher rather than by campus and grade level. District-level data, however, showed benchmark improvements over the previous year for all grades except Grade 9. The school district also was using formative mini-assessments (FMAs) throughout the academic year. The coaching activities had included showing teachers how to “drill down” when teaching so that students were exposed to content in more depth. An administrator reported that performance on the most recent FMAs showed improvement over performance on the previous administrations. This was attributed to the coaching and teachers learning how to drill down to greater depth in their teaching.

Statistics on the effects of the MIC program activities on dropout rates were not yet available. One of the high school administrators, however, reported that the school was experiencing fewer absences. This could indicate that fewer students would drop out of school in the future. The effects of MIC pilot program implementation on other academic indicators such as graduation, promotion, course completion rates, or SAT/ACT scores were unknown at the time of the site visit. With regard to student engagement, coaches reported working with teachers on developing and implementing mathematics activities that were interactive and engaging for students. Multiple principals at both the middle school and high school level reported they were observing students more engaged and on-task during walk-throughs of participating teachers’ classrooms.

“For example, if I see a student [in my office] and then see him in [the participating teacher’s] class and realize he is engaged in class, answering questions, is the leader of a group, and working on teams, I am thankful because it helps me to see him in a new light and [realize] that the teacher can pull that out of him. It leads to [the teachers’] belief they can make a difference with kids in the classroom.”

-Middle school principal, providing anecdotal evidence for the observation that the MIC pilot program has increased teachers’ efficacy and students’ engagement

Sustainability and Enhancement

Although the MIC grant coordinator and ASP representative had not explicitly discussed continuation of the MIC grant at the time of the site visit, all interviewees expressed the desire that the MIC program continue or that a comparable coaching experience be available to novice teachers. After seeing the bond the MIC grant has created between teachers in the mathematics department, the middle school principal would like to implement similar programs in other departments of the school. Coaches lamented that only some schools in the district were able to participate in the MIC pilot program and agreed that it would be great to roll the program out to other departments, especially science. Many coaches expressed a desire to better integrate and coordinate instruction in multiple subject areas through team teaching. One coach reported having plans to continue to mentor teachers in groups regardless of whether or not the grant continues. High school principals suggested using Title I funds, AYP improvement funds, or other grants to continue the program and provide stipends and substitutes for coaches and teachers. Site visit participants were also asked what they would change about the program if it continued, and recommended the following program changes:

- Expand the MIC program to all schools in the district.
- Expand the program to other subject areas, especially science.

- Include a co-teaching component with math and science teachers so students can see the connection between math and other subject areas.
- Devote more time to participating teachers, serve a greater number of teachers, and include teachers in professional development activities delivered by the ASP.
- Ensure teachers attend the summer institute *before* participating in other professional development sessions at the ASP.
- Schedule common planning periods for coaches and teachers.
- Allow more time for coaches to engage in coaching activities without them having to do it on their own time.
- Improve feedback from district administrators to school administrators so principals feel more informed and prepared to assist with the program.
- Include funding for additional instructional materials and for classroom supplies such as scissors, glue sticks, and paper.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. School administrators provided their thoughts about how the program helps their schools function as organizations, like one high school principal who stated, “[The program] helps us learn how to communicate and help each other reflect,” or the middle school teacher who remarked, “[The MIC program] has helped our math department and certainly the two teachers who are coaches.” Teachers expressed how crucial the MIC pilot program was to their success as novice teachers. One middle school teacher said, “I think if I didn’t have this mentor, I would be lost,” while another remarked, “I don’t know what I would do without [my coach]. If I get stuck, I can just knock on her door and ask.”

Summary/Conclusions

Grantee C, an urban, independent school district serving approximately 55,000 students was comprised an 89% Hispanic, 8% African American, and 3% White student body. Ten schools serving Grades 7-12 were implementing the MIC pilot program. The district was characterized by a high percentage of students being at risk of dropping out of high school and a high percentage of economically disadvantaged students. Furthermore, students experienced a number of other risk factors including teenage limited English proficiency, high mobility, and lack of preparedness and motivation to succeed in mathematics or academics in general. The MIC pilot program was being implemented in Grantee C schools deemed to be struggling the most, with the goal of providing support to novice teachers to reduce attrition and improve mathematics outcomes for at-risk students. The district selected 10 schools to participate in the grant. Then administrators selected one or more advanced teachers at their school to serve as coaches, who in turn each selected one or more struggling novice teachers to mentor. In total, there were 8 coaches and 14 teachers participating in MIC program activities. The Grantee C program was designed to provide coaches with professional development (through the ASP) in content and instructional strategies so the coaches could use this training in coaching sessions with participating teachers at their respective campuses. Professional development activities for coaches included an intensive, two week summer institute that focuses on mathematics content and instructional strategies, four training sessions at ASP offices across the year, an online community message board where coaches can share feedback

about lesson plans, and a mentor who was assigned to visit campuses and assist with coaching activities. Coaching sessions between coaches and teachers occurred at least twice a month (though most teachers reported more frequent interactions) and consisted of co-teaching, classroom observations, debriefing sessions, lesson planning, or instructional modeling.

Perceived barriers to MIC pilot program implementation reported by participants included the delay of a videoconferencing component that would allow more frequent interaction between coaches and the ASP, conflicting planning periods for coaches and teachers, scheduling conflicts that have prevented additional training for coaches, and a typical level of initial teacher resistance toward the program, the latter of which has since been much improved. Participants also described aspects of the program that facilitated program implementation including a successful kick-off meeting at inception of the program, quarterly meetings between coaches and the grant coordinator, stipends and incentives provided to coaches for participation, frequent communication between teachers and coaches, supportive department chairs, and helpful instructional strategies and activities gained by teachers through coaching activities.

Grantee C's MIC pilot program appeared to be having a positive impact for participating coaches, teachers, and students. Teachers' beliefs about teaching mathematics had changed in that they saw the value in implementing math activities that were interactive and hands-on, recognized the importance of breaking complex ideas down into simpler components for enhanced student learning, understood and could implement differentiated instruction, and were more confident and creative in their instruction. Teachers also have a greater sense they could make a difference in their students' learning of mathematics. The teachers could see and were encouraged by improved student performance on benchmark tests. Through sharing of best practices among teachers and coaches, teachers were better able to identify students who were at-risk of failure and have more information regarding what may or may not work with those students. Although participants all agreed that the professional development was having a positive impact on coaches' mathematics content knowledge, there was uncertainty about whether this was translating into increased content knowledge for participating teachers. There was a belief that this was due in part to the fact that teachers already possessed strong math content knowledge when the program began and that coaching sessions focus more on instructional techniques and effective teaching practices than content, per se.

Although TAKS data were not yet available to assess the MIC pilot program's impact on students' standardized math achievement scores, coaches, teachers, and principals all reported improvement on student district benchmark tests and formative mini-assessments over the previous year's scores. The grant coordinator was working on disaggregating student scores by teacher to assess the global impact of the program on student math achievement. Teachers and administrators agreed that it was clear that teachers were implementing activities that were more engaging with students, and students were more engaged and on-task during mathematics lessons. Participants also agree that the program should be continued beyond the grant period and suggested a number of changes, many of which involve expansion to more schools, teachers, and departments. Overall, the MIC pilot program being implemented by Grantee C was supported by its numerous stakeholders and was seen as beneficial to departmental cohesion, teacher effectiveness, and student math achievement.

Case Study: Grantee D (Cycle 1)

Methodology

In March 2009, a site visit took place at Grantee D, a mid-sized, suburban independent school district serving approximately 21,000 students located in Texas. Teachers from four middle schools (Grades 6-8) and three high schools (Grades 9-12) were participating in the MIC pilot program. Two of the three participating high schools previously functioned as a single campus and had since been divided into two distinct campuses, one serving Grade 9 and the other serving Grades 10-12. The site visit team made efforts to meet with as many participants from the seven participating campuses as possible. Interviews were conducted with two ASP representatives, the MIC grant coordinator, the school district’s math coordinator, two middle school principals, two middle school assistant principals, two high school principals, and one high school math specialist. Four focus groups were also conducted during the site visit. The first focus group included seven of the eight middle school teachers who participate in the MIC pilot program. The second focus group included eleven of the twelve participating high school math teachers. The third focus group included four middle school math specialists who serve as Grantee D’s middle school MIC coaches, and the final focus group included the three high school math specialists who serve as the high school MIC coaches.

Characteristics of Grantee D

Table 9 provides a summary of Grantee D’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 9
General Characteristics of Grantee D’s MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	4
Grades Served	6–12
Number of Schools Served	7
Type of Schools Served	4 middle schools, 3 high schools
Number of Teachers Served	20
Number of MIC Coaches Participating	7
Grant Amount	\$225,000
Grant Start Date	08/05/2008
Grant End Date	06/30/2010

Source: Grantee D’s Cycle 1 Application and Action Plan

Students

Grantee D is a mid-sized, suburban district serving approximately 21,000 students. At the time of the site visit, the ethnic distribution of the district was 21% African American, 71% Hispanic, and 7% White. Over half (61%) of students in the district were considered at-risk, and almost three-quarters (74%) were economically disadvantaged as reported by the Academic Excellence Indicator System (AEIS) for the 2007–08 school year. Administrators from participating schools also noted that Grantee D was a Title I district and many of the students were economically disadvantaged, at risk for low academic achievement and school dropout, and/or LEP. Teachers added that many of their students were in special education or remedial mathematics classes.

The four Grantee D middle schools participating in the MIC pilot program did not appear to be quite as high risk with regard to mathematics achievement as some of the other MIC pilot program grantees; they had been performing at or above state averages. However, only 45% of 2007 high school graduates were ready for college in math according to 2007–08 AEIS data. Table 10 shows the percentage of students in the district at Grantee D who met the standard on TAKS-Math compared to the percentages statewide at baseline (2007-08).

Table 10

Percentage Rates of Students in the District in Grantee D by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 6*	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee D	85%	82%	84%	63%	67%	79%
State of Texas	83%	80%	79%	64%	66%	80%

Source: Academic Excellence Indicator System (AEIS), 2007–08

* TAKS-Math (English version)

Teachers

Eight middle school teachers and twelve high school teachers were participating in the Grantee D MIC pilot program. Of those who were participating in the middle school focus group, one teacher had eleven years of teaching experience, two teachers had nine years of experience, and three teachers each had three years of teaching experience. The department chair at one of the middle schools was the most experienced of the group with 26 years of teaching experience. Five of the six teachers were teaching middle school math for Grades 6-8, one was teaching both geometry and a TAKS remediation course, and the department chair was teaching eighth grade math, geometry, and Algebra I. The teachers all held various certificates, including Elementary Education, Mathematics 4-8, Mathematics 4-12, Generalist 4-8, and Secondary Mathematics.

“There is a good blend of young teachers and veterans. All the teachers are competent and enthusiastic.”

-ASP representative, describing participating teachers

Of those teachers who participated in the high school focus group, the most experienced teacher had 37 years of teaching experience. Two teachers had 15 years of teaching experience, and the others had 13, 11, 8, 6, 4, and 3 years experience. Only one teacher was a first-year teacher. Most of the teachers were teaching Algebra I, Algebra II, or Geometry, and one also was teaching Pre-Calculus. Two of the teachers in the focus group had master's degrees, and one had a doctorate in mathematics. All were certified to teach high school mathematics.

Coaches

Four middle school math specialists and three high school math specialists were selected to serve as MIC coaches. The most experienced of the middle school coaches had 11 years of teaching experience. Two coaches had eight years of experience and one had five years of teaching experience. Two of the four middle school coaches had master's degrees. One of the coaches with a master's degree was certified in Grades 4-8 Math and Grades 8-12 Science, and was working toward certification in Grades 8-12 Math. The second coach with a master's degree was certified in Elementary Education, Grades 1-4, and Generalist 4-8. The third coach was certified to teach Grades K-8, and the fourth was certified in Grades 4-12 Math.

Two of the three high school coaches had over 20 years of teaching experience. One coach had 25 years experience, had a master's degree in education, and specialized in teaching at-risk students who needed to pass TAKS. The second coach had 20 years teaching experience, also had a master's degree, and was the department chair. The third coach had five years of teaching experience, was teaching ninth grade math, and held a doctorate in education. All were certified in secondary mathematics.

Overview of Grantee D MIC Pilot Program

Goals

According to the grant coordinator and ASP representative, the overall purposes of the Grantee D MIC pilot program were to:

- Develop leadership and content knowledge expertise in the district's math teachers
- Enhance teachers' understanding and instruction of the TEKS
- Develop coaches who are knowledgeable and have the skills to help teachers deliver better math instruction
- Help students be more successful with the district's math programs

Program Structure

The ASP for Grantee D's MIC pilot program was selected because of its reputation for improving the instructional quality and content knowledge of mathematics educators. The ASP was using a professional development model based on the standards for the National Council of Teachers of Mathematics (NCTM), and the model is supported by research conducted by the ASP that focuses on student-centered learning, group collaboration, and student assessments. The ASP supports

teaching that is focused on students and discourages teacher-centered instruction that encourages passive learning. The role of the ASP was to provide professional development for teachers and coaches, guide peer collaborative meetings, and conduct planning meetings with MIC pilot program participants. The ASP hosted a three-day training in August 2008. Since then, the ASP had delivered two more trainings, each consisting of two evening sessions and one Saturday session. The first of these trainings was conducted in October 2008 and the second in January 2009. In the second year of the MIC grant, the ASP was planning to provide a two-week leadership session during the summer of 2009, plus two, three-session trainings, one in fall of 2009 and another in spring 2010.

"The coach's job is to get other teachers to become coaches. If a coach won a five million dollar lottery tomorrow, we could replace that coach with one of ours and just keep on moving."

-Middle school administrator, on how the MIC coaching activities were building leaders for the future

Coaches and teachers selected for the MIC pilot program were participating in the professional development activities presented by the ASP. The first professional development sessions dealt with the vertical alignment of algebraic strands. A great deal of the professional development also had included coaching strategies. In the summer institute that took place in summer 2009, there was heavy emphasis on leadership training with a focus on the TEKS.

The goals of the coaching activities included building leadership skills and capacity, building confidence in novice teachers, and improving instruction for veteran teachers. Throughout the first year of the grant, coaching activities had included small group sessions in which coaches and teachers discussed ideas for techniques and activities to use in the classroom as well as effective ways to implement the ideas. One-on-one sessions were being held when an MIC coach and teacher felt they were warranted. The review of math content had been included in coaching sessions but only with the limited number of teachers who coaches believe require support in that area.

Professional Development and Coaching Activities

Professional Development Activities and Teacher Participation

Activities. The professional development activities for Grantee D's MIC pilot program were being designed and delivered by ASP staff. The district and ASP agreed on a program that would include a content strand, a leadership strand, and a communication strand. A problem-solving strand was added in summer 2009. During the first year of the MIC pilot program, professional development sessions included work on vertical alignment, coaching, the roles of a leader, and effective communication. Algebra was included in the content strand and geometry was to be added in the second year. According to the ASP, the content, leadership, and communication strands would strengthen the coach-teacher relationship. Professional development also included learning to create and use effective assessment strategies that would better prepare students for the TAKS.

"I would say there is total buy-in. [Teachers] bounce ideas and share viewpoints on different things they have learned during training."

-School administrator, on the level of teachers' participation in MIC program activities

Participation. According to principals and coaches, participation in all MIC pilot program activities was high, including those for which attendance was voluntary. There had been some absences due to athletic events or other school-related activities. For the most part, however, teachers had

participated fully in the scheduled events of the MIC pilot program's first year. A principal referred to the teachers' enthusiasm for the program as "total buy-in."

Coaching Activities and Teacher Participation

Activities. Coaching activities had consisted of small group or one-on-one sessions between coaches and teachers and were tailored to teachers' needs. For example, teachers with less experience were interested in learning strategies for classroom management. With veteran teachers, however, coaches emphasized new instructional strategies and improved delivery. The frequency of coaching activities depended on the size of the school. One group of teachers reported meeting with an MIC coach once a week, others reported meeting their coach for lunch daily. Coaches were spending a great deal of time in teachers' classrooms observing instruction and providing feedback following the observations.

Participation. Principals and coaches reported full participation and a high level of engagement by teachers in MIC coaching activities.

District/Campus Administrator Participation in Program Activities

The middle schools and high schools in Grantee D were using assistant principals to oversee academic departments. The assistant principals who were overseeing the mathematics departments were more actively involved in MIC pilot program activities than the school principals. Some administrators from both the middle schools and high schools were participating in professional development and coaching activities. High school teachers viewed administrator participation in professional development positively. Middle school teachers, on the other hand, preferred less involvement on the part of administrators so they could have honest, open discussions during professional development and coaching sessions.

"I oversee instruction for the entire campus... I have weekly meetings with the assistant principal who is directly involved with math. I oversee those components and make sure we see satisfactory results for our kids.

-Middle school principal, commenting on participation in MIC program activities

Other Mathematics Programs in the District

Grantee D had a number of programs designed to help teachers improve student performance in mathematics. One program serves ELLs and has specific content presented to students by a bilingual teacher and a math specialist. Schools have mentoring programs for first-year teachers and one of the middle schools offers a measurement and proportion class to improve instruction in that area.

One of the middle schools offers a math instruction class for students who were struggling in math and a numbers club for students who excel in math and want to participate in extracurricular math activities. The school also uses math "pull-outs," or sessions in which intensive mathematics instruction was offered. Another school has a math team that competes in mathematics competitions. All schools in the district have various forms of after-school or Saturday tutoring, often focusing on studying for the TAKS.

MIC Pilot Program Implementation

Barriers to Program Implementation

From an administrative standpoint, the most significant barrier cited by participants was the disruption of MIC pilot program activities due to the devastation caused by Hurricane Ike in September 2008. The program was in the initial planning and implementation stage when the hurricane struck the Gulf Coast. It destroyed homes and businesses, caused power outages, and put a two-week (or longer) hold on school district and ASP activities. School district and ASP representatives worked together to reschedule events and adjust the annual calendar to include activities that were cancelled or postponed.

Teachers expressed scheduling difficulties with Saturday and after school activities, and some were not aware of the requirement to participate in a two-week summer session when they began the program. Of equal concern among teachers was a lack of clarity about the objectives of the program during the implementation stage. The objectives of the program had since been clarified with all participants and this was no longer an issue.

Some difficulties were expressed as challenges rather than barriers by coaches. Among them was the need to learn effective communication skills for use during mentoring, particularly with strong-minded, vocal, and opinionated teachers. MIC coaches described the challenges of reconciling different viewpoints and philosophies during coaching sessions. They also noted that working with veteran teachers who had been using the same instructional strategies for years could be a challenge when the goal was to introduce new ideas.

Facilitators of Program Implementation

The Grantee D MIC pilot program had strong support from the principals and assistant principals of participating schools. Principals were kept informed of the program's progress by meeting with coaches and teachers after the professional development sessions take place. As discussed previously, Grantee D was using assistant principals to oversee the different academic departments within each school. These assistant principals were serving as liaisons between teachers, coaches, the ASP, and other school administrators.

"[Teachers] know it is important, and they feel it is an honor [to participate]."

-High school principal, on how the prestige of the program has contributed to teachers' motivation to participate

According to teachers, the selection process used for the MIC pilot program served as an incentive to participate. Teachers were selected for the program because of their leadership potential and they considered it an honor to be named to the program. The process created a cooperative environment among coaches, teachers, and the ASP, and the cooperative environment had helped to facilitate the program. Additionally, the ASP's mathematics training program had an excellent reputation and this had brought a certain level of prestige to the MIC pilot program. Finally, teachers reported that the stipends they were receiving have facilitated their participation in the MIC pilot program.

Relationship between Grantee D and the ASP

Because the ASP and the mathematics training program they were delivering were so well known, Grantee D administrators had wanted to forge a working relationship with them for many years. The MIC grant provided the opportunity to do so. ASP staff who were directing the training program had been working with school districts since 1987 and were familiar with Grantee D because it was located in close proximity to the ASP offices. The ASP was familiar with the demographics of the district's students and teachers and with the common challenges they were facing. The ASP had been able to tailor activities to the unique needs of participating teachers and coaches by meeting regularly with Grantee D's MIC grant coordinator and the mathematics coordinator for the district. Both the grant coordinator and the ASP reported they have an excellent working relationship.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Changing Teachers' Beliefs about Teaching Math

The site visit team asked participants to describe how they believe the MIC pilot program activities have affected teachers' beliefs about teaching mathematics. The MIC grant coordinator noted a renewed sense of confidence in teachers as a result of learning to teach across grade levels and connect middle school and high school content during instruction (vertical alignment). The ASP had seen evidence that middle school and high school teachers were collaborating more, mixing together during professional development activities, and becoming true colleagues. These relationships were not there before the MIC pilot program started. Middle school coaches agreed teachers have become more comfortable taking a leadership role since beginning the program, and the program had instilled a renewed sense of vigor in their desire to become better teachers. The high school principals explained that participation in the MIC pilot program had helped teachers see the "big picture" and simultaneously grasp the nuances of instruction, while middle school principals had observed teachers growing and gaining a sense of satisfaction from developing their craft to reach a higher level. Teachers themselves were coming to realize that learning was a lifelong process and all teachers could benefit from professional development, even master teachers. They were also learning how to use their new

"Learning is an enduring process. We can all learn."

-Middle school teacher, on how participation in MIC program activities has shown her that educators are life-long learners

mathematics instructional skills to assist non-participating teachers who were struggling, even those who were resistant to change, by taking a gentler, more subtle approach. In sum, participants reported the following effects of MIC pilot program activities on teachers' beliefs about teaching mathematics:

- Teachers were developing a renewed sense of confidence in their teaching.
- Teachers were seeing the benefit of vertical alignment.
- Teachers were collaborating more and viewing teaching as a team effort.
- Teachers were gaining a greater understanding that teaching math requires patience and creativity.
- Coaching was helping teachers believe they are leaders.
- Coaching was helping teachers accept that everyone can benefit from coaching.

Making a Difference in Student Learning of Mathematics

Participants provided observations of how program activities had affected teachers' sense they could make a difference in their students' learning of mathematics. One of the strengths of the district, according to the MIC grant coordinator, was that its teachers and administrators had always had a strong belief in the children and their ability to succeed. Collaboration during program activities had reinforced this belief. Feedback from teachers and coaches to the ASP indicated both were constantly thinking about how they can use the knowledge and instructional techniques they were acquiring through the MIC program to enhance students' engagement in mathematics. MIC coaches reinforced this sentiment. Teachers had reported to them that they were now better able to use vertical alignment, introduce hands-on activities, and modify their teaching strategies according to students' needs, and this had made them feel they can reach more students than before. Feedback from teachers to administrators indicated teachers' confidence in using innovative techniques, such as inquiry-based instruction, had enhanced teachers' sense of effectiveness. One high school principal stated, "Teachers really feel that they were empowered to support instructional tools [and this] will make the kids successful down the line."

"She is no longer just "Okay, here is the Pythagorean Theorem." It is now, "Why does this formula work, where do you think it came from?" The students get a clearer understanding of the concepts because of the questions she is asking. She is being instructed to that. She feels they are more successful because she is asking the right questions."

-Middle school principal, on how the MIC pilot program has influenced teachers' instruction and belief they can make a difference for their students' learning of math

Teachers themselves reported the coaching had helped them better understand the needs of the students, ask more effective questions during instruction, and feel they always have someone to turn to for questions. Some of the participating schools had experienced increased student performance on the benchmark tests that were administered periodically and used as predictors of performance on the TAKS. Overall, administrators were feeling positive about how students will perform on the 2009 TAKS administration. In sum, participants reported the following effects of MIC pilot program activities on teachers' sense they can make a difference in their students' learning of mathematics:

- The collaboration emphasized in professional development was strengthening teachers' beliefs that all students can succeed.
- Teachers were translating the knowledge they gained from program activities into improved instruction and sense this is making a difference in their students learning.
- Teachers were learning to ask questions that helped students gain a clearer understanding of mathematical concepts.
- Teachers were realizing they *can* reach students they previously thought were unreachable academically.
- Teachers were working harder to understand the student population and feel this will enable them to reach more students.

Teachers' Math Content Knowledge

Participants generally agreed that teachers were not lacking in content knowledge before the MIC pilot program started, and thus professional development activities had not included a great deal of mathematics content. As articulated by one middle school coach, "I think it has less to do with teachers' content [knowledge] [and more with finding] another way of approaching that content." When asked about how the program had influenced their math content knowledge, one of the participating teachers stated, "We learn something new every day," while another explained, "We kind of coach each other when we have content sessions." The ASP representative explained that coaches and teachers were learning math content in the context of learning pedagogy. The coaches were learning how to bring real world examples into the classroom and make the content applicable to students' lives and future careers. Finally, teachers reported that coaching had created an atmosphere in which they could collaborate and share ideas about how best to teach certain content. In sum, participants reported the following effects of MIC pilot program activities on teachers' mathematics content knowledge:

- Because teachers were already strong in content knowledge when the MIC pilot program began, program activities were focusing more on how to teach content in multiple ways, adjust to student needs, and connect content across grade levels (vertical alignment).
- Teachers were learning content from fellow teachers during collaborative activities and during professional development in the context of learning pedagogy.

Student Engagement and Performance

Although most participants felt it was too early to analyze empirical data on the effects of MIC pilot program activities on preparation for TAKS, teachers had learned the importance of creating better math assessments by developing more effective test items. The rationale for training teachers to develop more effective test items was that students would most likely perform better on the TAKS by taking teacher-developed tests that were closely aligned with curriculum standards and objectives tested on the TAKS. Although administrators acknowledged there were numerous factors that affect scores on district benchmarks,

"If our students are more engaged and focused they will be less likely to drop out."

-High school administrator, on how the MIC pilot program could influence high school dropout

administrators were also optimistic that recent improvements on benchmark tests indicate students would demonstrate improved performance on the TAKS in 2009. According to one coach, one teacher was working with the lowest performing students. The teacher conducted an assessment at the beginning of the year and none of that teachers' students passed. On a recent assessment, 50% of her students passed and 30% of those that failed missed passing by only a few questions. This coach felt the MIC program had "helped tremendously for these kids." There was also an increase in the number of students attending math tutorials, and this may indicated that more students were interested in succeeding in math. According to one administrator, students' increased engagement in math activities could lead to lower failure rates and, in turn, a reduction in the number of students who drop out of school.

Sustainability and Enhancement

"One year of this program is not going to make me perfect... I need and want that continuous practice. To better myself, and my position, I would love for this program to continue."

-Middle school coach, when asked if the MIC pilot program should continue

The ASP and the representatives from the school district had discussed continuation of the program beyond the grant award period. The discussions had been informal and had focused on the district's continuation of a coaching program using the capacity that was currently being built with the MIC pilot program grant. Although Grantee D's teacher mobility rate was somewhat lower than other comparable school districts, the school district and ASP felt that continuity was important when teachers leave the district and new teachers come in. By

including coaches and teachers in the leadership training offered by the ASP, the school district would be able to replace a departing coach with one of the teachers currently participating in the MIC pilot program. If additional funding was needed to continue a leadership training program for coaches in the future, the district would use Title I funds, if available. According to the ASP, trainers will soon have an increased presence on participating campuses. The visits would enable them to see how the training they were providing was translating into classroom instruction and would give them an opportunity to provide feedback on coaching sessions. Teachers and administrators added that through such visits, ASP trainers would gain firsthand knowledge of the schools and students and could give feedback to administrators about how the math department was doing. Additionally, participants recommended the following changes to the MIC pilot program:

- Include more teachers in the program and expand it to other academic departments.
- Include more training on leadership in the professional development activities.
- Make program activities more applicable to the family backgrounds and interests of students in the district.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. The ASP representatives commented on the district's role in the success of the project. One explained, "Overall, we have really enjoyed working with [Grantee D]. We have seen professionalism in the faculty and the administration, feel they enjoy working with us, and think there will be some real positive [results]." The other ASP representative remarked,

"[The MIC program] has changed their perspective on how to capture the hearts of all students which will lead to improvement and learning."

-Middle school principal, on how the MIC program has impacted the district's teachers

“They have a very nice culture here – they are a family. We don’t see that in some of our other districts. [Teachers] are there to support each other and the students. [Administrators] value the teachers and let teachers know it.” Some administrators, like this middle school teacher, focused on the teachers’ role instead. “The teachers in the district were excited about being a part of [the program]. They can have a part in the success of new teachers.” Others focused on what coaches had gained. “[The MIC pilot program] helps the specialist become a better leader... the professional development allows her to build her capacity. It is something we may not have been able to give her without the grant.” Finally, some participants just wanted to express their overall positive feelings about the project, like this administrator, who commented, “So far we are heading in the right direction. I am optimistic,” or another who was also looking to the future: “I am just very excited and optimistic about where we are headed and where we will be when we get to that sustainable point.”

Summary/Conclusions

Grantee D is a mid-sized, suburban independent school district serving approximately 21,000 students, many of whom were economically disadvantaged (low SES), at-risk for low academic achievement, and/or LEP. The ethnic distribution of the district was 21% African American, 71% Hispanic, and 7% White. Seven schools serving Grades 6-12 were implementing the MIC pilot program with the goals of 1) developing knowledgeable coaches; 2) developing teachers who were strong in leadership, instruction, and content knowledge; and ultimately, 3) improving students’ performance on the TAKS and in the district’s mathematics programs in general. The role of the ASP was to provide professional development for teachers and coaches with an emphasis on leadership, collaboration, and preparation for the TAKS. During the first year of the MIC pilot program, professional development sessions had included work on vertical alignment, coaching, the roles of a leader, effective communication, and how to create and use effective item stems for assessment and TAKS preparation. Coaching activities consisted of small group or one-on-one sessions between coaches and teachers and were tailored to teachers’ needs. Coaches also spent a great deal of time in teachers’ classrooms observing instruction and providing feedback following the observations.

Grantee D’s MIC pilot program experienced setbacks when a severe hurricane destroyed homes and businesses, caused power outages, and put a two week hold on school district and ASP activities. Teachers also reported scheduling difficulties with activities scheduled for Saturday, after school, or over the summer. Additionally, there was some lack of clarity for teachers about program objectives during the early stages of the program, and coaches reported challenges communicating with teachers who were resistant to change. Participants also noted many facilitators to program implementation, such as the strong support the program receives from principals and assistant principals of participating schools. These administrators were actively involved and serve as liaisons between teachers, coaches, the ASP, and other school administrators. Teachers felt honored to have been selected to participate in the MIC pilot program because it acknowledges their leadership potential and gave them an opportunity to work with a service provider (the ASP) that has an excellent reputation. Stipends had also facilitated teacher participation in the program.

Grantee D’s MIC pilot program appeared to be having a positive impact on participating coaches, teachers, and students. Teachers’ beliefs about teaching mathematics had changed in that they have a renewed sense of confidence in their teaching and leadership, viewed teaching as a team effort, understood that teaching math requires patience and creativity, saw the benefit of vertical

alignment, and realized that all teachers, novice and veteran, could benefit from additional training and new ideas. Teachers also had an increased sense they could make a difference in their students' learning of mathematics. Teachers felt students were grasping the material better as a result of their newly acquired instructional strategies, including using effective questioning techniques in the classroom. Teachers were also working harder to understand their student populations and felt they could reach more students academically than they could before. Teachers were already strong in content knowledge before the MIC pilot program started, so program activities had focused more on leadership, collaboration, and specific instructional techniques. However, participants did report that teachers learned content from fellow teachers during collaborative activities and in the context of learning pedagogy.

Most participants felt it was still too early to assess the effects of MIC pilot program activities on students' TAKS preparation, however participants also noted that all the signs were there, including improved performance on benchmarks, and they felt confident that students would perform better on the upcoming TAKS as a result of changes teachers had been making in the classroom. Teachers had also been working on creating effective item stems for TAKS preparation and there had been increased attendance by students at math tutorial sessions. Overall, participants were very optimistic about the MIC pilot program and wanted it to continue. Participants noted that participating schools were building capacity from within by developing leadership and mentoring capabilities across the participating and non-participating teaching staff.

Case Study: Grantee D (Cycle 1) Revisit

Methodology

In May 2010, evaluators conducted a return site visit to the MIC program at Grantee D. The first site visit was in March 2009. During this round of site visits, the site visit team conducted individual interviews with the MIC grant coordinator, a representative of the ASP, and administrators from the high schools and middle schools. The site visit team also conducted separate focus group sessions with high school MIC coaches and teachers from participating middle schools and high schools.

Characteristics of Grantee D

Grantee D has a student enrollment of approximately 21,000 students. The MIC program at Grantee D includes teachers and administrators from seven campuses including two high schools, one ninth-grade campus, and four middle schools. Nine middle school MIC coaches and 12 high school MIC coaches participate in the MIC program.

Table 11 provides a summary of Grantee D’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 11
General Characteristics of Grantee D’s MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	4
Grades Served	6–12
Number of Schools Served	6
Type of Schools Served	4 middle schools, 1 ninth-grade campus, 2 high schools
Number of Teachers Served	94 (50 middle school, 44 high school)
Number of MIC Coaches Participating	21 (9 middle school, 12 high school)
Grant Amount	\$225,000
Grant Start Date	08/05/2008
Grant End Date	05/31/2010

Source: Grantee D’s Cycle 1 Application and Action Plan

Students

The ethnic distribution of the students in Grantee D during the 2008–09 school year was 20% African-American, 73% Hispanic, and 6% White. Over half (61%) of students in the district were considered “at-risk” and more than three-quarters (78%) were economically disadvantaged. More than one-quarter (29%) of students were LEP.

The four middle schools served by the grant were performing at or above state averages on TAKS-Math. Table 12 shows the percentage of students in the district at Grantee D meeting the standard on TAKS-Math compared to the percentages statewide for the year prior (2008-09) to the follow-up site visit.

Table 12

Percentage Rates of Students in the District in Grantee D by Grade Who Met the 2008-09 Standard on TAKS-Math

School Name	Grade 6*	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee D	89%	83%	85%	81%	73%	80%
State of Texas	82%	82%	82%	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008–09
 * TAKS-Math (English version)

Compared to the baseline (2007-08), Grantee D students’ TAKS-Math results increased across all grades. The increase in percentage ranged from 1% (in Grades 7 and 11) to 18% (Grade 9).

Teachers

Five of the 50 middle school teachers (10%) participated in a focus group. The department chair was the most experienced teacher in the group with 27 years of teaching experience. The least experienced teacher in the focus group had four years of teaching experience. One of the participants had a master’s degree in education. All had certification in mathematics except for one who held a generalist certification. All but one of the five teachers had participated in the MIC program in the 2008–09 and 2009–10 school years.

Seven of the 44 high school teachers (16%) participated in a focus group. The most experienced of the focus group participants had 36 years of teaching experience. The two least experienced of the participants had five years of teaching experience. One of the high school teachers was expecting to earn a master’s degree in December 2010. All teachers had certification to teach high school mathematics. All high school teachers who participated in the 2010 focus group also participated in the MIC program during the 2008–09 school year.

MIC Coaches

Three of the 12 high school MIC coaches (25%) participated in a focus group on this site visit. The site visit did not include a focus group with middle school MIC coaches due to scheduling conflicts. Each of the high school MIC coaches who participated in the focus group was certified in high school mathematics. Two MIC coaches had over 20 years of teaching experience. One of the high school MIC coaches had a Ph.D. in mathematics.

Overview of Grantee D's MIC Pilot Program

Goals

One of the high school MIC coaches described the goals of the MIC program as two-fold. One goal was to develop leadership on campus for math instruction. Another goal was to improve teachers' questioning and test development skills. High school mathematics teachers in the focus group described a goal of the MIC program as "building a math network of support for our campuses."

Program Structure

Grantee D's MIC program was being implemented in collaboration with a university center, which was serving as the ASP. The responsibilities of the ASP included planning and delivering the professional development component of the program. This component included training in mathematics content, leadership, and math coaching.

The middle school and high school MIC coaches were working with teachers on content and instructional strategies, and the frequency of math coaching activities depended on an individual teacher's needs. MIC coaches reported that they worked more closely and more frequently with teachers who were less experienced or who needed additional work in content or instructional strategies.

Math Coaching and Professional Development Activities

Math Coaching Activities and Teacher Participation

Each of the high school and middle school teachers who participated in the focus groups worked with an MIC coach throughout the 2009–10 school year. Activities in which the high school teachers were participating included co-teaching and working specifically with special education students within the regular classroom. One of the high school teachers described the co-teaching arrangement as a weekly session. Math coaching at the middle school included assisting teachers who were struggling and working with teachers to understand test data.

Professional Development Activities and Teacher Participation

All high school and middle school teachers had participated in monthly professional development activities throughout the 2009–10 school year. Most of the activities were in small, informal group settings. Most sessions included work on content and instructional strategies.

Middle school teachers described some of the changes in professional development activities that occurred during both years of the MIC grant period. At the end of the first year, school district administrators and the ASP representative asked teachers for their observations about the activities implemented in the first year and requested information on changes they would like to see in the second year. Modifications in the second year included adding more literature on leadership and working on communication across grade levels. The middle school teachers felt that the second year activities were more suited to their professional development needs.

In the high school teachers' focus group, one of the participants described the changes in professional development activities between the first year to the second year of the MIC grant period. The teacher noted that the professional development activities in the second year included more instructional strategies presented for teachers than in the first year.

District/Campus Administrator Participation in Program Activities

According to the ASP representative, more building administrators visited the professional development activities in the first year of the MIC program. Teachers described administrators' participation in second-year program activities as just "dropping by to say hi." Middle school and high school principals confirmed in interviews that their participation in the program activities was minimal. They described their roles as monitoring teachers' participation, receiving feedback from teachers and MIC coaches following the activities, and making recommendations to the MIC grant coordinator for modification to the activities as needed.

MIC Pilot Program Implementation

Barriers to Program Implementation

According to the ASP representative and the MIC grant coordinator, a program objective was to have vertical teaming between middle school and high school teachers. Teachers were resistant to the concept at the beginning of the second year activities. Regardless of the resistance, however, program administrators developed professional development activities to accomplish this objective. Within a short period, teachers became accustomed to the teaming arrangements and administrators began to see positive results such as middle school and high school teachers sharing information and instructional materials.

Scheduling all the planned program activities presented challenges to program administrators. After MIC grant administrators developed the activities calendar for the school year, school district activities that arose during the year required changes to the MIC calendar. Rescheduling became a challenge since the grant was ending and summer training would not be available through the MIC grant.

One of the high school MIC coaches noted that continuously trying to keep teachers' interest through professional development activities was a challenge. Program activities that brought in experienced teachers with new ideas and new instructional materials helped overcome this challenge.

Facilitators of Program Implementation

The ASP representative noted that available funding to purchase new books through the MIC grant was a facilitator of program implementation. These materials formed the basis for book studies with teachers and MIC coaches. A middle school teacher confirmed that the new books purchased with MIC funds were beneficial. The MIC grant coordinator felt that teachers' positive attitudes also served as facilitators. According to the MIC grant coordinator, teachers began to see that the professional development activities were helping them to become specialists and leaders on their campuses. Another middle school teacher cited the stipend as a facilitator and a high school MIC coach noted that support from school administrators served as program facilitators.

Relationship between the District and the ASP

The ASP representative described the relationship between Grantee D and the ASP as a "very positive, very comfortable" relationship, with excellent communication that included regular meetings, phone calls, and e-mail messages. The ASP representative complimented the MIC administrators for always being prepared for the professional development and math coaching activities.

The MIC grant coordinator explained that the ASP was providing professional services in other areas besides the MIC program, such as alignment of Advanced Placement Algebra and Algebra II. Teachers were familiar with the ASP staff and had formed a good working relationship throughout the past few years.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinator, ASP representatives, high school principals, middle school principals, and high school MIC coaches discussed their perceptions of the effects of program activities on teachers. The site visit team asked participants to address the ways, if any, that the professional development and math coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Teachers' instructional strategies
- Teachers' use of assessment or assessment data
- Student engagement and performance

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs About Teaching Mathematics

Effects of Math Coaching Activities

All high school teachers who participated in the focus group agreed that math coaching activities strengthened teachers' beliefs about teaching mathematics but did not necessarily change teachers' beliefs about teaching mathematics. They noted that the math coaching activities, a mix of mathematics content and strategies, helped them improve in most areas of teaching.

One of the high school MIC coaches described the impact of math coaching on teachers' beliefs about teaching mathematics as recognition of the "holes in mathematics vocabulary and basic skills." Math coaching had helped to clarify differences in terminology used in eighth and ninth grade mathematics, according to a high school principal.

The MIC grant coordinator felt that one of the effects of math coaching on teachers' beliefs about teaching mathematics was an improvement in self-esteem. Based on the MIC grant coordinator's observations and on feedback from teachers, teachers had stronger teaching skills, had more confidence, and had a greater recognition and understanding of why certain strategies were effective.

A middle school principal stated that the math coaching activities had made a "huge difference" in instructional strategies, and noted that teachers were working together more effectively and using strategies that took advantage of their teaching strengths. Another middle school principal felt that math coaching had helped increase teachers' awareness of how using test data could improve teaching.

Effects of Professional Development Activities

From comments the teachers made in the evaluations following the activities, the MIC grant coordinator felt that a belief shift was occurring and teachers were beginning to understand that they did not have to "stand and lecture" to get their points across. A high school principal described teachers' responses to professional development as keeping them excited and feeling more like professionals.

One of the high school teachers who participated in the focus group described a change in teaching approaches rather than a change in beliefs about teaching mathematics. The teacher explained that the professional development activities helped teachers rethink their approaches to teaching a subject.

Teachers Making a Difference in Students' Learning of Mathematics

Effects of Math Coaching Activities

A high school MIC coach explained that teachers participating in the MIC program already felt that they could make a difference in their students' learning of mathematics. This was the reason why administrators

"We have finally started to see that there isn't just one way to teach math. They don't have to just stand and lecture to get the point across."

-MIC grant coordinator, commenting on the effects of professional development activities on teachers' beliefs about teaching mathematics

selected them for the MIC program. In the high school teachers' focus group, a teacher explained that although teachers all believe that they can make a difference in their students' learning of mathematics, the math coaching had strengthened those beliefs.

Effects of Professional Development Activities

The MIC grant coordinator believed that one of the professional development activities related to equity helped solidify teachers' beliefs that they could make a difference in their students' learning of mathematics. In the professional development activity, the consultant spoke about "color blindness" and working with students of different ethnicities. The MIC grant coordinator noted how teachers' comments concerning some students' inability to learn mathematics had decreased and had shifted to more positive comments about students and their ability to learn. One high school teacher felt that the professional development activities had enhanced creativity and provided the ability to use hands-on activities more effectively. A middle school teacher described the professional development activities as strengthening the belief that teachers could have a positive effect on student learning.

Effects of MIC Activities on Teachers' Mathematics Content Knowledge and Eagerness to Learn

Effects of Math Coaching Activities

One of the high school principals described how math coaching activities helped teachers see content presented in a new or different way. A high school MIC coach noted that teachers had learned how to find out quickly whether the student had learned the content and how to re-teach it if necessary. The MIC grant coordinator stated that math coaching might not have had as great an impact on content knowledge in mathematics as on knowledge about teaching in general. Professional development activities helped teachers understand that mathematics content would be learned more effectively when students were motivated to learn and were interested in what was being taught.

A high school principal noted that math coaching gave participating teachers an opportunity to share their ideas and improve their content knowledge by teaching lessons to each other on different concepts.

Effects of Professional Development Activities

"Teachers have told me that they are using what they learn in the coaching clinics to work with each other. That has been one of the most impressive things for them."

-High school MIC coach, talking about the effects of coaching on teachers' content knowledge in mathematics

Professional development activities had broadened teachers' content knowledge in mathematics, according to one high school MIC coach. The high school MIC coach explained that the presenters brought concrete examples of teaching that they were using in their classrooms. This was especially true with teaching examples related to Geometry. The MIC grant coordinator felt that the discovery approach to

learning helped teachers improve their content knowledge. Teachers studied a challenging

mathematics situation and solved the problems, giving them a greater understanding of the concepts. The ASP representative cited the sharing of teaching ideas as a factor that contributed to an increase in content knowledge. Teachers made presentations to each other, and discussed ideas and problem solving techniques.

A high school teacher described how high school teachers meeting with middle school teachers helped both groups of teachers understand the “bridge” between middle school mathematics and high school mathematics. Another high school teacher stated that the professional development activities refreshed content knowledge learned many years ago but seldom used. A middle school teacher explained that the professional development activities provided a greater knowledge of the Math TEKS, the curriculum standards that teachers in Texas must teach.

Effects of MIC Activities on Teachers’ Instructional Strategies

Effects of Math Coaching Activities

The high school MIC coaches discussed the effects of math coaching activities on teachers’ instructional strategies. They agreed that high school teachers were very independent and that learning new instructional strategies was a process that does not occur rapidly. One of the MIC coaches observed that the math coaching activities had resulted in increased collaboration among teachers, evident in the increased communication among teachers in department meetings and willingness to share instructional strategies and information. With the increased teamwork, there was an increased opportunity to share ideas and instructional strategies.

One of the high school teachers in the focus group agreed that math coaching had given the teachers opportunities to meet other teachers who teach below and above the grade levels they teach. These opportunities were giving teachers a sense of the connections between content and instruction at different grade levels. The MIC grant coordinator also noted that math coaching had provided a sense of community and sharing.

Effects of Professional Development

The MIC grant coordinator provided several examples of how the MIC professional development activities had had a positive effect on teachers’ instructional strategies. Teachers had used some of the materials provided in the trainings, including books on teaching geometry and algebra to English language learners (ELLs), and books on communication. The ASP representative noted that teachers benefited from using program materials on motivation that included a section on questioning strategies.

A high school teacher described several professional development activities that helped to strengthen instructional strategies, specifically those targeted at reaching ELLs. Teachers in that session learned numerous approaches on how to teach ELLs using hands-on activities.

“I have gotten a lot more out of [the MIC program] in Year 2. [There are] more strategies I can take to the classroom.”

-High school teacher, on the effects of professional development activities on instructional strategies

The MIC professional development activities helped a middle school teacher learn effective questioning techniques. The teacher described how effective questioning techniques were helping to guide students through the problem solving process. Another middle school teacher explained how the professional development activities were helping the teacher learn to slow down the pace of instruction to make instruction more meaningful.

Effects of MIC Activities on Teachers' Use of Assessment or Assessment Data

Teachers participated in a professional development session related to writing assessments. In the session, teachers learned to develop tests, including tests that were not multiple-choice tests. Teachers also learned to write good test item stems and a variety of questions for effective testing. A high school principal and a middle school principal explained that the district was very data-driven and all teachers were responsible for knowing how to use assessment and assessment data.

A high school teacher confirmed that their work included examining test data closely and using the data to improve instruction in areas indicated. These efforts were part of the school district's emphasis on using data-driven instruction and not necessarily the result of participation in the MIC program.

Student Engagement and Performance

"Our completion rate last year was 98%. We are proud of that. Ninth graders who started with us have gone all the way through twelfth grade. And they have to pass TAKS to graduate!"

-High school principal, speaking about the effects of the MIC program on student completion and promotion rates

All participants in the focus groups and interviews were optimistic that the MIC program activities have improved student engagement and performance. The MIC grant coordinator felt that the professional development activities related to test item stems had given teachers the tools to better prepare their students for the 2010 TAKS.

The ASP representative discussed a professional development activity in which teachers analyzed the TAKS questions related to a mathematics objective on which students needed improvement. The activity required teachers to remove grade level designations from the test items and scramble them. Teachers would then work in groups to place each item into its appropriate grade level. They then would work with students so that students could identify key components of the test items and learn strategies to respond correctly.

High school teachers discussed the impact of the MIC program activities on students in terms of performance on daily assignments in class and their scores on the school district's benchmark tests. One high school teacher commented that students were more willing to try to solve problems using different approaches. The teacher noted that this was probably because students saw teachers trying different approaches to teaching mathematics. Another teacher credited the MIC professional development activities for helping to expand the inventory of instructional strategies. This, in turn, had benefited the students.

One middle school principal noted how 76% of seventh graders at the school met the standard on TAKS-Math in the previous year. In the subsequent year, 85% of the same group of students met the

standard on TAKS-Math. The principal credited the MIC professional development activities for increasing teachers' creativity in the classroom and helping to improve the students' performance in mathematics.

Teachers could not credit MIC program activities for affecting the dropout rate in the Grantee D school district. One teacher noted that the district does not have a serious dropout rate (the dropout rate at Grantee D in 2007–08 was 3% in comparison with the 3.2% state average). The MIC grant coordinator explained that although the promotion rate for students was higher in the 2009–10 school year than in 2008–09, MIC program activities were among many variables contributing to this improvement.

Sustainability and Enhancement

The school district had planned to continue its program of math coaching and mentoring using the MIC participants trained to provide the same types of support to teachers. Vertical alignment, a topic in the MIC professional development activities, would also continue with training assistance provided by teachers who participated in the MIC vertical alignment professional development activities.

The association with the university would continue beyond the grant funding period, according to the MIC grant coordinator. Grantee D administrators and teachers had a good relationship with the staff from the university because of their workshops for the MIC program as well as a number of other activities over the years. The MIC grant coordinator explained that the district would begin planning at the end of May for continuation of MIC program activities beyond the grant period.

The ASP representative agreed that the relationship with the university would most likely continue beyond the grant period with a focus on curriculum in future professional development activities. Changes in future program activities would include an increase in on-campus activities by university staff such as classroom observations and model teaching.

Middle school teachers discussed the continuation of program activities beyond the grant period. Although focus group participants agreed that the MIC program had been beneficial and that a math coaching program should continue, they offered several recommendations for consideration. One teacher recommended selecting a different group of teachers each year so that more teachers could benefit from the leadership training. Another middle school teacher recommended reducing the number of professional development hours that were required of teachers. The teacher explained the challenge of balancing family obligations and participating in professional development activities on Saturdays and during the summer.

High school teachers all agreed that the MIC program activities should continue beyond the grant period. They had several recommendations for improving the program. One recommendation was to make the program activities more specific and relevant to classroom use. Another teacher recommended adding opportunities for teachers to observe effective teaching by other successful teachers.

The high school MIC coaches also discussed aspects of the MIC program that they believed should continue beyond the grant funding period. One high school MIC coach stated that the vertical

alignment aspect of the training would continue. The high school MIC coach added that the collaboration aspect of the program, with teachers working together on content and instructional strategies, would also likely continue. Another high school MIC coach recommended more practice teaching. After observing a model lesson, the teachers would have the opportunity to practice teaching the lesson before actually using it in his or her classroom.

Summary/Conclusions

Grantee D's MIC program included numerous professional development activities that increased the school district's capacity to meet its mentoring and leadership needs in the future. The program provided opportunities for math specialists to become effective MIC coaches. The MIC coaches were continuing to coach and mentor math teachers throughout the school district. The MIC coaches were also able to train others to become effective math coaches, thereby increasing the district's math coaching capacity. The MIC program also gave classroom teachers opportunities to participate in leadership training. The result of this training was a cadre of classroom teachers who were prepared to fill leadership positions as campus and district leaders retire or relocate.

The school district has had a relationship with the ASP that began prior to the MIC grant. The MIC grant coordinator and ASP staff were assessing needs for future professional development activities and it was likely that the ASP will continue to serve the professional development needs of the school district after MIC funding ends. According to the ASP representative, it was likely that additional professional development activities in subsequent years will include more on-campus presence by ASP staff, including modeling instruction in select classrooms.

"Talking to the high school teachers has really helped a lot. It has opened up the communication."

-Middle school teacher, commenting on the value of meeting with high school teachers

In one of the final group activities of the MIC program, teachers offered written reflections on their experiences in the MIC program. All but two of more than 20 of them who participated in the reflections activity felt that the program had been beneficial. Throughout the interviews and focus groups that the site visit team conducted, a recurring theme among teachers, MIC coaches, and administrators was that the program activities instilled a sense of community and camaraderie among the teachers and that this collaboration and teamwork would benefit students, the ultimate target of the program's goals and activities.

Case Study: Grantee E (Cycle 1)

Methodology

In February 2009, a site visit took place at Grantee E, a rural, independent school district in a town of approximately 14,000 located in Texas. One middle school, one high school, and one alternative school were participating in the MIC pilot program. The site visit team conducted individual interviews with the ASP representative, the MIC grant coordinator, the middle school coach, the high school coach, the middle school principal, the high school principal, and the alternative school principal. Two teacher focus groups were also conducted; the first comprised 9 of the 11 middle school mathematics teachers who were participating in the MIC pilot program; and the second focus group comprised the 9 participating high school mathematics teachers, including 1 teacher from the alternative school.

Characteristics of Grantee E

Table 13 provides a summary of Grantee E’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 13
General Characteristics of Grantee E’s MIC Grant Program

Category	Characteristic
Setting	Rural (Independent Town)
ESC Region	2
Grades Served	6–12
Number of Schools Served	3
Type of Schools Served	1 middle school, 1 high school, 1 alternative high school
Number of Teachers Served	20
Number of MIC Coaches Participating	2
Grant Amount	\$220,000
Grant Start Date	06/01/2008
Grant End Date	03/31/2010

Source: Grantee E’s Cycle 1 Application and Action Plan

Students

At the time of the site visit, the Grantee E school district was serving 3,600 students of which 78% were Hispanic and 19% were White. Less than 3% of the students were African American or other

ethnicity. LEP status was not an issue among the Hispanic students in this district (less than 2% were LEP) since most were natives of the area. Approximately half of the students in the school district were considered at-risk and 70% of the entire student body was classified as low socioeconomic status (SES). The alternative high school was an academic credit recovery school that was serving students in Grades 9–12. Approximately 40–45 students were enrolled at the alternative high school at one time. All students (100%) attending the alternative high school were considered at-risk.

At baseline (2007-08), Grantee E students struggled with performance on TAKS-Math, especially students in Grades 8-10. Table 14 shows the percentage of students in the district at Grantee E meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 14

Percentage Rates of Students in the District in Grantee E by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 6*	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee E	79%	64%	58%	47%	55%	77%
State of Texas	82%	82%	82%	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2007-08
 * TAKS-Math (English version)

Teachers

The middle school teachers who participated in a focus group had teaching experience ranging from three years to 20 years. The high school teachers’ experience ranged from first-year teacher to 22 years of experience. The teacher from the alternative school had 16 years of teaching experience. One middle school teacher in the focus groups had a master’s degree and was working toward administrator certification. Two of the high school teachers who participated in the focus group had master’s degrees. According to the grant coordinator, sixth grade teachers were especially in need of professional development training that provided opportunities for them to learn more mathematics content knowledge.

Coaches

The two MIC coaches were employed by the ASP. The middle school coach had ten years of teaching experience, was certified in Grades 1-8 mathematics, and had worked for the ASP for almost three years. The high school MIC coach had 20 years of teaching experience, mostly at the high school level. She had also taught Grade 5 and Grade 6. She had a secondary mathematics certification and was certified in Texas as a master math teacher.

Overview of Grantee E MIC Pilot Program

Goals

According to the grant coordinator and ASP representative, the purposes of the Grantee E MIC pilot program were to:

- Plan, design, and implement a pilot program to support the improvement of secondary mathematics teachers' content knowledge and instructional expertise
- Implement a pilot program that was research-based
- Implement a pilot program that has a strong emphasis on improving mathematics teachers' abilities to increase at risk student performance in mathematics
- Institute a rigorous and engaging professional development program that redesigns structural and collaborative practices for mathematics teachers
- Develop the skills and knowledge of school leaders in the area of mathematics instruction
- Provide models of excellence in coaching teachers of mathematics to improve their knowledge and expertise

Program Structure

During their phone interview in January 2009, the MIC grant coordinator and ASP representative were both asked to describe the overall structure of the MIC pilot program. As a follow up to this question, they were each asked one month later during the site visit to elaborate on specific aspects of the program, including the role of the ASP and the types of activities that have been implemented thus far.

The ASP was providing two coaches to the school district; one for the middle school and one for the high school. The MIC coaches were conducting the professional development and coaching sessions with the teachers during on-site visits. During these visits to their respective campuses, the coaches would meet regularly with the school administrators from the middle and high school, and other staff to advise them on the progress of the program. The coaches were keeping all teachers apprised of new developments in math education. The ASP was handling the administrative aspects of the grant and was conveying new information that it receives from TEA to the school district.

The school district and the ASP had based their MIC pilot program on CSCOPE™ (n.d.), a research-based curriculum and professional development support program that is used to ensure that schools implement the four core curriculum areas (science, mathematics, English language arts, and social studies) correctly. The curriculum is divided into sections, and a new section is taught every six weeks. The idea is that every school district using CSCOPE is teaching the same concepts at the same time. Approximately 30% of the districts in Texas implement CSCOPE, so the hope is that if students were to move to a different district, they would be familiar with the curriculum and at the same point as where they left off.

Professional Development and Coaching Activities

Professional Development Activities and Teacher Participation

Activities. Teachers were participating in professional development activities that were based upon CSCOPE, the school district's adopted curriculum. Every six weeks, new content/concepts/strategies from the curriculum were being presented to the teachers by the MIC coach. In addition to introducing the new concepts and strategies to be used in the subsequent six weeks, exemplar lessons also were being included.

The exemplar lessons were stressing the use of manipulatives in the classroom (an integral part of the CSCOPE curriculum). The professional development sessions also included continuous emphasis on the use of the 5-E model that was also an integral part of the CSCOPE curriculum: Engage, Explore, Explain, Extend/Elaborate, and Evaluate. Small group sessions, one-on-one sessions, model teaching sessions in the classroom, and consultation were the various activities through which coaches were leading teachers after each curriculum component was presented.

Participation. Mathematics teachers participating in the MIC pilot program in this school district were required to participate in the professional development activities that form the basis of the MIC program. Participation had been at 100% except for excused absences.

"Teachers have a tendency to put things away after they have learned them. Knowing that someone is coming to observe them, they will work to implement these things."

-MIC high school coach, regarding her role and as an observer and its impact in the professional development and coaching activities at the high school

Coaching Activities and Teacher Participation

Activities. Coaching would follow the presentation of each new content/concept/strategy of the CSCOPE curriculum. First, the coaches and teachers would meet in small groups to discuss the curriculum component presented and to clarify any aspect of the curriculum as needed. Then, the coaches would work with each teacher individually using lesson modeling and consultation. Finally, the coach would model an entire lesson, the teacher would emulate the model teaching, and the coach and teacher would debrief and discuss positive aspects of the teaching lesson and improvements that could be made. This three-part process would occur after each presentation of a new component of the curriculum.

"They are very engaged in the activities. They determine the direction we are going. We know what our goal is when we sit down. We talk about where this fits in, or maybe this is something that we can leave out, change, or adapt. They are constantly involved in what they feel will work for them. I try to give them ideas and let them choose what they think will best work for them."

-MIC high school coach, on the level of teachers' engagement in MIC professional development and coaching activities

Participation. Mathematics teachers participating in the MIC pilot program in this school district were also required to participate in coaching activities that were part of the MIC pilot program. Participation had been at 100% except for an excused absence on occasion.

District/Campus Administrator Participation in Program Activities

The district was employing a middle school math coach and a high school math coach to conduct professional development and coaching activities. Principals were allowed to attend part of a professional development activity but usually for observational purposes only. The teachers were welcoming the participation of principals because they were viewed as colleagues in this setting rather than as administrators. The teachers recognized that the principals were to support teachers as opposed to conducting evaluations of the teachers' performance.

MIC Pilot Program Implementation

Barriers to Program Implementation

The main barrier encountered with implementing the MIC pilot program in this school district was the challenge teachers face with trying to balance the time they need to spend on classroom instruction with their students and the time required to participate in training to learn new instructional strategies. The district, in collaboration with the ASP, had addressed this barrier by developing a master calendar to assist participating teachers with balancing their time in the classroom with their time in professional development sessions.

An added barrier was that by implementing CSCOPE as a new curriculum (which differs considerably from the previous curriculum), not all of the teachers were agreeing with how they were required to teach the lessons. Some teachers believed that the lessons required more time, while other teachers believed the lessons required less time. The district, however, required that all teachers must adhere to the training schedule that was created for the MIC pilot program in terms of when professional development and coaching activities were to take place. The teachers had expressed their concerns about this to the MIC coaches, and everyone involved in the pilot program was working to address and resolve this issue.

Facilitators of Program Implementation

Communication between the ASP and the school district had been excellent and as a result, effective planning meetings between the school district administrators and the ASP had taken place to clarify the goals of the MIC pilot program and the roles of everyone involved in the program. In addition, as a way to minimize time away from the classroom, the district adopted an in-class model teaching approach for the coaching component of the MIC program. It had been beneficial to the MIC pilot program and the district that they had an MIC coach who was a Texas-certified master mathematics teacher.

Other Mathematics Programs in the District

In addition to CSCOPE, the school district was using two other programs/curricula, CompassLearning® Odyssey Math® (n.d.) and Apangea Learning Math® (n.d.). Odyssey Math® is a research-based interactive program that combines instruction, feedback, and exploration. Apangea Learning Math® supports one-on-one instruction and tutoring and allows the teacher to use

concepts that were appropriate for students from Grades 3 through 12. Apangea Learning Math® was primarily used with students who need additional assistance with mathematics concepts.

Relationship between Grantee E and ASP

According to the grant coordinator and the ASP representative, there was regular communication between the ASP and the school district due to the design and structure of the MIC pilot program. For example, when requests for assistance were received by the ASP, the ASP would respond immediately, which was keeping the processes and procedures moving so that everyone involved in the MIC pilot program would feel supported. There was a good relationship already in place between the district and the ASP when the district was awarded the grant; school personnel and teachers were familiar with the ASP staff.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and coaches discussed their perceptions of the effects of program activities on teachers. These participants were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: Development of Teacher Confidence and Innovative Instructional Techniques

The site visit team asked the coaches, the grant coordinator, and the principals to describe how they believe the MIC pilot program activities have affected teachers' beliefs about teaching mathematics. The principal from the alternative high school stated, "I think what our teacher has gone through has helped her develop confidence in how to work with these kids and get information across to them...[and] this has boosted her self confidence and reinforced the way she was delivering instruction to her students." The middle school principal also believed that the teachers, especially the Grade 6 teachers, were feeling an increased sense of confidence as a result of participating in the MIC pilot program. The Grade 6 teachers had been struggling more because they were not specifically trained in mathematics and thus, need to work harder to understand the concepts. The high school principal believed that CSCOPE had provided teachers with the opportunity to work collaboratively as well as provide user-friendly lessons to the students. This had increased the teachers' level of confidence. The high school mathematics coach acknowledged that at the beginning of the MIC pilot program implementation, teachers were resistant to being observed in

their classrooms, especially by people they did not know. But eventually the teachers were welcoming the help and wanted to be observed. The middle and high school teachers believed that the MIC pilot program had increased their level of confidence in the work they have and the lessons they have to teach.

Specifically, participants reported the following effects of the MIC professional development activities had affected teachers' beliefs about teaching mathematics:

- Instilling a sense of confidence in teachers' ability to teach mathematics
- Reinforcing teachers' love of teaching mathematics
- Providing a level of comfort with using hands-on teaching approaches with manipulatives
- Giving teachers a better sense of the connections between mathematics and the real world

Participants reported the following effects of the MIC coaching activities on teachers' beliefs about teaching mathematics:

- Providing an atmosphere of reinforcement and trust between teacher and coach
- Reinforcing the belief that there are different ways to structure and present mathematics
- Helping teachers to understand that students have different learning styles that require different instructional approaches

"It has changed the way I teach to a more hands-on approach."

-High school teacher, commenting about the effects of the MIC program

Making a Difference in Student Learning of Mathematics

The coaches, grant coordinator, and principals provided observations of how program activities had affected teachers' sense that they could make a difference in their students' learning of mathematics. The principal from the alternative high school described the self-esteem of the teacher who was participating in the MIC pilot program as having "risen at least 40-50%...she is getting feedback from students and they have been positive about how she is working with them." By providing opportunities for the middle school teachers to meet and discuss the CSCOPE curriculum with their coach, there had been an increase in classroom participation, especially since the lessons were hands-on. Middle and high school teachers also agreed with this sentiment. One teacher stated, "[The MIC pilot program] helps me learn new ways to say the same thing, or learn a new something to say...I have learned a new way or a different approach." A high school teacher stated, "I am seeing those kids who wouldn't have tried step up a little," which demonstrated that the program was making an impact on instruction and student learning.

Specifically, participants interviewed during the site visit reported the following effects of the MIC professional development activities on teachers' sense that they can make a difference in their students' learning of mathematics:

- Helping some teachers understand mathematics content knowledge better, which in turn, helps students understand mathematics better

- Providing reinforcement and support to teachers that they can make a difference in their students' learning of mathematics by correctly implementing new skills they are learning
- Increasing teachers' confidence that they can make a difference in their students' learning of mathematics
- Creating collaboration among teachers that enables them to discuss effective classroom practices with each other
- Making more resources available to teachers for use in the classroom
- Creating an environment where feedback from students is welcomed

Participants also reported the following effects of the MIC coaching activities on teachers' sense that they could make a difference in their students' learning of mathematics:

- Helping to reaffirm that a teacher is on the right track in his or her teaching
- Increasing teachers' confidence, which in turn increases students' confidence in their ability to understand mathematics
- Teaching them methods to increase communication with students
- Helping teachers feel more comfortable working with a new mathematics curriculum (CSCOPE)

"I think it gives the teachers a comfort level. They can communicate better with the kids on these activities. They feel more comfortable and can deliver to the kids. They are making the connection with the kids."

-High school principal, on the effects of the MIC activities on teachers' sense that they can make a difference in their students' learning of mathematics

Teachers' Math Content Knowledge and Eagerness to Learn

There were mixed feelings among the MIC pilot program participants regarding the impact the MIC pilot program had had on teachers' content knowledge. The middle school principal and the middle school coach both believed that the MIC professional development and coaching activities had a positive effect on the Grade 6 teachers in terms of increasing their content knowledge. Interestingly, the MIC grant coordinator indicated that the Grade 6 teachers had the greatest need for additional content knowledge. However, the middle and high school teachers stated that they felt the professional development and coaching activities had little impact on increasing teacher content knowledge because they believed their level of content knowledge was sufficient for the classes/grades they teach.

"It has affected the sixth grade teachers the most because they are not as confident with content. It has given them more tools to use. Having the activities and instructions listed out has given them more confidence and more content knowledge than they had before."

-Middle school MIC participant, on the effects of the MIC program on teachers' math content knowledge

Student Engagement and Performance

At the time of the Grantee E site visit, students had not yet taken the TAKS for the 2008–09 school year, so any effects of the MIC pilot program participation by teachers on their students standardized

tests were unknown. However, the high school teachers reported that their students' scores on the benchmark tests used to determine student performance throughout the year had improved, but middle school teachers stated that their students' scores on benchmark tests had not improved since the implementation of the MIC pilot program in this school district. Students had given teachers feedback about the program following classroom activities. In particular, students had expressed their enthusiasm for the activities they were enjoying in the classroom. The middle school principal stated, "When [the teachers'] confidence increases, that impacts the kids. When they're confident, the kids feel confident that they know what they are doing and will buy into it...I have seen [the students] more engaged in the classrooms. We aren't going to know the full extent of the effects [of the MIC pilot program] at this time, but I see them more engaged in the lessons than I have seen in the past."

"Students drop out when they have been unsuccessful for some time. [The MIC pilot program] allows the teachers to provide for more success. As a result, the students can feel more successful."

High school mathematics consultant,
discussing the impact professional
development and coaching activities can
have on dropout rates

Site visit participants believed that it was "too soon" to determine the impact the MIC pilot program had had on indicators such as academic achievement, dropout rates, graduation rates, course completion rates, and SAT/ACT scores. However, the MIC coach stated that the department head indicated that attendance rates had improved in the schools implementing the MIC pilot program. Anecdotally, the high school principal noted that students were achieving better grades in math compared to the previous year and that more students were staying after school for tutoring compared to the previous year. In addition, at least for the high school, attendance rates were more of a concern than dropout rates, so the principal was pleased to see that there had been an improvement in attendance rates this year.

Sustainability and Enhancement

The ASP, grant coordinator, teachers, principals, and coaches believed that the program should continue beyond the grant award period, especially if there was improvement in student achievement after the two years of the program implementation. Funding would be difficult although most agreed that the program could be included in other grant proposals. The only concern was that because the district typically has a high teacher turnover rate, it could be a challenge to implement the professional development and coaching activities because of the potential that the teachers would be at different points in their learning of CSCOPE during their tenures at the school.

While discussing the potential for continuing the program after the grant period ends, participants offered ideas for changes to the program if funding could be extended. Participants recommended that the district:

- Provide stipends to teachers for participation
- Extend the program for another three to five years or if possible, indefinitely
- Provide more on-site targeted professional development that was customized and tailored to the needs of the district

- Offer professional development activities before the school day starts in order to minimize disruptions to classroom instructional time
- Increase the number of hours allotted to coaching teachers
- Provide more sample lessons
- Include horizontal planning across grade levels, which would allow teachers at each grade level to share their teaching experiences with each other
- Have administrators participate more in professional development sessions
- Add a science professional development and coaching component to the program
- Hire mathematics coaches in addition to the ones provided by the ASP.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. The MIC grant coordinator stated, "We are really grateful for the grant because math is a very low area. We wouldn't be able to do what we are doing without it. It really helps with student achievement." The ASP representative shared similar sentiments about the program making a difference, but added, "We are able to be on site a whole lot more than we were ever able to before. We hope it continues."

"The staff development and the coaching combined provide students with more opportunities to be successful. Students drop out when they have been unsuccessful for some time. This allows the teachers to provide for more success. I don't think the students will drop out if they are successful and if they feel comfortable."

-High school math coach, on the potential positive effects of the MIC activities on the district's dropout rate

Summary/Conclusions

Grantee E, a rural school district located 100 miles outside a large metropolitan area in Texas was comprised primarily of Hispanic (78%) and White (19%) students with the remaining 3% representing African American and other ethnicities. Three schools in the district were implementing the MIC pilot program, where approximately 50% of the student body was considered at-risk and 70% of the students were classified as low socio-economic status. In terms of mathematics achievement, 70% of the students passed the TAKS-Math, which was 10% lower than the Texas average. Thus, there was well-documented need for an MIC pilot program. The Grantee E MIC pilot program was based on CSCOPE, a research-based curriculum and professional development program that is used to ensure that schools implement the four core curriculum areas correctly. The curriculum is divided into sections; a new section is taught every six weeks. The idea is that every school district using CSCOPE is teaching the same concepts at the same time. There were 20 mathematics teachers receiving coaching and participating in professional development activities provided by the MIC pilot program. There were two coaches, both employed by the ASP, to provide professional development and coaching activities directly to the teachers. Several school administrators attend the meetings between coaches and teachers and participate in the observations of the teachers.

The primary barrier to implementing the MIC pilot program has been to figure out how to train the teachers during their professional development activities and yet not have them miss too much classroom instructional time with their students. In addition, implementing CSCOPE as the new

curriculum had been the cause of some confusion because there was disagreement as to how long the lessons need to be. Despite these barriers, which the district has addressed by creating calendars and schedules, there had also been facilitators that have eased the operation of the MIC pilot program. The school district has had a positive ongoing relationship with the ASP, so both parties have been able to communicate well among all the participants involved in the pilot program. For example, the ASP and the school district held a planning meeting to clarify the goals of the MIC pilot program and the roles of everyone involved in the program. In addition, as a way to minimize time away from the classroom, the district and ASP adopted an in-class model teaching approach for the coaching component of the MIC program.

As this was the first year of the MIC pilot program in this school district and the site visit was conducted only midway through the academic year, it was not possible at this time to determine the full impact the program was having on mathematics teachers and their students. However, it was noted by several interviewees during the site visit that attendance rates have improved and students were more engaged than in the past. Teachers were also viewed as more confident of their teaching abilities and embracing new ways for conducting lessons in their classrooms. These findings were attributed directly to the impact of the MIC pilot program. There was consensus however that the mathematics content knowledge of the majority of the teachers had not changed because they were already familiar with the material, except in the case of the Grade 6 mathematics teachers who seemed to be learning more mathematics content because they were considered to be generalists rather than teachers who specifically teach mathematics.

Although the funding for the MIC pilot program was for two years, everyone interviewed during the site visit expressed the need and interest in extending the program to five years or if possible, indefinitely. The only concern was that because the district has a high teacher turnover rate, it could be a challenge to provide the professional development and coaching activities because of the potential that the teachers would be at different points in their learning of CSCOPE during their tenures at the school. Overall, despite being in its early stage of implementation, the program was making a positive impact on the mathematics teachers, students, and the school principals.

Case Study: Grantee F (Cycle 1)

Methodology

In March 2009, a site visit took place at Grantee F, a rural school district of approximately 45,000 people located near the Texas-Mexico border. Two middle schools were participating in the MIC pilot program; one sixth grade campus and one seventh and eighth grade campus. During the site visit, interviews were conducted with the MIC grant coordinator, the ASP representative, and the principal from each middle school. The MIC coach was interviewed via telephone. Focus groups were conducted with the mathematics teachers; 5 of the 7 sixth grade teachers participated in one group, and 12 of the 14 seventh and eighth grade teachers participated in another group.

Characteristics of Grantee F

Table 15 provides a summary of Grantee F’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 15
General Characteristics of Grantee F’s MIC Grant Program

Category	Characteristic
Setting	Rural (Independent town)
ESC Region	15
Grades Served	6-8
Number of Schools Served	2
Type of Schools Served	2 middle schools
Number of Teachers Served	21
Number of MIC Coaches Participating	1
Grant Amount	\$224,998
Grant Start Date	07/01/2008
Grant End Date	05/31/2010

Source: Grantee F’s Cycle 1 Application and Action Plan

Students

Grantee F is a small to mid-sized district serving approximately 10,200 students. Students in the district were mostly of Hispanic descent (90%), while 8% of students were White, and 1% were African American/Other. More than half (54%) of students in the district were considered at-risk and almost three-quarters (71%) were economically disadvantaged.

At baseline (2007-08), performance on the TAKS-Math among Grantee F students was considerably below the state averages on TAKS. Table 16 shows the percentage of students in the district at Grantee F meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the follow-up site visit.

Table 16

Percentage Rates of Students in the District in Grantee F by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 6	Grade 7	Grade 8
Grantee F	73%	63%	70%
State of Texas	83%	80%	79%

Source: Academic Excellence Indicator System (AEIS), 2007-08

Teachers

The sixth grade mathematics teachers who participated in a focus group had teaching experience ranging from two years to 30 years. The seventh and eighth grade teachers’ experience ranged from first year teachers to 17 years of teaching experience. One seventh grade teacher had a master’s degree in business administration and one eighth grade teacher had a master’s degree in civil engineering.

Coach

Grantee F’s original plan was to hire one MIC coach to work with mathematics teachers in both middle schools on a regular basis throughout the grant period. However, the district was unable to hire an MIC coach and instead contracted with a mathematics consultant to work with the teachers. This mathematics consultant, who was serving in the role as an MIC coach, had over twenty years of experience in teaching and working as a central office administrator. The coach’s primary responsibility was to help teachers better understand the state’s curriculum known as TEKS and to provide consistency across the three middle school grades in teaching the TEKS. At the time of the site visit, the coach had met with the teachers twice; usually as a three-day visit spent working with teachers from each grade for one day each visit.

Overview of Grantee F MIC Pilot Program

Goals

According to the MIC grant coordinator and ASP representative, the purposes of the Grantee F MIC pilot program were to:

- Assist in developing the content knowledge and instructional expertise of the district’s mathematics teachers in grades 6 through 8.
- Improve mathematics teachers’ abilities to increase at-risk students’ achievement in mathematics, especially those who are Hispanic, economically disadvantaged or English Language Learners (ELL)

- Build the mathematical understanding of students at the middle school level so they will have a stronger background/knowledge/understanding of mathematics when they transition to high school

Program Structure

During the phone interview in December 2008, the MIC grant coordinator and ASP representative were both asked to describe the overall structure of the MIC pilot program. As a follow up to this question, they were each asked three months later during the site visit to elaborate on specific aspects of the program, including the role of the ASP and the types of activities that have been implemented thus far.

The ASP is located more than 100 miles from Grantee F, so the ASP's primary role was to administer and manage the contracts of the two authors whose curriculum the MIC pilot program was based, *TEKSing Toward TAKS Mathematics*®, (TEKSing Toward TAKS, Inc., n.d.), developed by Brenda DeBorde and Juanita Thompson. According to the program's website, *TEKSing Toward TAKS Mathematics*® is designed to serve as an instructional tool for the classroom, offering questions for students and questioning strategies for the teacher. One of the goals of the program was to assist teachers in the instruction of the TEKS and assist teachers with assessment of TEKS mastery by their students. The authors were providing professional development to the middle school mathematics teachers once every six weeks. The ASP also was administering and managing the MIC coach's contract and was providing one additional staff person to be present when Brenda DeBorde and Juanita Thompson were training teachers.

Professional Development and Coaching Activities

Professional Development and Teacher Participation

Activities. The authors of *TEKSing Toward TAKS* were providing professional development activities to the middle school teachers every six weeks. The sessions were addressing the mathematics objectives that teachers would use in the subsequent six weeks. The MIC coach also had conducted two days of professional development activities with the teachers, grouped by grade level, to learn how to personalize the *TEKSing Toward TAKS* program for use in their classrooms by introducing new strategies and games to help engage students in learning.

Participation. Teacher participation in professional development activities had been at 100% except for an occasional excused absence.

Coaching Activities and Teacher Participation

Activities. During the two, three-day visits with teachers (one day per grade level), the MIC coach was observing teachers in their classrooms and provides specific feedback to each teacher along with recommendations for improving instruction.

Participation. Teacher participation in the two days of coaching activities had been 100% except for an occasional excused absence.

District/Campus Administrator Participation in Program Activities

Grantee F's secondary math curriculum coordinator was serving as the MIC grant coordinator and was participating in all professional development activities and coaching sessions with the teachers. One middle school assistant principal was overseeing the math curriculum at the school and was being actively involved in the program activities while principals were being kept abreast of progress by teachers, assistant principals, and the MIC grant coordinator.

MIC Pilot Program Implementation

Barriers to Program Implementation

The primary barrier to program implementation in this district was the inability to hire a full time teacher to serve as the MIC coach. To remedy this, the school district hired an external consultant, but she was based far away from the school district which had limited her contact with the teachers to only two days thus far. There had also been numerous changes in the school district administration this past year. Many of the staff members who were involved with writing the MIC pilot program grant proposal no longer were working in the school district. Although this had been the cause of some difficulties during the transition, there was one administrator who was involved from the beginning who was continuing to be involved with the pilot program. Additionally, a new superintendent was hired for the district and had been supportive of the pilot program, but it had taken time for staff to adjust to these changes.

Teachers have mixed reviews about the curriculum *TEKSing Toward TAKS* which had been another barrier to program implementation. The authors of the program were very specific with regard to the pace at which students and teachers progress through the program. This had created some difficulties for teachers who believed that more time was needed for some students to master the material. Because the teachers were required to continue at a very specific pace, some felt that they were moving on to the next objective before their students had fully grasped the previous objectives, and thus concerned that their students' scores on exams and standardized test would not improve.

Facilitators of Program Implementation

Hiring a new superintendent who was supportive of the MIC pilot program and wanted to see the implementation of more coaching activities in the future had been an excellent facilitator of program implementation. The plan was to use existing resources to train highly qualified teachers in the district to serve as coaches to their peers. In addition, the one administrator who was involved with writing the grant proposal who was still employed by the district had been a helpful mediator between the teachers and the curriculum authors to address the concerns about the pace with which lessons were being taught and expected to be implemented in the classrooms. Lastly, teachers now have more manipulatives in the classroom as a result of the MIC pilot program which had been helpful for teachers to work with their students in their classrooms.

Other Mathematics Programs in the District

The primary curriculum used to improve TAKS scores was *TEKSing Towards TAKS*; however, the school district also was using materials from The University of Texas at Austin to supplement this program, as well as implementing CSCOPE™ (n.d.).

Relationship between Grantee F and ASP

The school district and the ASP had had a long history of working together on numerous grants over the years as well as professional development activities. Therefore, the communication between the school district and the ASP had been solid, despite a large geographic distance between the two.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and coaches discussed their perceptions of the effects of program activities on teachers. These participants were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching: Innovative Techniques and Peer Support

The site visit team asked the MIC grant coordinator, the ASP representative, and the principals to describe how they believe the MIC pilot program activities have affected teachers' beliefs about teaching mathematics. According to the MIC grant coordinator, the teachers had gained a broader understanding of how to teach mathematics as a result of the MIC pilot program's professional development activities. "... [the teachers] realize their job is not just to give out information but to facilitate student learning," explained the MIC grant coordinator. The principals also agreed that because the curriculum was being taught and implemented in a very structured, regimented way, teachers had been less receptive to the MIC pilot program and were not reaping the full benefits possible. Although on a positive side, one principal reported that veteran teachers did seem more empowered and liked the idea of "being able to take novice teachers who were struggling under their wing" to help them.

Specifically, participants reported the following effects of the MIC professional development activities on teachers' beliefs about teaching mathematics:

- Teachers were learning that they should be facilitators of the learning process.
- Teachers were learning that positive feedback helps to empower teachers.
- Teachers were learning that effective instruction requires consistency.

As for the MIC pilot program coaching activities, the MIC grant coordinator believed that the coach had helped the teachers in terms of their beliefs about teaching mathematics by helping teachers find alternative ways to work with a very structured curriculum. By helping the teachers find other ways to approach the curriculum and deliver the information to the students, the teachers felt more positive and confident about teaching. The principals believed that the MIC coach had a balancing effect on the teachers since the coach was well regarded by the teachers and the curriculum consultants were not. "She has affected how they feel about themselves and how they present. The only problem with her was that she was not here every day or every week for that matter," stated one principal.

The professional development is really stressing that math has to be taught with the students very involved, teaching to use pairs and small groups in the classroom also. I think that has made a big difference.

-MIC grant coordinator, on the effects of MIC coaching activities on beliefs about teaching mathematics

Overall, participants interviewed during the site visit reported the following effects MIC coaching activities on teachers' beliefs about teaching mathematics:

- Teachers had learned that adding closure to their lessons is a critical step toward making math meaningful to the students.
- Teachers had gained confidence in their ability to teach math.
- Teachers were able to see how teaching math can be fun and students can have fun learning it.
- Teachers had learned that effective teaching requires the use of activities that engage the students.
- Teachers had learned to share their teaching experiences, including the difficulties in teaching math, with their colleagues.
- Teachers had learned that even with a very structured curriculum it is necessary to look at options and different approaches for students who need them.

Making a Difference in Student Learning of Mathematics

The grant coordinator, ASP representative, and principals provided observations of how program activities have affected teachers' sense that they can make a difference in their students' learning of mathematics. There was consensus among respondents that the professional development activities in the MIC pilot program in this school district was encouraging students to take a more active role in their learning. "One part of the curriculum is having students present an activity and that is very different for students and teachers and makes a big difference in how they are learning," explained the MIC grant coordinator. The principals believed that there had been some positive impact on how teachers teach and how students learn, but the resentment the teachers felt for the consultants who

taught the curriculum ran deep, especially at one of the campuses. Teachers at the other campus were also unhappy with the structured nature of the program and disagree with the consultants teaching them the program. The teachers would like the program to be more adaptable to the needs of the students, but since it was not, the campus had had to use other staff to work on data disaggregation and planning for the next unit that they would learn so that the teachers could find a way to adapt it to their classrooms anyway. Other teachers expressed that they felt the professional development activities had “held us back from how we can help our students” because the schedule was rigid and they did not have enough time to review assessments and other materials.

Overall, participants interviewed during the site visit reported the following more global effects of the MIC professional development activities on teachers’ sense that they could make a difference in their students’ learning of mathematics:

- Teachers had learned how teaching style and strategies affect student learning.
- Teachers had realized how increasing their own content knowledge in math can have a positive impact on their students’ learning.

The coaching activities provided by the MIC pilot program had also impacted students’ learning of mathematics. This school district was focused on 5E, so the coach had spent a lot of time working with the teachers about how to incorporate the 5Es into the curriculum. Teachers were not enjoying teaching anymore because the curriculum was so structured, but by having the coach present twice to explain ideas and provide the teachers with more freedom to try find ways to engage students, and to bring in various activities to use, both the teachers and students were motivated to study mathematics. In fact, one teacher explained, “I already knew math was fun. The program really didn’t change my beliefs, it just made my beliefs stronger with what I connect math to be. I connect math to be fun and I like to convey that to my kids. When [the coach] brought us those activities, I thought ‘yea, we can make it fun again.’”

Overall, participants reported the following effects of the MIC coaching activities on teachers’ sense that they could make a difference in their students’ learning of mathematics:

- Teachers had learned the importance of engaging students in math activities.
- Teachers had learned about resources outside of the curriculum that can be used to enhance student learning.

Teachers’ Math Content Knowledge and Eagerness to Learn

It was not clear how much interaction there had been between the people who were teaching the professional development activities and the MIC coach. It seems that during the professional development activities, the consultants would explain the content to the teachers and then it was the coach who would model the lessons; however, the coach had only come to the school twice, thus lessening the likelihood for content knowledge to change.

Interviewees reported the following effects of professional development activities on teachers’ mathematics content knowledge:

- There had been an increase in teachers' vocabulary in mathematics.
- The instructional materials teachers were using did not include answer keys. Teachers were required to work out each problem themselves. This activity was increasing their knowledge of content and was giving them a perspective of the processes that students go through to solve a problem.

Interviewees reported that the coaching activities had been limited to two meetings with teachers from each grade level. The focus of these meetings had been on using innovative ways to engage students in learning and on improving instruction rather than on content.

I thought I knew it all because I have been here for a long time, but I was able to learn some new vocabulary.

-Sixth grade teacher discussing the impact of the MIC activities on mathematics content knowledge

Student Engagement and Performance

At the time of the Grantee F site visit, students had not yet taken the TAKS for the 2008–09 school year, so any effects of the MIC pilot program participation by teachers on students' standardized tests were unknown. However, since the curriculum was very structured the consensus was that the district was now more prepared than ever for the TAKS. In fact, students' scores on mini-assessments, benchmark exams, and grades had already improved this year. Principals were meeting with teachers and students during Saturday school. The focus was to engage the families, counselors, and

One gratifying thing I have seen is students' willingness to participate in tutorials. Never before had you seen kids doing work in the morning while waiting in the cafeteria... You usually only saw them at tutorials when it was required for TAKS prep.

-Middle school principal on the impact of the MIC activities on student outcomes

assistant principals so that the students would learn the work, would be more engaged, and would perform better. In addition, now that the curriculum was aligned for all students in Grades 6 through 8, the same lessons were taught and the same assignments were provided to the students which had allowed for collaboration and discussion among the teachers. Improved

test scores was the desired result of such a structure. Teachers also reported that the MIC pilot program had made a difference because they no longer have to individually address students that usually needed more attention. Instead, students had become much more engaged in their mathematics classes. For example, if during a lesson the teacher was not using an activity that they liked, the students would ask the teacher to use it. In addition, teachers reported that students were participating more in class this year compared to the previous year when they were implementing a different curriculum. Lastly, teachers reported that student benchmark scores had improved by 50 points since last year, which was substantial.

Sustainability and Enhancement

Teachers, administrators, the grant coordinator, the ASP, and the coach all agreed that a mathematics coaching program should continue in the school district, but district personnel would review and determine how effective the curriculum *TEKSing Toward TAKS* had been at their schools. They would

This is the only grant that I believe will be sustained effectively long after monies are gone next year. I believe that because part of the grant was that we used a new curriculum to improve teachers' effectiveness and knowledge.

-Middle school MIC principal discussing plans for sustainability

determine whether any changes to the school district's math curriculum were warranted in subsequent years since there have been mixed reviews about it from all staff involved in the MIC pilot program. There were other changes anticipated for the future of the program such as arranging teachers' schedules to increase teaching time in math; decreasing teaching time in subjects when possible; identifying and training coaches from within the existing faculty; and implementing a grade-level coaching program that uses the current staff and resources they have available to them.

In discussing sustainability, one principal addressed the impact the MIC pilot program had had on the teachers as justification for why the program needs to continue. She stated, "If we didn't have the program we wouldn't have the opportunity for our teachers to gain content knowledge, to have time for planning days, and to have time to work on curriculum. That translates into good instructors, good teaching, and kids wanting to come to school because the teacher was available before and after school for tutoring."

While discussing the potential for continuing the program after the grant period was to end, participants offered the following changes to the program if funding could be extended:

- Provide 3 part-time teachers to function as part-time MIC coaches (one for each grade level) to their peers.
- Increase the amount of mathematics class time so that all students have 75-90 minutes of mathematics instruction daily so students have time for hands-on activities.

None of us realized how difficult it would be to find an MIC coach. The district didn't want to release a key person like a math teacher to serve in that role...but I think they have worked through it to have an internal [teacher] at each grade level.

-ASP representative, discussing changes that are needed for sustainability of the MIC pilot program

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. One principal stated, "The funding has been wonderful, it really helps me as a principal, but the beneficiaries are the kids. That is the bottom line." The MIC grant coordinator expressed gratitude to the teachers for working hard and spending extra hours (including Saturdays and evenings) dedicated to the students and the MIC pilot program. This principal acknowledged frustration with the program this year, but commended the teachers on their ability to collaborate well with each other. The principal regretted that the stipend for the teachers from the MIC pilot program was not a larger amount, but was pleased to be able to offer them something.

Summary/Conclusions

Grantee F, a rural school district located in a town of approximately 45,000 people is located near the Texas-Mexico border. The 10,200 students in this district were primarily of Hispanic descent (90%), while 8% were White, and 1% were African American/Other. About 54% of the students in the district were considered at-risk and 71% were economically disadvantaged. Two middle schools were implementing the MIC pilot program; one which was primarily a sixth grade campus and the other houses seven and eighth grade students. There were 7 sixth grade mathematics teachers and 14 seventh and eighth grade mathematics teachers participating in the MIC pilot programs at their schools. The district decided to implement the program in these two middle schools because only 39% of students graduating from the high school were college-ready in mathematics. Based upon

the 2008 TAKS, the middle and high schools had a 69% passing rate for mathematics, which was below the state average. Thus, there was well documented need for an MIC pilot program.

The Grantee F's MIC pilot program was based on the *TEKSing Toward TAKS Mathematics*. The co-authors of this program were training the 21 teachers in this new curriculum every six weeks by providing them with professional development activities. The district was unable to hire an MIC coach, so they had contracted a consultant to function as the MIC coach, but she had only been able to provide two days of coaching to the teachers in part due to geographic distance (the coach was based more than 100 miles from the schools). Several school administrators attended the professional development and coaching session, as well as observe the teachers in their classrooms.

There had been several major barriers to program implementation for Grantee F's MIC pilot program. The primary barrier was the inability of the district to hire a full time teacher to function as the MIC coach. The only solution was to hire a consultant to function in this role, but she was based far from the schools and therefore has only been able to provide two coaching sessions to the teachers so far. There also had been numerous changes in the school district administration this past year; thus, many of the people who were involved with writing the grant no longer work for the district. In addition, a new superintendent was hired and although supportive of the MIC pilot program, the superintendent has taken time to get settled. Lastly, there were mixed reviews of the curriculum being implemented for the MIC pilot program (*TEKSing Toward TAKS*). The consensus seemed to be that the program was too specific and rigid, which had caused difficulties for the teachers who believed they and their students need more time to understand the material. The MIC coach, although only having provided two sessions of coaching for the teachers, had helped address the concerns of the teacher by demonstrating ways that the teachers can adapt the program, despite the objection from the authors of the curriculum. The new superintendent was also supportive of the MIC pilot program and was working to find ways to modify/adapt the program for the second year of the grant. For example, the hope was that next year the district will be able to train highly qualified teachers in the district to function as coaches to their peers.

Since this was the first year of the MIC pilot program for Grantee F and the site visit was conducted midway through the academic year, it was not possible at this time to fully determine the impact the program was having on mathematics teachers and their students. However, based upon the site visit interviews, there were some noteworthy highlights. Teachers had gained a broader understanding of how to teach mathematics as a result of the MIC pilot program. In addition, the veteran teachers were now empowered to help novice and struggling teachers. Teachers had also learned new methods for engaging students in the classrooms by implementing various activities that the students were enjoying. This had meant less disruption in the classrooms and fewer instances that the teachers have needed to provide one-on-one assistance. It was also reported that students were more willing to participate in tutorials and Saturday school, which was never the case in the past. Scores on benchmark exams had improved, as had students' scores on mini assessments and grades compared to previous years.

Although Grantee F's MIC pilot program had a rough start its first year, there had clearly been worthwhile gains and improvements for teachers and students. Therefore, many of the interviewees from the site visit agreed that the MIC pilot program should continue into its second year and beyond. The district administrators would be reviewing the *TEKSing Toward TAKS* curriculum to

determine how effective it was, as well as examining what other potential changes needed to take place during the second year of the grant. Changes had been discussed, such as increasing teaching time in mathematics classes; identifying and training coaches from within existing faculty; and implementing a grade-level coaching program that uses the current staff and resources at their disposal. Therefore, Grantee F's MIC pilot program was likely to function and operate differently in the second year, and it was worth the growing pains they had to ensue the first year.

Case Study: Grantee G (Cycle 1)

Methodology

In March 2009, a site visit took place at Grantee G, an urban charter school serving at-risk students in Grades 9-12. Teachers from six high schools were participating in the MIC pilot program. The site visit team made every effort to meet with as many participants from these campuses as possible. Individual interviews were conducted with a representative from the ASP, the MIC grant coordinator, and all six campus principals. Additionally, the site visit team conducted focus groups with ten of the twelve mathematics teachers who participate in MIC coaching and professional development activities and all eight coaches who receive training and provide guidance to Grantee G’s teachers as part of the MIC pilot program.

Characteristics of Grantee G

Table 17 provides a summary of Grantee G’s MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 17
General Characteristics of Grantee G’s MIC Pilot Program

Category	Characteristic
Setting	Urban
ESC Region	10
Grades Served	9–12
Number of Schools Served	6
Type of Schools Served	6 charter high schools
Number of Teachers Served	12
Number of MIC Coaches Participating	8
Grant Amount	\$156,900
Grant Start Date	08/01/2008
Grant End Date	08/31/2010

Source: Grantee Action Plan; Academic Excellence Indicator System (AEIS), 2007–08

* The number of students potentially served is based on AEIS data (2008–09) for the number of students enrolled in all participating schools.

Students

Grantee G is a charter school with six urban campuses serving almost 1,800 at-risk students in Grades 9-12. At the time of the site visit, the ethnic distribution of the charter was slightly more balanced than some of the other MIC grantees, with approximately 17% African American, 30% Hispanic, and 51% White students. Grantee G was composed almost entirely of at-risk students (93%), and almost half (40%) were economically disadvantaged according to AEIS data for the 2007–08 school year. The high school dropout rate for Grantee G was more than four times the state average at 17%, and only 21% of its students graduate on time. Grantee G was also characterized by high mobility (82%), high

enrollment in career/technical education programs (95%), and higher than average enrollment in special education (14%). According to teachers, other risk factors for students in the charter included teen pregnancy, drug and alcohol abuse, and the need for credit recovery due to getting “off track” in the traditional school system. School principals added that many students in this district come from families that do not emphasize the value of education or who want them to work instead of focus on their education.

“For many of them, [Grantee G] is their last chance. We have parents who enroll their kids and say, “If this doesn’t work, nothing is left.”

-High school principal, remarking on how close many Grantee G students are to dropping out of school

Math achievement was a key concern at Grantee G, especially in Grades 9 and 10, where only 21% and 30% of students, respectively, met the standard on TAKS-Math at baseline (2007-08). According to teachers and administrators, many students were behind academically and have been resistant to math instruction in the past. Table 18 shows the percentage of students in the district at Grantee G meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 18

Percentage Rates of Students in the District in Grantee G by Grade Who Met the 2007-08 Standard on TAKS-Math

School Name	Grade 9	Grade 10	Grade 11
Grantee G	21%	30%	57%
State of Texas	64%	66%	80%

Source: Academic Excellence Indicator System (AEIS), 2007–08

Teachers

Twelve high school mathematics teachers were participating in the MIC pilot program at Grantee G. Of the 10 teachers who participated in the focus group, all had at least a bachelor’s degree. Four teachers also had a master’s degree and one teacher had a Ph.D. in a non-related field. Four of the teachers were certified in Grade 8-12 math and one teacher was certified in lifetime math. Three teachers were currently working on certifications. Participating teachers had an average of 4.33 years of experience with a range of 1-12 years. Overall, the teaching staff of Grantee G was relatively new to the charter. More than half (54%) of participating math teachers were new to the academy this year and the average length of tenure among these teachers was less than two years. Subjects taught included Algebra I, Algebra II, Geometry, and Pre-Calculus.

Coaches

Because of the unstructured classroom format employed at Grantee G schools, the MIC pilot program was able to utilize a variety of staff members to serve the coaching needs of participating

teachers. For example, focus group and interview data revealed that ASP staff, the MIC grant coordinator, STEM (science, technology, engineering, and math) coordinators (also called core recovery coaches), principals, and various administrators participated in MIC pilot program training and were providing coaching to math teachers.

The eight coaches who participated in the focus group also varied in years of experience and academic backgrounds. Coach 1 had been at Grantee G for five years and had served as the STEM coordinator for two years. This coach was certified in Science 8-12, Life Science 8-12, and had taught math for two years. Coach 2 had 11 years teaching experience with three years at Grantee G and two years as a STEM coordinator. This coach had earned degrees in math and physics. Coach 3 had a bachelor's degree in chemistry, a master's degree in computer science, a traditional certification in chemistry, and had recently become certified in mathematics. Coach 4 was serving as the district social studies chair, was certified for Social Studies 8-12, and was ESL certified. Coach 5 had been at Grantee G for five years and has 38 years of middle school and high school teaching experience. This coach was certified for chemistry and physical science and also has a master's degree in secondary education science. Coach 6 had taught at Grantee G for three years and has served one year as dean of students. This coach held a health science composite certification for high school. Coach 7 had been at Grantee G for five years and also had three years experience in special education. Coach 8 had been at Grantee G for one year and had served as a STEM coordinator during that time. This coach had seven years teaching experience, a master's degree in computer information systems, and had passed the content exam for math.

Overview of Grantee G MIC Pilot Program

Goals

According to the MIC grant coordinator and ASP representative, the overall purposes of the MIC pilot program were to:

- Increase teachers' mathematics content knowledge
- Develop and refine teachers' repertoires of instructional techniques to meet the unique needs of the charter's at-risk students
- Include administrators in program activities

Program Structure

The Grantee G MIC pilot program was drawing upon multiple research models. The first was based on the NCTM (National Council of Teachers of Mathematics) standards, which describe expectations for the math knowledge and skills students should have at each grade level. The ASP also was using Robert Marzano's nine strategies for what works in classroom instruction (Marzano, Gaddy, & Dean, 2000). Among these nine strategies are techniques like using nonlinguistic representations and encouraging cooperative learning. Finally, according to the MIC grant coordinator, Linda Darling-Hammond's research on

"The math lab has been a godsend for some of our students. They're disappointed when they don't have it."

-Grantee G teacher, on the value of the new math labs that have been funded with the MIC grant

effective teaching and learning (Darling-Hammond, 2006; Edutopia, 2008) had a strong influence on the initial planning and design of Grantee G's program. The ASP was using three trainers: the ASP representative and two assistants. The trainers were responsible for delivering professional development to Grantee G MIC participants including teachers, coaches, and administrators. Teachers were to use instructional strategies, teaching techniques, and content learned in professional development to improve their teaching approaches. Teachers also were being paired with participating MIC coaches who were to monitor the teachers' performance using a systematic observation technique called the 360° walkthrough (described in more detail below) and then meet with the teachers one-on-one to provide feedback and help the teachers master professional development lessons.

In addition to providing coaching and professional development activities, Grantee G was using a portion of the MIC grant money to establish a math lab at each campus. In the traditional charter school format, students work at their own pace on a variety of subjects (e.g., math, science, social studies). Teachers provide one-on-one guidance as students need assistance, but do not provide a formal lesson to the entire class. The new math lab associated with the MIC pilot program was providing students with a designated time to work on math in a separate room. The students were still being provided the flexibility to work at their own pace but the lab was serving as an area where the students can have unlimited access to the math teacher. In addition, the math teacher could answer common questions at one time instead of individually. The math labs on each campus also included many math visuals on the walls and new calculators, all funded by the MIC grant.

Professional Development Activities and Teacher Participation

Activities. Teachers were participating in MIC pilot program professional development activities at one of the Grantee G campuses, and one or more of the three professionals from the ASP would conduct the trainings. The activities included advanced book reading, homework, lecturing, and group activities with all members of the math department participating. Teachers were split into an A (algebra) group and a B (geometry) group and attended content-specific training based on this designation. Professional development activities had been structured and delivered throughout the 2008–09 school year. To begin the year, an ASP professional delivered a four-day professional development course for Grantee G teachers called 'Math Camp.' The Math Camp covered the following topics in depth:

- Algebra I training intended to deepen teacher content knowledge
- Algebra and high school Geometry, which worked to connect classroom concepts to key assessments
- Geometry and TEKS connections
- Algebra II, focused on building content knowledge and improving teacher strategic questioning strategies
- Mathematics for English Language Learners (ELLs)

In September 2008, the ASP were providing 360° walkthrough training to Grantee G coaches, principals, and administrators. Goals of this training included (1) developing classroom walkthrough observation techniques to provide instructional feedback, (2) learning how verbal feedback

"This year has been great. There was the 360° walkthrough training, the 'coaching for success' trainings, and the [training] on questioning techniques. We use them every day. It's very valuable."

-Grantee G coach, describing MIC professional development activities in which she has participated

complements the walkthrough process, (3) identifying best practices for continuous teacher improvement, (4) promoting research-based practices, (5) reinforcing an instruction and learning focus, and (6) enhancing student performance through ongoing assessment.

The ASP was provided three professional development series' throughout the school year, each of which was based on an established text: (1) *Fostering Algebraic Thinking* (Driscoll, 1999), (2) *How the Brain Learns Mathematics* (Sousa, 2008) and (3)

Fostering Geometric Thinking (Driscoll, 2007). Each series required teachers to read the related book, complete homework, and attend three to four professional development sessions occurring every two to three months. The *Fostering Algebraic Thinking* series was designed to assist teachers with easing students into algebra by developing and strengthening the students' questioning strategies. The *How the Brain Learns Mathematics* series was designed to cover brain mechanisms for learning math while developing effective questioning strategies for teachers. Finally, the *Fostering Geometric Thinking* series focused on cultivating geometric habits in student minds through problem-based teaching and questioning strategies.

The ASP was also providing an ongoing *Coaching for Success* training series throughout the school year for Grantee G coaches, the MIC grant coordinator, and administrators including principals, deans, department heads, and curriculum developers. This professional development was designed to build awareness and skills related to coaching conversation. These sessions helped to improve the feedback and skill development provided by coaches during coaching sessions. By all accounts, participants agreed that these trainings had facilitated and improved the delivery of coaching to teachers.

Participation. Attendance records of participation in professional development activities were maintained by the ASP and provided to Grantee G. All teachers had participated in all scheduled MIC professional development activities with the exception of an occasional illness or other excused absence.

Coaching Activities and Teacher Participation

Activities. Coaching activities included 360° walkthroughs and one-on-one coaching sessions during which coaches provide constructive feedback to improve teacher performance. During this time, teachers could ask questions and receive tips to improve their instructional techniques. Coaches could also model best practice teaching strategies during these sessions.

Participation. Coaches, administrators, and teachers reported that participation in coaching activities was virtually 100%.

Coaches were flexible in scheduling feedback sessions and teachers were receptive to feedback that can improve student learning.

"Just today, the ASP came into my classroom and was observing me. She then gave me a nice tip to help me make a breakthrough with a kid I was trying to teach a math concept to."

-Participating teacher, on how walkthroughs can be helpful for enhancing instruction

District/Campus Administrator Participation in Program Activities

Principals and administrators were participating in the MIC coaches' trainings provided by the ASP and provide support for program activities on their campuses. Coaches noted that although administrator participation can sometimes make teachers slightly uncomfortable at first, there were noted benefits as well. "I think it's great to have these administrators in the [professional development] classroom," remarked one coach. "Now that we've all done the same training, [teachers] have another person they can rely on. We're all on the same page."

Other Mathematics Programs in the District

To more fully understand the context under which the MIC pilot program was being implemented, it was helpful to know what other mathematics enrichment or teacher training programs, if any, students and teachers may be attending. In fact, several other math programs were being implemented in Grantee G's district to promote teacher and student success. For example, teachers received support from administrators to attend professional development trainings at the ESCs. Additionally, several campuses had STEM coordinators that were funded through the T-STEM Network Acceleration Grant (Wojnowski, Buckley, & Chambliss, 2008), currently in the phase-out process. Finally, campuses had student learning software packages such as Study Island® and Plato® Pathways that provide supplemental learning activities and opportunities for TAKS preparation.

MIC Pilot Program Implementation

Barriers to Program Implementation

Interview and focus group participants from Grantee G suggested there were few barriers to participation in the MIC pilot program. The major challenge cited by teachers was that training takes teachers away from their students. As a result, students would miss their math lab on days when teachers would attend professional development. These occasional cancellations were considered acceptable by administrators because trainings were not occurring on a regular basis.

Coaches cited time constraints as a challenge. Because one-on-one coaching sessions were generally based on teachers' schedules, they were often scheduled during coaches' lunch hours, requiring the coaches to forego their break for the day. In addition, coaches stated it was sometimes difficult to find continuity in the trainings and coaching activities because sessions were spaced out due to schedules, school breaks, and TAKS administration. Finally, the ASP representative noted that the logistics of the schools had made it difficult to debrief with teachers for any length of time. The ASP representative felt additional time for debriefing could enhance the effectiveness of professional development activities.

Facilitators of Program Implementation

There were several facilitators of MIC program implementation and participation at Grantee G. To begin with, teachers stated that the program was strongly supported by their principals and the students were allowed to attend MIC pilot program training whenever it was offered. Attendance at

program activities was also made easier because campuses were using team teaching, which would allow one of the two teachers to leave the class for training without the need to find a substitute. Another benefit was that program activities were not conflicting with teachers' out-of-school obligations because the activities were taking place during school hours.

In addition to the logistics of attendance, teachers reported that they were excited about what they were learning in the MIC pilot program. Because the trainings were thoughtfully designed to meet the needs of the teachers, attending them was worthwhile. Likewise, teachers reported that utilizing the techniques they were acquiring in professional development was rewarding because student enthusiasm for math and student completion rates had vastly improved since inception of the program. Finally, the stipend teachers receive had facilitated their participation in the MIC pilot program.

Relationship between Grantee G and the ASP

The ASP and the MIC grant coordinator were working closely to ensure Grantee G professional development and coaching needs were met. The professional development activities were tailored to teachers who needed to work in Grantee G's open classroom format, and the administrator training was "custom designed" for Grantee G's at-risk students. According to the ASP representative and MIC grant coordinator, communication and activity between the charter school and the ASP was ongoing with excellent rapport. Both parties felt they were on the same page with regard to how they were envisioning math instruction at Grantee G and this had made the working relationship very easy. Training participants also were regularly providing feedback to the ASP regarding the relevance of training (through training evaluations) and the ASP had used this feedback to make changes to the professional development offerings.

"Partnering with [the ASP] has been great. They've been a great help. They were open and willing to change their whole training so that it's relevant for our self-paced structure."

-Grantee G coach, on the interaction between District and ASP

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the grant coordinator, ASP representative, principals, and coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Student engagement and performance

Teachers were asked the same question, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: Understanding Student Needs and Learning Styles

The site visit team asked participants to describe how they believed MIC pilot program activities had affected teachers' beliefs about teaching mathematics. All agreed that the program had changed teachers' beliefs in a positive way. Administrators observed that the enthusiasm of both teachers and students had increased since the program started. Feedback from teachers to administrators indicated that teachers felt more supported and in turn, had more confidence and excitement for implementing new activities and using technology in the classroom. According to coaches, the listening training teachers received was helpful in better understanding students' needs and the teachers had gained an enhanced belief that every student could learn. Coaches further explained that because these teachers were often working with students who were far behind academically or lack motivation, the teachers were benefiting from how to teach the material in different ways to different types of students. Students then see that their teacher is using innovative techniques and, as one coach stated, "a light bulb goes off." Teachers themselves reported that they were more likely to use group activities, rather than simply lecturing or solving problems, to keep students engaged. Teachers were using this technique to allow students to impart knowledge to their peers through open discussion. Teachers explained that they had become more aware of the common difficulties students have when learning specific material due to the trainings on the cognitive psychology of learning math. This knowledge enables teachers to "teach to the way students learn," as described by one teacher. Learning the proper questioning techniques had also increased teachers' confidence. One teacher was starting to allow the students to explain what they know instead of just giving instructions. In sum, participants reported the following effects of MIC pilot program activities on teachers' beliefs about teaching mathematics.

- New questioning techniques learned by teachers in professional development had helped teachers become more confident and students become more engaged.
- Learning about how the brain processes mathematic material had been very informative for teachers. It had helped teachers understand that not all students learn in the same way.
- Teachers were seeing the value in using group activities to enhance student engagement, collaboration, and learning.
- Coaching activities had reinforced professional development concepts and motivated teachers to persistently implement new teaching strategies with their students.

Making a Difference in Student Learning of Mathematics

Participants provided observations of how program activities had affected teachers' sense that they could make a difference in their students' learning of mathematics. The difference the program had made was that the teachers and coaches were gaining the skills they need to convey mathematics knowledge to the kids. As described by one coach, "We have the means [training] and the place [math lab] to do it." A participating teacher reflected on feelings of making a difference by stating, "I feel like I'm improving." One coach explained that when teachers were

"I have more optimism about helping students."

-Grantee G teacher, on how MIC coaching activities have affected her attitude toward teaching

stuck, they now have access to resources (like the texts provided by the program) where they can look up information. Coaches felt students could see this increased commitment from teachers, which was a motivating force for the coaches. Teachers reported that they were connecting better with students, whether by “getting to their level” conceptually or having successful one-on-one time. Administrators based their observations of increased teacher efficacy on additional course completions and positive student feedback that was giving teachers more confidence that they were making a difference. One principal, for instance, explained, “This goes back to when the kids say, ‘Wow! We have a math lab!’ The teachers see that.” In sum, participants reported the following effects of the MIC pilot program activities on teachers’ sense that they could make a difference in their students’ learning of mathematics:

- Through participation in MIC pilot program activities, teachers had been gaining the support, skills, and resources needed to be effective instructors.
- Administrators and coaches stated that teacher performance (e.g., teaching approaches, questioning techniques) had been improving in the classroom, which had translated into improved student participation.
- Teachers reported that students had become extremely enthusiastic about math on their campuses, which was illustrating how the new teaching techniques had improved student motivation to learn.
- Teachers had been connecting more with students academically.
- Students had improved in terms of course completions and had been giving teachers the confidence that they are making a difference.

Teachers’ Math Content Knowledge

Most teachers suggested that the MIC program had improved their teaching techniques and strategies but not necessarily their content knowledge. Some participants did, however, report that during the math camp and monthly professional development sessions they had learned new approaches to content, which had helped them to solve old math problems in new ways. The new approaches had been learned during group activities where teachers would share with each other how they work on and solve the same problems in their content area. One teacher also reported feeling more comfortable with delivering the content to students during instruction. In sum, participants reported the following effects of MIC pilot program activities on teachers’ content knowledge:

- Teachers reported that the MIC pilot program had been more instrumental in improving their instructional strategies than their mathematics content knowledge.
- Program activities had facilitated the process of approaching content in new ways.
- Collaborative group activities were giving teachers the opportunity to share different ways of solving math problems.

Student Engagement and Performance

Although there was hope for improvement, effects of the MIC pilot program on TAKS preparation were unknown at the time of the site visit. However, administrators, coaches, and teachers reported that student quarterly completion rates had soared over the previous year and students were passing in far more class work than in years past. As explained by the MIC grant coordinator, "Student achievement is where we can get our bragging rights. We know Algebra 1 is the gateway. Last year, students completed 200 quarters in algebra; this year we have already done 295 quarters and our school doesn't end until June!" With regard to student engagement, reports of program effects were immense. Teachers stated that students were so excited about learning math that they were asking to attend math lab and must be asked to leave the lab when their scheduled sessions were complete. In fact, students were often disappointed when teachers were not holding lab in order to attend professional development training. This was in sharp contrast to previous years where students typically avoided the subject of math as much as possible. One coach described, "Before, you mentioned the word 'math' to these kids and they just laughed. Now they *want* to work on math." A coach who was also an administrator also observed that behavioral referrals had gone down because students were more invested and engaged in the classroom.

"Many of the students are now asking for math lab where as before they never wanted to come to class. Now the students don't want to leave. And when they get back to their desk, they want their calculators as soon as possible."

-Grantee G teacher, about the effects of the MIC grant on student engagement in math activities

Sustainability and Enhancement

"They're knocking each other over to turn their work in and move on to the next thing."

-Grantee G teacher, on the new enthusiasm displayed by students about math

MIC pilot program participants all believed the program should continue beyond the grant award period. Teachers and administrators reported that the program had dramatically increased student participation and enthusiasm for math. Participants also believed it would continue to increase completion rates and ultimately, student academic performance and TAKS scores. Participants suggested that some of the

techniques learned, such as 360° walkthroughs for administrators and questioning techniques, would naturally continue because they had been successful, while other components of the program, such as continued professional development, would need additional funding. Participants recommended the following program changes:

- Several teachers suggested that all teachers on campus be trained. For example, one teacher said, "If the whole staff were trained, the students would naturally pick up on the process. If we are modeling the skill to ask the students questions, then that helps [students] know we care and shows them how to trust. That's something that would benefit from global training."
- Adding student field trips to the program would be beneficial because it would allow the students to see math in the 'real world.'

- Teachers suggested having more partnering with other districts and campuses, particularly charter schools, in order to gain additional access to best practices through observation and learning communities.
- Teachers suggested that the math curriculum in Grantee G should be improved to reflect MIC activities, particularly since many students had been using their math textbook as the main learning resource in the self-paced charter school environment.

During each interview/focus group, participants were allowed time to share any final thoughts about the MIC pilot program in their district. The MIC grant coordinator expressed satisfaction with the positive changes that had been occurring with teachers and students since inception of the MIC pilot program. "I'd like to continue the program because we know it works. Teachers are saying the kids are really getting involved in math... This is great. Normally math teachers get 'beat up' because scores are low but this year it's positive." A high school principal also remarked on the positive effects the program has had on teachers and students. "I think it's all going very well. The teachers have enjoyed the professional development and I've seen a great increase in students working on math on my campus. My freshmen have really been enjoying the teacher and the things he's doing. My upperclassmen can't be stopped." Finally, a participating teacher expressed how the program had influenced the ultimate beneficiaries of the MIC pilot program, the students. "Before this [program] there might have been several things that kept them [the students] from trying – not enough help or no way to get it. Now we have multiple things working for them. They have hope."

Summary/Conclusions

Grantee G is an urban charter school with six campuses serving almost 1,800 at-risk students in Grades 9-12. The ethnic distribution of the charter was 17% African-American, 30% Hispanic, and 51% White. The student body was composed almost entirely of students who fell behind academically in the traditional school system and have a variety of challenges, including low socio-economic status, teen pregnancy, drug and alcohol abuse, high mobility, special education needs, and families who often do not emphasize the importance of education. Students also demonstrated extremely low passing rates on the mathematics portion of the TAKS. The MIC pilot program was being implemented to meet the unique needs of these students by enhancing the quality of mathematics instruction in the district. Grantee G based its MIC pilot program on multiple research models, including the NCTM standards, Robert Marzano's nine strategies for what works in classroom instruction, and Linda Darling-Hammond's research on effective teaching and learning. One unique aspect of the Grantee G program was the high level of administrator participation in program activities. Twelve teachers, eight coaches, and administrators from all six schools attended professional development designed and delivered by the ASP. Teachers attended a four-day 'Math Camp' and participate in professional development sessions centered on different instructional texts. Teachers then use the instructional strategies, teaching techniques, and content knowledge learned in professional development to improve their teaching approaches. Teachers were paired with participating MIC coaches who were monitoring the teachers' performance using 360° walkthroughs and provide feedback during one-on-one coaching sessions. In addition to providing coaching and professional development activities, Grantee G was using a portion of the MIC grant money to establish a math lab at each campus that was providing students with a designated time where they work on math in a separate room.

Participants reported some barriers to program implementation, though they were few. Teachers did not like that students have to miss math lab when they attend professional development, though they appreciated that participating in the program did not interfere with their after-school obligations. Coaches often missed their lunch period because this was the time when teachers were most available, and the coaches also noted that the wide spacing of the trainings sometimes made finding continuity difficult. The ASP representative suggested more time for debriefing with teachers after professional development would be helpful. Despite these challenges, participants were able to note numerous facilitators of MIC pilot program implementation and participation. These included the high level of administrator support for the program, the coverage that team teaching allowed when teachers needed to leave for professional development, the relevance of program activities to their teaching needs, the positive feedback and improved performance from students (which motivates teachers), and the stipend provided for participation.

Participants reported positive changes for both teachers and students because of Grantee G's MIC pilot program. Teachers better understood students' needs and learning styles and as a result teachers were more effective at keeping students engaged during instruction with innovative instructional strategies learned through MIC training. Teachers were also connecting more with students and students' improved performance and positive feedback was increasing teachers' confidence they were making a difference in their learning of math. Teachers had learned some new content, but highlighted that they were satisfied with learning multiple ways to deliver content through collaborative activities with other teachers. Although participants were unsure how the program has affected TAKS instruction specifically, student quarterly completion rates had soared over the year and students were passing more courses than in years past. Students were also far more engaged and invested in math than they had ever been before, as evidenced by their increased participation and enthusiastic feedback to teachers and administrators. Participants all expressed a strong desire for the MIC pilot program to continue and believe it will continue have positive effects on teachers and students.

Case Study: Grantee H (Cycle 2)

Methodology

In May 2010, an evaluator conducted a site visit to the MIC program at Grantee H. The evaluator conducted interviews with the grant coordinator, two representatives of the ASP, the MIC coach, and principals of the junior high and high schools. The evaluator also conducted separate focus group sessions with teachers from the junior high school and high school. The superintendent of Grantee H joined in for part of the interview with the MIC grant coordinator.

Characteristics of Grantee H

Grantee H is located in a rural community located outside the Dallas. Grantee H has a student enrollment of approximately 1,877 students. The MIC program at Grantee H was involving all math secondary teachers, including three teachers from the junior high school and six from the high school. The MIC coach, an employee of Grantee H, was serving both the junior high and high school campuses. The ASP was the ESC in the district's region. Table 19 provides a summary of Grantee H's MIC pilot program including schools, grades, and students served, as well as details of the award.

Table 19
General Characteristics of Grantee H's MIC Grant Program

Category	Characteristic
Setting	Rural
ESC Region	12
Grades Served	7-12
Number of Schools Served	2
Type of Schools Served	1 junior high, 1 high school
Number of Teachers Served	9 (3 junior high school, 6 high school)
Number of MIC Coaches	1 (serving both the junior high and high school)
Grant Amount	\$110,000
Grant Start Date	04/01/09
Grant End Date	05/31/11

Source: Grantee H's Cycle 2 Application

Students

The ethnic distribution of Grantee H was 19% African-American, 52% Hispanic, and 29% White. Asian/Pacific Islanders accounted for less than one percent of the school district’s population. Nearly three-quarters (74%) of Grantee H students were economically disadvantaged and half of Grantee H students were considered at-risk. Additionally, 17% of the district’s students were LEP.

The state accountability system listed Grantee H’s High School as Academically Unacceptable in 2009. Grantee H’s Junior High School earned an Academically Acceptable rating in 2009, as did the school district as a whole.

At baseline (2008-09), Grantee H students performed below statewide averages on TAKS-Math, especially students in Grades 9 and 10. Table 20 shows the percentage of students in the district at Grantee H meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 20

Percentage Rates of Students in the District in Grantee H by Grade Who Met the 2008–09 Standard on TAKS-Math

School Name	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee H	78%	76%	63%	60%	76%
State of Texas	82%	82%	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008–09

Teachers

Nine teachers were participating in the MIC program at Grantee H during the 2009–10 school year. Three teachers were from Grantee H’s junior high school and six were from Grantee H’s high school. The most experienced of the three junior high school teachers had 13 years of teaching experience. The least experienced teacher at the junior high was in the first year of teaching. The third junior high teacher had nine years of teaching experience. The two more experienced teachers had teaching certification in mathematics. The least experienced teacher had a general teaching certification for Grades 4-8. The subjects taught by the three junior high teachers included seventh and eighth grade mathematics, remedial mathematics, and Algebra I.

“I’m looking forward to your meeting all of our math teachers. When you see them and talk to them, you will see the range in their style, background, and their abilities.”

-MIC grant coordinator, describing Grantee H’s new math faculty

The six high school math teachers participating in the MIC program were in their first year of teaching at Grantee H’s high school. According to the MIC grant coordinator, the school district replaced teachers at the high school to address issues related to the school’s Academically

Unacceptable rating by the state. The most experienced among the high school teachers participating in the MIC program had fourteen years of teaching experience. Three of the six teachers were in their first year of teaching. The other two teachers had ten years and five years of teaching experience. All had certification to teach high school mathematics except one, the inclusion teacher, who was certified to teach special education from early childhood through Grade 12. Two of the six high school teachers had master's degrees. Subjects taught by the high school teachers included ninth and tenth grade mathematics, Algebra I and II, Geometry, Pre-Calculus, Advanced Placement Statistics, Applied Mathematics, and Information Systems.

MIC Coach

The MIC coach was a high school mathematics teacher selected to work with teachers from the high school and junior high school. The coach had 18 years of teaching experience with teaching certification in mathematics education as well as certification in educational administration. The coach had participated in all the professional development activities presented by the ASP for mathematics teachers. In addition to teaching responsibilities, the coach was working with Grantee H's junior high school and high school teachers to improve instruction in mathematics.

Overview of Grantee H's MIC Pilot Program

Goals

Participating high school math teachers described the goals of the Grantee H's MIC program as a "program to help the teachers help the kids." Teachers explained that the coach's role was to support teachers by assisting with lesson plans and providing constructive advice on instruction. One of the teachers in the focus group also explained that a goal of the program was to increase the use of technology in the classroom.

Junior high school teachers participating in the program described the MIC goals as helping students to increase their math skills. They cited an increase in student achievement in the classroom as evidence of the program's effectiveness.

Program Structure

All of Grantee H's junior high and high school teachers participated in six MIC trainings provided by the ASP, the ESC in the district's region. The school district were hiring substitute teachers on professional development days so that teachers could attend the trainings. The MIC coach, also a high school teacher, participated in each of the professional development sessions. The MIC coach was following the professional development sessions with a debriefing with participating teachers and in-class observation. The MIC coaching consisted of providing individual support to teachers, including assistance with lesson plans, recommendations for effective instruction, and modeling. The MIC coach would determine coaching needs based on observation of teachers and consultations with the teacher. Staff members from the ASP also would observe teachers in their classrooms and provide support to the MIC coach, including recommendations on effective coaching. ASP staff had conducted four complete observations of each teacher during the 2009–10 school year. Each

complete observation consisted of three visits to the classroom to observe the beginning, middle, and end of lessons taught.

Math Coaching and Professional Development Activities

Math Coaching Activities and Teacher Participation

All mathematics teachers at the junior high school and high school were participating in MIC coaching activities. The MIC coach was observing each of the teachers in his or her classroom at least once a week. The purpose of the coaching activity was to provide feedback to teachers on their instructional strategies and to follow-up on any questions that teachers may have had after attending professional development sessions presented by the ASP.

The MIC coach's observations were that teachers seemed to be "fairly engaged" in the coaching activities. The coach believed that teachers were all motivated to improve, particularly at the high school. The high school received an Academically Unacceptable rating on the state accountability system in 2009, in part because of their scores on the TAKS-Math.

Professional Development Activities and Teacher Participation

Each of the junior high and high school mathematics teachers were participating in six professional development sessions presented by the ASP. Among the topics included in professional development were math journaling, learning styles, formative assessment, cooperative grouping, algebraic thinking, geometric thinking, and use of technology in the classroom. According to the ASP representative, teachers had been very engaged and enthusiastic about the professional development activities. They were particularly interested in learning more about the new operating system for calculators used in mathematics and the hands-on approach to teaching addressed in professional development activities.

District/Campus Administrator Participation in Program Activities

"I would say a highlight that has impacted the classroom most significantly from the training is the integration of technology in the classroom."

-MIC grant coordinator, commenting on the MIC program's professional development activities

The high school principal was participating in classroom observations of the teachers with the ASP staff and MIC coach. It was the principal's goal to make certain that all parties involved in the observations drew the same or similar conclusions from the observations. This would enable the staff to develop the coaching activities based on the teachers' needs as determined by consensus. The

principal understands that the relationship between a principal and teacher included an evaluation role for the principal that could intimidate some teachers. The principal believed, however, that there was a strong enough rapport between principal and teacher to make the observations constructive and non-threatening to the teacher. The high school principal had participated in one of the professional development sessions presented for teachers at the ASP.

The junior high school principal was taking a different approach to participation in coaching activities and classroom observations. Realizing that the principal's presence would create a distraction to students and teachers, the principal was trying to conduct observations of math coaching and teaching activities more discretely. To avoid or minimize the distraction, the principal was practicing "window shopping," viewing instruction and coaching briefly through the classroom windows. There was progress throughout the school year on being able to enter the classroom and observe without too much distraction. The principal did so by entering the classroom more frequently so that students and teacher could get used to the principal's presence in the classroom. The junior high school principal also attended one of the professional development activities during the school year.

"I'm in the classroom all the time and so is the coach. Sometimes we are both in there trying to help the teachers and trying to help the students obtain the information that we need them to obtain to be successful."

-High school principal, describing the reasons for conducting frequent classroom observations

An aspect of this MIC program involved scheduling regular meetings with ASP staff and school administrators. The meetings were taking place on a quarterly basis. The purpose was to help administrators understand the role of professional development and the importance of classroom observations. The ASP was providing administrators with updates on professional development activities and observations they have had in classrooms. The high school and junior high school principals have participated in all meetings with ASP staff.

MIC Pilot Program Implementation

Barriers to Program Implementation

The ASP representative said that one challenge they had faced was the knowledge that the program would only last two years. It had taken several months just to build the rapport that was needed for effective communication, professional development, and coaching. This left only about a year and a half, at the most, to make a difference in the teachers' instructional skills and content knowledge, and students' academic achievement. From the MIC coach's perspective, a challenge had been trying to build a teacher-coach relationship with so many teachers, many of whom were new to the teaching profession. It had been difficult to schedule time for effective coaching with all the teachers given the MIC coach's teaching responsibilities at the high school.

A challenge for one of the junior high teachers had been trying to learn and implement the new technology available for the classroom. The time needed to learn the technology included working on weekends and evenings and staying late during the week.

High school teachers commented that it was difficult for teachers to give up their classes for the time spent in professional development sessions.

Facilitators of Program Implementation

The ASP representative cited support from the school district administration as a facilitator of program implementation. Administrators had participated in every meeting that had been held to update them on program activities.

The MIC coach listed the ASP staff as facilitators of program implementation. The MIC coach and ASP had been communicating regularly and coordinating the coaching activities effectively.

A junior high school teacher considered the networking among teachers as a facilitator of program

implementation. Another cited the new technology implemented in the classroom as a facilitator as well.

"It makes a significant difference when teachers are motivated and engaged as well as the administration."

-Representative of the ASP, commenting on the support of campus administrators as a facilitator of program implementation

One feature of Grantee H's MIC program included a briefing with teachers on the nature of the MIC grant, its objectives, and the expectations that school district administrators had of the teachers. According to the ASP representative, this was very different from other grants in which teachers were unaware that a grant was in place and unaware of the expectations that the administration had of them. This briefing was a facilitator of program implementation, according to the ASP, because all participants were cognizant of the program's goals and their role in accomplishing them.

Relationship between the District and the ASP

The ASP staff were working one-on-one with the MIC coach to support the coaching effort and to build coaching capacity for the future. The ASP staff and the MIC coach would discuss teachers' coaching and professional development needs and develop strategies to address any issues that they agree need addressing. A major part of the ASP's responsibilities included modeling of effective math coaching practices. The MIC coach would go into classrooms with ASP staff and watch the interactions that they were having with teachers. This would provide a setting for the MIC coach in which observation and learning could take place in a non-judgmental, non-evaluative manner with a person who would not hold a supervisory role over them.

The ASP would schedule regular meetings with the school administrators to update them on MIC program activities. The meetings also would include recommendations on how administrators could more effectively conduct teacher observations to look for improvement in areas addressed through coaching and professional development. Administrators had expressed their appreciation for the regularly scheduled updates.

The MIC grant coordinator explained that the school district had had a long-term relationship with the ASP for this program. The ASP was only 35 miles away, making the professional development sessions convenient for teachers to attend.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinator, ASP representatives, high school principal, junior high school principal, and MIC coach discussed their perceptions of the effects of program activities on teachers. The school district superintendent also contributed to the discussions. The evaluator asked participants to address the ways, if any, that the professional development and math coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Teachers' instructional strategies
- Teachers' use of assessment or assessment data
- Student engagement and performance

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics

Effects of Math Coaching Activities

The MIC coach felt that math coaching had helped the high school teachers learn that there were alternative ways to teaching mathematics. They had gained confidence in their abilities to teach math. One teacher, according to the MIC coach, had become confident enough to make recommendations to the coach about new ways of teaching mathematics.

The junior high principal cited a change in teachers' beliefs about grouping for instruction. Desks aligned in a neat row were no longer required nor were perfectly straight lines on a white board. According to the principal, math coaching had taught teachers that they do not have to be perfect and that they can make mistakes in the classroom and still be effective teachers. Each of the junior high teachers noted that making changes in classroom activities to include more hands-on activities seemed to have made a positive effect on students' interest and engagement

The high school principal spoke about the stress that a first-year teacher must feel being on an Academically Unacceptable campus. Math coaching had provided support for the teachers and had given them the motivation to believe that they can help the school pull through and move beyond the Academically Unacceptable rating.

Two of the high school teachers described how math coaching had affected their beliefs about teaching mathematics. One teacher explained that math coaching showed how doing things

"Even in our set ways, we see that we can improve on or maybe do something a little differently that will help us become better teachers."

-High school teacher describing the effects of coaching on beliefs about teaching mathematics

differently sometime could be beneficial. Another teacher explained that the MIC coach had been a motivator, particularly when a teacher was discouraged after a bad day. In such cases, the MIC coach would remind teachers that the student who does not listen one day could be ready to learn the next day. This was particularly motivating for the new or less experienced teachers in the district.

Effects of Professional Development Activities

The ASP representative had seen some shifts in teachers' beliefs about teaching mathematics. There had been movement from the traditional "stand and direct" teaching method to a research- and inquiry-based approach of getting students involved and engaged. The ASP representative's observations of teachers in the classroom indicated that an increasing number of teachers were trying new approaches that they had learned in professional development activities.

The high school principal noted that professional development activities had affected how teachers view technology use in the classroom. Students were more responsive to questions and more engaged in the classroom activities when using technology.

The junior high school principal described how a very experienced teacher learned, through professional development, that students could work effectively in groups. The teacher had learned about peer teaching and had started to engage students in activities such as learning about X-Y axes using illustrations on the floor.

One of the junior high school teachers with extensive teaching experience described how the professional development activities had reinforced the concept of using varied approaches to keep students' attention. Another commented that simple things like changing colors on notepaper seemed to make a difference in students' levels of engagement.

In the high school teachers' focus group, teachers noted several effects of professional development activities on their beliefs about teaching mathematics. One teacher explained how teachers "get in a rut" and continue teaching using the same activities and materials without thought to how changes can affect learning. The professional development activities had given teachers an opportunity to consider their teaching styles and make changes that can, in turn, make learning more interesting to the students. The high school teacher also cited the example of changing colors of notepaper and the difference it made in students' attention in class.

Teachers Making a Difference in Students' Learning of Mathematics

Effects of Math Coaching Activities

A junior high school teacher stated that most educators believe that all students can learn and that all teachers can make a difference in their students' learning mathematics. What math coaching had taught this particular teacher, however, was that teachers need to realize where to focus their energy, that students learn in different ways, and that the activities that teachers use in the classroom make a difference in the students' learning of mathematics. A high school teacher explained that the focus of the math coaching had moved away from "Are we going to be able to make it (better TAKS scores)?" to "How are we going to do it (better prepare students for TAKS)?" This

helped teachers who were feeling the stress of being a new teacher on an Academically Unacceptable campus feel confident that the students would be successful.

Effects of Professional Development Activities

The ASP representative described the professional development sessions as opportunities for teachers to share their experiences with teachers from school districts other than Grantee H. Teachers also had the opportunity to meet with other teachers to learn what works in specific situations and what does not work. The ASP representative explained that when teachers were seeing effective teaching with positive results, it would affect their belief that they could make a difference.

According to the high school principal, the professional development activities provided teachers with tools that would enable students to have small successes in class every day. Following what the principal called a “data dig,” teachers discovered that some of the high school students had never been successful on TAKS. Teachers learned to develop classroom activities that would give students a sense that they could be successful. The principal explained further that students were reluctant to try to solve problems on the board at the beginning of the year. By working with students to set goals and start them with problems that they could solve, one teacher reported being able to build the students’ confidence in their ability to learn mathematics.

The junior high principal described how the professional development activities changed a junior high teacher’s sense that the type of activities used could make a difference in students’ learning of mathematics. The teacher was having classroom management issues and felt that the students were unable to learn the mathematics content. After incorporating classroom activities designed to increase students’ interest and engagement, the teacher commented to the principal that students’ engagement and enjoyment of math activities had increased.

Only one junior high school teacher responded to the question of whether the professional development activities made a difference in teachers’ sense that they could improve students’ learning of mathematics. The teacher explained that students could learn mathematics and the professional development activities reinforced the belief that students can learn.

High school teachers described several ways that the professional development activities instilled a greater sense that teachers could make a difference in students’ learning of mathematics. One teacher explained that professional development activities enabled the teacher to see that questioning techniques could affect whether students learn. Another high school teacher who teaches students who have failed the TAKS discussed how the professional development activities showed how a change in routine and activities could have a positive effect on students’ learning. An example was reconfiguring a classroom to enable students to work in groups.

Effects of MIC Activities on Teachers’ Mathematics Content Knowledge and Eagerness to Learn

"These are kids who hated math, didn't want to do it, and didn't have confidence in it. They helped me to give them different ways to achieve but not in the same format that they've always seen. It's helped me be creative."

-High school teacher describing the effects of MIC professional development activities on teachers' sense that they can make a difference in their students' learning of mathematics

The ASP representative explained that math coaching activities dealt mainly with instructional strategies, classroom management, and integration of technology rather than content knowledge. Each of the professional development activities, on the other hand, included work on mathematics content. The ASP representative also acknowledged the difficulty in assessing teachers' content knowledge without testing. Efforts were underway to develop an assessment of content knowledge that could show change over time.

According to the junior high school principal, professional development activities had shown teachers where they could find resources that would help them with their content knowledge needs. An example was the ASP, which had numerous resources available for teacher use.

The high school principal credited the MIC coach for much of the progress made in content knowledge among teachers. The principal explained that the MIC coach's careful planning and consultation with teachers had made a difference in teachers' content knowledge in the past year.

Effects of MIC Activities on Teachers' Instructional Strategies

Effects of Math Coaching Activities

The MIC grant coordinator described how the MIC coach had developed a level of comfort with the teachers and was in their classrooms frequently enough to become involved in the instruction. This would give the coach an opportunity to model instruction and introduce instructional strategies that teachers can use in specific situations. The coach was able to do this without teachers feeling intimidated or threatened.

The high school principal noted that the feedback that teachers received from the MIC coach regarding instructional strategies had been beneficial. The principal also noted that the MIC coach had developed a relationship with teachers in which they felt comfortable enough to discuss the instructional strategies used and strategies that teachers can use instead of, or in addition to, the ones they were using.

"If something wasn't quite right, the coach was able to say, 'Let's try this in a different way,' or 'Let's try a different strategy.'"

-High school principal describing how the MIC coach works with teachers on improving instructional strategies

The junior high school principal described how the MIC coach emphasized use of hands-on activities in the classroom. The MIC coach also stressed the need to keep students engaged in the classroom. The principal had observed all three teachers using more of the activities that the MIC coach demonstrated in their classrooms.

In the junior high teachers' focus group, one of the teachers described how working with new, less experienced teachers had provided an opportunity to serve as mentor. According to the teacher, this had probably had more influence on instructional strategies than the math coaching activities.

One experienced high school teacher felt that the math coaching activities had provided a few more “tools” to use in the classroom. The math coaching, however, would probably be more useful for less experienced teachers, according to the teacher.

Effects of Professional Development

The ASP representative described some of the professional development activities in which teachers designed lessons using specific instructional strategies. The ASP’s classroom observations following the professional development activities indicated that teachers were implementing the new strategies. Teachers would bring students’ work back to the ASP for staff to analyze the work and determine if the teachers were implementing the strategies included in professional development activities. According to the ASP’s observations, a clear change in the classroom had been the increased level of student engagement in mathematics activities. For the ASP, this was an indication that teachers were implementing strategies presented in professional development.

The junior high school principal also pointed to students’ increased engagement in math activities as an indication that the instructional strategies presented in professional development activities were effective. The principal explained that new instructional strategies required the use of the white board and manipulatives. The principal observed that students were more eager to use them now.

The high school principal felt that the reason professional development activities were having a positive effect on teachers’ instructional strategies was because the MIC coach conducted follow-up meetings with teachers to make certain that the concepts presented were clear.

“I will tell you that we had 100% attendance at our high school on testing days. I think that’s indicative of the change in attitude of the students. Their confidence level in the area of math has improved.”

-MIC grant coordinator, describing the improvement in student engagement and performance

One of the junior high school teachers felt that the professional development activities had the most impact on the use of technology in the classroom. A high school teacher credited questioning techniques learned in professional development activities as helping to improve instruction in mathematics.

Effects of MIC Activities on Teachers’ Use of Assessment or Assessment Data

Professional development activities had been the primary source of information for teachers on assessment or use of assessment data. According to the ASP representative, one of the professional development days included a session on formative assessment. The session focused on alternatives to multiple-choice tests, including using technology for assessment. The junior high principal described how teachers were building their own tests for TAKS preparation but that the effort was a school district effort rather than an MIC activity. The principal acknowledged, however, that the teachers came back from their professional development activity on assessment more “tuned in” to how to develop their assessment instruments.

Student Engagement and Performance

One indicator of improved student engagement and performance was the 100% attendance rate at the high school on testing days, according to the MIC grant coordinator. The MIC grant coordinator believed that this indicated a change in students' attitude toward school and an increase in their confidence that they could succeed on the tests. The high school had also seen an improvement in scores on benchmark tests, which are used to predict performance on TAKS, in the past year.

The MIC coach confirmed the improvement in benchmark test scores and credited the improved attitude of students toward being in school as a primary reason for the increase in scores. The MIC coach added that failure rates in Algebra I were high in the first two six-week periods of the school year and that these rates had been reduced since then. The MIC coach felt that the positive attitudes of teachers toward teaching mathematics and the positive attitudes of students toward learning mathematics were responsible for the improvements. According to the MIC coach, students were working harder at trying to improve in mathematics.

The high school principal described one of the motivators that teachers had started to use in their classrooms. An "Algebra Wall of Fame" would celebrate every student who would score 100 on a quiz. The number of names was continuing to grow and the students would celebrate when their names would go on the list.

One of the junior high school teachers believed that a primary reason for increased engagement on the part of the students and improved performance in mathematics was the integration of technology into the classroom, a focus of the professional development activities. A high school teacher credited the hard work of the MIC coach for the improvement in benchmark test scores at the high school.

Sustainability and Enhancement

The MIC grant coordinator and school district superintendent believed that mathematics coaching would continue beyond the MIC grant period. They were confident that they had identified a good resource in the MIC coach and expected that the program could expand into science if the school district was to secure funding for that purpose.

The ASP and school district had not yet discussed continuation of the MIC program beyond the grant period and the role that the ASP might play in the future. The ASP representative believed that six professional development meetings during the school year provided a powerful knowledge base for the coach and that teachers fully expected continuation of the model into the future. The ASP representative added that sustainability was very likely for a program such as Grantee H's because of the capacity building that was occurring. Planning was underway for a math coaching academy in summer 2010 that would continue the effort to build math coaching capacity for future school district needs.

The MIC coach believed that the school district should expand the program downward to at least the fifth grade. The MIC coach explained that teachers establish students' foundations for success in

mathematics as early as the third grade. Waiting until the sixth or seventh grade was almost too late to implement effective teaching strategies in mathematics.

"Everybody knows the realities of school finance. In my opinion as superintendent, this was as important as paying a light bill, maybe more important."

-Superintendent of schools commenting on the importance of having the Mathematics Instructional Coaches program in Grantee H

The MIC coach stressed the importance of having a full-time mathematics coach that could devote more time to teachers' content and instructional needs. The MIC coach also emphasized the importance of teachers and coach having common planning and conference times during the day.

Continuation of the math coaching program should take into consideration the amount of time needed for professional development. Six days away from the classroom was a major sacrifice, according to the MIC coach. The MIC coach suggested that administrators should consider scheduling some professional development days prior to the beginning of school, thereby reducing the number of days that teachers must be away from their classrooms during the school year.

Summary/Conclusions

The Grantee H's MIC program was a collaborative effort with the ASP, which was the ESC in the district's region. All junior high school and high school mathematics teachers participated in the program by attending professional development sessions at the ASP and by working with the MIC coach for the district, an experienced high school mathematics teacher.

The ASP was responsible for providing the professional development activities for the MIC program and for working with the MIC coach to identify areas where teachers need improvement in content and instruction. The ASP also worked closely with the MIC coach to strengthen the coach's coaching skills through modeling and consultation.

Grantee H's high school received an Academically Unacceptable rating on the state's accountability system in 2009, partially due to performance on the TAKS. To improve instruction and student performance in the future, the district administration made numerous staffing changes, including hiring new mathematics teachers at the junior high and high school. Consequently, several of the junior high and high school teachers were new to the teaching profession. Other teachers with prior teaching experience were new to the campuses.

During the 2010 site visit, interviewees and focus group participants pointed to several positive results of the first-year MIC activities. Teachers were beginning to implement many of the strategies learned in professional development designed to increase student engagement in mathematics activities. According to observations made by ASP staff, the MIC coach, and principals, teachers had a more positive attitude toward teaching math and had shifted away from the stand and lecture approach to teaching to an approach that utilizes more hands-on activities and manipulatives. Students were more engaged in mathematics activities, particularly when using technology.

Students' performance on benchmark tests, tests used to predict performance on TAKS, improved over the previous year's scores. Teachers and administrators also noted an improvement in teacher-

made quizzes in Algebra I and started an Algebra Wall of Fame to celebrate students who scored 100 on the quizzes.

Math coaching needs would continue as teachers retired, took other positions, or moved away from the school district for a variety of reasons and new teachers come into the school district. Many of the new teachers would need the type of math coaching and mentoring that the MIC coach now provides. It was the goal of the school district administration to continue this mathematics coaching program to meet these needs. School district administrators were also considering an expansion of the coaching program into science.

Case Study: Grantee I (Cycle 2)

Methodology

In March 2010, evaluators conducted a site visit at both campuses of Grantee I, an open-enrollment charter school. The site visit team conducted individual interviews with the MIC grant coordinator, the MIC instructional coach, who also represented the ASP, and principals of both campuses. Because Grantee I was unable to schedule groups of teachers at a common time for focus group sessions, the team conducted five individual interviews with teachers from the main campus and two with teachers from the other campus who receive coaching and professional development through the MIC pilot program.

Characteristics of Grantee I

Table 21 provides a summary of Grantee I’s MIC pilot program including schools, grade levels taught, the number of teachers served, as well as details of the award.

Table 21
General Characteristics of Grantee I’s MIC Grant Program

Category	Characteristic
Setting	Urban
ESC Region	4
Grades Served	9-12
Number of Schools Served	2
Type of Schools Served	2 high schools
Number of Teachers Served	7 (5 main campus, 2 secondary campus)
Number of MIC Coaches Participating	4 (2 on-site, 2 located in Dallas and rarely visit)
Grant Amount	\$100,000
Grant Start Date	05/21/09
Grant End Date	05/31/11

Source: Grantee I’s Cycle 2 Application

Students

The student population of Grantee I included approximately 712 students. The main campus was made up of 71% African-American students, 28% Hispanic students and 1% White students. A

secondary campus comprised 30% African-American students, 68% Hispanic students, and 2% White students. Across both campuses, 89% of students were considered economically disadvantaged and approximately 98% of students were considered at-risk. Risk factors, in addition to low socioeconomic status, included high mobility rates, failure to pass the TAKS, and limited English proficiency.

Teachers at Grantee I described the students as coming from a “hard” background. Many were parents, and most were older than their counterparts in other high schools. Many of the students had dropped out of other high schools or had been expelled, some were drug users, and most had not had a positive academic experience.

Students in the district at Grantee I scored significantly below the statewide average on the 2009 administration of TAKS-Math. The 2008–09 TAKS-Math results (as shown in Table 22) indicated that 20% of students in Grade 9, 26% of students in Grade 10, and 36% of students in Grade 11 met the standard on TAKS-Math. This compared to the statewide averages of 71%, 69%, and 82% for Grades 9-11, respectively. In a comparison of student performance in mathematics at the two campuses, students at the secondary campus scored higher than students at the main campus. Both campuses scored significantly better on TAKS-Reading than on TAKS-Math. Grantee I has been rated as Academically Unacceptable by the Texas Education Agency.

Table 22
Percentage Rates of Students in the District in Grantee I by Grade Who Met the 2008-09 Standard on TAKS-Math

School Name	Grade 9	Grade 10	Grade 11
Grantee E	20%	26%	36%
State of Texas	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008–09

Teachers

Seven high school mathematics teachers and one teaching assistant were participating in Grantee I’s MIC pilot program, and all (100%) participated in the focus group. Five of the teachers were located at the main campus and two were at the second campus. The teaching assistant was also employed at the second campus. The most experienced of the teachers had ten years of teaching experience and was certified as “highly qualified” in mathematics and business. The least experienced teacher was in the first year of teaching. One of the eight teacher participants in the MIC program had a master’s degree in applied mathematics. The others, with the exception of the teaching assistant, all held bachelor’s degrees. The teaching assistant had an associate’s degree and three years of teaching experience. Five of the mathematics faculty at Grantee I were certified to teach high school mathematics. One was certified to teach Grades 4-8, and one held an undergraduate degree in management and marketing and was certified in career and technology education. The teaching

assistant did not hold a teaching certificate. Mathematics subjects taught at Grantee I included Algebra I and II, Geometry, Mathematics Models, and TAKS preparation in mathematics.

MIC Coach

A mathematics consultant from the ESC was serving as the primary mathematics instructional coach for Grantee I. Her coaching efforts, as well as the professional development component of Grantee I's MIC program, were supported by a visiting mathematics specialist from the charter school's main office. The visiting mathematics specialist also was supporting the educational programs on several other campuses in Texas.

Prior to joining the ESC, the MIC coach taught mathematics for fifteen years of classroom teaching experience and worked for four years as a mathematics specialist in central administration. She was certified in secondary mathematics.

Overview of Grantee I's MIC Pilot Program

Goals

According to the grant coordinator, the goals of Grantee I's MIC pilot program were to:

- Improve teachers' knowledge of mathematics.
- Improve and expand teachers' instructional strategies.
- Help students with their understanding of mathematics.
- Help students pass the TAKS and graduate from high school.

Program Structure

The ESC in Grantee I's region was the ASP for Grantee I's MIC program. The ASP was providing an MIC coach and developing the professional development and coaching components of the program in coordination with Grantee I's administration and their corporate office. The corporate office also was providing a visiting mathematics specialist who was working closely with staff from the ASP.

The MIC model at Grantee I included direct participation by teachers in professional development sessions delivered by the ASP. MIC coaches were working individually with teachers in their classrooms to clarify topics presented in professional development. MIC coaches were providing feedback to teachers based on classroom observations, and providing general support and reinforcement of strategies learned and utilized.

Math Coaching and Professional Development Activities

Math Coaching Activities and Teacher Participation

The ASP was responsible for developing and delivering the math coaching and professional development activities for Grantee I. All teachers participating in the MIC pilot program had participated in coaching activities. Following each of the professional development activities, the two MIC coaches were coordinating their schedules to observe teachers in the classrooms and provide feedback based on the observations. MIC coaches were working with participating teachers to ensure that the content and strategies presented in the professional development sessions were being implemented in the classroom. According to the MIC coaches, the goal was to meet with each teacher at least once a week to answer questions and provide support.

Professional Development Activities and Teacher Participation

The ASP was maintaining records of MIC teachers' attendance at professional development activities. Most participating teachers had participated in all professional development activities held after school and on Saturdays. One teacher had a religious conflict and was not participating in the activities held on Saturday.

The professional development activities of Grantee I's program were being prepared and delivered by the ASP. Teachers were the primary participants. The MIC coach was also involved in the planning and delivery of professional development activities as was the visiting math specialist from the corporate office. The MIC coaches were developing and delivering the professional development activities and then following up the professional development sessions with observations and coaching sessions in the teachers' classrooms.

Teacher participants from both Grantee I campuses were attending professional development sessions during the week and on Saturdays. Professional development sessions were being held at both campuses on an alternating schedule. Weekday sessions were being held after school, usually from 5 p.m. to 7 p.m. Examples of professional development topics included testing strategies, use of manipulatives in the classroom, scaffolding, technology integration, and strategies for engaging students in mathematics.

District/Campus Administrator Participation in Program Activities

Participation of campus administrators in professional development activities was limited. Administrators were aware of the visits by MIC coaches and were stopping into the classroom briefly to observe but they were not directly involved in planning the math coaching sessions or working with the MIC coaches. They were speaking with teachers about the math coaching experience and were kept abreast of all professional development and math coaching activities by the ASP.

MIC Pilot Program Implementation

Barriers to Program Implementation

From an administrative perspective, the major challenge had been impressing upon the teacher participants the importance of attending each professional development session. There was a misconception at the program's inception that the schedule for the professional development sessions included repeat sessions for those who missed an earlier session. This misconception was addressed early and unexcused absenteeism had not been cited as a problem in the program's operations.

The challenges that teachers experienced during the program's implementation included scheduling time away from family activities to attend the evening and Saturday professional development sessions. Because the school day was divided into two four-hour blocks for students, teachers would work from before 8:00 a.m. until 5:00 p.m. The evening professional development sessions would begin just after 5:00 p.m., making for a long workday for the Grantee I mathematics teachers. For the teacher who was unable to participate in the Saturday sessions due to religious beliefs, the challenge was trying to continue making progress despite the missed sessions. This had required some added time with the MIC coach or support from colleagues.

Less experienced teachers cited as a major challenge the volume of new material that had to be digested and implemented within a short period of time. Teachers also cited the diversity of the student population as a challenge because of the different learning styles, the different levels of knowledge among students in the same course, and the range of strategies required to teach a class with such diversity among its students.

Facilitators of Program Implementation

From the ASP and MIC coaches' perspectives, it was each other's support that had helped facilitate implementation of the MIC program at Grantee I. According to the visiting mathematics specialist from the corporate office, the MIC coach from the ASP who was providing professional development and math coaching was always prepared and would immediately communicate with the visiting specialist about any issues that came up in professional development and math coaching activities. The MIC coach from the ASP cited the support of the visiting mathematics specialist from the corporate office as a primary facilitator to the implementation of the program. The communication between the two and the support that each provided to the other was cited as a key to successful implementation of the program.

Teachers cited the MIC coaches as facilitators and most believed that their own motivation to improve their teaching was a facilitator of the MIC program. The stipend was also a facilitator and much appreciated by the teachers.

Relationship between the Academy and the ASP

The relationship between Grantee I and the ASP was involving a small number of individuals. The MIC coach was a staff member of the ASP and was representing the ASP in planning and

implementing the professional development and coaching activities. The MIC coach was working closely with the visiting math specialist from the corporate office who also was serving as coach and professional development consultant. A third person, also from the ASP, was contributing to the professional development component of the program. The MIC coach and the visiting math specialist were coordinating professional development and math coaching activities with campus administrators. They also were providing regular updates to campus administrators on the progress of the MIC program. No other ASP staff were involved in the daily operations of the program.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinator, ASP representative, principals, and MIC coaches discussed their perceptions of the effects of program activities on teachers. They were asked to address the ways, if any, that the professional development and math coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Teachers' instructional strategies
- Teachers' use of assessment or assessment data
- Student engagement and performance

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs about Teaching Mathematics: Innovative Techniques and Peer Support

The MIC grant coordinator noted that the professional development sessions had given teachers an opportunity to be the student and to have empathy for what students go through trying to learn mathematics. According to the MIC coach and MIC grant coordinator, teachers were more willing to try new approaches to teaching and that it was necessary to add manipulatives or change activities in order to reach the student. One of the campus principals stated that teachers had learned that there were more effective teaching approaches than the traditional lecture approach.

"We get in a rut as to how we can teach to our students. Personally, I don't like 'sit-n-get.' That's how you lose them."

-Principal, on the need to change teachers' beliefs about teaching mathematics

Teachers' Beliefs about Teaching Mathematics

Teachers were also asked about the impact of the MIC program on their beliefs about teaching mathematics. Two of the eight teachers indicated that the professional development activities had affected their beliefs about teaching mathematics. One of the two teachers learned that questions

could be asked in a way that would help students see connections with previously learned material and understand the reasons behind a correct answer. The change in another teacher's beliefs about teaching mathematics included an acceptance that alternative approaches to teaching and learning, such as the use of fingers for counting, were acceptable if they were effective.

The MIC coaches, the MIC grant coordinator, and school principals felt that improvements in content knowledge among teachers were easier to observe and measure than were beliefs about teaching mathematics. When MIC coaches were in the classroom observing instruction, they were able to spot the areas of mathematics needing improvement.

These were noted for either future professional development or one-on-one math coaching between teacher and coach.

"The student has to know the processes behind the work. What we learn in professional development was how to teach those processes."

-High school teacher about the effects of MIC professional development activities on teachers' beliefs about teaching mathematics

Two of the teachers reported that math coaching activities had positive effects on their beliefs about teaching mathematics. One had learned that teachers, like students, could learn from others when learning was collaborative. Another teacher reported that the effect of math coaching included learning that a person must be open to new ideas and techniques before they can progress.

Teachers Making a Difference in Students' Learning of Mathematics

The MIC grant coordinator, also involved in professional development activities and math coaching, believed that the MIC professional development activities had made an impact on teachers' sense that they can make a difference in their students' learning mathematics. She believed that teachers could find some relief in knowing that there were multiple approaches to teaching and that students may be more receptive to one strategy than another. The activities have forced teachers to get over their fear of trying new approaches in the classroom. The professional development activities were particularly useful for teachers who did not go through a teacher education program because they give teachers a toolbox that they would not have otherwise.

One of the principals stated that the professional development activities had given teachers more confidence in their effectiveness. The teachers' confidence was translating into more effective learning by the student.

Most teachers were positive about the effects of the math coaching activities on their sense that they can make a difference in their students' learning mathematics. Teachers cited the following examples:

- The math coaching activities had enabled them to see successes in the classroom.
- Many students believed that they were unable to learn math but when teachers would see the MIC coach's effectiveness, it would give them the confidence to try new approaches.
- The math coaching activities had taught the teachers to break down the multiplication and addition processes in order to teach the students more effectively.
- Math coaching had helped teachers focus on one student at a time.

Effects of MIC Activities on Teachers' Mathematics Content Knowledge and Eagerness to Learn

"Even though I've gone through my own personal schooling and I'm certified, there are still some things that aren't clear to me."

-Participating teacher, commenting on a personal need to continue learning mathematics content

The MIC coach and grant coordinator for Grantee I's MIC program both agreed that it was difficult to distinguish whether effects on teachers' content knowledge resulted from professional development or math coaching. Mathematics content were key components of the professional development and math coaching activities. Teachers, on the other hand,

were more certain that the most positive effects of the MIC program activities on their content knowledge resulted from the math coaching activities. Teachers reported the following regarding effects of the MIC program on their content knowledge in mathematics:

- The MIC program addressed areas of mathematics not familiar to new teachers and teachers who were not certified in mathematics.
- The MIC program provided more depth for experienced mathematics teachers.
- The MIC program provided teachers with a better understanding of how to align their instruction in mathematics to the TEKS.

Effects of MIC Activities on Teachers' Instructional Strategies

The MIC grant coordinator described teachers' willingness to try new techniques as ranging from diving in wholeheartedly, to "itty bitty transformations," to little or no willingness to try innovative methods. Generally, teachers and principals felt positive about the effects of professional development activities on their instructional strategies. A campus principal stated that the professional development activities had helped teachers move away from direct teach methods to working in groups and in one-on-one sessions with the students. A teacher, commenting on a professional development activity designed with teachers as students, described feeling empowered when realizing what a student goes through to learn mathematics concepts. Another teacher described how the professional development activities had taught teachers to ask themselves, "How can I apply today what I learned last night?"

Most teachers described the math coaching activities as "reinforcing" and "supportive." With regard to the effects of math coaching on instructional strategies, teachers felt that the math coaching sessions and professional development activities had reinforced effective strategies and had provided new ideas to use in situations where students need more engaging activities. The MIC coaches had worked hard to build a positive rapport with the teachers and to develop a coaching relationship built on trust. Teachers were more receptive to trying new instructional strategies because of the positive relationships most had with the MIC coaches.

Effects of MIC Activities on Teachers' Use of Assessment or Assessment Data

Grantee I's professional development sessions had included analysis of assessment data. The assessment data reviewed in professional development was mainly focused on TAKS and benchmark tests. The benchmarks were usually based on released TAKS items from previous administrations. The MIC grant coordinator and MIC coach had included use of teacher-made assessments but those had been limited due to time constraints and directives from the central office to focus on analyzing and using TAKS results for diagnostic purposes.

"The test needs to reflect exactly what I taught. I do put in a bonus or so, but it's important the test reflects what has been given in the class."

-Teacher, on the use of assessment in the classroom

The MIC coaching sessions dealing with assessment and use of assessment data had included training on a software program designed to align TAKS results with CSCOPE, the curriculum used by Grantee I. The program was providing information to administrators and teachers that could be used for diagnostic and prescription purposes and for improving instruction. In planning periods following benchmark test administrations or TAKS, the MIC coach would look at test results with teachers and would note the areas where the students fared poorly. The follow-up questions for teachers would include, "How did you teach that objective?", "Did you teach at the knowledge level when the question required understanding at the synthesis level?", "During your instruction, how did you word your questions?", and "Were your questions consistent with the language used in TAKS?" The MIC coach's objective with the test data analysis was to train teachers to always question whether different instructional strategies could have been more effective. Teachers believed that the professional development and math coaching activities related to assessment and use of assessment had been effective. Specifically, the activities had been effective in the following ways:

"Going into the classrooms and everybody's working. That's the biggest thing – for me to see student engagement. They may not get it right, but they're working at it!"

-Principal, on evidence that students are more engaged due to the MIC program activities

- The professional development and math coaching activities provided opportunities for teachers to receive feedback on their teacher-developed tests.
- The professional development and math coaching sessions focused on test results and their relationship to instruction.
- The professional development and math coaching activities taught teachers about formative and summative evaluations and when to use each type of evaluation.
- The professional development and math coaching sessions taught teachers how effective alignment of instruction with TEKS can improve TAKS results.

Student Engagement and Performance

At the time of the 2010 site visit, students at Grantee I had not yet taken the TAKS for the 2009–10 school year, so the effects of MIC pilot program participation on TAKS performance were unknown.

The professional development and math coaching activities throughout the school year, however, had focused on alignment of instruction with the TEKS. The faculty was optimistic that this focus, combined with the introduction of new strategies that engage students more, would have positive results. According to one of the principals, scores on the benchmark tests, usually effective predictors of performance on TAKS, had been promising.

Another promising development, according to a principal, was the level of engagement that students had demonstrated in math classes. The principal believed that this would translate to better results on measures of student performance, including TAKS. This, in turn, could positively affect students' willingness to stay in school, pass the required TAKS, and graduate. According to a principal, more students were slated to graduate at the end of the 2009–10 school year than in the previous school year.

Sustainability and Enhancement

Participants in the MIC program at Grantee I were unanimous in their belief that the program should continue beyond the funding period. There had been discussions among administrators about the need for continuing a math coaching program and the ways in which the program would continue when state funding ends. The ESC in the district's region was a major resource for school districts and the district would look to the ESC for support, most likely for professional development. The district had not decided how the math coaching component would continue even though they were in agreement that math coaching was needed, particularly for the less experienced teachers.

"I felt empowered; it makes me feel good to know that at least somebody else cares how these kids do. I would like to introduce any math teacher to the coach. She has ideas that can blow your mind. We know she's experienced."

-Teacher, commenting on the need to continue the MIC program

Participants agreed that the major change in the program should be to address the issue of scheduling professional development activities. The schedule had required participation in professional development activities in the evenings during the week and on Saturdays. This had created hardships for teachers with families or other responsibilities in the evenings and on weekends. One teacher was unable to work on weekends due to religious practices.

One recommendation was to consider having professional development activities during the teachers' planning periods. This would require common planning periods for mathematics teachers or multiple sessions being held on the same topic. Another possibility was to have professional development prior to the beginning of the school year with reinforcement through math coaching and refresher sessions throughout the year that would not require the extensive time commitment that was now required.

Summary/Conclusions

Grantee I is an open-enrollment charter school with two campuses in a major metropolitan area in Texas. The student body of both campuses includes students who, for the most part, have had academic difficulties throughout their academic experiences. Many of the students have dropped

out of other high schools or have left school and returned to Grantee I. Lack of success on TAKS was but one indicator of the risk factors of students at the Academy.

The mathematics faculty was made up of teachers with a wide range of professional development needs in mathematics. The MIC pilot program had been developed to encompass the diversity among the teachers. Participation in the professional development and coaching activities had been good despite the concerns about having to work after school and on weekends. Most believed the professional development and math coaching sessions have been beneficial in boosting their confidence in the classroom, giving them new strategies to implement with their students, and showing them how to more effectively engage students in mathematics activities.

All participants felt that the math coaching program should be continued although there was not a specific plan in place to continue it. The primary reason for wanting to continue the program was to support teachers who were new to mathematics or to the teaching profession.

Although TAKS scores were not available for the 2009–10 school year at the time of the site visit, teachers and administrators were confident that there would be improvement over the previous year's scores. Participants pointed to improved scores on the benchmark exams. The benchmark exams included released items from previous TAKS administrations and were usually strong indicators of actual TAKS performance. Non-empirical evidence of improvement in student achievement included a higher level of student engagement in classroom activities. Teachers attributed this to the professional development and math coaching activities of the MIC program. Additional positive results of the first-year activities of the MIC program included teachers' higher levels of confidence, increased content knowledge in mathematics, and greater awareness of the links between alignment of instruction to the TEKS and TAKS scores.

Case Study: Grantee J (Cycle 2)

Methodology

In April 2010, evaluators conducted a site visit to Grantee J in east Texas. The site visit team conducted individual interviews with the two grant coordinators, a representative of the ASP, the high school principal, and the MIC coach. The site visit team also held four focus groups with three Algebra I teachers, four Geometry teachers, two special education teachers, and four teachers teaching a mix of mathematics courses including Algebra II, Mathematical Models with Applications and high school mathematics.

Characteristics of Grantee J

Grantee J has a student population of approximately 5,800 and is located in east Texas near the Texas-Louisiana state line. The district's lone high school has 1,580 students. The MIC program at Grantee J includes teachers and administrators from the school district's high school and one coach. Table 23 provides a summary of Grantee J's MIC pilot program including setting, schools and grades served, and details of the award.

Table 23
General Characteristics of Grantee J's MIC Grant Program

Category	Characteristic
Setting	Rural
ESC Region	7
Grades Served	9-12
Number of Schools Served	1
Type of Schools Served	High school
Number of Teachers Served	23, including 2 special education teachers
Number of MIC Coaches Participating	1
Grant Amount	\$200,000
Grant Start Date	04/01/09
Grant End Date	05/31/11

Sources: Grantee J's Grantee Action Plan and Academic Excellence Indicator System (AEIS), 2008-09

Students

Grantee J High School's student population included 44% African-American students, 39% White students, and 17% Hispanic students. According to school personnel, the Hispanic student population was the fastest growing segment of the student population. Approximately 49% of the students were considered economically disadvantaged. A small percentage of students, about 1%, were categorized as LEP. The 2% dropout rate among Grantee J's high school students was below the state average of 30%. Table 24 compares Grantee J's high school students' districtwide performance on TAKS-Math with students statewide at the baseline (2008-09).

"One thing that we stress with our kids and our teachers is that these kids are just as intelligent as any other kids on the planet. They just need the opportunity to see what the rest of the world sees on a daily basis."

-MIC grant coordinator discussing student demographics at Grantee J

Table 24

Percentage Rates of Students in the District in Grantee J by Grade Who Met the 2009 Standard on TAKS-Math

School Name	Grade 9	Grade 10	Grade 11
Grantee J	71%	65%	67%
State of Texas	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008-09

Performance in Mathematics

With the exception of Grade 11 students, the percentage of high school students at Grantee J who passed TAKS-Math was at or near the state average.

Teachers

Twenty-three high school mathematics teachers were participating in Grantee J's MIC program. Five of the thirteen teachers who participated in focus groups (38%) had master's degrees. Six of the thirteen focus group participants (46%) had over 20 years of experience teaching mathematics. One of those six had 33 years of experience teaching mathematics. Two teachers had 11 years of experience teaching mathematics, one had four years experience, and four were in their first year of teaching mathematics. Three of the four who were in their first year of teaching mathematics were new to teaching. The fourth had experience teaching other subjects.

MIC Coaches

Grantee J's MIC program was using one coach, a school district employee. The MIC coach in Grantee J's high school had a background in elementary education, elementary/junior high school history, and Grades 6-12 business education. Because the coach's background and experience was with

younger students, the primary role of the MIC coach in this program was to run the mathematics laboratory at the high school and support the teachers and students in the lab. Each teacher rotated through the math lab according to a schedule established by the coach. Students in the lab worked in groups and rotated through the various stations set up in the lab. The MIC coach helped teachers plan activities for the lab, assisted teachers with materials used in the lab, and suggested instructional strategies to use with students in the math lab. The MIC coach also participated in ASP-sponsored professional development sessions designed to train instructional coaches.

Overview of Grantee J's MIC Pilot Program

Goals

According to the MIC grant coordinators, the goals of the MIC program were to:

- Improve teacher instruction.
- Make mathematics relevant for students by helping them “connect” mathematics to other aspects of education and everyday living.
- Increase teachers’ use of technology in the classroom.

The goals of the MIC program were addressed with professional development activities sponsored by the ASP and the use of a mathematics laboratory. The mathematics laboratory, located in the high school, gives teachers an environment in which they can vary instruction and move from a lecture format to instruction that includes hands-on activities, manipulatives, and technology. Students rotate through activities that were set up as learning stations. As students work, the MIC coach supports both teachers and students by assisting with materials and suggesting instructional strategies.

Program Structure

The ESC in Grantee J's region was the ASP for Grantee J's MIC program. The ASP was responsible for providing professional development activities to participating teachers. The activities included several sessions related to making connections in mathematics, *Kagan Professional Development workshops*⁵, use of the *SMART Board*⁶, and *Agile Mind*⁷. At the time of the site visit, teachers had attended four of the six sessions scheduled for the school year.

In addition to the professional development sessions for teachers, the ASP also was sponsoring professional development sessions on effective coaching. The MIC coach for Grantee J had participated in all seven of the sessions held during the 2009–10 school year.

⁵ Kagan professional development workshops are designed to increase student engagement and learning. More information on Kagan professional development workshops can be found online [here](#).

⁶ More information on these interactive digital boards can be found online [here](#).

⁷ According to their website, the mission of *Agile Mind* was to “provide the tools and support you need to improve student performance while supporting exemplary, sustainable teaching practices.” More information was available online [here](#).

The school district was operating and maintaining the mathematics laboratory, another component of the MIC program. The MIC coach was responsible for scheduling and coordinating the activities in the laboratory.

Math Coaching and Professional Development Activities

Math Coaching Activities and Teacher Participation

The MIC coach's role in Grantee J's MIC program was to support and assist the teachers and students in the lab. The mathematics laboratory included learning stations with computers, a *Smart Board*[™], hands-on activities for students, and manipulatives to understand and solve mathematics problems. Teachers and students use the math lab every other week. The MIC coach would confer with the teachers prior to their using the lab and would describe the activities and learning stations that will be included in each session. The teachers would take their students into the lab and students would rotate through the various learning stations, each with hands-on activities. The MIC coach would model some instruction, consult with the teachers throughout the lab session, make suggestions for instructional strategies, and generally assist the teachers in a variety of ways, including preparation of materials for the activities.

"I think that's the biggest thing, having her there and having the materials, and then letting us go and teach."

-Teacher, commenting on the lab activities and MIC coach

All but five of the teachers participating in the MIC program had used the lab. Those who had not would do so before the end of the school year. Teachers who had used the laboratory were positive about the increased levels of student engagement following their participation in the lab activities. According to teachers, however, there was a scarcity of activities that could be used with the lab's *Smart Board*[™]. Teachers were optimistic, however, that additional activities would be added as the program progresses.

Professional Development Activities and Teacher Participation

All teachers participating in the MIC program at Grantee J had participated in the scheduled professional development activities. The ASP was responsible for setting up the professional development program and hiring the consultants for the sessions. The professional development sessions in the 2009–10 school year had included a six-session activity that deals with the

"We're trying to improve teachers' content base but also make connections between mathematics so that mathematics is not isolated from day-to-day activities."

-MIC grant coordinator, commenting on the professional development activities of Grantee J's MIC program

connections in mathematics. The purpose of these workshops was to look at the commonalities within mathematics, starting with middle school mathematics and progressing to the mathematics courses taught in high school and college. Teachers were getting a broad view of how concepts from middle school mathematics, for example, can be applied in the higher level courses they take in high school and college. The sessions were

emphasizing how important it was for students to see these connections.

Additional professional development topics facilitated by the ASP included integrating technology into the classroom, *Kagan Professional Development* workshops, and *Agile Mind*[®] training. *Kagan Publishing and Professional Development* offered a range of workshops for teachers that focus on collaborative learning and student engagement. *Agile Mind*[®] was designed in collaboration with the Charles A. Dana Center at The University of Texas at Austin. Among numerous objectives, *Agile Mind*[®] was providing teachers with tools to customize lesson plans that align to curriculum standards. The program was serving as a resource for assessment and provides instructional materials and teaching tips to support instruction.

The ASP had also sponsored training in effective coaching. The MIC coach had participated in each of the training sessions held during the 2009–10 school year.

District/Campus Administrator Participation in Program Activities

The high school math department chair, who also was serving as one of the MIC grant coordinators, was the administrator most actively involved in the MIC program. The role of the high school principal was to keep abreast of the program activities, provide feedback to higher level administrators, observe some of the activities, and provide feedback to the grant coordinators as needed.

MIC Pilot Program Implementation

Barriers to Program Implementation

Grantee J encountered two barriers with program implementation. The first was a delay in filling orders for equipment and materials needed for the MIC program. This internal administrative issue was eventually resolved by October 2009.

A second barrier involved teachers' resistance to change. Teachers were uneasy with the changes that the MIC program would bring to their teaching routines, including the laboratory activities, the professional development sessions, and homework assignments associated with learning new technologies and instructional strategies. Teachers, particularly veteran teachers, reported in the focus groups that they were not happy with the assignments.

Teachers acknowledged the difficulties in becoming accustomed to the laboratory setting, a very new experience for many of them. Included in the lab are four learning stations with four groups of students working on different activities. Teachers had to learn to coordinate the activities, monitor the four groups, assess the progress of each group, and provide feedback on the effectiveness of the learning station activities. Using the lab also meant that the teachers would be working with another teacher, the MIC coach. This arrangement was also new to many of the teachers who felt initially that this would mean losing control of the classroom.

For the MIC coach, a challenge during implementation was learning to work with a diverse group with both veteran teachers and teachers new to the profession, each with different personalities and teaching styles. The MIC coach noted how every teacher has a different approach to classroom management and discipline and it was incumbent on the coach to adjust to each style.

The school district addressed the challenges early in the school year by clarifying the goals of the professional development workshops and the extra assignments. They addressed the additional work stemming from the lab work by spending more time on the topics and readings during the school day rather than expecting teachers to study at night when they also needed to prepare for the next day's classes. The staff alleviated uncertainties associated with using the lab by explaining that the lab activities enabled the teacher to teach students with a wide range of learning styles and content needs. The teachers and MIC coach had synchronized their efforts and the lab activities appeared to be effective ways of promoting student engagement and learning.

Facilitators of Program Implementation

Participating teachers cited camaraderie among all involved in the MIC program as a facilitator. The teachers' approach to the program, "all jumping in and giving it a shot," established teamwork as a basis for the program.

Teachers also praised the MIC coach's organization as a facilitator. The MIC coach was providing direction for the lab activities and was giving teachers information on activities and schedules in advance and this helped with preparation and expectations.

Grantee J's superintendent and board of trustees thought highly of the math lab and the results it appeared to be producing. Board members and teachers from other schools had visited the lab on several occasions and had been impressed with the activities and results.

The MIC coach cited the ASP training on effective coaching as one of the program's facilitators. Teachers credited the ASP professional development program for helping them improve their teaching effectiveness. Specific components of the professional development program included the model lessons and training on technology in the classroom.

Relationship between the District and the ASP

The relationship between the ASP and Grantee J involved very specific roles for each. The ASP was responsible for the professional development component of the program for teachers and the effective coaching training for the MIC coach. The school district was responsible for establishing and operating the math coaching component, centered on the math lab and the interactions between the MIC coach, the teachers, and the students. The ASP was not involved in the on-campus activities of the program nor do they gauge the degree to which teachers implement the concepts and strategies presented in professional development. Following the presentations, the ASP would conduct evaluations of the professional development sessions and invite teachers to provide feedback on what they learned and how useful they feel it will be to them in practice.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinators, ASP representative, high school principal, and MIC coach discussed their perceptions of the effects of program activities on teachers. The site visit team asked participants to address the ways, if any, that the professional development and math coaching activities had affected:

- Teachers' beliefs about teaching mathematics
- Teachers' sense that they can make a difference in their students' learning of mathematics
- Teachers' mathematics content knowledge
- Teachers' instructional strategies
- Teachers' use of assessment or assessment data
- Student engagement and performance

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs About Teaching Mathematics

Effects of Math Coaching Activities

A common response from teachers to the question of how the laboratory experiences affected their beliefs about teaching mathematics was that classrooms do not have to be quiet for learning to occur. Teachers described the lab activities with four learning stations and four groups of students working as "controlled chaos."

"In the lab, it's like controlled chaos. There are voices and sounds at all times, but they are still learning. That is okay. Because I originally thought the class had to be completely quiet, focused, and paying attention. Even with them making noise, they can still learn."

-Teacher, commenting on the student activity
in the math lab

Teachers' beliefs about the use of hands-on activities for high school math students also changed, according to participants in teachers' focus group sessions. Teachers said there had always been an emphasis on focused learning in a quiet classroom. Manipulatives and hands-on activities had usually been a part of elementary and middle school classes. Teachers had seen an increased level of student engagement that they credited to the use of more manipulatives and hands-on activities in the lab.

Effects of Professional Development Activities

Through the MIC professional development activities, teachers had come to learn about showing students the connections in math that were present from math in the lower grades through Algebra II and up. Learning about those connections also would enable teachers to teach about the connections to add relevance to students' learning of mathematics. The professional development activities had helped teachers realize that they forget a great deal of content over the years and that maintaining math teaching skills was a continuous process.

Students learn differently today, according to teachers who participated in the focus groups. Teachers need to vary their instruction and reach out to the students rather than just lecturing. The professional development sessions enabled teachers to develop new approaches to engage students and more effectively address today's students' instructional needs.

Teachers Making a Difference in Students' Learning of Mathematics

Effects of Math Coaching Activities

Teachers cited the increased engagement in lab activities as a positive sign that they could make a difference in students' learning of mathematics. An example of a successful activity in the lab was using the *Smart Board*[™] to enable students to see objects in three dimensions (3D). This was particularly useful for algebra and geometry activities. Teachers also pointed to improved academic performance for all students on pop quizzes and an increase in students' engagement in math activities as evidence that they can make a difference in students' learning of mathematics. This included those students who had not been successful in the traditional classroom.

Effects of Professional Development Activities

The professional development sessions dealing with connections in mathematics had been helpful to teachers in seeing the "big picture" in mathematics teaching and learning. Knowing how early math courses connect to algebra and more advanced math courses helped them teach students to make those connections and see how one course will relate to the next. The training received in professional development had been aligning with the activities in the lab, and was exposing them to a setting that teachers describe as noisy and seemingly not organized. The evidence that they were making a difference, however, was whether students were learning, and whether teachers were seeing those connections presented in professional development. Most teachers believed that was happening.

Effects of MIC Activities on Teachers' Mathematics Content Knowledge and Eagerness to Learn

Effects of Math Coaching Activities

Teachers who had participated in lab activities described a positive effect on content knowledge resulting from the lab experience. Teachers described a better understanding of the content because of the lab activities. The lab activities had called for a variety of strategies to reach a diverse group of students in the lab that can be modified and replicated later in a traditional classroom. Teachers must view the subject matter in terms of how best to apply it in order to develop the strategies required. The lab experience enabled them to continuously develop and apply different strategies and to understand the subject matter in terms of its application. The MIC coach noted that the exposure to lab activities had an especially positive effect on veteran high school mathematics teachers' content knowledge.

Effects of Professional Development

The professional development activities had been successful in at least two ways, according to teachers. The activities had refreshed veteran teachers' content knowledge and expanded the content knowledge of less experienced teachers. The emphasis on connections between mathematics subjects had provided teachers with a broader understanding of how mathematics

concepts learned in one subject connects to concepts presented in more advance mathematics subjects. This enabled teachers to explain to students in a lower level math course how the concepts learned this year would apply in the more advanced mathematics courses. Teachers were almost unanimous in their enthusiasm for learning through the *Agile Mind*[®] program.

Effects of MIC Activities on Teachers' Instructional Strategies

Effects of Math Coaching Activities

"I'm much more willing to jump in and try something new. I was a little apprehensive, but seeing the kids working on the Smart Board has been tremendous. They seem to be paying much more attention."

-Teacher, commenting on the positive effects of professional development workshops on instructional strategies

Participants were positive about the lab component of the MIC program. The high school principal saw the lab activities as a place to apply strategies to impart content. The MIC coach was optimistic that some of the recommendations for instructional strategies applied in the lab go back to the classroom following the lab session. Teachers verified that they apply some of the lab activities in their classrooms. An example cited was the use of paper plates to demonstrate angles and

percentages. Another described how the resources provided by the MIC coach in the lab, such as Internet links with recommended strategies, have been useful in the classroom.

Effects of Professional Development

Teachers had participated in numerous professional development sessions in the 2009–10 school year, including sessions on making connections in mathematics, *Agile Mind*[®] training, and *Kagan Professional Development* workshops. Teachers had been trained in the use of the *Smart Board*[™] and other technologies as part of the MIC program.

Prior to participating in the workshops, some teachers had only used the lecture format in their mathematics classes. Some were apprehensive about trying out new approaches, including using the *Smart Board*[™]. The professional development activities had an impact on instructional strategies used, according to teachers participating in the focus groups. Teachers were especially positive about the *Kagan* training. These workshops focused on using hands-on activities, group work, and activities to increase student engagement and learning. Teachers noted that they were becoming more confident and more willing to take risks with new instructional strategies even if they were not always successful.

Effects of MIC Activities on Teachers' Use of Assessment or Assessment Data

Although the lab activities had not specifically involved training in assessment or use of assessment data, the laboratory setting had provided teachers with an opportunity to assess their students' level of engagement. The more traditional benchmark measures and classroom tests were the primary sources of assessment data in addition to TAKS.

According to the MIC grant coordinators, Grantee J had employed the use of data analysis for diagnostic purposes for years, prior to the implementation of the MIC program. Teachers and administrators cited an improvement in the traditional assessment measures as well as in student engagement but they did not attribute the positive results to lab activities or professional development components of the MIC program.

Student Engagement and Performance

The MIC professional development activities throughout the school year had reinforced the concept of engaging students with interesting, relevant activities, including hands-on activities. Teachers participating in the MIC program had implemented many of the strategies for engaging students that they learned in professional development and used student engagement as one measure of student achievement. They reported improvement in the students' levels of engagement, particularly during the lab activities. Teachers also reported improved response time when asking students math questions in their regular classrooms. According to teachers, students seemed to be more comfortable with mathematics resulting from their work in the lab. There, they could work on a variety of math activities, in groups with peers, in a less pressured environment.

Math activities in the lab had included a great deal of TAKS preparation activities. Results on benchmark tests had improved over the previous year's results with similar positive results expected on TAKS.

Sustainability and Enhancement

Participants all believed that the MIC program should continue beyond the grant funding period. The principal believed that the program should begin at a lower level, perhaps in middle school or lower. The MIC coach concurred with the idea of starting the program at lower grades where students already were working with learning centers. The superintendent was positive about the math lab and had planned to continue it with the support of the district's board of trustees.

The focus in the first year of the program was on Algebra I and Geometry. This was where the grant coordinators felt the need was greatest. In subsequent years, the plan was to expand the program into the other subjects, add work in content knowledge, and set up shared conference periods for more effective team meetings.

Teachers suggested closer coordination of math topics addressed in the lab. They further suggested grouping activities by math objective so that multiple activities linked under the same objective could be going on in the lab at the same time. Classrooms needed additional computers so that students could use the computers when they complete their classroom assignments.

Teachers recommended additional work on understanding how to use manipulatives in the classroom and how to use effective grouping for maximum benefit. Teachers also recommended expanding the available activities to use with the *Smart Board*[™]. One teacher suggested expanding the amount of time that teachers and students can use the math lab.

The MIC coach was organizing and scheduling all math lab activities. The MIC coach saw the role as one that was supportive of teachers and students in the lab, and helpful in preparing the activities and suggesting ideas for teaching the variety of activities presented in the lab. The ASP representative recommended a continuation of the effective coaching training and an expansion of the math coaching role so that the MIC coach could be providing greater support for the teacher as opposed to assisting with teaching students and coordinating lab activities. As the program was designed, the MIC coach's primary responsibility was organizing and scheduling lab activities. The MIC coach's role in this program did not include serving as mentor nor did it include observing teachers in their classrooms in order to provide feedback on their instruction.

Summary/Conclusions

Grantee J is a small school district in east Texas near the Texas-Louisiana border. They were in their first year of the MIC program. There were three major components of the MIC program. The first was the professional development component for teachers. The ASP was responsible for organizing and delivering the professional development sessions. The second component, also professional development, involves the MIC coach from the district. This series of workshops dealt with effective coaching.

The third component of the MIC program centered on the high school mathematics laboratory. The participating teachers were rotating through the lab, as were their students. Within the lab, students worked in groups at learning stations. The MIC coach was responsible for scheduling teachers and students, organizing the lab activities, briefing teachers prior to coming to the lab on the objectives for the day, and assisting teachers throughout the lab sessions. The coach's role in Grantee J's MIC program differed from the traditional role of the instructional coach—observing teachers, providing feedback and suggestions for improving instruction, and mentoring. Grantee J's coach saw the role as one that was *supporting* teachers and students rather than one that was *mentoring* teachers. The MIC coach was new to high school teaching, with most professional experiences with younger students. The first year, therefore, had required rapid learning and adjusting to a new environment with high school students and a diverse group of teachers. The professional development training in effective coaching had also served to broaden the MIC coach's understanding of the role of instructional coaching.

Teachers participating in the focus groups were enthusiastic about the professional development sessions that were part of the MIC program. They were particularly positive about training to increase students' engagement, the use of effective grouping of students for collaborative learning, and the use of manipulatives and hands-on activities in the classroom. The teachers had not received TAKS results for 2010 at the time of the site visit but all were optimistic that the results would show gains from the previous year.

All but five of the teachers had used the math lab. Those who had used it were positive about the increased levels of student engagement that they have observed. Some teachers noted that they used activities from the lab in their classrooms with positive results. Others felt that it has been beneficial to teachers and students to change locations and work in a setting that encouraged group work for students and hands-on activities. *Smart Boards*™ and computers were available for students and teachers, and both groups enjoyed learning in what teachers call "controlled chaos."

The district administration was supportive of the math lab and the professional development components of the MIC program. They credited the professional development sessions and the lab activities with increasing interest and engagement on the part of the students and expanding the repertoire of instructional strategies that teachers can use. School district trustees had observed the activities in the math lab and supported continuing the lab beyond the grant period. Key members of the administration were planning its continuation with a possible expansion downward into the middle school and involving more teachers than in the first year of the program.

Case Study: Grantee K (Cycle 2)

Methodology

In May 2010, evaluators conducted a site visit to the MIC program at Grantee K, located outside of Dallas, Texas. The site visit team conducted individual interviews with the MIC grant coordinator, a representative of the ASP, and administrators from each of the participating high schools and middle schools. The site visit team also conducted separate focus group sessions with MIC coaches from the middle schools and high schools, Algebra I teachers from the middle schools, and Algebra I teachers from one of the participating high schools. The team held a separate meeting with mathematics department heads from the middle schools and high schools.

Characteristics of Grantee K

Grantee K has a student enrollment of approximately 18,000 students. The MIC program at Grantee K includes teachers and administrators from two high schools and five middle schools. Seven MIC coaches participate in the MIC program. Table 25 provides a summary of Grantee K's MIC pilot program including setting, schools and grades served, and details of the award.

Table 25
General Characteristics of Grantee K's MIC Grant Program

Category	Characteristic
Setting	Suburban
ESC Region	7
Grades Served	6-12
Number of Schools Served	7
Type of Schools Served	Middle school, high school
Number of Teachers Served	35 (8 middle; 27 high school)
Number of MIC coaches	7 (2 middle school; 5 high school)
Grant Amount	\$250,000
Grant Start Date	04/01/09
Grant End Date	05/31/11

Source: Grantee K's Cycle 2 Grant Application

Students

Grantee K’s student population included approximately 32% African-American students, 26% Hispanic students, 40% White students, and 2% Asian/Pacific Islander students. More than half of Grantee K’s students were considered at-risk or economically disadvantaged (61% and 64%, respectively). A much smaller proportion of students were LEP (20%). The high school dropout rate of 2.6% for 2007–08 was below the state average of 3.2% for that school year.

At baseline (2008-09), Grantee K students struggled to meet the standard on TAKS-Math, particularly students in Grades 6, 8, and 9. Seventy percent of Grade 6 and 8 Grantee K students met the standard on TAKS-Math, in comparison to 82% statewide. The greatest difference in achievement was between Grantee K students’ results and statewide results in Grade 9: 56% of Grantee K students passed versus 71% statewide. Table 26 shows the percentage of students in the district at Grantee G meeting the standard on TAKS-Math compared to the percentages statewide for the year prior to the site visit.

Table 26

Percentage Rates of Students in the District in Grantee K by Grade Who Met the 2008-09 Standard on TAKS-Math

School Name	Grade 6*	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11
Grantee K	70%	72%	70%	56%	62%	75%
State of Texas	82%	82%	82%	71%	69%	82%

Source: Academic Excellence Indicator System (AEIS), 2008–09

* TAKS-Math (English version)

Teachers

Eight middle school and 27 high school mathematics teachers were participating in Grantee K’s MIC program. Five middle school teachers and seven high school teachers participated in the two focus groups during the site visit. Middle school teachers who participated in the focus groups had a range of math teaching experience of 3 to 22 years. All have teaching certification in mathematics. Subjects taught at middle school included sixth, seventh, and eighth grade mathematics and Algebra I. Middle school teachers who participated in the focus group were teachers who have participated in the MIC Algebra Institute. They were not teachers who were receiving regular math coaching, but rather teachers at the middle school level who were teaching Algebra I.

At the high school, focus group participants had from one to 33 years of mathematics teaching experience. High school teachers who participated in the focus group were teaching Algebra I and Geometry. Two of the high school focus group participants had master’s degrees. All high school teachers had teaching certification in mathematics except the special education teacher; the special education teacher has teaching certification in special education.

MIC Coaches

Grantee K's MIC program was using two middle school MIC coaches and five high school MIC coaches. All were employees of Grantee K. All were experienced math teachers selected to participate in the Coaching Academy, designed to train effective MIC coaches. MIC coaches also supported and served as mentors for Algebra I teachers from the participating middle and high schools. The most experienced MIC coach has 33 years of teaching experience. The MIC coach with the least experience had eight years of experience.

Overview of Grantee K' MIC Pilot Program

Goals

One goal of Grantee K's MIC program was to improve Algebra I instruction at the middle and high schools. A second goal was to increase the district's coaching and mentoring capacity. The ASP was responsible for developing and delivering the professional development and math coaching components of the program.

Program Structure

The school district administration selected the participants for the MIC program. Participants included 35 teachers from 10 middle and high school campuses, two middle school MIC coaches, seven high school MIC coaches, and nine administrators. All teachers participating in the MIC program attended the program's Algebra Institute, established by the STEM Center. The institute's professional development involved training in mathematics content, instructional strategies, and technology integration.

The MIC coaches and a group of teachers and administrators had participated in the Coaching Academy, also sponsored by the STEM Center. The purpose of the academy was to develop the capacity for math coaching and mentoring at the campus level. MIC coaches were using the training they received at the Coaching Academy to help improve instruction of designated teachers at the middle and high schools. In addition, the math coaching consultant from the STEM Center and an additional resource, Five Star Educational Solutions, were providing math coaching assistance on designated Grantee K campuses.

Math Coaching and Professional Development Activities

MIC coaches were working with selected middle and high school teachers to build content knowledge and improve instruction by observing instruction, providing feedback, and serving as mentors. One MIC coach had spent a great deal of time with a new teacher on one campus and had mostly conducted observations in classrooms at another campus. The MIC coaches at the middle school were working with teachers in groups as well as on a one-on-one basis.

High school MIC coaches tailored their math coaching activities to each teacher and were focusing on those who need mentoring or additional attention. One of the high school MIC coaches had been

working with long-term substitute teachers due to the faculty turnover at that campus. Another focused the math coaching activities with high school teachers who needed additional work in interpreting student assessment data. Another MIC coach developed math coaching activities to address technology needs.

High school teachers in the focus group felt that the professional development component was the most helpful component of the MIC program. They described their experience with the high school MIC coach as one that primarily involved observation, with assistance provided upon request. They were positive about the modeling of lessons and especially positive about the interactions they had with the consultant from the STEM Center. The consultant was visiting classrooms, offering assistance with instructional strategies, answering questions, and providing feedback to teachers in their classrooms.

Professional Development Activities and Teacher Participation

A university mathematics center was the ASP for the program, responsible for delivery of professional development activities. The professional development activities included the Algebra Institute and the Coaching Academy. All participating teachers and several designated MIC coaches and administrators had attended the institute training. Teachers were meeting at the institute once a month during a school day to receive training on mathematics content, instructional strategies, and technology. Substitute teachers were hired on professional development days.

A separate professional development component was the Coaching Academy. The participants in the coaching included the MIC coaches and a small number of middle and high school teachers and administrators. The Coaching Academy was meeting four times in the 2009–10 school year. These sessions were held during weekdays.

District/Campus Administrator Participation in Program Activities

Designated campus administrators were participating in the professional development activities, including the Algebra Institute and the Coaching Academy. One of the middle school assistant principals interviewed during the site visit was participating fully in all of the algebra professional development activities. The assistant principal noted that although the focus of the institute was on algebra, the activities involved solid teaching principles that teachers could apply in other subject areas.

MIC Pilot Program Implementation

Barriers to Program Implementation

A murder occurred at one of the participating high schools at the beginning of the school year. There were significant staffing challenges due to the subsequent changes in leadership at the campus as well as emotional challenges that occurred following the tragedy. The MIC grant coordinator explained that the school district was fortunate to find two individuals with extensive experience. The MIC coaches had spent a great deal of their time working with the new staff and with long-term

substitute teachers so that students would receive high quality algebra instruction. A change at the assistant principal level at another campus was an additional personnel challenge.

Middle school MIC coaches noted that resistance to change could become a barrier to successful implementation if not addressed at the beginning of the coaching experience. They cited the importance of building relationships with teachers to overcome a natural resistance to change. It was particularly important that teachers understand that the MIC coach plays a supportive role rather than an evaluative role.

Teachers described the challenge of a “pull-out” program in which the teachers must leave their classrooms to participate in professional development activities. They addressed this challenge by explaining to their students that the purpose of leaving the classroom was to learn new activities that students could use in the future.

Facilitators of Program Implementation

The Coaching Academy had helped participants understand the coaching concept and how coaching can be beneficial to teachers and administrators. Middle school MIC coaches noted that a facilitator of program implementation was the collaboration of teachers, assistant principals, MIC coaches, and instructional specialists from the campuses in the Coaching Academy.

A representative of the ASP cited the support of the school district administration as a major facilitator of program implementation. Teachers included the availability of additional resources through the Algebra Institute and individuals who could provide resources as facilitators.

Relationship between the District and the ASP

Grantee K had had numerous collaborations with ASP staff in previous years. A middle school principal described the relationship as a “natural fit” since the ASP was quite familiar with the school district and its professional development needs. The ASP confirmed that the relationship of the school district and the ASP was one that allowed easy access to the school administration, including the superintendent. This positive relationship had been beneficial in successfully planning and implementing the MIC program.

Perceived Effects of MIC Pilot Program Activities

During the site visit interviews, the MIC grant coordinator, ASP representatives, high school principal, middle school principals, and MIC coaches discussed their perceptions of the effects of program activities on teachers. The site visit team asked participants to address the ways, if any, that the professional development and coaching activities had affected:

- Teachers’ beliefs about teaching mathematics
- Teachers’ sense that they can make a difference in their students’ learning of mathematics
- Teachers’ mathematics content knowledge
- Teachers’ instructional strategies

- Teachers' use of assessment or assessment data
- Student engagement and performance

Teachers were asked the same questions, but in reference to their own teaching beliefs and competencies.

Teachers' Beliefs About Teaching Mathematics

Effects of Math Coaching Activities

The MIC grant coordinator explained that a major shift in teachers' beliefs about teaching mathematics included the shift from a lecture approach to one that involves understanding and interaction. High school MIC coaches described the effects on teachers' beliefs about teaching mathematics as an awareness of the importance of instruction, including the way that teachers ask students questions. Teachers had become aware of the need for warm-up questions in mathematics classes and the importance of spiraling information so that students learn the subject matter continuously throughout the year. According to a high school principal, the math coaching experience had taken away the fear factor in some teachers, particularly those with less experience.

Effects of Professional Development Activities

Teachers learned new ways to engage students by using technology and manipulatives. The professional development activities included modeling instruction so that teachers could observe others teaching a lesson and replicate it in their classrooms. Middle school teachers listed several effects of the professional development activities on their beliefs about teaching mathematics. These included understanding how student-centered, hands-on instruction can have a positive impact on student learning and realizing the need to tailor instruction to the students' learning styles and needs. An assistant principal stated that the most important effect of the professional development activities on teachers' beliefs about teaching mathematics was teachers' learning that change was difficult.

Teachers Making a Difference in Students' Learning of Mathematics

Effects of Math Coaching Activities

According to one of the middle school MIC coaches, math coaching had helped teachers identify students' instructional needs and develop activities that address the concepts needed. Math coaching had also helped teachers understand the positive impact of enthusiastic teaching on student learning. MIC coaching had given teachers confidence to try new instructional strategies and get feedback from students on their effectiveness in helping them learn mathematics.

Effects of Professional Development Activities

Participating high school teachers explained how professional development activities had helped them see the effect of their teaching on students' learning of mathematics. As the program was continuing, the ASP was planning to administer a teacher efficacy survey in the next year as one way

to measure effectiveness. Anecdotal evidence from teachers indicated that they were enthusiastic about the professional development activities and the impact of those activities on the teachers' ability to help students learn mathematics.

Effects of MIC Activities on Teachers' Mathematics Content Knowledge and Eagerness to Learn

Effects of Math Coaching Activities

Middle school MIC coaches believed that teachers' content knowledge had increased a great deal through the math coaching experiences. The high school MIC coaches believed that teachers were now much more aware of the connection between mathematics content, the TEKS and the TAKS. A middle school teacher credited the MIC coaches for helping struggling teachers build content knowledge in areas where they were weak. Math coaching had helped teachers be open about their content needs so that they could get the help they need before imparting incorrect information to the students. This was evidenced by teachers' willingness to ask questions about content areas in meeting with MIC coaches and other teachers.

Effects of Professional Development

According to the MIC grant coordinator, the professional development activities demonstrated to teachers how instruction in technology called for different delivery methods. The professional development activities gave teachers with less experience more time on content and strategies. The professional development activities provided more tools for middle school teachers and gave them an opportunity to collaborate with colleagues to address content needs that they identified. Collaboration between middle school teachers and high school teachers enabled middle school teachers to see how content "spirals" upward to high school. High school teachers were able to see the continuity between the content taught at middle school and the content taught at high school.

Effects of MIC Activities on Teachers' Instructional Strategies

Effects of Math Coaching Activities

MIC coaches had seen teachers take strategies that they had learned in group activities and try them out in their classrooms. Teachers had modified those activities and adapted them to their classrooms and made them more advanced, if necessary, to meet their students' needs.

"They are using a lot more technology. They had it before but it sat at the back of the room and was rarely utilized."

-Representative of the ASP, discussing the effects of professional development activities on teachers' instructional strategies

Effects of Professional Development

The Algebra Institute included activities that showed teachers how to use technology in the classroom. The ASP noted that teachers were using technology more frequently as a result. Assistant principals interviewed during the site visit attested to the increase in the range of strategies that teachers were using, including use of manipulatives and hands-on activities. They also noted that

teachers gave them feedback on what was working and that teachers were very positive about the new instructional strategies they learned and applied in their classrooms.

Effects of MIC Activities on Teachers' Use of Assessment or Assessment Data

Effects of Math Coaching Activities

One of the participating high school principals believed that having an MIC coach work with teachers on interpreting data had been beneficial. Most other MIC participants felt that the professional development activities had had the most effect on teachers' use of assessment or assessment data.

Effects of Professional Development

High school teachers described the time taken to review data and use data to guide instruction. The ASP representative described how the professional development activities in the future would show teachers how to assess students informally to help them plan instruction. A principal explained how the professional development activities helped teachers create their own assessments. The MIC grant coordinator noted that the professional development activities and school practices would focus on formative evaluations throughout the school year rather than the summative assessments every six weeks.

Student Engagement and Performance

There were indications that the MIC program was having a positive effect on student engagement and performance. The MIC grant coordinator had seen higher levels of student engagement in classroom activities. This was evidenced by a classroom environment that was not necessarily quiet all of the time. The professional development activities had also focused on those aspects of the mathematics standards included on TAKS. Teachers had spent a great deal of time studying the TAKS blueprint and reviewing released TAKS items and TAKS data.

"All signs show that our math scores will be going up this year."

-Middle school principal, discussing the impact of the MIC program on student achievement

An assistant middle school principal described how the students scored higher in math, including a 12% increase over scores in the previous year. One teacher's classroom had all the students who did not reach the math standard on TAKS in the previous year, and 64% of those students passed the TAKS that year.

Students often provide direct feedback to teachers and MIC coaches on whether they understand mathematics. Teachers know if students understand the subject matter by the questions that students ask. Teachers were more cognizant of the effect their questions will have on a student's response. They now included questions that could have more than one answer. Students were more likely to try to answer a question of this nature than a question with only one correct answer.

School districts often use scores on benchmark tests to forecast performance on TAKS. Benchmark scores had improved considerably in the participating middle schools, according to middle school

administrators. The high school principal who participated in the site visit interviews also cited an improvement in benchmark test scores. These scores, combined with higher levels of student engagement in mathematics activities and a greater degree of teachers' confidence in their ability to teach mathematics, were positive indicators of improved student performance in upcoming assessments.

Sustainability and Enhancement

Participants in Grantee K's MIC program were looking forward to continuing the program beyond the grant period. MIC coaches pointed out that the need for mentoring would continue as long as there was turnover on the faculty and in the administration. The school district had used the MIC grant to build math coaching capacity by training its mathematics instructional specialists to be effective math coaches and mentors. Institutionalizing the math coaching program would help ensure that the district will have effective math coaches and mentors as new teachers enter the system.

Participants made several recommendations for improvement. They included:

- Providing additional work for teachers needing to build their classroom management skills
- Limiting the math coaching and professional development work to new teachers only (MIC was involving teachers with a wide range of teaching experience)
- Expanding the program to include more teachers
- Expanding the program to other subject areas
- Holding the training sessions before school begins in the fall to eliminate the pulling out of teachers from the classroom for training and holding shorter refresher courses throughout the school year
- Increasing the training in technology, especially with calculators.

Summary/Conclusions

Grantee K's MIC program was providing training in Algebra I for participating middle and high school teachers. Teachers, MIC coaches, and administrators had attended four sessions of the Algebra I Institute developed by the ASP. Participants received training in instructional strategies, mathematics content, and the use of technology in the classroom.

A second component of the MIC program was the math coaching component. The math coaching component consisted of the Coaching Academy, also sponsored by the STEM Center. Grantee K selected math instructional specialists from middle and high schools to participate in this academy. The math instructional specialists were also mathematics teachers. The purpose of the academy was to build effective math coaching capacity by training existing math specialists to be effective math coaches. MIC coaches were applying the skills they learned in the academy with teachers requiring support and mentoring.

An important element of Grantee K's MIC program was the institutionalization of math coaching. By selecting key instructional specialists to undergo training in effective math coaching, the school district was taking steps toward ensuring that they would have capacity to address coaching needs in the future. Selecting existing instructional specialists with knowledge of the campus and faculty facilitated the most important step of building rapport and trust between teachers and MIC coaches.

"The training makes people think. To get math teachers to think in terms of what they can do to help their kids has been beneficial."

-High school principal, discussing reasons why the MIC program should continue

Grantee K planned to continue the MIC coaching program beyond the grant period. The focus group and interview participants cited a number of reasons for continuing including the ongoing need for effective math coaches who could help teachers stay abreast of research on best practices and technology. The ASP and the school district had discussed plans for continuing the program and making the modifications necessary for continued success on the part of teachers and students.

References

- Apangea. (n.d.). Retrieved April 24, 2009, from <http://www.apangea.com/>
- Compass Learning Odyssey Math. (n.d.). Retrieved April 24, 2009, from <http://www.compasslearningodyssey.com/odysseymath.html>
- CSCOPE. (n.d.). Retrieved April 24, 2008, from <http://www.cscope.us/aboutus.html>.
- Bloom B. S. (1956). *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*. New York: David McKay Co., Inc.
- Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs*. Indianapolis: Jossey-Bass.
- Driscoll, M., DiMatteo, R.W., Nikula, J., & Egan, M. (2007). *Fostering geometric thinking: A guide for teachers*. Portsmouth, NH: Heinemann.
- Driscoll, M. (1999). *Fostering algebraic thinking: A guide for teachers grades 6-10*. Portsmouth, NH: Heinemann.
- Edutopia (2008). Linda Darling-Hammond: Thoughts on teacher preparation. Retrieved February 17, 2009 from <http://www.edutopia.org/linda-darling-hammond-teacher-preparation>
- Marzano, R.J., Gaddy, B.B., & Dean, C. (2000). *What works in classroom instruction*. Aurora, CO: Mid-continent Research for Education and Learning
- Sousa, D.A. (2008). *How the brain learns mathematics*. Thousand Oaks, CA: Corwin.
- Texas Education Agency (2001). *Academic Excellence Indicator System, 2000-01 State Performance Report*. TEA Division of Performance Reporting. Retrieved November 24, 2008 from <http://www.tea.state.tx.us/perfreport/aeis/2001/state.html>
- Texas Education Agency (2008). *Academic Excellence Indicator System, 2007-08 State Performance Report*. TEA Division of Performance Reporting. Retrieved October 7, 2009, from <http://www.tea.state.tx.us/perfreport/aeis/2008/state.html>
- Wojnowski, B., Buckley, P., & Chambliss, D. (2008). *Redesigning Texas high schools: T-STEM Initiative (Texas science, technology, engineering, and math)*. Texas High School Project. Retrieved June 29, 2009 from www.utdanacenter.org/downloads/octconf/2007/tstem.pdf
- Feger, S., Woleck, K., & Hickman, P. (2004). How to develop a coaching eye. *Journal of Staff Development* 25(2), 14-18.
- Felux, C. & Snowdy, P. (Eds.). (2006). *The Math Coach Field Guide: Charting Your Course*. Sausalito, CA: Math Solutions Publications.
- Hasbrouck, J. & Denton, C. (2005). *The Reading Coach: A How-to Manual for Success*. Longmont, CO: Sopris West.

Knight, J. (2007). *Instructional coaching: A partnership approach to improving instruction*. Thousand Oaks, CA, Corwin Press.

Jobs for the Future. (n.d.). *Jobs for the Future in brief*. Retrieved April 24, 2009, from <http://www.jff.org/Content/About+JFF.html>

TEKSing Toward TAKS Mathematics, DeBorde, B., & Thompson, J. (n.d.). Retrieved April 24, 2008, from <http://users.htcomp.net/TAKS/>

Texas Education Agency. (n.d.). *Academic Excellence Indicator System*. Retrieved April 24, 2009, from <http://ritter.tea.state.tx.us/perfreport/aeis/>

**Appendix A:
MIC 2010 Cycle 2 Site Visit Interview Protocols and
Focus Group Protocols**

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Grant Coordinator Interview Protocol – Cycle 2

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are the grant coordinator for the district we chose to visit. We would like to take this opportunity to speak with you to obtain information about the MIC pilot program at this district. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

Grant Coordinator Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as gather information about the implementation of your MIC program.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?
2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. Please provide a brief overview of the components you are providing to the MIC pilot program in this district. Please provide some details about:
 - a) The types of activities being implemented.
 - b) The role of your Approved Service Provider (ASP) (i.e., What services is your ASP providing?).
 - c) Your district's interaction/relationship with the ASP for the MIC pilot program.
4. Are there any barriers to implementation you have encountered? How have you overcome these barriers?
5. Are there any factors helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, records that you keep, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teacher effectiveness.

6. Do you keep attendance records of teacher participation in professional development or coaching activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain this information?
 - b) If no, is there a way to collect this information?
7. Do you assess students' and/or teachers' content knowledge as part of the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, do you plan to collect this information?

Probe: What types of assessments do you use/plan to use?

8. What other mathematics programs exist currently in this district that teachers and/or students could have participated in?
9. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

11. Do any district or campus administrators participate in any of the professional development or coaching activities?
 - a) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

12. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected their students in terms of the following:
 - a) Preparation for TAKS?
 - b) Student academic achievement?
 - c) Dropout rates?
 - d) Graduation rates?
 - e) Promotion rates?
 - f) Course completion rates?
 - g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

13. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected their students in terms of following:
 - a) Preparation for TAKS?
 - b) Student academic achievement?
 - c) Dropout rates?
 - d) Graduation rates?
 - e) Promotion rates?
 - f) Course completion rates?
 - g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 4

Lastly, I would like to learn about possible plans for sustainability of this program beyond the grant funding period.

14. Do you envision continuing this mathematics coaching program once funding ends?
 - a) If yes:
 - i. How will you continue to run the program (where will funding come from)?
 - ii. What changes would you make to the program?
 - b) If no:
 - i. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Approved Service Provider Interview Protocol – Cycle 2

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are a representative of the Approved Service Provider working with the MIC grantee that we are visiting. We would like to take this opportunity to speak with you to obtain more detailed information about the MIC pilot program at this district. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

ASP Representative Name(s):

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your staff, as well as to gather more information about the implementation of the MIC program in this district.

1. How would you characterize the teachers and coaches being served through the MIC pilot program in this district (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?
2. How would you characterize the students who are taught by the mathematics teachers participating in the MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. Please provide a brief overview of the components you are providing to the MIC pilot program in this district. Please describe:
 - a) The roles/responsibilities your staff has with the MIC pilot program.
 - b) The types of activities your staff is implementing.
 - c) Your staff's interaction/relationship with the district for the MIC pilot program.
4. Have you encountered any barriers to program implementation? How have you overcome these barriers?
5. Are there any factors helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teachers.

6. Do you keep attendance rates of teacher participation in professional development activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?

7. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

8. Do you keep attendance rates of teacher participation in coaching activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?

9. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. Do any district or campus administrators participate in any of the professional development or coaching activities?
- a) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

11. In what ways, if any, do you think the professional development activities in which the mathematics teachers participated thus far have affected their students in terms of the following:

- a) Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

12. In what ways, if any, do you think the coaching that the mathematics teachers have received thus far has affected their students in terms of following:

- a) Preparation for TAKS?
- a) Student academic achievement?
- b) Dropout rates?
- c) Graduation rates?
- d) Promotion rates?
- e) Course completion rates?
- f) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 4

Lastly, I would like to learn about possible plans for sustainability of the program beyond the grant funding period.

13. Has anyone from the district discussed continuing the MIC program with your organization once grant funding ends?
 - a) If yes,
 - ii. What changes would you make to the program?
 - iii. How will the program continue?
 - b) If no,
 - iv. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Principal Interview Protocol – Cycle 2

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because teachers from your school are participating in the MIC pilot program in your district. We would like to take this opportunity to speak with you to obtain your perspective on the MIC pilot program in which teachers from your school are participating. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

Principal's Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as to gather more information about the implementation of the MIC program at your campus and your level of participation.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?
2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. Please describe the MIC program in terms of:
 - a) The types of activities being implemented
 - b) The role of your Approved Service Provider (ASP)—what services is your ASP providing?
4. What is your level of participation in the MIC pilot program? That is, do you attend the professional development seminars and/or the coaching sessions?
 - a) If you do participate in these activities,
 - i. How often?
 - ii. In what ways and to what extent do you support the program?
 - iii. What is your impression of these activities?

- iv. In what ways, if any, do you think the activities are helpful to the teachers and ultimately the students?
- v. How do the teachers feel about their superiors attending the trainings with them?
- vi. What if anything needs to be done differently/ revised?

Section 2

Next, I would like to learn about the overall mathematics curriculum at your campus and any effects you believe the MIC pilot program is having on teacher effectiveness.

- 5. What other mathematics programs exist currently at your school that teachers and/or students could have participated in?
- 6. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far as part of the MIC pilot program affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

- 7. In what ways, if any, has the coaching that the mathematics teachers have received thus far as part of the MIC pilot program affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on student outcomes.

8. What effects, if any, have you seen thus far on student academic performance in mathematics as a result of their teachers participating in the MIC pilot program?
 - a) Anything specific they learned in professional development or coaching activities to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

9. What effects, if any, have you seen thus far on student dropout rates as a result of mathematics teachers participating in the MIC pilot program?
 - a) Anything specific they learned in professional development or coaching activities to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn any plans for the sustainability of this program beyond the grant funding period.

10. Do you envision continuing this mathematics coaching program at your campus once grant funding ends?
 - a) If yes:
 - v. How will you continue to run the program (where will funding come from)?
 - vi. What changes would you make to the program?
 - b) If no:
 - vii. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program at your school?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Teacher Focus Group Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You all were selected to participate in this focus group because you all were identified as the mathematics teachers participating in the MIC pilot program. We would like to take this opportunity to speak with you all to obtain information about your experiences with the MIC pilot program at this campus. This session should last approximately 60 minutes, and we ask that you review and sign the participant informed consent form before we proceed. Although some of you may have different perspectives, we are interested in all perceptions. We ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group.

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your backgrounds and teaching experiences, the demographics/characteristics of the students you teach mathematics to, and your perspectives on the implementation of the MIC pilot program.

1. Let's go around the table and have each of you tell me a little about yourself, including your position/title, what grades/courses you teach, how long you have been teaching mathematics, how long you have been teaching at your current campus, your certification, and the highest degree you have received.
2. How would each of you characterize the students to whom you teach mathematics (e.g., grade level(s), socioeconomic status, risk factors)?
3. How would each of you describe the MIC pilot program in terms of:
 - a) The goals of the program?
 - b) Who provides the program activities?

Section 2

Next, I would like to learn about the professional development (PD) and coaching activities that each of you have participated in and what effects, if any, you feel they've had on your teaching.

4. Please describe the format (e.g., one on one or small groups) and duration (e.g., daily, once a month) of professional development (PD) activities in which you have participated as part of the MIC pilot program, as well as the content (e.g., number sense) covered through these activities.
 - a) What format, duration, and content of these PD activities have been most helpful? Why?
 - b) What format, duration, and content of these PD activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these PD activities? Why?
5. What has each of your attendance been like at the professional development (PD) activities?
 - a) How many PD activities have each of you attended?
 - b) Are you all receiving a stipend?
 - i. If yes, is it a motivating factor for participating?
 - ii. If no, would it be helpful to have received one?
6. To what extent, if any, have the professional development activities in which each of you participated thus far affected the following:
 - a) Your beliefs about teaching mathematics?
 - b) Your sense that you can make a difference in your students' learning of mathematics?
 - c) Your mathematics content knowledge?
 - d) Your instructional techniques?
 - e) Your usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?
7. Please describe the format and duration of coaching activities that each of you have participated in/received as part of the MIC pilot program, as well as the content covered through these activities.
 - a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been most helpful? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?

8. What has been each of your level of participation in coaching activities?
 - a) How often do each of you meet with a mathematics coach?
9. To what extent, if any, has the coaching that each of you have participated in thus far affected the following:
 - a) Your beliefs about teaching mathematics?
 - b) Your sense that you can make a difference in your students' learning of mathematics?
 - c) Your mathematics content knowledge?
 - d) Your instructional techniques?
 - e) Your usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. What factors, if any, have helped facilitate each of your participation in the MIC pilot program?
11. What challenges, if any, have each of you experienced while participating in this program? How have you overcome these challenges?
12. Do any administrators from your school/this district participate in any of the professional development or coaching activities?
 - a) If yes:
 - i. What do they do?
 - ii. What has the experience been like for each of you to have your superior present in the trainings/coaching?

Section 3

Next, I would like to learn about the impact the MIC pilot program has had on your students.

13. What effects, if any, have each of you seen thus far on your students' academic performance in mathematics as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?
14. What effects, if any, have each of you seen thus far on your students' dropout rates as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

15. Do each of you believe this mathematics coaching program should continue once funding ends?

- a) If yes:
 - i. Why?
 - ii. What changes would you make to the program?

- b) If no:
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Coaches Focus Group Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this focus group because you were identified as the mathematics coaches participating in the MIC pilot program. We would like to take this opportunity to speak with you to obtain information about your experiences with the MIC pilot program in this district. This session should last approximately 60 minutes, and we ask that you review and sign the participant informed consent form before we proceed. Although some of you may have different perspectives, we are interested in all perceptions. We also ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group.

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your coaching experiences and discuss the goals and components of the MIC pilot program.

1. Let's go around the table and have each of you tell me about yourself, including your position/title, the number of years of teaching experience you have, your certification, your role in the MIC program, and how long you have been working with the Approved Service Provider (ASP) on the MIC pilot program.
2. Please provide a brief overview of the MIC pilot program in your district. How would each of you describe the program in terms of:
 - a) The goals of the program?
 - b) Your role in the provision of these activities?
 - c) Other individuals who provide these activities?
3. What barriers, if any, have each of you experienced as a coach in the implementation of this MIC pilot program? How have you overcome these barriers?
4. What factors, if any, have helped each of you as a coach in the implementation of the MIC pilot program?

Section 2

Next, I would like to learn more about the coaching activities provided and what effects, if any, you feel they have had on the mathematic teachers participating in the MIC pilot program.

5. Please describe the format and duration of coaching activities that you have provided to the mathematics teachers for the MIC pilot program, as well as the content covered through these activities.
 - a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have been well received by participating teachers? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have not been well received by participating teachers? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?

6. How would each of you describe the teachers' level of participation in coaching activities?
 - a) What can you tell me about the amount and duration of the coaching activities?
 - b) To what extent do the teachers seem to be actively engaged in these activities?
 - c) Are administrators present during these activities?
 - i. If yes, what is that experience like? That is, is it helpful or problematic to have them participate with the teachers?

7. In what ways, if any, do each of you think the coaching that you have provided thus far has affected the following:
 - d) Participating teachers' beliefs about teaching mathematics?
 - a) Participating teachers' sense that they can make a difference in their students' learning of mathematics?
 - b) Participating teachers' content knowledge?
 - c) Participating teachers' instructional strategies?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 3

Next, I would like to learn about the effects, if any, that the MIC pilot program has had on students whose teachers are participating in the MIC pilot program.

8. What effects, if any, do each of you know of thus far on student academic performance in mathematics as a result of their teacher's participation in the MIC pilot program?
 - a) Was there something specific that happened to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

9. What effects, if any, do each of you know of thus far on other measures of student success (e.g., retention, course completion, promotion, graduation) as a result of their teachers' participation in the MIC pilot program?
 - a) Was there something specific that happened to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

10. Do each of you believe this mathematics coaching program should continue once grant funding ends?
 - a) If yes:
 - i. Why?
 - ii. What changes, if any, would you make to the program?
 - b) If no,
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

**Appendix B:
MIC 2010 Cycle 1 Return Site Visit Interview Protocols and
Focus Group Protocols**

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Grant Coordinator Interview Protocol – Cycle 1 Return Visit

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are the grant coordinator for the district we are revisiting. We originally visited this district in the spring of 2009 and now are doing a follow-up. We would like to take this opportunity to speak with you to obtain information about the MIC pilot program at this district. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

Grant Coordinator Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as gather information about the implementation of your MIC program.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?

Probe: Have the characteristics of the teachers changed at all over the last year?

2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?

Probe: Have the characteristics of the students changed at all over the last year?

3. Please provide a brief overview of the components you are providing to the MIC pilot program in this district. Please provide more detail about:
 - a) The types of activities being implemented.
 - b) The role of your Approved Service Provider (ASP) (i.e., What services is your ASP providing?).
 - c) Your district's interaction/relationship with the ASP for the MIC pilot program.

Probe: Have any of these changed in the last year? In what ways?

4. Are there any new barriers you have encountered since the interview last year (Spring 2009)? How have you overcome these barriers?
5. Are there any new factors, since the interview last year (Spring 2009), helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, records that you keep, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teacher effectiveness.

6. Do you keep attendance records of teacher participation in professional development or coaching activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain this information?
 - b) If no, is there a way to collect this information?

Probe: Has your record keeping changed at all in the last year?

7. Do you assess students' and/or teachers' content knowledge as part of the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, do you plan to collect this information?

Probe: What types of assessments do you use/plan to use? Have your assessment methods changed at all in the past year?

8. Are there currently any other mathematics programs in this district that teachers and/or students could participate in? *Probe: What are they?*

9. Have the professional development activities in which the mathematics teachers participated affected: *Probe: In what ways?*

- a) Their beliefs about teaching mathematics?
- b) Their sense that they can make a difference in their students' learning of mathematics?
- c) Their mathematics content knowledge?
- d) The instructional strategies they implement in their classes?
- e) Their usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

10. Has the coaching that the mathematics teachers have received affected: *Probe: In what ways?*

- a) Their beliefs about teaching mathematics?
- b) Their sense that they can make a difference in their students' learning of mathematics?
- c) Their mathematics content knowledge?
- d) The instructional strategies they implement in their classes?
- e) Their usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

11. Do any district or campus administrators participate in any of the professional development or coaching activities?

- a) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Probe: Have there been any changes in administrator participation since last year (Spring 2009)?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

12. Have the professional development activities in which the mathematics teachers participated affected their students in terms of: *Probe: In what ways?*

- a) Students' preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes in rates or procedures since we visited last year?

13. Has the coaching that the mathematics teachers have received affected their students in terms of: *Probe: In what ways?*

- a) Students' Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes in rates or procedures since we visited last year?

Section 4

Lastly, I would like to learn about possible plans for sustainability of this program beyond the grant funding period.

14. Do you envision continuing this mathematics coaching program once funding ends?

a) If yes:

- i. How will you continue to run the program (where will funding come from)?
- ii. What changes would you make to the program?

b) If no:

- iii. What are the reasons for not continuing the program?

Probe: Have your thoughts about this changed in the past year?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Approved Service Provider Interview Protocol– Cycle 1 Return Visit

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are a representative of the Approved Service Provider working with the MIC grantee that we are visiting. We would like to take this opportunity to speak with you to obtain more detailed information about the MIC pilot program at this district. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

ASP Representative Name(s):

District:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your staff, as well as to gather more information about the implementation of the MIC program in this district.

1. How would you characterize the teachers and coaches served through the MIC pilot program in this district (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?
Probe: Have any characteristics changed since we visited you last year, in 2009?
2. How would you characterize the students who are taught by the mathematics teachers participating in the MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)? *Probe: Have any characteristics changed since we visited you last year, in 2009?*
 - a) Please provide a brief overview of the components you are providing to the MIC pilot program in this district. Please describe:
 - b) The roles/responsibilities your staff has with the MIC pilot program.
 - c) The types of activities your staff is implementing.
 - d) Your staff's interaction/relationship with the district for the MIC pilot program.

Probe: Have any components changed since we visited you last year, in 2009?

3. Are there any new barriers to implementation you have encountered since we interviewed you last year? How have you overcome these barriers?
4. Are there any new factors helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teachers.

5. Do you keep attendance rates of teacher participation in professional development activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?

Probe: Have there been any changes in these procedures since we visited last year?

6. Have the professional development activities in which the mathematics teachers participated affected: Probe: In what ways?
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

7. Do you keep attendance rates of teacher participation in coaching activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?

8. Has the coaching that the mathematics teachers have received affected: Probe: In what ways?

- a) Their beliefs about teaching mathematics?
- b) Their sense that they can make a difference in their students' learning of mathematics?
- c) Their mathematics content knowledge?
- d) The instructional strategies they implement in their classes?
- e) Their usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

9. Do any district or campus administrators participate in any of the professional development or coaching activities?

- a) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Probe: Have there been any changes in administrator participation since last year?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

10. Do you think the professional development activities in which the mathematics teachers participated have affected their students in terms of the: *Probe: In what ways?*

- a) Students' preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes in rates or procedures since we visited last year?

11. Do you think the coaching that the mathematics teachers have received has affected their students in terms of:

- a) Students' preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes in rates or procedures since we visited last year?

Section 4

Lastly, I would like to learn about possible plans for sustainability of the program beyond the grant funding period.

12. Has anyone from the district discussed continuing the MIC program with your organization once grant funding ends?

- a) If yes,
 - i. How will the program continue?
 - ii. What changes would you make to the program?
- b) If no,
 - iii. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Principal Interview Protocol - Cycle 1 Return Visit

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because teachers from your school are participating in the MIC pilot program in your district. We visited your district in the spring of 2009, and your district was selected to be revisited this year, during the second year of the grant. We would like to take this opportunity to speak with you to obtain your perspective on the MIC pilot program in which teachers from your school are participating. This interview should take approximately 45 minutes, and we ask that you review and sign the participant informed consent form before we proceed.

Do you have any questions before we begin?

Principal's Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as to gather more information about the implementation of the MIC program at your campus and your level of participation.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have MIC teachers participated in the activities you have implemented? Has participation differed across grade levels? How so?

Probe: Have there been any changes in these characteristics over the last year (since spring 2009)? Please describe.

2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?

Probe: Have there been any changes in these characteristics over the last year (since spring 2009)? Please describe.

3. Please describe the MIC program in terms of:
 - a) The types of activities being implemented
 - b) The role of your Approved Service Provider (ASP)—what services is your ASP providing? (Note to Interviewer – Please record the name of the ASP)

Probe: Have there been any changes in these activities over the last year (since spring 2009)? Please describe.

4. What is your level of participation in the MIC pilot program? That is, do you attend the professional development seminars and/or the coaching sessions?
 - a) If you do participate in these activities,
 - i. How often?
 - ii. In what ways and to what extent do you support the program?
 - iii. What is your impression of these activities?
 - iv. In what ways are the activities helpful to the teachers and ultimately the students?
 - v. How do the teachers feel about their superiors attending the trainings with them?
 - vi. What if anything needs to be done differently/revised?

Probe: Has your level of participation or other aspects of your participation changed over the past year (since spring 2009)?

Section 2

5. Are there currently any mathematics programs at your school that teachers and/or students could participated in? Probe: If yes, What are they?

Next, I would like to learn about the effects the MIC pilot program is having on teacher effectiveness.

6. In what ways have the professional development activities that are a part of the MIC pilot program affected
 - a) Teachers' beliefs about teaching mathematics?
 - b) Teachers' sense that they can make a difference in their students' learning of mathematics?
 - c) Teachers' mathematics content knowledge?
 - d) The instructional strategies they implement in their classes?
 - e) Their usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

7. In what ways, has the coaching that is part of the MIC pilot program affected
- Teachers' beliefs about teaching mathematics?
 - Teachers' sense that they can make a difference in their students' learning of mathematics?
 - Teachers' mathematics content knowledge?
 - The instructional strategies they implement in their classes?
 - Their usage of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on student outcomes.

8. Have you seen any effects on student academic performance in mathematics as a result of the MIC pilot program? *Probe: In what ways?*
- Anything specific that teachers learned in professional development or coaching activities to which you attribute this change?
 - What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Probe: Have there been any particular changes over the past year, since spring 2009?

9. Have you seen any effect on student dropout rates as a result of the MIC pilot program? *Probe: In what ways?*
- Anything specific that teachers learned in professional development or coaching activities to which you attribute this change?
 - What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Probe: Have there been any particular changes over the past year, since spring 2009?

Section 4

Lastly, I would like to learn any plans for the sustainability of this program beyond the grant funding period.

10. Do you envision continuing this mathematics coaching program at your campus once grant funding ends?

a) If yes:

- i. How will you continue to run the program (where will funding come from)?
- ii. What changes would you make to the program?

b) If no:

- iii. What are the reasons for not continuing the program?

Probe: Have there been any changes in your thinking over the past year, since spring 2009?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program at your school?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Teacher Focus Group Protocol – Cycle 1 Return Visit

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You all were selected to participate in this focus group because you all were identified as the mathematics teachers participating in the MIC pilot program. We would like to take this opportunity to speak with you all to obtain information about your experiences with the MIC pilot program at this campus. This session should last approximately 60 minutes, and we ask that you review and sign the participant informed consent form before we proceed. Although some of you may have different perspectives, we are interested in all perceptions. We ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group.

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your backgrounds and teaching experiences, the demographics/characteristics of the students you teach mathematics to, and your perspectives on the implementation of the MIC pilot program.

1. Let's go around the table and have each of you tell me a little about yourself, including your position/title, what grades/courses you teach, how long you have been teaching mathematics, how long you have been teaching at your current campus, your certification, and the highest degree you have received.

Probe: How long have each of you participated in the MIC program? Is this your first year or second year?

2. How would each of you characterize the students to whom you teach mathematics (e.g., grade level(s), socioeconomic status, risk factors)?

Probe: For those of you in your second year of the program, have you seen any changes in the characteristics of the students over this period?

3. How would each of you describe the MIC pilot program in terms of:
 - a) The goals of the program?
 - b) Who provides the program activities?

Probe: Have there been any changes in either the goals or providers since the program was started?

Section 2

Next, I would like to learn about the professional development (PD) and coaching activities that each of you have participated in and what effects, if any, you feel they've had on your teaching.

4. Please describe the format (e.g., one on one or small groups) and duration (e.g., daily, once a month) of professional development (PD) activities in which you have participated as part of the MIC pilot program, as well as the content (e.g., number sense) covered through these activities.
 - a) What format, duration, and content of these PD activities have been most helpful? Why?
 - b) What format, duration, and content of these PD activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these PD activities? Why?

Probe: For those of you who have been in the program more than one year, have there been any changes in the format, duration, or content since the program began?

5. What has each of your attendance been like at the professional development (PD) activities?
 - a) How many PD activities have each of you attended?
 - b) Are you all receiving a stipend?
 - i. If yes, is it a motivating factor for participating?
 - ii. If no, would it be helpful to have received one?

Probe: For those of you who have been in the program more than one year, have there been any differences between years one and two?

6. To what extent, if any, have the professional development activities in which each of you participated thus far affected the following:
- a) Your beliefs about teaching mathematics?
 - b) Your sense that you can make a difference in your students' learning of mathematics?
 - c) Your mathematics content knowledge?
 - d) Your instructional strategies that you use in the classroom?
 - e) Your usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

7. Please describe the format and duration of coaching activities that each of you have participated in/received as part of the MIC pilot program, as well as the content covered through these activities.
- a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been most helpful? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?

Probe: For those of you who have been in the program more than one year, have there been any changes in the format, duration, or content since the program began?

8. What has been each of your level of participation in coaching activities?
- a) How often do each of you meet with a mathematics coach?

Probe: For those of you who have been in the program more than one year, has your level of participation changed from one year to the next?

9. To what extent, if any, has the coaching that each of you have participated in thus far affected the following:

- a) Your beliefs about teaching mathematics?
- b) Your sense that you can make a difference in your students' learning of mathematics?
- c) Your mathematics content knowledge?
- d) Your instructional strategies that you use in the classroom?
- e) Your usage of assessments and/or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Probe: Have there been any changes over the past year, since spring 2009?

10. What factors, if any, have helped facilitate each of your participation in the MIC pilot program?

Probe: For those of you who have been in the program more than one year, have the factors changed over time?

11. What challenges, if any, have each of you experienced while participating in this program? How have you overcome these challenges?

Probe: For those of you who have been in the program more than one year, have the challenges changed over time?

12. Do any administrators from your school/this district participate in any of the professional development or coaching activities?

- a) If yes:
 - i. What do they do?
 - ii. What has the experience been like for each of you to have your superior present in the trainings/coaching?

Probe: For those of you who have been in the program more than one year, has administrator participation changed over time?

Section 3

Next, I would like to learn about the impact the MIC pilot program has had on your students.

13. What effects, if any, have each of you seen thus far on your students' academic performance in mathematics as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

14. What effects, if any, have each of you seen thus far on your students' dropout rates as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

15. Do each of you believe this mathematics coaching program should continue once funding ends?
 - a) If yes:
 - i. Why?
 - ii. What changes would you make to the program?
 - b) If no:
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Coaches Focus Group Protocol – Cycle 1 Return Visit

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this focus group because you were identified as the mathematics coaches participating in the MIC pilot program. We would like to take this opportunity to speak with you to obtain information about your experiences with the MIC pilot program in this district. This session should last approximately 60 minutes, and we ask that you review and sign the participant informed consent form before we proceed. Although some of you may have different perspectives, we are interested in all perceptions. We also ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group.

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your coaching experiences and discuss the goals and components of the MIC pilot program.

1. Let's go around the table and have each of you tell me about yourself, including your position/ title, the number of years of teaching experience you have, your certification, your role in the MIC program, and how long you have been working with the Approved Service Provider (ASP) on the MIC pilot program.

Probe: How long have each of you participated in the MIC program? Is this your first year or second year?

2. Please provide a brief overview of the MIC pilot program in your district. How would each of you describe the program in terms of:
 - a) The goals of the program?
 - b) Your role in the provision of these activities?
 - c) Other individuals who provide these activities?

Probe: Have there been any changes in either the goals or providers since the program was started?

3. What barriers, if any, have each of you experienced as a coach in the implementation of this MIC pilot program? How have you overcome these barriers?

Probe: For those of you who have been in the program more than one year, have the challenges changed over time?

4. What factors, if any, have helped each of you as a coach in the implementation of the MIC pilot program?

Probe: For those of you who have been in the program more than one year, have the factors changed over time?

Section 2

Next, I would like to learn more about the coaching activities provided and what effects, if any, you feel they have had on the mathematic teachers participating in the MIC pilot program.

5. Please describe the format and duration of coaching activities that you have provided to the mathematics teachers for the MIC pilot program, as well as the content covered through these activities.
 - a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have been well received by participating teachers? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have not been well received by participating teachers? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?

Probe: For those of you who have been in the program more than one year, have there been any changes in the format, duration, or content since the program began?

6. How would each of you describe the teachers' level of participation in coaching activities?
 - a) What can you tell me about the amount and duration of the coaching activities?
 - b) To what extent do the teachers seem to be actively engaged in these activities?
 - c) Are administrators present during these activities?
 - i. If yes, what is that experience like? That is, is it helpful or problematic to have them participate with the teachers?

Probe: For those of you who have been in the program more than one year, have there been any changes in teacher participation over time?

7. In what ways, if any, do each of you think the coaching that you have provided thus far has affected the following:
- Participating teachers' beliefs about teaching mathematics?
 - Participating teachers' sense that they can make a difference in their students' learning of mathematics?
 - Participating teachers' content knowledge?
 - Participating teachers' instructional strategies?
 - Participating teachers' use of assessments and/ or assessment data?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 3

Next, I would like to learn about the effects, if any, that the MIC pilot program has had on students whose teachers are participating in the MIC pilot program.

8. What effects, if any, do each of you know of thus far on student academic performance in mathematics as a result of their teacher's participation in the MIC pilot program?
- Was there something specific that happened to which you attribute this change?
 - What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?
9. What effects, if any, do each of you know of thus far on other measures of student success (e.g., retention, course completion, promotion, graduation) as a result of their teachers' participation in the MIC pilot program?
- Was there something specific that happened to which you attribute this change?
 - What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

10. Do each of you believe this mathematics coaching program should continue once grant funding ends?
 - a) If yes:
 - i. Why?
 - ii. What changes, if any, would you make to the program?
 - b) If no,
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

**Appendix C:
MIC 2009 Cycle 1 Site Visit Interview Protocols and
Focus Group Protocols**

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Grant Coordinator Interview Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are the grant coordinator we interviewed in December 2008/January 2009. We would like to take this opportunity to speak with you to obtain information about the MIC pilot program at this district. This interview should take no more than 45 minutes, and we ask for your permission to record the conversation for note-taking purposes to ensure accuracy in reporting. Your answers will be kept confidential, with no individual identifying information revealed. Is it okay to record the interview? (Refer to confidentiality form and ask them to read and sign the form.)

Do you have any questions before we begin?

Grant Coordinator Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as gather information about the implementation of your MIC program.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have teachers at each grade level being served participated in the various types of activities you have implemented so far?
2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. During the phone interview in December/January, you provided a brief overview of the components you are providing to the MIC pilot program in this district. Please describe more detail about:
 - a) The types of activities being implemented.
 - b) The role of your Approved Service Provider (ASP) (i.e., What services is your ASP providing?).
 - c) Your district's interaction/relationship with the ASP for the MIC pilot program.
4. Are there any new barriers you have encountered since the December/January interview? How have you overcome these barriers?

5. Are there any new factors helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, records that you keep, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teacher effectiveness.

6. Do you keep attendance records of teacher participation in professional development or coaching activities related to the MIC pilot program?
- a) If yes, is there a way for us to obtain this information?
 - b) If no, is there a way to collect this information?
7. Do you assess students' and/or teachers' content knowledge as part of the MIC pilot program?
- a) If yes, is there a way for us to obtain that information?
 - b) If no, do you plan to collect this information?
8. What other mathematics programs exist currently in this district that teachers and/or students could have participated in?
9. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected the following:
- a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected the following:
- a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

11. Do any district or campus administrators participate in any of the professional development or coaching activities?
- a) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

12. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected their students in terms of the following:

- a) Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

13. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected their students in terms of following:

- a) Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 4

Lastly, I would like to learn about possible plans for sustainability of this program beyond the grant funding period.

14. Do you envision continuing this mathematics coaching program once funding ends?

- a) If yes:
 - i. How will you continue to run the program (where will funding come from)?
 - ii. What changes would you make to the program?
- b) If no:
 - iii. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Approved Service Provider Interview Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because you are the Approved Service Provider representative that we interviewed in December 2008/January 2009. We would like to take this opportunity to speak with you to obtain more detailed information about the MIC pilot program at this district. This interview should take no more than 45 minutes, and we ask for your permission to record the conversation for note-taking purposes to ensure accuracy in reporting. Your answers will be kept confidential, with no individual identifying information revealed. Is it okay to record the interview? (Refer to confidentiality form and ask them to read and sign the form.)

Do you have any questions before we begin?

ASP Representative Name(s):

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your staff, as well as to gather more information about the implementation of the MIC program in this district.

1. How would you characterize the teachers and coaches being served through the MIC pilot program in this district (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have teachers at each grade level being served participated in the various types of activities you have implemented so far?
2. How would you characterize the students who are taught by the mathematics teachers participating in the MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. During the phone interview in December/January, you provided a brief overview of the components you are providing to the MIC pilot program in this district. Please describe more detail about:
 - a) The roles/responsibilities your staff has with the MIC pilot program.
 - b) The types of activities your staff is implementing.
 - c) Your staff's interaction/relationship with the district for the MIC pilot program.
4. Are there any new barriers you have encountered since the December/January interview? How have you overcome these barriers?
5. Are there any new factors helping to facilitate the implementation of the MIC pilot program?

Section 2

Next, I would like to learn about level of teacher participation in MIC activities, and other mathematics programs that might already exist in this district, as well as any effects that you believe the MIC pilot program is having on teachers.

6. Do you keep attendance rates of teacher participation in professional development activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?
7. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?
 - d) What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?
8. Do you keep attendance rates of teacher participation in coaching activities related to the MIC pilot program?
 - a) If yes, is there a way for us to obtain that information?
 - b) If no, is there a way to collect this information?
9. In what ways, if any, has the coaching that the mathematics teachers have received thus far affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. Do any district or campus administrators participate in any of the professional development or coaching activities?
 - b) If yes:
 - i. What is their role?
 - ii. What has the experience been like for the teachers to have his or her superior present in the professional development or coaching activities?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on the students of the participating teachers.

11. In what ways, if any, do you think the professional development activities in which the mathematics teachers participated thus far have affected their students in terms of the following:

- a) Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

12. In what ways, if any, do you think the coaching that the mathematics teachers have received thus far has affected their students in terms of following:

- a) Preparation for TAKS?
- b) Student academic achievement?
- c) Dropout rates?
- d) Graduation rates?
- e) Promotion rates?
- f) Course completion rates?
- g) SAT/ACT scores?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 4

Lastly, I would like to learn about possible plans for sustainability of the program beyond the grant funding period.

13. Has anyone from the district discussed continuing the MIC program with your organization once grant funding ends?
 - a) If yes,
 - i. What changes would you make to the program?
 - ii. How will the program continue?
 - b) If no,
 - iii. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Principal/Campus Administrator Interview Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this interview because teachers from your school are participating in the MIC pilot program in your district. We would like to take this opportunity to speak with you to obtain your perspective on the MIC pilot program in which teachers from your school are participating. This interview should take no more than 45 minutes, and we ask for your permission to record the conversation for note-taking purposes to ensure accuracy in reporting. Your answers will be kept confidential, with no individual identifying information revealed. Is it okay to record the interview? (Refer to confidentiality form and ask them to read and sign the form.)

Do you have any questions before we begin?

Principal's Name:

Today's Date:

Time:

Section 1

First, I would like to discuss with you the demographics/characteristics of your teachers and students, as well as to gather more information about the implementation of the MIC program at your campus and your level of participation.

1. How would you characterize the teachers being served through your MIC pilot program (e.g., years of teaching experience, grade levels taught, highest degree, professional development needs)?
 - a) To what extent have teachers at each grade level being served participated in the various types of activities you have implemented so far?
2. How would you characterize the students who are taught by the mathematics teachers participating in your MIC pilot program (e.g., grade level(s), socioeconomic status, risk factors)?
3. Please describe the MIC program in terms of:
 - a) The types of activities being implemented
 - b) The role of your Approved Service Provider (ASP)—what services is your ASP providing?

4. What is your level of participation in the MIC pilot program? That is, do you attend the professional development seminars and/or the coaching sessions?
 - a) If you do participate in these activities,
 - i. How often?
 - ii. In what ways and to what extent do you support the program?
 - iii. What is your impression of these activities?
 - iv. In what ways, if any, do you think the activities are helpful to the teachers and ultimately the students?
 - v. How do the teachers feel about their superiors attending the trainings with them?
 - vi. What if anything needs to be done differently/revised?

Section 2

Next, I would like to learn about the overall mathematics curriculum at your campus and any effects you believe the MIC pilot program is having on teacher effectiveness.

5. What other mathematics programs exist currently at your school that teachers and/or students could have participated in?
6. In what ways, if any, have the professional development activities in which the mathematics teachers participated thus far as part of the MIC pilot program affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

7. In what ways, if any, has the coaching that the mathematics teachers have received thus far as part of the MIC pilot program affected the following:
 - a) Their beliefs about teaching mathematics?
 - b) Their sense that they can make a difference in their students' learning of mathematics?
 - c) Their mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 3

Next, I would like to learn about any effects the MIC pilot program has had on student outcomes.

8. What effects, if any, have you seen thus far on student academic performance in mathematics as a result of their teachers participating in the MIC pilot program?
 - a) Anything specific they learned in professional development or coaching activities to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

9. What effects, if any, have you seen thus far on student dropout rates as a result of mathematics teachers participating in the MIC pilot program?
 - a) Anything specific they learned in professional development or coaching activities to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn any plans for the sustainability of this program beyond the grant funding period.

10. Do you envision continuing this mathematics coaching program at your campus once grant funding ends?
 - a) If yes:
 - i. How will you continue to run the program (where will funding come from)?
 - ii. What changes would you make to the program?
 - b) If no:
 - iii. What are the reasons for not continuing the program?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program at your school?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Teacher Focus Group Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You all were selected to participate in this focus group because you all were identified as the mathematics teachers participating in the MIC pilot program. We would like to take this opportunity to speak with you all to obtain information about your experiences with the MIC pilot program at this campus. Although some of you may have different perspectives, we are interested in all perceptions, so we ask that you respect each others' opinions. This session should last about 60 minutes, and we ask for your permission to record the conversation for note-taking purposes to ensure accuracy in reporting. Your answers will be kept confidential, with no individual identifying information revealed. Is there anyone who objects to being recorded? We also ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group. (Refer to confidentiality form and ask them to read and sign the form.)

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your backgrounds and teaching experiences, the demographics/characteristics of the students you teach mathematics to, and your perspectives on the implementation of the MIC pilot program.

1. Let's go around the table and have each of you tell me a little about yourself, including your position/title, how long you have been teaching mathematics, how long you have been teaching at your current campus, your certification, and the highest degree you have received.
2. How would each of you characterize the students to whom you teach mathematics (e.g., grade level(s), socioeconomic status, risk factors)?
3. How would each of you describe the MIC pilot program in terms of:
 - a) The goals of the program?
 - b) Who provides the program activities?

Section 2

Next, I would like to learn about the professional development (PD) and coaching activities that each of you have participated in and what effects, if any, you feel they've had on your teaching.

4. Please describe the format (e.g., one on one or small groups) and duration (e.g., daily, once a month) of professional development (PD) activities in which you have participated as part of the MIC pilot program, as well as the content (e.g., number sense) covered through these activities.
 - a) What format, duration, and content of these PD activities have been most helpful? Why?
 - b) What format, duration, and content of these PD activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these PD activities? Why?
5. What has each of your attendance been like at the professional development (PD) activities?
 - a) How many PD activities have each of you attended?
 - b) Are you all receiving a stipend?
 - i. If yes, is it a motivating factor for participating?
 - ii. If no, would it be helpful to have received one?
6. To what extent, if any, have the professional development activities in which each of you participated thus far affected the following:
 - a) Your beliefs about teaching mathematics?
 - b) Your sense that you can make a difference in your students' learning of mathematics?
 - c) Your mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?
7. Please describe the format and duration of coaching activities that each of you have participated in/received as part of the MIC pilot program, as well as the content covered through these activities.
 - a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been most helpful? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of these coaching activities have been least helpful? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?

8. What has been each of your level of participation in coaching activities?
 - a) How often do each of you meet with a mathematics coach?
9. To what extent, if any, has the coaching that each of you have participated in thus far affected the following:
 - a) Your beliefs about teaching mathematics?
 - b) Your sense that you can make a difference in your students' learning of mathematics?
 - c) Your mathematics content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

10. What factors, if any, have helped facilitate each of your participation in the MIC pilot program?
11. What challenges, if any, have each of you experienced while participating in this program? How have you overcome these challenges?
12. Do any administrators from your school/this district participate in any of the professional development or coaching activities?
 - a) If yes:
 - iii. What do they do?
 - iv. What has the experience been like for each of you to have your superior present in the trainings/coaching?

Section 3

Next, I would like to learn about the impact the MIC pilot program has had on your students.

13. What effects, if any, have each of you seen thus far on your students' academic performance in mathematics as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?
14. What effects, if any, have each of you seen thus far on your students' dropout rates as a result of your participation in the MIC pilot program?
 - a) Was there something specific you were taught (e.g., a skill or information) that you attribute this change to?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

15. Do each of you believe this mathematics coaching program should continue once funding ends?

- a) If yes:
 - i. Why?
 - ii. What changes would you make to the program?

- b) If no:
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?

Mathematics Instructional Coaches (MIC) Pilot Program Evaluation

Coaches Focus Group Protocol

ICF International is working with the Texas Education Agency (TEA) to evaluate the Mathematics Instructional Coaches (MIC) pilot program. You were selected to participate in this focus group because you were identified as the mathematics coaches participating in the MIC pilot program. We would like to take this opportunity to speak with you to obtain information about your experiences with the MIC pilot program in this district. Although some of you may have different perspectives, we are interested in all perceptions, so we ask that you respect each other's opinions. This session should last about 60 minutes, and we ask for your permission to record the conversation for note-taking purposes to ensure accuracy in reporting. Your answers will be kept confidential, with no individual identifying information revealed. Is there anyone who objects to being recorded? We also ask that everyone in this group today keep each other's responses confidential and not share responses with people who are not present in this group. (Refer to confidentiality form and ask them to read and sign the form.)

Does anyone have any questions before we begin?

Names of Participants:

Today's Date:

Time:

Section 1

First, I would like to gather information about your coaching experiences and discuss the goals and components of the MIC pilot program.

1. Let's go around the table and have each of you tell me about yourself, including your position/title, the number of years of teaching experience you have, your certification, your role in the MIC program, and how long you have been working with the Approved Service Provider (ASP) on the MIC pilot program.
2. Please provide a brief overview of the MIC pilot program in your district. How would each of you describe the program in terms of:
 - a) The goals of the program?
 - b) Your role in the provision of these activities?
 - c) Other individuals who provide these activities?
3. What barriers, if any, have each of you experienced as a coach in the implementation of this MIC pilot program? How have you overcome these barriers?
4. What factors, if any, have helped each of you as a coach in the implementation of the MIC pilot program?

Section 2

Next, I would like to learn more about the coaching activities provided and what effects, if any, you feel they have had on the mathematic teachers participating in the MIC pilot program.

5. Please describe the format and duration of coaching activities that you have provided to the mathematics teachers for the MIC pilot program, as well as the content covered through these activities.
 - a) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have been well received by participating teachers? Why?
 - b) What format (e.g., one on one or small groups), duration (e.g., daily, once a month), and content of coaching activities have not been well received by participating teachers? Why?
 - c) What, if anything, would you change about the format, duration, and content of these coaching activities? Why?
6. How would each of you describe the teachers' level of participation in coaching activities?
 - d) What can you tell me about the amount and duration of the coaching activities?
 - e) To what extent do the teachers seem to be actively engaged in these activities?
 - f) Are administrators present during these activities?
 - i. If yes, what is that experience like? That is, is it helpful or problematic to have them participate with the teachers?
7. In what ways, if any, do each of you think the coaching that you have provided thus far has affected the following:
 - a) Participating teachers' beliefs about teaching mathematics?
 - b) Participating teachers' sense that they can make a difference in their students' learning of mathematics?
 - c) Participating teachers' content knowledge?

Probe: What type of evidence/documentation (e.g., anecdotal, pre/post assessments, surveys) do you have for each of these?

Section 3

Next, I would like to learn about the effects, if any, that the MIC pilot program has had on students whose teachers are participating in the MIC pilot program.

8. What effects, if any, do each of you know of thus far on student academic performance in mathematics as a result of their teacher's participation in the MIC pilot program?
 - a) Was there something specific that happened to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

9. What effects, if any, do each of you know of thus far on other measures of student success (e.g., retention, course completion, promotion, graduation) as a result of their teachers' participation in the MIC pilot program?
 - a) Was there something specific that happened to which you attribute this change?
 - b) What type of evidence/documentation do you have of this (e.g., anecdotal, assessments, surveys)?

Section 4

Lastly, I would like to learn about your all of your thoughts as to the sustainability of this program beyond the grant funding period.

10. Do each of you believe this mathematics coaching program should continue once grant funding ends?
 - a) If yes:
 - i. Why?
 - ii. What changes, if any, would you make to the program?
 - b) If no,
 - iii. Why not?

Thank you for your time today. Is there anything else you would like to add about the MIC pilot program in this district?