

## Executive Summary

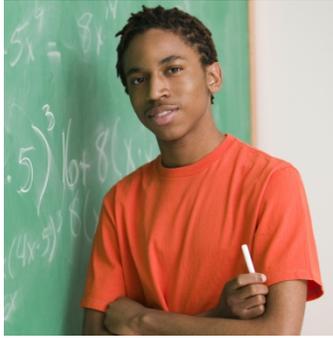
# Evaluation of the Mathematics Instructional Coaches Pilot Program: A High School Success Pilot Program

February 2011 Report

Submitted to:

Texas Education Agency





## **Executive Summary**

# **Evaluation of the Mathematics Instructional Coaches Pilot Program: A High School Success Pilot Program**

**February 2011 Report**

**Submitted to:**

Texas Education Agency

**Submitted by:**

ICF International



# 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  
Email: [info@icfi.com](mailto:info@icfi.com)

## ***Contributing Authors***

Stacey Merola, PhD  
Thomas Horwood  
Allison Nebbergall, PhD  
Kazuaki Uekawa, PhD  
Katerina Passa, PhD  
Amy Mack, PsyD  
Jing Sun, PhD

## ***Other Project Contributors***

Felix Fernandez, PhD  
Jacqueline Schmidt  
Daniel Fien-Helfman  
Jessica DeFeyter  
Kelle Basta  
Robert Leos, PhD

## ***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<sup>©</sup> Notice The materials are copyrighted<sup>©</sup> trademarked<sup>™</sup> 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; phone: 512-463-9270 or 512-936-6060; email: [copyrights@tea.state.tx.us](mailto:copyrights@tea.state.tx.us).

Texas Assessment of Knowledge and Skills<sup>™</sup> (TAKS<sup>™</sup>) is a registered trademark of the Texas Education Agency. Other product and company names mentioned in this report may be the trademarks of their respective owners.

Citation:

Merola, S., Horwood, T., Nebbergall, A., Uekawa, K., Passa, K., Mack, A., & Sun, J. (2011). *Evaluation of the Mathematics Instructional Coaches Pilot Program: A High School Success Pilot Program, February 2011 Report*. Fairfax, VA: ICF International.

This report is available at the Texas Education Agency's website:  
[http://www.tea.state.tx.us/index2.aspx?id=2914&menu\\_id=949](http://www.tea.state.tx.us/index2.aspx?id=2914&menu_id=949)

# Table of Contents

Executive Summary .....	v
MIC Goals .....	vi
MIC Evaluation .....	vi
MIC Grantees .....	vii
Overview of Methods .....	vii
MIC Implementation Findings: Cycle 1 and Cycle 2 .....	ix
Teacher Effectiveness Findings: Cycle 1 and Cycle 2 .....	ix
Findings from the Student Outcomes Analyses: Cycle 1 .....	x
Findings from the Student Outcomes Analyses: Cycle 2 .....	x
Findings from Cost and Sustainability Analyses .....	xi
Conclusions and Next Steps for MIC .....	xi

# Table of Tables

Table ES-1: MIC Cycle 1 and Cycle 2 Grantees .....	viii
--	------



## Executive Summary

### **Highlights:**

- The purpose of the Mathematics Instructional Coaches (MIC) pilot program is to provide eligible grantees with assistance in developing the content knowledge and instructional expertise of math teachers at the middle school, junior high school, or high school level as a way to improve college and workforce readiness of students.
- 62 MIC grantees have received \$6.2 million to create math coaching programs. Between 2008 and 2010, 2,018 teachers, coaches, and administrators participated in the program. The average cost per teacher in MIC Cycle 1 program was \$6,971, which translates to an average cost of \$131 per student served by a MIC teacher in Cycle 1 grantee schools.
- Newer teachers from both MIC Cycle 1 and Cycle 2 grantees, as compared to more veteran teachers, were more likely to report that the program was beneficial for them.
- In both the Cycle 1 middle schools and high schools, MIC participation was associated with increases in student TAKS-Math achievement. Students who were exposed to MIC teachers for longer periods of time experienced greater achievement gains, indicating that the effects of the program may be cumulative.
- In Cycle 2, MIC participation was associated with TAKS-Math achievement gains for middle school students after one year of participation.

This evaluation report presents findings from the first two years of the evaluation of the Mathematics Instructional Coaches (MIC) pilot program, which is one of three grant programs grouped together as the High School Success Pilot Programs (HSSPP) administered by the Texas Education Agency (TEA). The other two programs are the Intensive Summer Programs (ISP) pilot program and the Collaborative Dropout Reduction (CDR) pilot program, for which separate reports have been published simultaneously. Collectively, these three programs were initially authorized by the 80<sup>th</sup> Texas Legislature in 2007<sup>1</sup> so districts could develop and implement programs to prevent and reduce dropout, increase high school success, and improve college and workforce readiness in public schools (TEA & ICF, 2010).

MIC provides 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 these public schools. This is done by offering professional development (PD) and coaching activities for teachers, as well as instructional leadership training for administrators.

---

<sup>1</sup> All three HSSPP programs were authorized by House Bill 2237 (80<sup>th</sup> Texas Legislature), as amended by the 81<sup>st</sup> Texas Legislature. Specifically, MIC was authorized as Texas Education Code §21.4541. All three programs were funded by Rider 53 (General Appropriations Act [GAA], Article III, 80<sup>th</sup> Texas Legislature); further funded by Rider 51 (GAA, Article III, 81<sup>st</sup> Texas Legislature). The evaluation is required by Rider 79 (GAA, Article III, 80<sup>th</sup> Texas Legislature); further required by Rider 69 (GAA, Article III, 81<sup>st</sup> Texas Legislature). A final report will be due to the Texas Legislature in January 2013, pending further funding.

## MIC Goals

The purpose of MIC is to have grantees plan, design, and implement research-based projects to support the improvement of secondary math teachers' content knowledge and instructional expertise. Ultimately, MIC is designed to improve math teachers' abilities to increase academic performance in math for students identified as being at risk of dropping out of school.<sup>2</sup> Specifically, grantees must institute a rigorous and engaging PD program, which includes using models of excellence in coaching math teachers. In addition, the projects must address the improvement of school leaders' knowledge of math instruction.

## MIC Evaluation

TEA contracted with ICF International to conduct an evaluation of MIC. The comprehensive evaluation approach was designed to address the following objectives:

- To describe and evaluate the implementation of MIC
- To evaluate the impact of MIC on teacher effectiveness
- To evaluate the impact of MIC on student outcomes
- To determine the cost-effectiveness and sustainability of MIC

This evaluation report is designed to provide evaluation findings for MIC Cycle 1 grantees after completing two years in the program, and a detailed accounting of evaluation findings to date of the MIC Cycle 2 grantees who completed their first year in the program in 2009–10. Cost-effectiveness/sustainability findings for Cycle 1 and Cycle 2 grantees, which include a comparison of budgeted funds to expenditures, are also presented. Cycle 1 grantees completed their grant period in 2009–10, so this report presents the final cost-effectiveness/sustainability findings for these grantees. Although none of the MIC grantees have all outcome data available at the time this report was written, the report provides preliminary evidence of implementation effectiveness, improved math teacher content and instructional knowledge, and progress toward grant program outcomes for Cycle 1 and Cycle 2 grantees. Lastly, using a dataset in which MIC teachers were matched to the students enrolled in their math courses, this report presents the impact of MIC on student math achievement, dropout rates, graduation rates, promotion rates, course completion rates, and college readiness for Cycle 1 grantees. For Cycle 2 grantees, this second report includes student math achievement and college readiness outcomes.

*"For me, especially since it's my first year, she may be the sole reason I've survived. I met with her weekly, sometimes more than that if I had a question, I'd meet with her. Before school, after school, during lunch, if I had a question I'd run up and ask her. We met at least once a week after school just to go over lesson plans and different techniques on how to teach things. Little tricks that she knew that she would teach me so I could help the kids with that. She came in my room several times to observe and give me tips and things on how to change things and what I was doing well. She was very helpful and always available."*

– High school teacher talking about her relationship with the math coach

---

<sup>2</sup> 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](#).

## MIC Grantees

Between 2008 and 2010, 62 grantees implemented MIC. Cycle 1 consisted of 29 grantees that implemented a variety of PD and coaching activities for participating teacher and administrators commencing during the 2008–09 school year and ending in the 2009–10 school year. There are 33 MIC Cycle 2 grantees that implemented a variety of PD and coaching activities for participating teachers and administrators during the 2009–10 school year. MIC grants were awarded throughout most of Texas, with Cycle 1 grantees from 14 of the 20 education service center (ESC) regions and Cycle 2 grantees dispersed among 12 of the 20 ESC regions. A total of 241 campuses from the 62 grantees participated in MIC grant activities. MIC Cycle 1 and Cycle 2 grantees are listed in Table ES-1.

*“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

## Overview of Methods

In order to evaluate MIC, data were collected from multiple sources. Data provided by TEA included MIC Grant Applications, Academic Excellence Indicator Systems (AEIS) longitudinal Texas school and district data; Public Education Information Management Systems (PEIMS) longitudinal data on teachers, schools, and districts in Texas; Texas Assessment of Knowledge and Skills (TAKS) student achievement data in math (TAKS-Math); and MIC teacher participant grantee uploads that included data on levels of teacher participation in MIC activities. Student roster data from classes taught by MIC teachers were also collected by TEA from participating grantees in order to match teachers and students.<sup>3</sup>

Data collection activities carried out by the evaluation team included site visits to select campuses participating in MIC where stakeholder interviews and focus groups were conducted. All grantees were also asked to submit progress and expenditure reports. Finally, surveys with MIC teacher participants, MIC coaches, and Approved Service Provider (ASP) representatives were conducted.

Using both the extant data and new data collected by the evaluation team, analyses were conducted to assess the relationship between MIC and student performance on TAKS-Math, math course completion, college readiness, promotion, graduation, and dropout. Survey and site visit data were used to investigate teachers’ perceptions of their effectiveness after participating in MIC. Similarly, survey and site visit data were used to explore the implementation of MIC and how it may have changed between 2008 and 2010, and across Cycle 1 and Cycle 2. Finally, grantee expenditure data were analyzed to determine the cost-effectiveness of MIC.

<sup>3</sup> ICF received only de-identified student-level data.

**Table ES-1  
MIC Cycle 1 and Cycle 2 Grantees**

Cycle 1 Grantees (N=29)	Cycle 2 Grantees (N=33)
Alice ISD	Abilene ISD
Beeville ISD	America Can!
Clarksville ISD	Athens ISD
Covington ISD	Ben Bolt-Palito Blanco ISD
Diboll ISD	Chapel Hill ISD
El Paso ISD	Corsicana ISD
Evolution Academy Charter School	Cosmos Foundation Inc (Harmony)
Galena Park ISD	Dawson ISD <sup>b</sup>
Galveston ISD	Del Valle ISD
Hidalgo ISD	East Central ISD
Higgs Carter King Gifted & Talented Charter (Youth Empowerment Program)	Elgin ISD
Houston ISD	Everman ISD
Irving ISD	Gladewater ISD
La Feria ISD	Goose Creek CISD
La Joya ISD	Hillsboro ISD
La Vega ISD	IDEA Academy Inc
La Villa ISD	Kingsville ISD
Manor ISD	Laredo ISD
Marlin ISD	Longview ISD <sup>c</sup>
Motley County ISD <sup>a</sup>	Marshall ISD
Pharr-San Juan-Alamo ISD	McAllen ISD
Runge ISD	McGregor ISD
San Antonio ISD	Mercedes ISD
San Felipe-Del Rio CISD	Mt Pleasant ISD
Star ISD	Pasadena ISD
Valley View ISD	Patton Springs ISD <sup>d</sup>
Weslaco ISD	Plainview ISD
West Oso ISD	San Benito CISD
Winfree Academy Charter Schools	School of Excellence in Education
	Snook ISD <sup>e</sup>
	Tyler ISD
	Waco ISD
	West Sabine ISD

Source: MIC Cycle 1 Grant Applications; Implementation Interviews; MIC Cycle 2 Grant Applications and Action Plans

<sup>a</sup> Motley County ISD formed a Shared Services Agreement (SSA) with the following districts for their grant: Floydada ISD, Littlefield ISD, Lorenzo ISD, Morton ISD, O'Donnell ISD, Olton ISD, Paducah ISD, Seagraves ISD, and Roosevelt ISD.

<sup>b</sup> Dawson ISD formed a SSA with Kopperl ISD and Malone ISD for their grant.

<sup>c</sup> Longview ISD did not implement MIC.

<sup>d</sup> Patton Springs ISD formed a SSA with Crosbyton ISD and Ralls ISD for their grant.

<sup>e</sup> Snook ISD formed a SSA with Hearne ISD for their grant.

## MIC Implementation Findings: Cycle 1 and Cycle 2

Teachers and coaches participated in PD activities (e.g., training) and coaching activities (e.g., mentoring, classroom observation). Not surprisingly, after the second year of implementation, the program was more fully developed in the Cycle 1 schools than in the Cycle 2 schools after one year of implementation. A larger proportion of Cycle 1 teachers than Cycle 2 teachers rated MIC activities as being fully implemented, while a larger proportion of Cycle 2 teachers than Cycle 1 teachers rated MIC activities as being in development. In both cycles, coaches most frequently supported teachers by providing feedback on instructional materials and techniques. Coaches also provided a high degree of training in data collection and analysis, content area knowledge, and instructional techniques.

When asked about the challenges faced in implementing the program, many teachers expressed that the greatest barrier to MIC implementation was the amount of time required for PD activities, meetings, planning, and coaching. This was similar across both cycles and both years of implementation (Cycle 1). A supportive administrative, coaching, and teaching staff was identified as most helpful in overcoming barriers to MIC program implementation.

## Teacher Effectiveness Findings: Cycle 1 and Cycle 2

Cycle 1 teachers indicated that MIC was influential in increasing their feelings of effectiveness, increasing their math content knowledge and teaching knowledge and skills, and in broadening their use of various assessment and instructional strategies. New Cycle 1 teachers, in particular, reported that the program benefited them. New Cycle 1 teachers, as compared to veteran Cycle 1 teachers, indicated the greatest amount of influence of MIC on their feelings of effectiveness. Cycle 1 teachers indicated that they benefited from participation in MIC, particularly in the area of gaining varied instructional strategies. In addition, the math achievement of students who had MIC teachers for two years and whose teachers had participated in MIC for two years improved significantly, indicating that these were effective teachers helping to increase their students' TAKS-Math performance. These results suggest that access to a non-evaluative, mentoring relationship, as well as instructional tips and content clarification, may most benefit new teachers, who are likely still developing their instructional style and building their confidence in the classroom. Indeed, once hours of coaching, PD, and other teacher background characteristics were considered, there was very little relationship between years of teaching experience and student math achievement. In other words, MIC seems to be helping to level the playing field between the Cycle 1 novice and veteran teachers.

Similar to the Cycle 1 teachers, Cycle 2 teachers felt that MIC improved their feelings of effectiveness, math content knowledge, and on their teaching knowledge and skills. New teachers and teachers with bachelor's degrees in particular indicated that the program was beneficial, so the program may be particularly effective in meeting the needs of novice teachers. During the site visits, the teachers expressed that they were optimistic about the impact of MIC on student math achievement, particularly noting improvements in student engagement. Overall, Cycle 2 teachers felt more uniformly positive about the effects of MIC coaching than the Cycle 1 teachers. This may be due to the ASP's making improvements based on their experiences with Cycle 1 grantees.

## Findings from the Student Outcomes Analyses: Cycle 1

MIC Cycle 1 grantees completed their second and final year of implementation during the 2009–10 school year. In both the Cycle 1 middle schools and high schools MIC participation was associated with increases in student TAKS-Math achievement. For all middle school students with a teacher participating in MIC the TAKS-Math passing rate in 2009–10 was 81%, compared to 74% in 2008–09; this 7 percentage point increase was statistically significant. This increase compared favorably with the changes in passing rates across Texas during the same time period, when there was an increase of 2 percentage points in middle schools students passing TAKS-Math.

*"The coaches are really good coaches, and the teachers are working together as a team. As they work as a team and encourage each other, the belief system is changing. It's the collaborative work."*

– MIC Principal

At the high school level, for all students with a teacher participating in MIC there was an increase in the percentage of students who met TAKS-Math standards from 65% to 73% between 2008–09 and 2009–10. This 8 percentage point increase was statistically significant. Across all the high school students in Texas, there was a 7 percentage point increase in the rates of passing TAKS-Math over the same one-year period.

Students who were exposed to MIC teachers for two years experienced the largest gains in achievement, particularly if in 2009–10 their teacher also had two years of experience in MIC (i.e., dual-year participants). Cycle 1 middle school students who had two years of experience with dual-year MIC teachers (teacher in 2009–10 had two years experience in MIC) scored .31 of a standard deviation higher on TAKS-Math than students who had never had a MIC teacher. Cycle 1 high school students with similar levels of experience with MIC teachers scored .16 of a standard deviation higher than students who never had a MIC teacher. These findings indicate that the program has a cumulative beneficial effect over time. At the high school level, higher amounts of PD were associated with gains in student math achievement; however, for the most part the results of the analyses indicate that participation of any hourly amount per year in coaching and PD, as long as it is sustained over time, can have an impact on student math achievement.

Similarly, preliminary evidence indicates that MIC may be helpful in reducing dropout rates, improving graduation rates, and improving grade promotion rates. Evidence also indicates that being exposed to MIC teachers for two years can improve students' college readiness.

## Findings from the Student Outcomes Analyses: Cycle 2

Cycle 2 MIC grantees completed their first year of implementation during the 2009–10 school year. Results indicate that at the middle school level even after this short amount of time, MIC coaching may be beneficial. Similar findings were not found for high school. There was about a 3 percentage point increase in the passing rate for all MIC Cycle 2 middle school students as a whole (71% in 2008–09 vs. 74% in 2009–10), which is 1 percentage point higher than the 2 percentage point increase that occurred

*"[The students] told other teachers that for the first time they feel like they're learning something."*

– MIC Cycle 2 Teacher

across the state.<sup>4</sup> High amounts of coaching (61 hours and over) were associated with significant increases in student math achievement at the middle school level. The results for the analysis of the impact of MIC on student math achievement and college readiness at the high school level for MIC Cycle 2 grantees are inconclusive after one year of program implementation.

## Findings from Cost and Sustainability Analyses

Cycle 1 grantees were at the end of their grant cycle during the 2009–10 school year, so a full picture of the cost-effectiveness of MIC could be obtained. Results of the analysis of MIC grant expenditures show Cycle 1 grantees had, on average, spent 87% of their total awarded funds. Of course, some grantees spent the entire amount of their grants. The average cost per teacher in MIC Cycle 1 program was \$6,971, which was

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

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

about \$3,000 less than the maximum amount grantees could be awarded per teacher (\$10,000). The average cost per teachers translates to an average cost of \$131 per student served by a MIC teacher in Cycle 1 grantee schools. In the current reporting period, Cycle 2 grantees have completed their first grant year. The initial Cycle 2 grantee expenditure data provided by grantees shows that grantees have spent 32% of the total budgeted funds after one year. It should be noted that some of the grant funds went to PD and coaching with some of it going into school enhancements such as math labs that will continue to be used after the grant period ends. Overall, the cost analyses indicate that MIC is a cost-effective program after two years with Cycle 1 grantees. In addition, if the program continues to help teachers improve math instruction, then the cost per student will become lower over time. The future cost realized also assumes that student math achievement gains made after two years of participation with current Cycle 1 students remain steady with future students receiving instruction from math teachers participating in MIC.

## Conclusions and Next Steps for MIC

This study finds that MIC is a cost-effective program that is benefiting teachers and students in the Cycle 1 schools. There are also early indications that MIC is impacting teachers and students in Cycle 2 schools. Findings indicate that the program may be particularly beneficial for new teachers. There seem to be particular gains in student math achievement when students have exposure to MIC over time.

As more data become available, findings will be refined and expanded accordingly. As additional data on dropout rates become available, the relationships between the program and reducing dropout can be investigated further. In addition, the Cycle 2 schools will complete their grant period during 2010-11 allowing for a complete comparison of results between the Cycle 1 and Cycle 2 schools to see if the effects have been replicated or enhanced over time.

---

<sup>4</sup> Significance testing could not be conducted due to the nature of the data from the two sources.