



## Powerful Teaching and Learning in MMP Classrooms Compared to Math Classrooms around the State

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Research funded by the U.S. Department of Education in the last few years on effective programs to improve math achievement found that “the key to improving math achievement outcomes is changing the way teachers and students interact in the classroom. ...What characterizes successfully evaluated programs...is a focus on how teachers use instructional process strategies, such as using time effectively, keeping children productively engaged, giving children opportunities and incentives to help each other learn, and motivating students to be interested in learning mathematics” (Slavin & Lake, 2007, p. 35). This is a compelling finding given that historically, most states, districts, and schools are more focused on curriculum programs or assessment changes rather than on changing instructional practices.

Over the last several years, members of The BERC Group conducted thousands of classroom observations to determine the extent to which classroom instruction aligns with brain-based research and instructional process strategies, such as the ones mentioned above. The STAR Classroom Observation Protocol™ serves as an instrument to measure this type of instruction, which we refer to as Powerful Teaching and Learning™ (PTL). The STAR Protocol breaks down PTL into five Essential Components (*Skills, Knowledge, Thinking, Application, and Relationships*) and 15 Indicators of effective teaching and learning.

Recently, BERC Group researchers performed an analysis to better understand the relationship between Powerful Teaching and Learning and student achievement. A positive and statistically significant correlation exists between a school’s level of Powerful Teaching and Learning and the percentage of students passing the math portion of the Washington Assessment of Student Learning (Peterson, Gratama, & Baker 2010). When controlling for low-

income, the partial correlation between a school’s PTL score and math achievement is .34,  $p < .01$ . This basically means that as a school’s PTL score increases so does their math achievement; the two are positively related to one another.

Regression analysis performed using PTL to predict school level math achievement revealed that PTL predicts 7% ( $p < .001$ ) of the variance in math achievement beyond the effects of low income. This is an important finding considering how strong the relationship is between achievement and income level (Abbott & Fouts, 2003). Very few constructs are able to predict additional significant variance in achievement when accounting for income level.

As part of the program evaluation for the Microsoft Math Partnership (MMP), researchers from The BERC Group conducted classroom observations at all of the MMP-funded schools. These classroom observations occurred each spring during all three years of the grant (Spring 2008, 2009, and 2010). Each lesson is given an overall score (*not at all, very little, somewhat, or very*) and each Essential Component and Indicator is given a score from 0 to 4, with 0 being ‘*not observable*’ and 4 being ‘*clearly observable*’.

In Year 3 of MMP, 66% of classroom lessons observed by researchers fell in the *Somewhat/Very* category on the STAR Protocol. This represents a 16 percentage-point increase from Year 2 of the grant and a 12 percentage-point increase from Year 1 of the grant. This finding is significant alone, but is even more notable when compared to statewide results collected by BERC researchers over the last six years. Statewide, the percentage of middle school math classrooms scoring a *Somewhat* or *Very* on the protocol is 57%, and there has been relatively little movement in this percentage over the last six years of data collection. This

indicates that while math classrooms throughout the state are generally not improving on the level of PTL observed, MMP classrooms made a significant jump over the course of the three year grant. So how do MMP classrooms look different than other math classrooms around the state?

**Although math classrooms throughout the state are generally not improving on the level of Powerful Teaching and Learning observed, MMP classrooms made a significant jump over the course of the three year grant.**

MMP classrooms look different from comparison classrooms in that there are more occurrences of students actively reading, writing, and/or communicating at a conceptual level during a lesson. Teachers in MMP classrooms ask students to complete more meaningful and engaging tasks, and students to do more than just complete simple problem-solving worksheets or copy information down from an overhead. These lessons go beyond just having student recall information, and the tasks encourage more rigorous thinking and problem-solving by students. Students engage in discussions around relevant topics, and teachers provide students with clearer lesson objectives to ensure students know the expectations.

#### **In MMP classrooms:**

- **Students complete more meaningful, engaging, and collaborative tasks that have application to their real-world setting**
- **Lessons encourage rigorous thinking, problem-solving, metacognition, and meaningful discussion around relevant topics**
- **Teachers convey clear lesson objectives so students know what is expected of them**
- **Teachers pose open-ended, higher-level questions to students**

MMP classrooms also include the presence of more reflection and metacognition compared to comparison classrooms. Teachers in MMP classrooms ask more open-ended, higher-level questions where they expect students to evaluate and consider alternatives. Teachers direct and encourage students to reflect on their own learning and to explain their thinking by providing extended answers to questions.

In addition, MMP classrooms look different because teachers make more attempts to relate the content to other subject areas, to personal experiences, or to contexts outside the classroom. This is essential since students are more likely to retain the information if they are able to connect concepts to other aspects of their lives. Although, this is still an area that needs more attention in all classrooms, in Year 3, MMP classrooms scores increased in this area by 18 percentage-points over the previous year. Finally, teachers in MMP classrooms are also becoming more adept at having students work together to share knowledge and complete projects. This type of collaborative work often helps students to be more motivated to learn, while they gain valuable experience for how to work effectively with others.

MMP school districts are beginning to work on having a common vision for instruction within their districts, and this is helping to support the MMP work. District and school administrators must continue to support teachers in providing a rigorous and engaging instructional experience for all students by providing opportunities for teachers to observe colleagues. Although, MMP classroom lessons show more evidence of making learning relevant to students in Year 3 compared to previous years, this continues to be an area for improvement. Coaches and collaborative teacher teams should be used to help plan lessons that make learning more relevant to students.

Overall there are several key takeaways regarding instruction in MMP classrooms:

- 1) The presence of Powerful Teaching and Learning is more evident in the math classrooms at MMP schools than it was at the beginning of the grant.
- 2) Math classrooms throughout the state are generally not improving in the amount of Powerful Teaching and Learning observed, while MMP classrooms are improving.
- 3) MMP classrooms show more student collaboration, more rigorous student thinking, and more relevancy than math classrooms across the state.

References:

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