

Abstract Name: **Comparison of Math Teacher Leader Models: Value-added Analysis of Student Achievement in Schools with Released and Non-released Math Teacher Leaders**

MSP Project: Milwaukee Mathematics Partnership

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Summary

The released Math Teacher Leader (MTL) strategy represented a *significant change* from the initial approach of the Milwaukee Mathematics Partnership. This strategy, which provides for teachers to be released from 80% of their teaching responsibilities, was important for sustaining the MTL role. Results from a value-added analysis at the elementary and middle school levels suggest that the MTL release model has led to improvements in underperforming schools. The initial disparities in achievement between underperforming schools with a released MTL and higher performing schools without a released MTL are disappearing. This suggests that the released MTL model may be a better solution for underperforming schools than the non-release model and that MTLs are having a positive impact in many schools.

Section 1: Questions for dialogue at the MSP LNC

What types of math teacher leader models have been implemented in school districts across the country?
To what extent have various models proved efficacious for improving student results?

Section 2: Conceptual framework

The MMP began during the 2003-04 school year with the goal of improving mathematics teaching and learning in the Milwaukee Public Schools. Student success has been defined as performance on the Wisconsin Knowledge and Concepts Exam (WKCE). High achievement schools are defined as those schools in which a high proportion of students score proficient or advanced on the state exam. High value-added schools demonstrates improvement year over year on the state exam as an indicator of student success. High performing schools are those that demonstrate higher achievement and greater value added.

Initial funding for the MMP was provided for five years by the National Science Foundation (NSF) through its Math Science Partnership (MSP) program. The foundation for this effort was that each school in the district named a math teacher leader (MTL) who would assume the responsibility for improving mathematics teaching and learning in his or her school, in addition to a full-time teaching role. During the first semester of the 2007-08 school year, Milwaukee Public Schools (MPS) leaders made the strategic decision to provide approximately \$5 million in funding to ‘release’ 114 MTLs from their normal classroom responsibilities beginning in February 2008. In spring 2008, the District was successful in securing approximately \$10 million from the Wisconsin Department of Administration to continue this effort through the 2008-09 school year. Sustaining funding of approximately \$10 million was secured from the Department of Administration for 2009-10 and from the Wisconsin Department of Public Instruction for 2010-11.

The released MTL strategy represented a *significant change* from the approach adopted at the start of the MMP. The released model allowed the MTL to devote 80% time to working directly with other adults to improve the teaching and learning of mathematics throughout the school, with the other 20% devoted to working directly with students. This provides time for the MTLs to work with individual and groups of teachers to plan lessons and assessments, model lessons, and collaboratively examine student math work

and data. The time devoted to students might involve the MTL teaching his or her own class of students each day, shared-teaching of students, or working with small pull-out groups of students.

This strategy has proved to be important for sustaining the MTL role within schools. During interviews conducted with key stakeholders in April and May 2010, several reported that the released model was needed because “it allows MTLs to work with all teachers in their buildings and to see much more of what is going on and what is needed [to improve math teaching and learning].” In addition, stakeholders reported that the non-released model could not have been sustained because of “the burden placed on the MTLs to do essentially two full-time jobs.”

Based on the information available to date, it is apparent that the MTL released model represents a viable strategy for improving student achievement in the Milwaukee Public Schools. This strategy may be especially important for improving results in underperforming schools.

Section 3: Explanatory framework

Methods

Student achievement data were compiled from two sources—district Wisconsin Knowledge and Concepts Examinations (WKCE) results and the value-added analysis conducted by the Wisconsin Center for Educational Research (WCER).¹ The time period covered by this analysis begins with data collected from the Fall 2007 WKCE and ends with data collected from the Fall 2009 WKCE. This is essentially the two year period starting before the release MTL model was instituted through the most recent academic year.

Value added data were obtained from MPS. These analyses indicated growth in student achievement over a year, as well as indicated if a school was high achieving in a particular school year. These metrics are commonly called ‘value added’ and ‘attainment,’ respectively. Each school is evaluated on these metrics in relation to all other schools in the district and placed in a ‘quadrant’ based on these measures. For example, a school with above average value added and above average attainment would be placed in quadrant 1.

Schools are thought to be ‘high performing’ or ‘underperforming’ based on their quadrant placement. Underperforming schools have low attainment and low value added relative to the other schools in the district. Conversely, high performing schools have high attainment and high value added relative to other schools. It is not uncommon for schools that are low attaining to demonstrate high value added which would indicate they are on a improvement trajectory.

Our analysis uses data from the WKCE over three school years. The results confirm that statistical differences between the distribution of schools with and without a released MTL have disappeared over the time period in which the release model has been in place.

Results

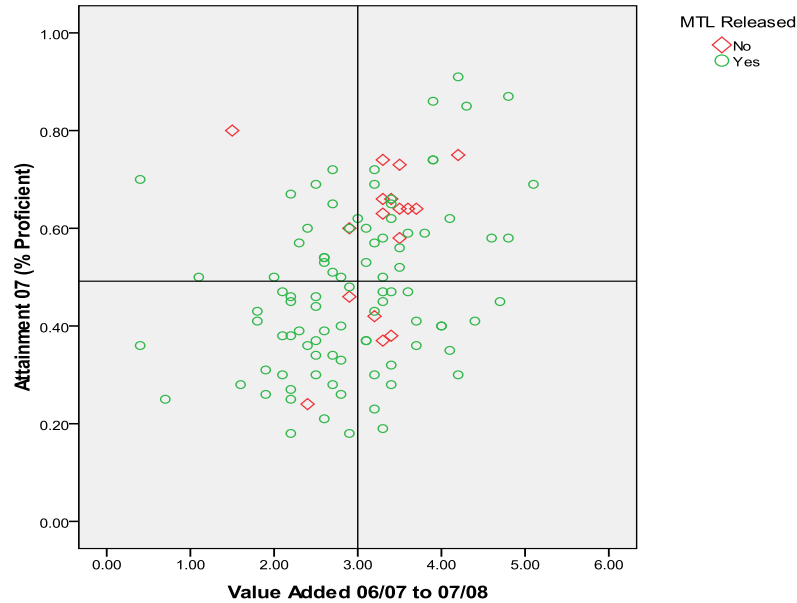
Value added analysis is conducted at the elementary and middle school levels on the WKCE. High school analysis is not conducted because the WKCE is only administered in the tenth grade.

Elementary Results

Figures 1-3 below are scatter plots of value-added analysis comparing schools that serve elementary students (grades 3-5) with a released MTL to those schools without a released MTL. These results show that schools that received support for a released MTL were generally lower performing through the 2006-07 school year (Figure 1), but that those performance differences began to shift through the 2007-08 school year (Figure 2) and have disappeared based on test results in Fall 2009 (figure 3).

¹ WCER’s Value Added analysis is available to the public on the Milwaukee Public Schools website at <http://mpsportal.milwaukee.k12.wi.us>.

Figure 1. Elementary Value Added from Fall 2006 to Fall 2007 versus Fall 2007 Attainment



Statistical analysis of the distribution in Figure 1 indicates a weak relationship ($\Phi = 0.26$, $p=0.07$) between quadrant assignment and whether or not a school had a released MTL during the 2007-08 school year. The scatterplot suggests that a higher proportion of schools without a released MTL were high attaining and high value added. This is to be expected given that preference for assigning a released MTL was given to schools that were historically lower achieving.

Figure 2. Elementary Value Added from Fall 2007 to Fall 2008 versus Fall 2008 Attainment

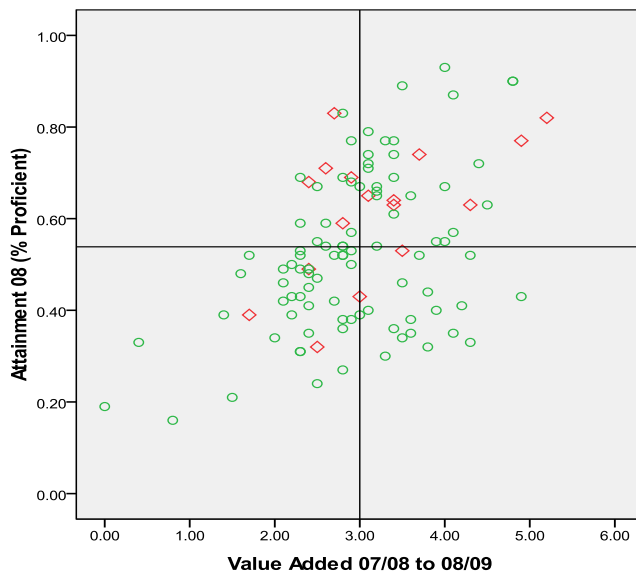
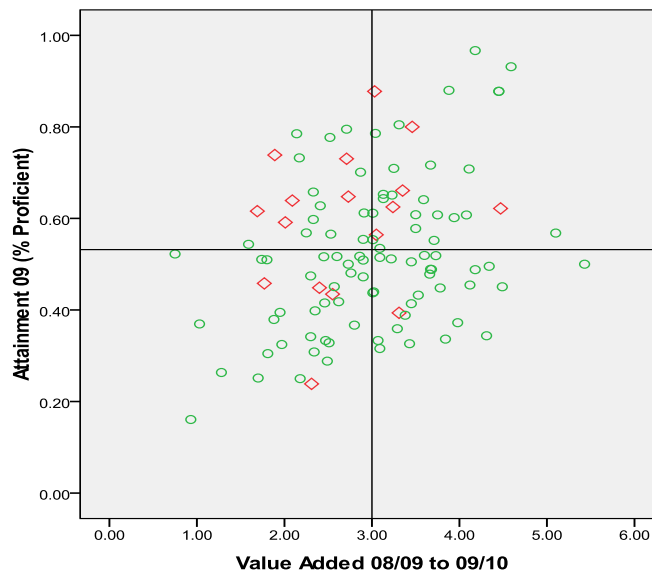


Figure 3. Elementary Value Added from Fall 2008 to Fall 2009 versus Fall 2009 Attainment



Similar results are seen in Figure 2 which shows value added from Fall 2007 to Fall 2008 versus attainment in Fall 2008. A weak, but statistically significant statistical relationship exists between quadrant assignment and whether or not a school has a released MTL ($\Phi = 0.26$, $p=0.05$). What is

evident, however, is that schools without a released MTL exhibited above average value added less frequently than with a released MTL—the percentage of school without a released MTL in quadrant 1 fell from 58 percent in 2007 to 41 percent in 2008. This suggests that schools with a released MTL were improving at a greater rate than schools without a released MTL, i.e., they were closing the gap.

The trend started in the previous school year continued during the 2008-2009 school year—schools with released MTLs were demonstrating similar achievement to those that did not have a released MTL. This is clearly shown in Figure 3 by the non-significant relationship between quadrant assignment and MTL status ($\Phi = 0.24$, $p=0.11$). This indicates that there is no difference between the distribution of schools across quadrants according to released MTL status. Therefore, during the two-year period that the MTL release model has been in place, it is reasonable to assert that the model has had the impact of equalizing student achievement results between previously lower-performing schools and high performing schools.

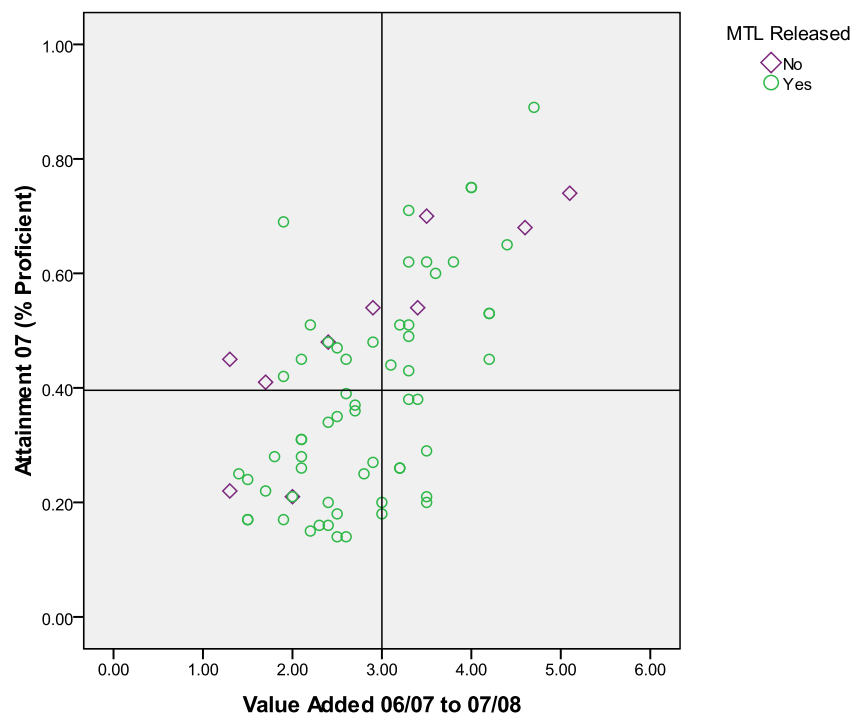
Middle School Results

Figures 4-6 demonstrate similar results for schools that serve students in grades 6-8. Some of the same schools reflected in the elementary analysis are also reflected here because those schools serve students across multiple grade bands (e.g., schools serving K-8 students).

For each analysis, a moderate to weak correlation exists between quadrant assignment and MTL release status—in Fall 2007, $\Phi = 0.31$, $p=0.09$ (Figure 4); in Fall 2008, $\Phi = 0.29$, $p=0.11$ (Figure 5); in Fall 2009, $\Phi = 0.28$, $p=0.13$ (Figure 6). Each of these correlations was non-significant indicating no statistical difference between the proportions of schools assigned to a given quadrant and their MTL release status. However, due to the unbalanced sample size, achieving statistical significance was unlikely.

As with the elementary analysis in Fall 2007, a large proportion of middle schools (40%; 4/10) without a released MTL appear in quadrant 1 in the upper right (Figure 4). Conversely, approximately 43% (26/60) of middle schools with a released MTL appear in the lower left quadrant. This again indicates that schools that were lower performing were more likely to receive support for a released MTL than schools that were higher performing.

Figure 4. Middle School Value Added from Fall 2006 to Fall 2007 versus Fall 2007 Attainment



The distribution begins to shift during the 2007-2008 school year (Figure 5). While a high proportion of schools without released MTLs is in quadrant 1, an increasing proportion of schools with a released MTL has moved to the high-valued added side of the scatterplot (the right side). Nearly 47 percent (30/64) of schools with a released MTL were on the high value side of the scatterplot in 2008 versus 43 percent (26/60) in 2007. This is important because it indicates that these schools are closing the gap and it is reasonable to conclude that the released MTL model has contributed to this improvement.

The shift started in the 2007-2008 school year continues during the 2008-2009 school year. As seen in Figure 6, a lower proportion of schools without a released MTL are seen in the upper right quadrant (22%, 2/9) and an stable proportion of schools with a released MTL are on the high-value added side of the scatterplot (45%, 28/62). This supports the conclusion that essentially no differences are now evident in achievement or value added between schools with or without a released MTL. Schools with released MTLs have closed the gap with schools that did not have a released MTL.

Figure 5. Middle School Value Added from Fall 2007 to Fall 2008 versus Fall 2008 Attainment

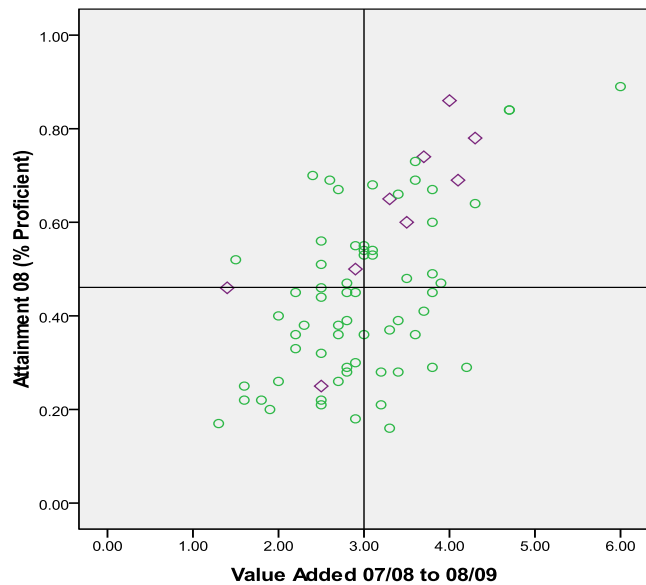


Figure 6. Middle School Value Added from Fall 2008 to Fall 2009 versus Fall 2009 Attainment

