Session Number: 50

Abstract Name: Sustaining the Momentum: Finding from a Study of Implementation Factors and Sustainability

MSP Project: Oregon Mathematics Leadership Institute Partnership

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1. Questions(s) or issue(s) for dialogue at Learning Network Conference session:

How can effective projects be sustained beyond the grant funding?
What factors contribute to sustainability?
How can sustainability be improved in future NSF projects?

2. Context of the work within the STEM education literature and within your MSP project:

The Oregon Mathematics Leadership Institute (OMLI) is a 5-year project funded by the National Science Foundation under the Mathematics and Science Partnership program. OMLI is a partnership between Oregon State University, Portland State University, Teachers Development Group, 10 Oregon school districts, and RMC Research Corporation. In its sixth year of operation, OMLI has completed the majority of the original work that involved building a cadre of school- and district-based intellectual leaders and master mathematics teachers through a series of intensive summer institutes, follow-up academic year professional development. The summer institutes combined rigorous and relevant mathematics content coursework with leadership development workshops and seminars. Academic year activities facilitated the ongoing development of collaborative professional learning communities composed of K–12 teachers, school administrators, and higher education faculty within each participating school. These activities promoted systemic mathematics reform to increase student achievement in mathematics. OMLI activities were based on the belief that understanding and facilitating meaningful mathematics achievement requires a focus on the learner and an emphasis on all levels of student discourse around important concepts in mathematics. OMLI activities were also intended to impact the K–12 classroom learning communities, teacher professional learning communities, and the OMLI learning community of higher education faculty and K–12 teacher leaders and administrators.

The School Leadership Team (SLT) role was an important aspect of the OMLI project. Each of the 82 participating schools had established an SLT that included at least 1 school administrator and 2 teacher leaders. The SLT teachers attended 3 of the 3 week summer institutes (1 each summer for 3 years beginning July 2005) and the SLT administrator attended each of the 3 summer institutes for 1 week. In August 2007 OMLI completed the third of the 3 summer institutes.

Each SLT coordinated 4 site visits conducted by Teachers Development Group (TDG) each academic year through the 2008–2009 school year, developed and implemented an action plans
for improving the mathematics teaching and learning that takes place in their school, and provided professional development and support to the other mathematics teachers in their school as needed. The SLT administrators also participate in the school year activities.

3. Claim(s) or hypothesis(es) examined in the work (anticipating that veteran projects will have claims, newer projects will have hypotheses):

The SLT structure was based on the premise that the summer institute experiences would develop participants’ content expertise and the leadership skills, which would in turn enable each SLT to implement an effective reform plan that results in improved teaching and learning and improved student achievement in mathematics. To accomplish this, each SLT conducted monthly professional development activities with the larger group of teachers of mathematics in each participating school. TDG developed a number of professional learning tasks from which the SLT could use to address the needs of the teaching staff in each school. The professional learning tasks provide flexibility to fit the contest within the school while providing enough structure to keep the participants focused on improving student learning. This session will address the following questions: 1) to what extent did the this model result in improved student achievement in mathematics and 2) to what extent did school continue to implement the school-based activities beyond the initial professional development provided by the OMLI project?

4. Evaluation and/or research design, data collection and analysis:

The school was the primary unit of change in the OMLI project. Thus the evaluation planned to examine trends in school-level student achievement on the mathematics portion of the standardized state assessment and compares the results of the schools participating in OMLI to the statewide averages. Because of changes to the mathematics assessment cut scores that were implemented between the 2006 and 2007 administrations of the state assessment, it was not possible to compare changes in trends in student achievement in OMLI schools to demographically similar schools in the state, as originally planned. As a result, project staff elected to collect data on the degree to which each school implemented the practices promoted in the OMLI professional development to determine the relationship between the level of implementation and student achievement. With input from site visit staff, RMC Research developed a scoring rubric that the site visit staff used to rate the level of implementation of the key aspects of the OMLI project at each of the participating school. Implementation ratings were gathered at the end of the 2006–2007, 2007–2008, and the 2008–2009 school years. Based on feedback from the site visit teams, RMC Research made slight modifications to the rubric each year in order to improve reliability and to gather data on important aspects of the OMLI project. There were, however, 8 traits that remained consistent across all 3 data gathering periods. The final version of the scoring rubric used by the site visitors in 2009 will be shared during the session. All 3 years of data was available for 79 out of the 82 schools that remained in the OMLI project through the 2008–2009 school year.

RMC Research also obtained school-level student achievement data from the Oregon Department of Education for all schools in Oregon from 2004 through 2009 for Grades 3 through
8 and 10. The data also included demographic data about the school population that were used as control variables for the analysis.

RMC Research used linear regression modeling to control for socioeconomic differences between schools (as measured by the percent of students who qualified for free or reduced price lunch) and to determine if any of the implementation traits were a significant predictor of student mathematics achievement. The percent of students in the school who met or exceeded the mathematics standard on the state assessments was the dependent variable, the percent of students who qualified for free or reduced price lunch was the control variable, and the ratings of the project staff of the degree to which the school implemented key project traits were the independent variables. Among the elementary schools, a combination of 6 project traits consistently proved to be correlated to student mathematics achievement across the 3 years of data that was collected. This includes:

- Quality of the school action plan for improving mathematics teaching and learning developed by the SLT during the summer institutes.
- How well the SLT implemented the action plan.
- The degree to which mathematics is a priority for the school.
- The degree to which the SLT conducted routine school-based professional development with the other mathematics teachers in their school.
- The degree to which the school-based professional development engaged a critical mass of other teachers of mathematics in the school.
- The degree to which the professional development utilized well-defined professional learning tasks and protocols developed by project staff and modeled during the summer institutes.

Using the scores for these 6 traits, RMC Research constructed an elementary implementation scale (EIS) that represented the degree to which the site visitors reported that the elementary school implemented all 6 of these key project traits. The IES ranged from 0 to 100 where 100 represented the highest implementation level for all 6 traits. The Exhibit 1 below shows the results of the regression analysis performed using the IES as a predictor of student mathematics achievement.
## Exhibit 1
Elementary Implementation Scale vs. Student Achievement

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.841</td>
<td>.002</td>
</tr>
<tr>
<td>FRLP</td>
<td>-.003</td>
<td>.000</td>
</tr>
<tr>
<td>EIS</td>
<td>.001</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note. $R^2 = .288$. The amount of change to the $R^2$ contributed by the EIS was .009. Dependent variable: percentage of students in the school who met or exceeded mathematics standard in the respective school year (2007, 2008, or 2009). Data is from 45 and 55,034 students. Weighted by number of students to adjust for differences in the size of the schools. FRLP = free or reduced-price lunch. EIS = elementary implementation scale.

***$p < .001$.

This analysis indicates that the degree to which schools implemented the practices promoted by OMLI measured by the elementary implementation scale was a significant positive predictor of student performance beyond what could be explained by the socioeconomic factor. In order to portray this finding more clearly, RMC Research used univariate analysis of variance to predict the effect of the EIS on student achievement while controlling for socioeconomic. Schools were classified into 3 categories based on their EIS. As shown in Exhibit 2 below, each increasing category of implementation projects to a higher percentage of students who met or exceeded the mathematics standard.

The implementation index using the 6 traits described earlier used for the elementary schools and other combinations of traits considered did not show any consistent pattern for secondary schools. Patterns that seemed promising accounted only a small portion of the variance in student achievement scores and was disregarded as significant.
Therefore, the degree to which schools implemented the key components of the OMLI project was a small but significant predictor of student mathematics achievement above and beyond what can be explained by socioeconomics (FRLP).

RMC Research is in the process of following up on these findings by collecting data from schools regarding the degree to which the SLT remained operating after the conclusion of the OMLI project. This data will be combined with the project implementation and student achievement analyzed for relationships between implementation and sustainability of the project. This work will be completed by the time of the conference.

5. Key insights (retrospective for veteran projects, prospective for newer projects) that have value for the Learning Network:

One of the major lessons learned was that the project needed to place greater emphasis on and build stronger mechanisms for schools to maintain the mathematics instructional leadership established by the initial project work.