Session Title:
The RETA and MSP Partnership: Developing Knowledge from Research and Evaluation Support

MSP Project Name:
Impact of MSP Professional Development on the Quality of Instruction in Middle-School Mathematics Classrooms

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Project Session

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Summary:
In late 2009, the American Institutes for Research (AIR) was awarded a Research, Evaluation, and Technical Assistance (RETA) grant from the National Science Foundation's Math and Science Partnership (MSP) Program to assess the impact of MSP-supported professional development (PD) on the quality of instruction in middle-school mathematics and science classrooms. To conduct this study, AIR partners with two MSPs: Greater Birmingham Math Partnership (GBMP) and Rhode Island Technology Enhanced Science (RITES). AIR is producing data collection instruments for MSP use and is serving as a data collection and analysis partner. In this session AIR will describe results of our study, share instruments, and reflect on the challenges of operating as a RETA project.

Section 1: Questions framing the session:
Our RETA study set out to address the following three research questions using a rigorous longitudinal, multisite, quasi-experimental design:

1. To what extent do the PD activities supported by MSPs exhibit features of high-quality PD as identified in prior research? Do teachers in MSP schools receive higher-quality PD than comparable teachers in non-MSP schools?
2. What are the effects of PD activities supported by MSPs on the quality of instruction in middle-school mathematics and science classrooms?
3. To what extent are features of high-quality PD identified in prior research related to the quality of instruction in middle-school mathematics and science classrooms?

In addition, over the course of our project we addressed questions of implementation that emerged from working with two MSPs, with regards to the role of a RETA project:

1. What makes a good fit between a RETA project seeking to answer broad research questions and specific MSP projects, investigating outcomes of a narrowly focused intervention?
2. In light of these differences in scope and focus, what are best practices in evaluation and research design, data collection, and analysis?
3. What are the long-term implications for the support and operation of RETA-type projects?

Section 2: Conceptual framework:

Our research was informed by previous research on critical features of high-quality PD (Darling-Hammond et al., 2009; Desimone, 2009; Garet, Porter, Desimone, Birman, & Yoon, 2001; Yoon, Garet, Birman, & Jacobson, 2006). In previous empirical studies, these PD features were found to be associated with improvement in teachers' instructional practices and student achievement (Desimone, Porter, Garet, Yoon, & Birman, 2002; Garet et al., 2001; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Yoon et al., 2006; Yoon, Duncan, Lee, S. Scarloss, & Shapley, 2007).

Our math and science rubrics also drew upon research on instructional strategies that lead to rigor and relevance:

1. The Mathematics Teacher Assignment Scoring Rubric used to score assignments from teachers at our GMBP partner schools was adapted from rubrics developed by AIR and SRI for the Bill & Melinda Gates Foundation and originally developed by Bryk, Newmann, and others at the Consortium on Chicago School Research at the University of Chicago (Newmann, Lopez, & Bryk, 1998; Bryk, Nagaoka, & Newmann, 2000; and Newmann, Bryk, & Nagaoka, 2001). The rubric focused on opportunities for students to gain a conceptual and procedural understanding of important mathematics concepts and solve problems (i.e., "rigor" of assignments), while doing work with real-world connections and authentic purpose (i.e., "relevance" of assignments) in mathematics.
2. The Science Teacher Assignment Scoring Rubric was aligned to the new draft standards for teaching science (http://www.nextgenscience.org/next-generation-science-standards) and informed by researchers who had prepared rubrics focused on teaching middle school earth science (Penuel & Gallagher, 2009).

Section 3: Explanatory framework:

At the time of this proposal, we had just begun collecting data with our second partner, RITES. The results of that investigation will be reported in our final project report. For this presentation, we will report on the findings from the three years of work with GBMP based on a survey of instructional practices and PD experiences (PDIP) and the analysis of teacher assignments. GBMP collected data from the treatment teachers and AIR collected data from comparison teachers (non participants in the GBMP). AIR and GBMP worked together to identify the pool of comparison teachers and AIR recruited the teachers.

Our analyses showed that the PD activities supported by GBMP exhibited features of high-quality PD as identified in prior research (e.g., Darling-Hammond et al., 2009; Garet et al., 2001). Specifically, GBMP teachers received higher-quality PD than comparison

teachers in terms of total contact hours, opportunities for active learning, collective participation, and content focus. Further, GBMP teachers were more likely to participate in such reform-type PD activities as Professional Learning Communities (PLCs) than comparison teachers.

Second, the findings from the analysis of the PDIP survey data suggest that the GBMP program offered relatively higher-quality PD to their participating teachers, which, in turn, had some significant impact on their teachers' instructional practice. For example, GBMP teachers surpassed the comparison teachers over time in an indicator we termed, student-group oriented instruction, despite a slight deficit at baseline. In contrast, the findings from the analysis of teacher assignment data did not show any impact of the GBMP program on the quality of their teachers' instruction in middle school mathematics, as measured by three assignment quality dimensions (i.e., rigor, relevance, and total quality).

Lastly, we found some evidence that some features of high-quality PD identified in prior research (e.g., Garet et al., 2001) were related to the quality of instruction in middle-school mathematics classrooms as measured by the PDIP survey. For example, active learning and coherence were significantly correlated with student-group oriented instruction, considered an effective instructional strategy. In addition, participation in reform-type PD activities was found to be related to instructional relevance.

In sum, we concluded that the GBMP program offered relatively higher-quality PD to their participating teachers, which, in turn, had some positive impact on their teachers' instructional practice.

In terms of our implementation questions, over the three years of working with our first partner, GBMP, we documented how the evaluation/research methods we chose were modified in response to the conditions of the intervention implemented. When we began working with RITES, we made additional changes, specifically in the approach to selection of comparison teachers, development of survey items and the development of a rubric that could be used to review assignments from secondary science teachers. We will report on changes made and lessons learned about fit, as we sought to recruit partners and meet their research needs.

Section 4: Discussion:

Our charge as a RETA project was to develop partnerships with MSPs, be a source of support to MSPs in research and evaluation, and provide information to the MSPs and to NSF regarding the relative impact of the MSPs on teacher practices. Through our partnership with GBMP we have been able to answer research questions that would likely be posed by MSPs, work with their cohort of treatment teachers, develop a comparison group, and expand the research base regarding the outcomes of MSPs.

Our findings are currently informing our approach to a study we are conducting with RITES, a statewide MSP project with a focus on teacher instructional strategies in science. For example, based on our experiences in maintaining the participation of the comparison teachers in Alabama, we have sought a more direct involvement of RITES

staff in the data collection. We have also collaborated on the design of our research instruments.

We hope our experiences, when compared with other project participants, will lead to helpful recommendations for other RETA and MSP grantees regarding optimum ways of collaboration.

Section 5: How will you structure this session? What is your plan for participant interaction?

We propose a four-part structure for this session:

- Presentation of key findings from our research with GBMP
- Distribution of instruments developed for the study and discussion of similar approaches used by LNC participants, focusing on ways to improve instrument reliability and validity
- Discussion of challenges addressing the research needs of MSPs
- Discussion of ways to enhance prospective partnerships with RETA grantees.

Our primary report writers will present the GBMP findings. Project team members who worked on the survey and rubric will lead the discussion of instrument development and use. The project director and PI will lead the discussion regarding challenges and implications of RETA/MSP partnerships.

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