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Synthesizing Measures of Implementation Fidelity Across Partnerships: Designing a State-Level Evaluation Plan

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Abstract

The Illinois Mathematics and Science Partnership (IMSP) program is designed to improve the performance of students by encouraging collaboration between STEM organization or business, universities, and local school districts and service agencies. The goal of the state evaluation is to examine the implementation and output of the IMSP through a mixed-methods research design that includes collection and analysis of both qualitative and quantitative data. The twenty three projects use a variety of data sources to establish the levels of implementation of project goals locally. Each project measures the levels at which participants are implementing expected project activities using a variety of data sources (e.g., surveys , logs, interview and/or focus groups, classroom observation, and extant data) and submit implementation data through the IMSP portal about the level to which project participants successfully integrated content expertise from program activities, integrated curriculum resources, integrated instructional strategies and classroom activities, and integrated STEM technologies. The IMSP Implementation Evaluation framework balances the needs of the state with the local program implementation needs to assess implementation fidelity across the program.

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Introduction

The Illinois Mathematics and Science Partnership (IMSP) program represents an important response to a very critical need in students' mathematics and science achievement. The program is designed to improve the performance of students by encouraging universities and schools to collaborate in programs that improve mathematics and science teaching. Each of the IMSP programs is comprised of a graduate level program granting a Master's Degree for participants that incorporates collaboration between STEM organization or business, universities, and local school districts and service agencies. In addition, each project incorporates teacher action research aligned to project goals.

The goal of the state evaluation is to examine the implementation and output of the IMSP through a mixed-methods research design that includes collection and analysis of both qualitative and quantitative data. The evaluation examines funded partnerships' progress toward three project goals: improving teachers' subject matter knowledge and student achievement, promoting strong teaching skills, and increasing the understanding and application of scientifically based educational research.

The evaluation of project implementation includes an analysis of the extent to which partnerships are implementing their proposed plans, using effective collaboration techniques, and monitoring their own progress towards meeting outcomes. The evaluation provides

descriptive analyses, meta-analyses of program-level evaluation data, and hierarchical linear analyses as appropriate with each data source.

Background

STEM evaluations must examine both the implementation and outcomes of program work in order to describe the context of each program (Miller, Williamson McDiarmid, Luttrell-Montes, 2006) and help to connect outcomes to project activities. Similarly, evaluation of professional development, be it in STEM projects or other school-based evaluations must examine not only perceptions of the professional development, but also its outcomes and impact on instruction (Guskey, 2000). Implementation fidelity is a pivotal part of understanding the impact of the IMSP projects. Quality of implementation is complex and encompasses adherence to the intervention, exposure to the intervention, quality of program delivery, participant engagement in program, and unique and essential program components (Carroll et al, 2007). Evaluation of adherence of program delivery means assessing the degree to which the "implementation process is an effective realization of the intervention as planned by its designers" (Carroll et al, 2007).

The proposed evaluation plan has two foci: an analysis of implementation and an analysis of outcomes of the funded projects. One of the critical questions throughout the evaluation is to examine the level of implementation of funded partnerships to determine whether proposed activities are being put into place and whether these activities are leading to the proposed intermediate and long term outputs. The implementation evaluation includes data collected by the state as well as local partnerships to provide the evaluation team with

data about project activities and collaboration success over the course of the project. The implementation evaluation also allows the evaluation to connect project activities with project outcomes.

In the implementation stage of the project, the state-level evaluation is focused on the synthesis of local evaluation results to evaluate the overall effect of program intervention components on key program outcomes. Data from local evaluations provide specific contextual factors of each partnership affecting implementation and outcomes (see Figure 1 in Appendix B). The cross-site evaluation uses these local evaluation results in a systematic way as an indicator of the effectiveness of the IMSP project overall. By applying meta-analyses to this multisite evaluation, a global statistical summary of program effectiveness for the individual sites as well as across sites is made more meaningful and accurate (Kalaian, 2003). These meta-analyses will be applied to the Implementation Phase model outcomes. The current report summarizes the implementation model for aggregating implementation results across projects.

Overview of local evaluation methodology issues

The twenty three projects are using a variety of data sources to establish the levels of implementation of program goals in participating teachers' classrooms. Although there are broad commonalities across projects, the unique scope and sequence of the content, strategies, resources, and technologies across programs precludes the use of a single implementation measure for everyone. In addition to the differences in goals and design, differences in local school settings require flexibility at the local project level for measuring implementation. Contextual variables related to the participants (administrators, teachers, and

students), competing reforms in the participating schools, and unique partnerships with STEM industry professionals need to be considered when determining how to measure local implementation.

Common Implementation Areas

Regardless of local needs, all projects will be measuring the following common implementation elements:

- Integration of content expertise from program activities
- Integration of curriculum resources
- Integration of instructional strategies and classroom activities
- Integration of STEM technologies

These four areas are the focus of the state-level implementation evaluation requirements.

Data Sources

Local level

Each project will measure the levels at which participants are implementing expected local project activities using a variety of data sources (e.g., surveys , logs, interview and/or focus groups, classroom observation, and extant data). Examples of each of these methods for assessing implementation include:

1) Surveys – most local projects use the SEC (gives very broad view of implementation and the use of a wide variety of strategies) will not provide information about specific new lessons, tools, strategies, or resources that teachers are implementing in their classrooms.)

2) Logs – some projects require teachers to complete instructional logs tailored to the exact implementation requirements of each project during the period of implementation specified by the project

3) Extant data –some projects collect and analyze lesson plans, teacher reflection journals, and artifacts from action research projects to examine implementation.

4) Observation – all projects conduct some type of observation using one of several classroom observation protocols or original protocols developed to assess specific content-specific outcomes.

Projects selected observation protocol that aligns with their specific program goals. Notable resources include:

- Horizon Research Classroom Observation Protocol
- Reformed Teaching Observation Protocol (RTOP)
- Oregon Mathematics Leadership Institute (OMLI) Classroom Observation Protocol

5) Interviews/Focus Groups – projects may employ interviews or focus groups to supplement their understanding of teachers' implementation or barriers to implementation.

State level

At the state level, there are two primary sources of implementation data: SEC data (completed annually by participating teachers) and local implementation data related to the four common areas (integration of content expertise from program activities, integration of curriculum resources, integration of instructional strategies and classroom activities, and integration of

STEM technologies). State-level SEC data will be available directly from SEC. SEC data will be summarized across content areas to provide broad trends of implementation across strategies and content areas.

The next section lists the requirements of implementation data summaries that each project submits to the state.

Implementation Requirements for Meta-Analyses

Projects will submit implementation data through the IMSP portal about the level to which project participants successfully integrated content expertise from program activities, integrated curriculum resources, integrated instructional strategies and classroom activities, and integrated STEM technologies.

For each of these four areas, projects will report the following:

1) A list of the specific goals (with indicators and/or benchmarks) that were provided to their participants as expectations of implementation for the reporting period.

2) The data sources that the projects used to measure the level of implementation for each participating teacher. Three data sources are mandatory in order to ensure triangulation of evidence. The data entry form will have check boxes for types of surveys, logs, and observation protocols as well as generic descriptors for interview protocols.

3) The proportion of teachers in each of the following categories (rated separately for content, instructional resources, strategies, and STEM technologies):

- Evidence from multiple data sources shows full implementation of requirements for implementation
- Evidence from multiple data sources shows most but not all requirements for implementation met
- Evidence from multiple data sources shows about half of requirements for implementation met
- Evidence from multiple data sources shows some (less than half) requirements for implementation met
- Evidence from multiple data sources shows few requirements for implementation met
- Evidence from multiple data sources shows none of requirements for implementation met

The projects provide a narrative summary of the evidence they used to assign proportions of teachers to the levels of implementation for each of the areas (content, instructional resources, strategies, and STEM technologies). These proportions are used to generate four moderating variables (implementation of content, instructional resources, strategies, and technologies) in the meta-analyses models.

Conclusions

Measuring implementation fidelity at the state level requires sensitivity to local evaluations as well as attention to the core elements of adherence to the broad guidelines of the state program. The IMSP Implementation Evaluation framework balances the needs of the state with the local program implementation needs.

References

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Figure 1. State Evaluation of IMSP