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Analysis of Title IIB Mathematics and Science Partnerships in the Northwest Region

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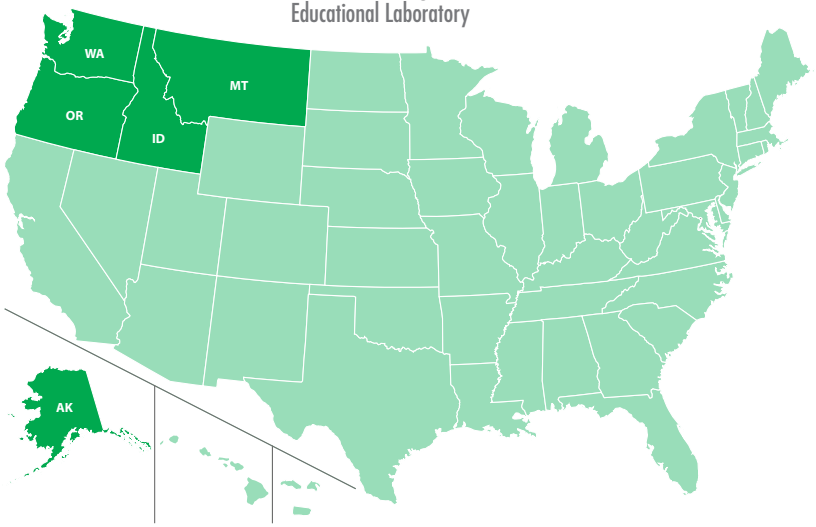

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Summary

Analysis of Title IIB Mathematics and Science Partnerships in the Northwest Region

This report describes the first year of the funded professional development activities in the Title IIB Math and Science Partnership projects in the Northwest Region and the evaluation models. The analysis is structured around the factors of professional development associated with changes in teacher knowledge and practice.

Title IIB Mathematics and Science Partnerships (MSPs) are the main resource in the No Child Left Behind Act to support the ongoing professional development of science and mathematics teachers. Funds available to states must be used to purchase high-quality professional development. In addition, with increasing concerns about accountability throughout the field—from federal agencies to the individual classroom teacher and student—educational interventions must demonstrate a positive impact on important educational outcomes. The Title IIB MSPs are intended to positively affect content knowledge and pedagogical skills for mathematics and science teachers. The ultimate goal is improved student achievement in mathematics and science.

This report describes the nature of the funded professional development activities in the Title IIB MSP projects in the Northwest Region and characterizes the models of evaluation during their first year of implementation, 2004–05.

The analysis is structured around the factors of professional development that have been identified as associated with changes in teacher knowledge and practice (Desimone et al., 2002; Garet, Birman et al., 1999; Garet, Porter et al., 2001; Porter et al., 2000). The description of the evaluations examines the extent to which the projects have connected their activities to measurable outcomes for teacher knowledge and practice and for student achievement, measured those outcomes, and clearly articulated their qualitative and quantitative study designs.

All projects met at least some of the criteria for high-quality professional development

The prevalent model of professional development in the MSP projects was a two-week, content-focused workshop or institute held during the summer, with follow-up support for teachers during the school year. One reason that this model was so common is that three of the five Northwest Region states required it in their requests for proposals. However, most of the projects in Idaho and Montana—the two states that did not require an institute—also conform to this model. This may be because the model is highlighted and defined in both the legislation and the requests for proposals, or it may also reflect the prevalence of the institute model in the previously funded Eisenhower Professional Development Program.

Although the summer institute was prevalent, the projects in the Northwest Region did feature many variations on that model. Projects differed in the way they structured and conducted the follow-up activities, as well as in the amount of ongoing support. Some projects included less emphasis on the summer workshop and more on ongoing, school-embedded, and collaborative activities for teachers. Despite these variations, the multiple authorized activities suggested in the legislation—such as recruitment of mathematics, engineering, and science majors to teaching through a variety of mechanisms—are not the focus of projects funded in the Northwest Region.

All of the projects provided evidence in the documentation that they met at least some of the criteria for high-quality professional development. It is far from clear whether projects must meet all criteria in every category to be considered effective. No available evidence indicates that professional development projects are more effective when they are rated highly in all categories than when they receive high ratings in only some categories. Nor is there evidence that any criterion is more important or less important than the others.

Evaluation presented significant challenges to the Title IIB MSP projects

Evaluation design and implementation in year one of the Title IIB MSP projects were problematic. In interviews many project staff and evaluators reported difficulties designing and implementing adequate evaluation due to the late awarding of the Title IIB MSP contracts for professional development. In addition, limited budgetary resources were identified as barriers to effective evaluation.

Evaluations of many projects relied on capturing participant reactions and self-reporting as the only sources of evidence of their effectiveness. Few projects used well developed instruments to measure changes in teacher content knowledge. Projects indicated difficulties using state assessments to directly measure the impact of projects on student achievement. For instance, the professional development might include a majority of teachers who were teaching at a level different from that targeted by the state science assessment. The lack of instruments for measuring changes in teacher and student knowledge of specific content led some projects to attempt to develop their own measures, while other projects resorted to less rigorous methods.

Care should be taken in interpreting these findings because this analysis is based on the first year of implementing the Title IIB MSP programs, when evaluation designs may not be fully mature. However, the minimal extent to which the project evaluations addressed evaluation standards that should be well known in the evaluation and professional development community indicates larger issues than the barriers identified above. Clearly, there is room for improvement in the project evaluations.

Ongoing technical assistance is necessary to increase the evaluation skills of the state education agency staff responsible for the Title IIB MSP programs and the staff and evaluators of the individual projects. The U.S. Department of Education regional forums are a start in informing stakeholders about the method and instruments to improve evaluations, but access to these regional forums is limited by project budget constraints.

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This report describes the first year of the funded professional development activities in the Title IIB Math and Science Partnership projects in the Northwest Region and the evaluation models. The analysis is structured around the factors of professional development associated with changes in teacher knowledge and practice.

OVERVIEW

The Title IIB Mathematics and Science Partnership (MSP) program is a federally funded formula grant program to the states that represents a major investment in the professional development of mathematics and science teachers under the No Child Left Behind Act. The program supports partnerships between the mathematics, science, and engineering faculty of higher education institutions and high-need school districts to increase teachers' content knowledge and pedagogical skills. Other partners, including schools of education, business, and nonprofit organizations, may also join the work. In fiscal year (FY) 2003 an appropriation of just under $100 million supported more than 300 projects. In FY2004 $150 million was appropriated and awarded to the states in fall 2004 and winter 2005.

Each state was responsible for administering a competitive grants program with the federal funds (box 1). As part of this process, the states established program priorities and a review process to award projects that responded to the most pressing problems in science and mathematics education that could be addressed through professional development. After funding the projects, the states were responsible for monitoring progress and working with the U.S. Department of Education to document their effectiveness. The enabling legislation required states to annually report to the U.S. secretary of education on the programs' impact on teachers' content knowledge and on student learning.

This report addresses three research questions

This study is intended to provide policymakers, state agency staff, and university and school personnel interested in potential Title IIB MSP projects with information about how the MSP program has been implemented and evaluated in the Northwest Region in the first cohort of the funded projects. Results of the Northwest Regional Educational Laboratory needs assessment document the growing concern by educators in

BOX 1

Details of the Title IIB Mathematics and Science Partnership legislation

The Title IIB MSP legislation provides considerable guidance for how the Title IIB programs in the states should be structured to improve teacher quality in science and mathematics.

Five goals for improving teaching
The legislation has five goals for improving the teaching force in K–12 science and mathematics education:

- Improving and upgrading the status and stature of mathematics and science teaching by encouraging higher education institutions to assume more responsibility for improving mathematics and science teacher education through a comprehensive, integrated system of recruiting, training, and advising mathematics and science teachers.
- Focusing on career-long intellectual growth of teachers and upgrading of skills and knowledge.
- Bringing mathematics and science teachers at both the elementary and secondary levels together with scientists, mathematicians, and engineers to increase teachers' subject matter knowledge.
- Developing more rigor in science and mathematics curricula to align them with state and local academic content standards and with the standards expected for postsecondary study in engineering, mathematics, and science.
- Improving and expanding training of mathematics and science teachers, including training in the effective integration of technology into curricula and instruction (Title IIB, Section 2201, Purpose, Definitions).

Required partners
The legislation identifies the members of the partnership, including a state education agency; science, engineering, and mathematics faculty at a higher education institutions; and a high-need local education agency. Other partners might include additional science, engineering, and mathematics faculty; teacher preparation faculty; additional local education agencies (public charter or private schools); businesses; and nonprofit or for-profit organizations.

Authorized activities
Although the legislation defines one possible model of professional development—the summer workshop or institute—a range of 10 authorized activities are suggested, including:

- Professional development activities that increase mathematics and science content knowledge for teachers.
- Recruitment of mathematics, engineering, and science majors to teaching through a variety of mechanisms.
- Development of rigorous science and mathematics curricula.
- Development of distance learning programs for mathematics and science teachers.
- Design of programs to connect teachers to practicing scientists.
- Development of teachers and programs to encourage women and underrepresented populations in postsecondary study of science, technology, engineering and mathematics careers. (Title IIB, Section 2201, Grants for Mathematics and Science Partnerships).

The definition of a summer workshop or institute includes direct interactions of at least two weeks between teachers, as students, and higher education institution faculty are required. In addition, the workshop or institute must include at least three days of follow-up in the classroom or through distance learning.

Evaluation and accountability plan
MSP partnerships are required to develop an evaluation and accountability plan that measures the impact of activities. The legislation clearly articulates that the evaluation needs to focus on the impact of the professional development on student achievement and must include measurable objectives to increase the number of teachers who participate in content-based professional development (Title IIB, Section 2201, Grants for Mathematics and Science Partnerships).

Evaluations might also include measurable objectives to increase participation by students in advanced courses in mathematics and science and to increase percentages of teachers with academic majors or minors in science, technology, engineering, and mathematics or classes taught by such teachers.

the Northwest Region on implementing research-based instructional practices in core subject areas to directly improve student achievement. Respondents recognized that more effort is needed in identifying "research-based" best practices, and a majority said that they are particularly interested in professional development in specific research-based mathematics practices. The No Child Left Behind Act requires science assessments beginning in 2007–08, and 7 of 10 principals indicated that their schools need to put more effort into student proficiency in science. However, responses regarding professional development needs suggest that most schools have not yet given much thought to specific practices or models they might consider.

Three research questions structure this report:

1. What is the nature of the professional development provided by the Title IIB MSP projects in the Northwest Region?

2. What is the nature of the evaluation of the Title IIB MSP projects in the Northwest Region?

3. Under what conditions is the development of experimental or quasi-experimental models of evaluation appropriate and successful?

Descriptive analyses were conducted of the year one Title IIB MSP projects in Alaska, Idaho, Montana, Oregon, and Washington (see appendixes A and B). These analyses are intended to present the projects as they existed at the end of the first year of funding viewed through the lenses of criteria for high-quality professional development and program evaluation. A related study is currently being conducted by the Council of Chief State School Officers in a project funded by the National Science Foundation (box 2).

The analysis is based on the available documents produced by the states and funded projects and an interview structured around core programmatic issues of the professional development and evaluation designs (appendix C). The documents included state requests for proposals, funded proposals, and year one annual reports. These are static documents, collected before the projects unfolded.

BOX 2

Details of the Improving Evaluation of Professional Development in Mathematics and Science Education project

A related study is currently being conducted by the Council of Chief State School Officers (CCSSO) in a project funded by the National Science Foundation. The purpose project is to identify professional development programs that meet criteria established by research and to report on the effects of the identified programs on improving teaching and learning in mathematics and science. The CCSSO study convened a review panel to examine 27 nominated programs from 15 states using a program quality rubric to assess the professional development and evaluation designs (Blank, 2006). The preliminary results are available online at www.ccsso.org/projects/Improving_Evaluation_of_Professional_Development/.

A detailed comparison of the results of the CCSSO review with the results of this study is not appropriate because the two projects are different in both nature and scope. The CCSSO study is not limited to Title IIB MSPs and includes projects funded by the National Science Foundation. Also, the CCSSO study conducted an analysis around iterative interviews with project staff and evaluators as well as project documents, while this study relies on a static database. Finally, the CCSSO study uses a rating system implemented by an expert panel, while this study is descriptive and uses similar but not identical criteria in its analysis. Although a detailed comparison is not possible, some general statements about the CCSSO findings are provided in this report. Overall, the preliminary findings from CCSSO suggest results similar to those of this analysis—namely, that there is variation among the projects in terms of both professional development and evaluation design.

The nature of the professional development being implemented in each of the projects was examined using an analytic framework based on the National Evaluation of the Eisenhower Professional Development Program (Desimone et al., 2002; Garet, Birman et al., 1999; Garet, Porter et al., 2001; Porter et al., 2000). The framework is organized around six features of high quality professional development that were identified in that evaluation of mathematics and science programs: duration, activity type, collective participation, content focus, active learning, and coherence (see appendix D). There are four dimensions of partnership: supporting preconditions, complexity, interdependence, and communication (Kingsley & O'Neil, 2004; Kingsley & Waschak, 2005).

The analysis of the evaluations of Title IIB MSP projects used a matrix of evaluation criteria developed by SRI International in the Online Evaluation Resource Library based on the program evaluation standards established by the Joint Committee on Standards for Educational Evaluation (JCSEE, 1994). The program evaluation standards focus on the utility, feasibility, propriety, and accuracy of evaluations of educational programs. The Online Evaluation Resource Library web site includes three matrixes that provide a descriptive framework of what should be included in an evaluation that meets the program evaluation standards.

Title IIB MSP programs vary across the five Northwest Region states

Alaska is the only state among the five that funded only one project in the first year. The Alaska project served 51 teachers in two school districts: Anchorage—a large urban district—and Lake and Peninsula—a large rural district with many remote schools. The partnership for this project included the two districts and the University of Alaska–Anchorage. The Alaska MSP program focused on K–8 mathematics. Some of the requirements identified by the state included a summer institute of at least two weeks with follow-up during the school year, coursework to help teachers achieve highly qualified status, and the participation of master teachers to serve as instructors.

Idaho funded four MSP projects in year one, all of which focused on mathematics. The total number of teachers served was 163. Two of the projects served schools in northern Idaho and two were based in southern Idaho. Although the Idaho projects all focus on mathematics, the state did not exclude science projects from the Idaho MSP program.

There were six MSP projects funded in Montana. Three projects focused on mathematics, two on science, and one on both. The projects served 165 teachers in the first year. Three projects served teachers in western Montana, one project was based in eastern Montana, and two projects served teachers from both sides of the state.

In year one, Oregon funded four projects. Three projects were focused on mathematics and one on science. The projects served approximately 142 teachers. Two projects were based in northwestern Oregon, one in the central region of the state, and one in the eastern region. The Oregon MSP program emphasized K–12 mathematics, although it did not exclude science-focused projects from eligibility. The state required a two-week institute with follow-up during the year. Unlike other states in the region, Oregon gave preference to projects that used an experimental or quasi-experimental design for the evaluation. Due to these challenging requirements, the Oregon MSP program also recommended that the projects limit the number of teachers served.

Washington funded four projects in year one. Two projects integrated mathematics and science, one project treated both subjects separately, and one project focused only on mathematics. The partnerships served 258 teachers and were distributed across the state—two were based in western Washington, one in central Washington, and one in the eastern region of the state.

The Washington MSP program required a two-week summer institute with follow-up. The state

also tailored the requirements to emphasize Washington priorities for mathematics and science, placing emphasis on pedagogical content knowledge and teacher collaboration.

The Title IIB program has multiple implications for analyzing how policy is translated into professional development program implementation

The Title II legislation focuses heavily on policymaking at the federal and state levels around the quality of the teaching workforce (Plecki & Loeb, 2004). Many of the policy issues in Title II focus at the level of the classroom teacher, including recruitment, induction, retention, certification, and compensation. However, the Northwest Region states have established Highly Objective Uniform State Standards for Evaluation, as required by the No Child Left Behind Act, that have resulted in most veteran teachers already being identified as highly qualified.

One policy issue is what states are doing to provide support for teachers' work. As the primary vehicle for professional development in science and mathematics education, the Title IIB MSP program is a key leverage point in state education policy, determining what is sanctioned as effective professional development. Title IIB MSP projects represent one way that states are addressing the issue of highly qualified teachers. For the most part, Title IIB MSP resources are used largely to improve the disciplinary knowledge and teaching skills of in-service teachers, who are typically already licensed to teach. This policy issue is the focus of the first research question articulated below.

A second policy issue is the nature of acceptable evidence of the effectiveness of professional development. This includes a project evaluation that addresses measurable objectives of improvement of teacher mathematics and science content knowledge and pedagogical skills and of increases in student achievement. The U.S. Department of Education's *Strategic Plan 2002–2007* provided criteria to "transform Education into an evidence-based field" (U.S. Department of Education, 2002, p. 53). The Education Science Reform Act of 2002 emphasizes the role of experimental and quasi-experimental research and evaluation to determine the effectiveness of educational programs. This policy issue is the focus of the second and third research question articulated below.

The purpose of the analysis in this report is to provide a description of the professional development and evaluations conducted in the first year of the Title IIB MSP programs in the Northwest Region. The analysis is not intended to provide information about the effectiveness of the professional development or the evaluations. Such an analysis would require more extensive sources of data and a direct assessment of the projects, which are beyond the scope of this project.

WHAT IS THE NATURE OF THE PROFESSIONAL DEVELOPMENT PROVIDED BY THE TITLE IIB MSP PROJECTS IN THE NORTHWEST REGION?

This section summarizes the findings from the descriptive analysis and provides an overview of the professional development conducted in year one. The nature of the professional development being implemented in each of the projects was examined using an analytic framework based on the National Evaluation of the Eisenhower Professional Development Program (Desimone et al., 2002; Garet, Birman et al., 1999; Garet, Porter et al., 2001; Porter et al., 2000). Full descriptions of each project can be found in appendix A. The framework is organized around six features of high quality professional development: duration, activity type, collective participation, content focus, active learning, and coherence. (The analysis framework for professional development is included in appendix D).

In conducting the descriptive analysis of the professional development, the proposals, year one evaluation reports, and interviews were examined to identify evidence related to each of the criteria and subcriteria in the analysis framework. The data were organized into an analysis framework

matrix and then summarized into the project tables that are included in appendix A. The descriptions should not be read as an evaluation of the effectiveness of the projects.

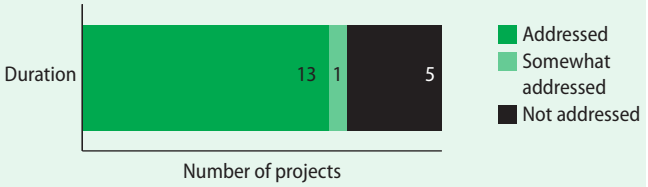
The summary of the qualitative analysis that follows was developed to look at patterns in professional development provided by the Title IIB MSP projects in the Northwest Region. The intent of the summaries is to provide an overview of the information available in the full descriptions.[1]

To create this summary, the authors iteratively assigned projects to categories based on the available information related to the dimensions of the analysis framework. The categories that were used to summarize the qualitative analysis included the extent to which the criteria were addressed, or reported. For example, a component of a project was assigned to the "Addressed" category if information related to the dimension was explicitly put forth in both the proposal and the annual report. The "Somewhat addressed" category was assigned if the criterion was treated minimally or the information provided was incomplete. For example, some of the proposals and annual reports included statements that the project was aligned with standards, but no specific information was provided. The category "Not addressed" indicates that there was evidence that the project did not include the aspect of professional development or evaluation, while "Not reported" indicates that the documentation does not provide sufficient information to assign the project to a category.

Duration provides opportunities for in-depth study and ongoing support

Duration includes the total number of contact hours and the span of the program. Duration is related to the quality of professional development in at least two ways (Garet, Birman, et al., 1999). First, longer activities provide opportunities for in-depth study of content and pedagogy. In addition, activities that take place over a substantial span of time provide more opportunities to support teachers in trying out new practices. Exemplary professional development programs generally provide learning experiences that are at least 80 hours long (Garet, Birman, et al. 1999).

FIGURE 1
Most projects provided 80 or more hours of professional development



In year one 13 projects provided 80 or more hours of professional development and were assigned to the "Addressed" category (figure 1). One project was assigned to the "Somewhat addressed" category because evidence of duration was reported in terms of weeks rather than hours or days. The remaining five projects did not provide sustained professional development.

Activity type has two dimensions: traditional and reform

Activity type has two dimensions. Traditional activities include within-district workshops and conferences, courses for college credit, and out-of-district workshops and conferences. Reform activities include teacher study groups; teacher collaboratives, networks, and committees; mentoring; internships; and resource centers. Reform activities often take place during the school day and may be more consistent with teachers' goals and other professional development activities (Garet, Birman, et al., 1999).

Two projects were assigned to the "Addressed" category because their primary means of providing professional development was reform activities (figure 2). Nine projects were assigned to the "Somewhat addressed" category because they provided a mix of traditional and reform activities. The eight projects in the "Not addressed" category conducted only traditional activities. One project was included in the "Not reported" category because there was not enough information to characterize the activities.

FIGURE 2
More than half of projects included at least some reform activities

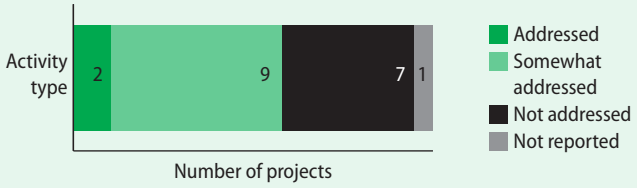
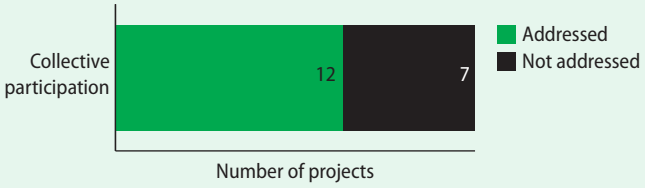


FIGURE 3
Almost two-thirds of projects included collaboration among teachers from the same school or district



Collective participation includes activities for teachers from the same school or district

Collective participation includes activities designed for groups of teachers from the same school or district as opposed to individual teachers. Activities that feature collective participation provide opportunities for teachers to support each other as they attempt to incorporate new knowledge and practices (Garet, Birman, et al., 1999). Collective participation may also make it more likely that structural or organizational support will be put in place.

Twelve projects supported collaboration among teachers from the same school or district and were thus included under the "Addressed" category (figure 3). The remaining seven projects were not designed to explicitly support collective participation, although many of them did provide opportunities for participants to collaborate with each other. While such opportunities may be valuable, they do not address the same issues that are reflected in the criterion for collective participation—fostering schoolwide or districtwide support for teacher growth and improved instruction.

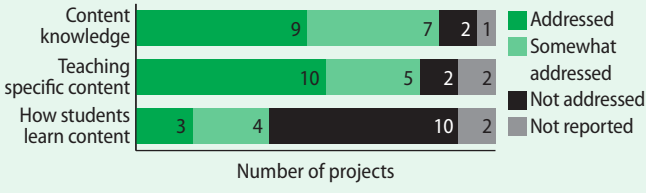
Content focus addresses the substance of professional development

Content focus is the degree of emphasis on deepening teachers' content knowledge in mathematics and science. There is evidence that professional development focused on content is related to increased student achievement (Cohen & Hill, 1998; Kennedy, 1998). Content focus has three dimensions: content knowledge, methods of teaching specific content, and emphasis on how students learn specific content (Garet, Birman, et al., 1999; Garet, Porter, et al., 2001).

Projects were assigned to categories for each of the dimensions—some projects addressed multiple aspects of content focus while others addressed only one. Projects that appeared to have a less focused approach—indicated by coverage of multiple topic areas or lack of detail about the content—were assigned to the "Somewhat addressed" category. Two projects in the "Not addressed" category did not identify a focus for the professional development, while one project did not provide any information about the content of the professional development. More projects fell in the "Addressed" category for emphasis on content knowledge and teaching specific content than for how students learn content (figure 4).

In interviews project staff identified a tension between having enough time to address both content and how to incorporate such content into instructional units. However, many project staff also indicated that two weeks was the limit for engaging teachers.

FIGURE 4
Most projects at least somewhat addressed content knowledge and teaching specific content



Active learning describes participants' learning experiences

Active learning includes opportunities for teachers to use new knowledge and practices with support and feedback. It is divided into four dimensions to provide a more specific description of participants' learning experiences: observing and being observed, planning for classroom implementation, analyzing student work, and presenting and leading discussions and writing reports or plans (Garet, Birman, et al., 1999).

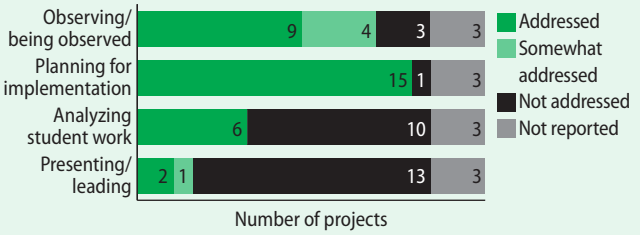
All projects provided some form of active learning except for three that did not provide evidence related to the format of the learning opportunities and were assigned to the category "Not reported." Projects that provided evidence of some types of active learning but not others were placed in the "Not addressed" category for the dimensions not included in their activities. Projects that provided opportunities for participants to observe modeled instruction but not to be observed and receive feedback were categorized as "Somewhat addressed" for the observing and being observed dimension (figure 5); one project provided opportunities for a small subset of participants to present and was categorized as "Somewhat addressed" for the presenting and leading dimension.

The most common form of active learning in the Northwest Region MSP projects was planning for implementation, which was included in 15 projects. Nine projects provided opportunities for participants to observe instruction, to be observed, or both. Significantly fewer projects conducted activities in which participants had opportunities to make presentations or to analyze student work.

In interviews disciplinary faculty indicated that integrating professional development into the work of classroom teachers was a challenge. Lack of sufficient funds to support ongoing interactions with faculty in institutions of higher education and the difficulty integrating service work with schools into tenure requirements were two problems noted.

FIGURE 5

Most projects provided active learning in the form of planning for implementation



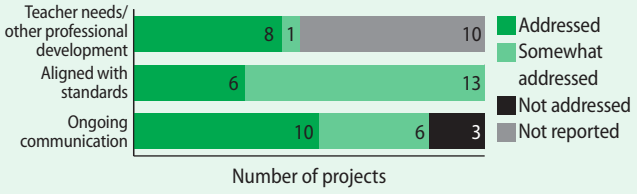
Coherence indicates how connected professional development is to other teacher learning and development activities

Coherence is the degree to which the professional development is part of a wider set of activities for teacher learning and development. It includes connection to other professional development activities and to teachers' professional goals, alignment with state and district standards and assessments, and support for sustained communication among teachers (Garet, Birman, et al., 1999). Coherence was related to improvements in knowledge and practice reported by teachers (Desimone et al., 2002; Garet, Porter, et al., 2001).

Eight projects provided evidence that the activities were connected to teacher needs or to other professional development and were assigned to the "Addressed" category (figure 6). One project reported providing information that could help create coherence in this dimension and was placed in the "Somewhat addressed" category. The other 10 projects did not provide any information on this dimension.

All of the projects provided some evidence that the activities were aligned with standards, but six projects provided more detailed information and were assigned to the "Addressed" category. Ongoing communication was more common than connecting the project to teachers' needs or other professional development efforts. Projects were assigned the category "Somewhat addressed" if issues of ongoing communication were identified, but it was not clear how the issues would be addressed.

FIGURE 6
Ongoing communication was the most common dimension of coherence addressed by projects



There are four criteria for describing partnership

The analysis of the professional development also includes criteria that examine the nature of the partnerships that are demonstrated in project documents and through interviews. It has been more problematic to structure the criteria for what constitutes an effective partnership. The work of Gordon Kingsley and his group at the Georgia Institute of Technology has informed the development of the characteristics to describe "partnership" in the Title IIB MSP projects. A partnership, for the purpose of this analysis, is a group of entities (organizations such as schools, colleges or universities, and for-profit or non-profit companies) that work together to accomplish a set of mutual goals. The four dimensions for describing partnership include supporting preconditions, complexity, interdependence, and communication (Kingsley & O'Neil, 2004; Kingsley & Waschak, 2005).

For the summary of partnership descriptions, the projects were divided into only two categories. The "Included" category indicates that the documentation included information related to that dimension. The "Not included" category indicates that the projects did not provide information. This binary system was used because the available evidence related to partnership categories was very limited. In addition, many of the dimensions related to partnership are not indicators of quality but are merely descriptive.

Preconditions for partnership include existing relationships and mutual goals

Partnership preconditions include existing relationships between organizations prior to the development of the partnership. An additional precondition is the extent to which the needs of the partners are congruent and the partnership enables them to pursue mutual goals. Just over half the projects included information about prior collaboration (figure 7). Only three projects included goals that were mutually beneficial to all partners—most of the activities were designed to produce outcomes only for teachers and schools.

Complexity characterizes the structure of the partnership

Complexity encompasses several dimensions to describe the structure of a partnership. A partnership with a vertical structure is hierarchical, and a partnership with a horizontal structure includes peer organizations on the same level. Partnerships with sector complexity include organizations with different areas of work. Spatial complexity refers to size of the geographic area that the partnership serves.

The MSP projects were characterized as having either a vertical or horizontal structure, with more projects falling into the vertical category than the horizontal category (figure 8). These categories are merely descriptive—one type of structure is not

FIGURE 7
Most activities were designed to produce outcomes only for teachers and schools

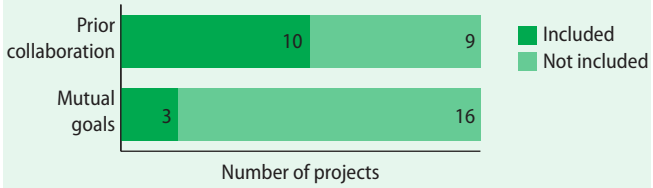
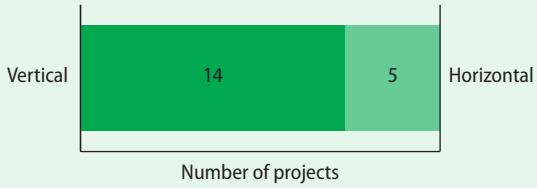


FIGURE 8
More projects had a vertical structure than had a horizontal structure



considered more desirable than the other. Only one project involved partners from sectors other than education (figure 9). On the other hand, 10 projects were spatially complex and served a large geographic region.

Interdependence describes how the partners organize their work

Interdependence characterizes the extent to which partners depend on each other for resources or materials and how they accomplish their work. Partners with reciprocal interdependence share their work back and forth. With sequential interdependence, the work of one partner will feed into the work of another. Pooled interdependence characterizes partnerships in which the members work independently for the most part.

None of the projects indicated that the partners had a sequential approach to interdependence (figure 10). This is likely the result of the available documentation, which provided little detail about how the projects intended to go about partner collaboration. More projects fall into the pooled category, in which the partners have different responsibilities, than into the reciprocal category, in which the partners share responsibilities. Some of the projects used a mixture of pooled and reciprocal collaboration.

Communication describes the frequency of contact among partners

The final partnership dimension is communication. The characteristics of communication in the projects were more difficult to identify than those in the other dimensions, and the inferences made are more tentative. Communication refers only to the frequency of communication among the partners rather than the quality or direction of communication. Just over half of the projects provided information about frequency of communication in the documentation (figure 11).

Only a brief comparison with the Council of Chief State School Officers project is possible

At the time this report was written, CCSSO has not released a full-scale report of its study, *Improving Evaluation of Professional Development in Mathematics and Science Education*. As a result, only a brief comparison between the two projects is possible. Some of the general findings from the CCSSO study include a consistent focus on content knowledge (12 of 15 projects) and alignment with standards (13 of 15 projects). More of the projects in the Northwest Regional Educational Laboratory study provided active learning opportunities via planning for implementation (15 of 19 projects) and analyzing student work (6 of 19 projects) than the CCSSO projects did—7 of 15 projects for planning and 3 of 15 projects for student work.

FIGURE 9
More than half the projects served a large geographic region

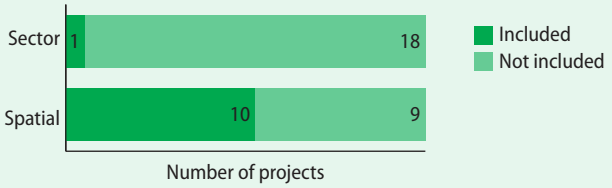


FIGURE 10
A pooled approach to collaboration was more common than a reciprocal approach

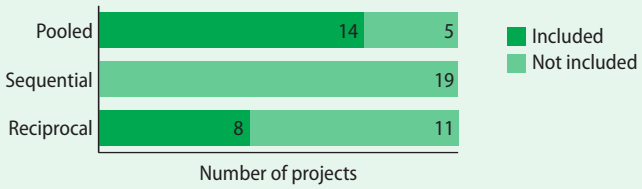
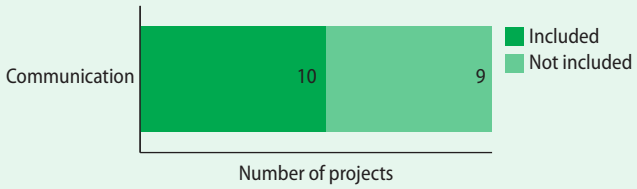


FIGURE 11
Just over half of projects provided information about frequency of communication in the documentation



WHAT IS THE NATURE OF THE EVALUATIONS OF THE TITLE IIB MSP PROJECTS IN THE NORTHWEST REGION?

The second research question examines the nature of the evaluations of the Title IIB MSP projects and the extent to which the project addressed standards for the design and implementation of program evaluations. The authors constructed descriptions of the nature of the evaluation in each project using evidence from the project documents and interviews conducted at the end of year one. The data were organized into a project evaluation analysis framework matrix and then summarized into project tables (see appendix B).

The summary of the qualitative analysis that follows was developed to look at patterns in the evaluations provided by the Title IIB MSP projects in the Northwest Region. The intent of the summaries is to provide an overview of the information available in the full descriptions. The descriptions of the project evaluation should not be read as an evaluation of the effectiveness of the projects. The analysis framework for project evaluation can be found in appendix D.[2]

To create the summaries of evaluation design and implementation, the authors iteratively assigned project evaluation features to categories based on the available information related to the dimensions of the evaluation analysis framework. A feature of a project was assigned to the "Addressed" category if evidence related to the dimension was explicitly put forth in the proposal, the set of project interviews, and the annual report. The "Somewhat addressed" category was assigned if the criterion was treated minimally or the information provided was incomplete. For example, in many of the proposals and annual reports, the evaluator was identified, but no information was provided about that person's experience to establish credibility. The category "Not addressed" indicates that there was evidence that the project did not include the aspect of professional development or evaluation, while "Not reported" indicates that the documentation does not provide sufficient information to assign the project to a category. More detail about how categories were assigned is provided in the summary sections for professional development and evaluation in the main report.

Project context provides information about factors that might influence implementation

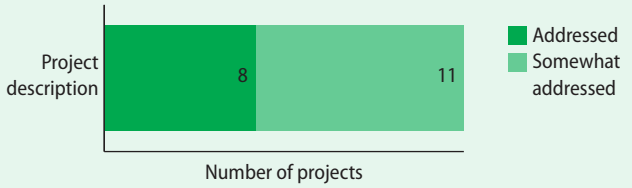
A key element of an evaluation should be sufficient information about the project so that the evaluation audience can make inferences about factors that might contribute to project implementation and impact. This criterion includes a description of the project goals, objectives, and activities and an identification of appropriate stakeholders. Evaluations should also include some information about contextual factors that might have influenced the project.

All the projects included some information about the project and identified the appropriate stakeholders in their proposals or annual reports. However, only eight projects included information about the project context that might have influenced project implementation (figure 12).

Evaluation purpose should be clearly identified

A second criterion of evaluation quality addresses the extent to which the evaluations of the projects identified ways in which information was used. Formative evaluation information should be reported by the extent to which it was used by project staff to improve the professional development. Summative evaluation information communicates the extent to which project goals and objectives have been met.

FIGURE 12
Less than half of projects included information about the project context that might have influenced project implementation



A majority of the projects included at least some identification about the purpose of the project, and formative purposes were most frequently cited (figure 13). Only four project evaluations included details about how the projects used the information from the evaluation to improve project function. Almost one-third of the projects did not indicate the purposes the evaluation served.

Evaluation questions should be aligned with project goals

A key feature of a quality evaluation is the identification of evaluation questions and their alignment with project goals and objectives. In addition, evaluation questions should indicate how evaluation information might be used by appropriate stakeholders.

Only two projects had evaluation questions that were clearly articulated, well aligned with project goals and objectives, and explicitly tied to data sources (figure 14). Another five projects stated evaluation questions, but the questions were either not aligned with project goals or not connected to sources of information to answer them. In the remaining projects evaluation questions were either not stated simply repeated the project goals or objectives.

The identity and credibility of the evaluator should be clear

The evaluator of a project should be clearly identified and the relationship between the evaluator and project should be articulated. In addition, the professional qualifications and experiences of the evaluator should be briefly described to establish one element of trust in the findings.

FIGURE 13
Few projects included details on how the projects used the information from the evaluation

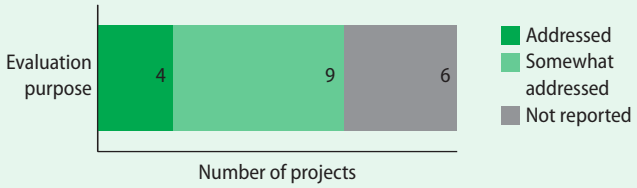
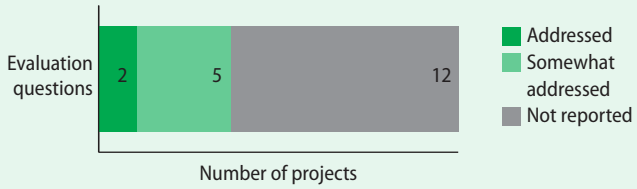


FIGURE 14
Few projects had evaluation questions that were clearly articulated, well aligned with project goals and objectives, and explicitly tied to data sources



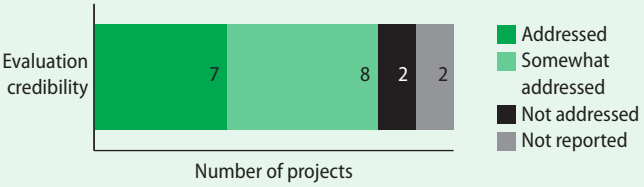
Seven projects identified a specific person for the evaluation and included information about the evaluator's qualifications (figure 15). In eight projects the evaluator was identified, but no additional information about the evaluator was included. In two projects the evaluator identified in the proposal was not used for the evaluation, and in two others the evaluator was not identified at all.

Evaluation plans should describe stakeholder involvement

An evaluation should describe how the positions and perspectives of the stakeholders will be taken into account throughout the evaluation. A description of stakeholders' involvement in the evaluation illustrates how they influence the evaluator's understanding of project goals and objectives, how evaluation questions are shaped, and how results are reviewed.

Only seven project evaluations mentioned stakeholder involvement with the evaluation (figure 16). Involvement was defined as having contributed information to the evaluation, and formative use of evaluation information was largely limited to

FIGURE 15
More than a third of projects identified a specific person for the evaluation and included that person's qualifications



project staff responsible for the development of professional development activities. In the remaining projects no indication of stakeholder involvement was provided.

Methodological approaches need to be clearly described

The evaluation plan should describe the proposed methodological approaches. The description should provide information about how the evaluator will identify and use data that help answer the evaluation questions within the constraints of time and cost. The data gathered need to be aligned with the goals that the project is intended to achieve.

Four projects included sufficient information about the design of the evaluation to identify the methodological approach (figure 17). They attempted some form of experimental or comparison group design, with enough information to explain how the design was implemented. In seven projects a methodological approach was initially identified and included both quantitative and qualitative evaluation designs, but there was insufficient evidence in the annual report that the approach had actually been implemented. Two projects indicated in their proposals that they would use a comparison group approach but did not implement such a design. The evaluations that used a qualitative evaluation approach included limited information about the design elements. Almost half of the projects did not indicate any methodological approach.

FIGURE 16
Seven project evaluations mentioned stakeholder involvement

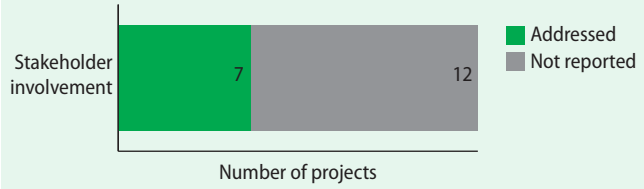
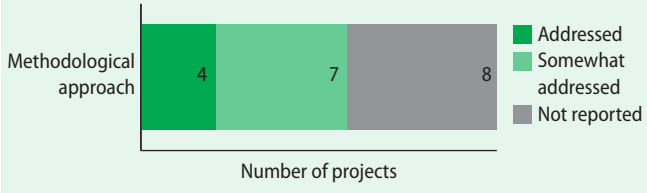


FIGURE 17
Over half the projects included some information about the design of the evaluation



Plans should report information sources and sampling

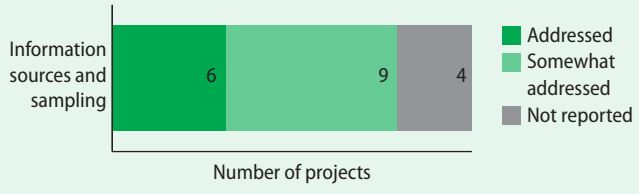
The sources of information that will be used in the evaluation should be described in enough detail to assure that the information will be sufficient to meet the evaluation's purposes. Information about how the groups were selected to provide information should be identified and briefly described. If stakeholders are sampled, sampling strategies need to be clearly described.

Almost one-third of the project evaluations included some characterization of the sources of information for their evaluations as well as how those sources were chosen and how samples were determined (figure 18). Nine projects identified the sources of information. But four did not include any information about data sources or about who supplied comments about professional development activities, meaning the reader does not know how many participants commented in support of the project.

Information about data collection instruments is essential

The evaluation should describe the nature of the data collection instruments and how they will be used to gather needed information. Information should also be included that demonstrates how

FIGURE 18
More than half of projects identified the sources of information



instruments are used to examine evidence of data reliability and validity.

More than one-third of the projects specifically identified the instruments used to collect data and included those instruments as appendixes in their annual reports, but they did not provide information about quality control characteristics of the use of the instruments, such as evidence of reliability and validity (figure 19). An additional 10 projects indicated that they used instruments, frequently project designed, but did not include the instruments in their reports. Two projects did not specify instruments in enough detail to inform the reader of what data were collected.

Specific data collection procedures should be identified

The evaluation report should describe how and when data were collected from sources. This information should include how the sources will answer evaluation questions through triangulation and multiple perspectives. The description of the data collection and its intent will provide a context for the eventual judging and interpreting of evaluation findings and recommendations.

Only four projects provided specific information about when and how data were collected, but it was unclear who was responsible for collecting the data (figure 20). A majority of projects indicated that data collection occurred but provided no specific information about when and how. Almost one-quarter of the projects did not address when and how data were collected.

FIGURE 19
Most projects provided some information about instruments they used to collect data for their reports

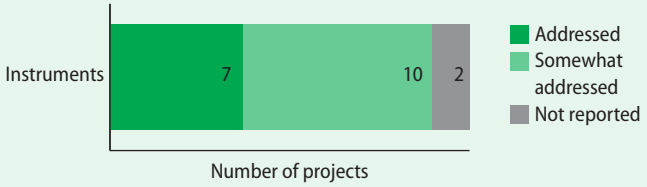
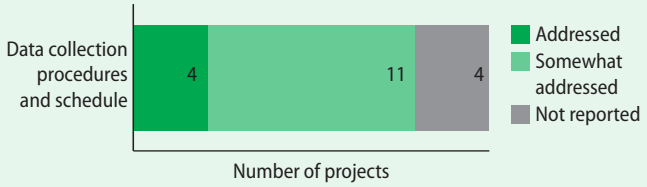


FIGURE 20
Few projects provided complete information on when and how data were collected



Descriptions of quantitative analysis processes should be detailed

Evaluations need to show the nature and appropriateness of the quantitative analysis procedures and their relationships to the evaluation questions and data sources. Information about how the evaluation addresses the practical significance (e.g., effect sizes) and replicability, as well as statistical significance, should be included.

Only three projects included information about which quantitative analysis procedures were used to conduct statistical analysis of project data (figure 21). One-quarter indicated using descriptive statistics to report survey results, and another quarter reported statistically significant results but provided no information about how their analyses were performed. Reporting significance without providing transparent data and analysis processes is a major flaw in these evaluations. The remaining six projects provided no indication of quantitative analysis.

Qualitative analysis processes should be articulated

Evaluations need to show the nature and appropriateness of the qualitative analysis procedures and

FIGURE 21
Most evaluations did not provide complete information on quantitative analysis

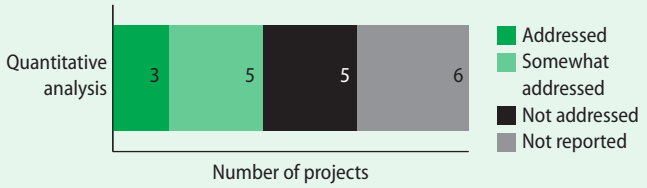


FIGURE 22
Only one project provided any information about how qualitative data were analyzed

their relationships to the evaluation questions and data sources. The extent to which the findings are supported by qualitative data gathered from more than one source should be addressed.

Only one project provided at least some information about how qualitative data were analyzed and addressed triangulation methods (figure 22). Most projects indicated that qualitative data were analyzed but failed to provide sufficient information as to how. And two projects did not report any qualitative data.

Results from the evaluation analyses here cannot be compared with those from the Council of Chief State School Officers

The results of the evaluation analyses from this Fast Response Task and the CCSSO study are not comparable because two different sets of criteria were used. The CCSSO study rated the evaluations according to Guskey's model for evaluating professional development (Guskey 2000), while the Northwest Regional Educational Laboratory study used criteria based on the Joint Committee on Standards for Educational Evaluation (JCSEE 1994).

UNDER WHAT CONDITIONS IS THE DEVELOPMENT OF EXPERIMENTAL OR QUASI-EXPERIMENTAL MODELS OF EVALUATION APPROPRIATE AND SUCCESSFUL?

The third research question of this Fast Response Task asks under which conditions experimental or quasi-experimental evaluation designs are successful or appropriate or successful for the Title IIB MSP projects in the Northwest Region. No project conditions supported successful implementation of an experimental or quasi-experimental evaluation design in the Title IIB MSP projects. But the extent to which such rigorous evaluation models are appropriate for Title IIB MSP projects is less straightforward.

Only 7 of 19 funded projects included some evaluation design that included a control or comparison group. Two projects used randomized control experiments with random assignment of schools to a treatment and control group. Characterizing the other project evaluation designs in a quasi-experimental category is problematic because the evaluators did not provide sufficient indication of how they compared treatment and comparison groups These projects are thus referred to here as comparison group evaluation designs. Of the five projects with comparison group evaluation designs, two included the comparison group design in the proposal, but there was no evidence of the results in the year one report. Two other projects used a comparison group design but lacked enough detail regarding the identification of the comparison group to determine the utility of the information provided. A fifth project allowed for self-selection of teachers into a treatment or comparison group and provided limited information about the comparison group.

The first issue that arises in the analysis is why only 7 of 19 funded projects even attempted a comparison group, quasi-experimental design, or experimental evaluation design. In interviews project staff and evaluators reported several issues that arose as they initially examined the potential to design and implement rigorous evaluations. The primary reason that projects did not seek to implement an experimental, quasi-experimental, or comparison group design was the difficulty or reported impossibility of recruiting a control or comparison group within the context of the professional development partnership. Project staff indicated that schools and districts refused to consider such assignment. Even when a project

sought to recruit a comparison group, they had difficulty matching the treatment and comparison groups at the grade level when their projects addressed a broad span of teachers. Another reason was the lack of availability of adequate instrumentation. Project staff indicated that even if they had negotiated an agreement for a randomized design, they did not have adequate measures of changes in teacher content knowledge and instructional practices or of student achievement in project-focused content. They indicated that they did not consider the state assessments to be aligned with the content of the professional development.

Adequate evaluation resources were identified as problematic by several projects. In many cases the evaluation budget was reported to be between $3,000 and $10,000. Conducting a rigorous evaluation for such a sum was cited as being impossible. Finally, evaluation capacity was indicated as a major reason why the models of evaluation were not rigorous. Few of the evaluators indicated that they had experience with or capacity to carry out a rigorous evaluation.

Two of the projects attempted to implement an experimental design. In both the initial model of evaluation posited random assignment to treatment and control groups at the teacher level. However, both projects had to change that random assignment to a school level as teacher collaboration in either a formal lesson study approach or across grade levels through electronic support were an integral part of the professional development. Changing the unit of analysis from teacher to school resulted in a severe reduction in sample size. Project staff indicated that they were aware of the lack of power in their evaluation design and that this lack of power made determining an effect of the project on teacher content knowledge, instructional practices, or on student achievement very problematic.

Both of the projects that did attempt more rigorous evaluations came from Oregon. The request for proposals in that state indicated that preference would be given to grant applicants who included randomized controlled trials or similar quasi-experimental methods in the project evaluations. In addition, the bidders sessions provided by the state education staff who were responsible for explaining the grant program to potential applicants emphasized the need to conduct research within the Title IIB MSP program. This is not to say that simply exhorting projects to implement rigorous evaluations will result in projects engaging in such designs. However, the state education agency staff member indicated that including the increased preference for experimental or quasi-experimental evaluations was a major factor in the resulting attempts.

In addition, the U.S. Department of Education has provided continued technical assistance to the state education agency staff and to projects on a regional basis. This technical assistance included information about assessments for both teachers and students that several project staff and evaluators indicated provided them with instruments that they might use to measure change in teacher and student content knowledge. State education agency staff have shared this information with project staff in periodic meetings throughout the past two years. They indicated that projects intended to increase the rigor of their evaluations in the second year of the projects.

FINDINGS SUGGEST FUTURE DIRECTIONS FOR RESEARCH

Two difficulties were encountered in the design of Title IIB MSP professional development programs. One is providing content to teachers and addressing instructional needs. In interviews project staff identified tension between having enough time to address content and the ways in which such content should be incorporated into instructional units, especially within the two week window usually allotted for training workshops. Another issue is the difficulty that project partners, especially disciplinary faculty, have integrating professional development into the work of the teacher in the classroom. Lack of sufficient funds

to support ongoing interactions between faculty in institutions of higher education and the difficulty integrating service work with schools into tenure requirements were two problems noted.

The evaluation designs of Title IIB MSP programs are not rigorous enough to provide gold standard evidence of their effectiveness. Even evaluations that attempted an experimental or comparison group design suffered from common flaws. Evaluations of many projects do not address key measurable outcomes or impacts of the projects. Few projects used well developed instruments to measure changes in teacher content knowledge. In addition, the state assessment systems on which many of the projects relied were inadequate to directly measure the impact of projects on student achievement.

Ongoing technical assistance is needed to increase the evaluation skills of the state education agency staff responsible for the Title IIB MSP programs and the staff and evaluators of the individual projects. The U.S. Department of Education regional forums can be a start in informing stakeholders about the method and instruments to improve evaluations, but access to these regional forums is limited by project budget constraints.

But this analysis is based on the first year of implementing the Title IIB MSP programs, when evaluation designs may not be fully mature. The data analyzed were static, showing what the projects intended to do in the proposals and what they could demonstrate in the first year annual report. The single interview conducted with the staff and evaluator in each project captured information just after the second year of the summer institutes. State education agency staff indicated on several occasions that the projects had learned from their first year and that the projects' professional development changed from year one to year two.

In addition, the analysis was conducted by the two authors with assistance from a policy expert at the Northwest Regional Educational Laboratory. There has been no opportunity to include additional reviews to examine the data sources to refine the analyses.

The Northwest Regional Educational Laboratory's Center for Classroom Teaching and Learning has proposed extending this research to a second year of analysis of the Title IIB MSP projects. Year two annual reports will be collected and an expanded evaluation rubric will be constructed that examines additional elements of the Joint Committee on Standards for Educational Evaluation that addresses the criteria for the use of instruments and evaluation reports. In addition, this second year of the research would send the current analyses by state back to the state education agency staff and through them to the original project stakeholders for a member check. This is not seeking validation of the analysis. Rather, this member check would be an additional data source that would be analyzed to determine how the Title IIB MSP is being manifested in the Northwest Region.

NOTES

1. Presenting this information in this compressed format means that there is a risk that the findings will be misrepresented. To understand what the summaries mean, it is necessary to interpret them in the context of the full project descriptions.

2. Presenting this information here in a compressed format creates the risk that the findings will be misrepresented. To understand what the summaries mean, they must be interpreted in the context of the full descriptions.

APPENDIX A
ANALYSIS OF THE TITLE IIB MATHEMATICS AND SCIENCE PARTNERSHIPS PROFESSIONAL DEVELOPMENT PROJECTS BY STATE

This appendix addresses the first research question, which asks about the nature of the professional development provided by the Title IIB MSP projects in the Northwest Region. Project documents and interviews were examined using the analysis framework to identify evidence of quality in the professional development. Evidence related to the nature of the partnerships was also examined. The descriptions should not be read as an evaluation of the effectiveness of the projects. Nor are they intended to compare the individual projects or the state programs to each other. Rather, the summaries describe the professional development funded through the program. In the following sections the evidence from each project is summarized and presented in tables. There are also summaries for each state and a final program-wide summary of the evidence related to each category of professional development.

One overarching question that has emerged from conducting these analyses is the extent to which the projects must meet all criteria in every category in order to be considered effective. It is not clear whether professional development projects are more effective when they are rated highly in all categories than when they receive high ratings in only some categories. Nor is there evidence that any criterion is more important or less important than the others. Can a project that does not fully address one or more of the criteria still provide useful professional development for the teachers who participate? How many of the criteria for quality must be present in order for a project to be considered high quality? This issue cannot be resolved within the scope of the analysis of these programs included in this report.

Alaska

Alaska is the only state in the region that funded one project in the first year. The Alaska MSP program focused on K–8 mathematics. Some of the requirements included a summer institute of at least two weeks with follow-up during the school year, coursework to help teachers achieve highly qualified status, and the participation of master teachers to serve as instructors.

The Journeys in Mathematics project served 51 teachers in two school districts: Anchorage—a large urban district—and Lake and Peninsula—a large rural district with many remote schools. The partnership for this project included the two districts and the University of Alaska–Anchorage. The Journeys in Mathematics project activities included a three-week summer institute, three weekend workshops held during the school year, and collaborative work in lesson study teams and study groups (table A1). The content focus of the professional development was numeration. Participants analyzed the content of mathematics lessons and explored how to teach mathematics to diverse students.

Journeys in Mathematics provided sustained professional development that featured a balance of traditional and reform activities. There was a targeted focus on content knowledge and multiple and varied opportunities for active learning. While the project documentation referenced standards and participants used standards in their work, detailed information on specific standards addressed was not provided. The partnership featured spatial complexity, serving teachers in remote schools over a large geographic area. There was evidence of reciprocal interdependence among the partners and frequent communication.

Idaho

Idaho funded four MSP projects in year one, all of which focused on mathematics. The total number of teachers served was 163. Two of the projects served schools in northern Idaho, and two were based in southern Idaho. Although the Idaho projects all focus on mathematics, the state did not exclude science projects from the Idaho MSP program.

TABLE A1
Journeys in Mathematics project features

Criteria	Subcriteria	Project features
Duration		Approximately 140 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, weekend workshops
	Reform—school- or classroom-based activities	Lesson study, study groups
Collective participation	Teachers from the same school or district work together	Designed for teams of teachers from participating schools
Content focus	Content knowledge	Targeted focus on numeration; specific topics identified (for example, operations, fractions, and decimals) Content faculty conducted professional development
	Teaching specific content	Pedagogical focus on problem solving Participants analyzed lessons and explored how to teach mathematics to diverse students
	How students learn content	No evidence identified
Active learning	Observing or being observed	Participants observed model lessons and taught lessons in front of their peers
	Planning for classroom implementation	Participants engaged in lesson study and analyzed classroom activities
	Reviewing student work	Participants analyzed student work and identified implications for instruction
	Presenting leading discussions, writing	Participants wrote reports and led study groups
Coherence	Connected to teachers' goals and other professional development	Development of a new master's program in middle school mathematics education
	Aligned with standards and assessments	Courses were designed to align with state and National Council of Teachers of Mathematics standards; participants used standards in their work No information about specific standards addressed
	Supports sustained communication	Opportunities for collegial communication via lesson study, study groups, and other collaborative projects
Partnership preconditions	Existing relationships	No evidence of prior collaboration among the partners
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	University responsible for leading the project; school districts responsible for recruiting, release time
	Horizontal	
	Sector	
	Spatial	Project covered a large geographic area
Interdependence	Pooled	
	Sequential	
	Reciprocal	Master teachers from the districts given a role in designing and providing the professional development
Communication		Project team met monthly during the spring and less frequently during the fall and winter

Classroom Assessment for Mathematics Performance

The Classroom Assessment for Mathematics Performance project partners included the University of Idaho in Moscow and six school districts in northern Idaho. The districts are not named in the documentation other than Lakeland, the lead local education agency. The project provided a two-week summer institute for 18 elementary and middle school teachers with follow-up conducted primarily via an online course. Teacher content knowledge was a secondary focus in the Classroom Assessment for Mathematics Performance project (table A2). The primary focus of the project was assessment. The summer institute focused on learning to use tools for organizing and analyzing data related to school math programs. The participants analyzed data from state assessments, examined student work for evidence of mathematical proficiency, and developed classroom assessments.

The documentation from the Classroom Assessment for Mathematics Performance project did not articulate the number of hours of professional development provided in year one. Other than the summer institute, it was not possible to determine whether the activities were traditional or reform. Although the focus of the project was on assessment, teachers' content knowledge of number sense, as well as their knowledge of how to teach this content area, was addressed in the context of assessment. The professional development was designed to meet the needs of the participating teachers. Although the project included a lead school district partner, additional districts were referenced, but not identified.

Coeur d'Alene—Mathematics

In year one, the Coeur d'Alene project served 34 teachers from 12 schools who taught in grades one through nine. The partners included the University of Idaho in Moscow, Coeur d'Alene School District, and Washington State University. The project provided a two-week summer institute and during the school year, teachers participated in six Saturday sessions—three in the fall term and three in the spring. The content focus of the project was number sense (table A3). The Coeur d'Alene project focused on providing teachers with conceptual understanding of the content that would improve their ability to provide effective instruction to students.

The Coeur d'Alene MSP project provided a sustained learning experience for teachers that featured traditional forms of professional development. There was a targeted focus on content knowledge with opportunities for active learning provided in the form of planning for implementation. The partnership had a horizontal structure and reciprocal interdependence—representatives from all partners were involved in designing the professional development. There was evidence of frequent communication among the partners.

Developing Mathematical Thinking

The Developing Mathematical Thinking project served 56 kindergarten through grade six teachers from four schools in three Boise-area districts. The partners included Boise State University; Boise, Caldwell, and Emmett school districts; and the Lee Pesky Learning Center. The Developing Mathematical Thinking project began with a week-long institute during the summer. Project staff made monthly visits to each teacher's classroom, and teacher teams met once a week. The first year of the project was focused on number (table A4). Participants investigated how students learn by reading research and by analyzing videos and examples of student work.

The Developing Mathematical Thinking project provided sustained professional development that featured primarily reform activities in addition to a traditional summer institute. There was a targeted focus on content knowledge and how students learn specific content with multiple and varied opportunities for active learning. The project documentation included detailed information on alignment with standards and participants used standards in their work. The partnership had a vertical structure and pooled interdependence, with the project primarily driven by the university.

TABLE A2
Classroom Assessment for Mathematics Performance project features

Criteria	Subcriteria	Project features
Duration		Approximately four weeks of professional development, including work online
Activity type	Traditional—institutes, workshops	Summer institute
	Reform—school- or classroom-based activities	Other activities difficult to characterize without more information
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation Collaboration among individual participants
Content focus	Content knowledge	Primary focus on assessment rather than content; secondary focus on number sense addressed in the context of assessment Content faculty involved in developing the professional development
	Teaching specific content	Emphasis on how to teach content that is being assessed
	How students learn content	Evidence of some attention to student learning via analysis of assessments
Active learning	Observing or being observed	
	Planning for classroom implementation	Participants developed an implementation plan and examined lessons
	Reviewing student work	Participants analyzed student artifacts and developed assessment items
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Teacher needs were used to design the project activities
	Aligned with standards and assessments	Participants used standards, assessments in their work No information about specific standards addressed
	Supports sustained communication	Opportunities for collegial communication via online discussion forum
Partnership preconditions	Existing relationships	Project based on long-standing relationship between university and school district partners
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	University responding to district needs Partner districts were not named in the proposal or the report with the exception of the lead school district
	Horizontal	
	Sector	
	Spatial	
Interdependence	Pooled	University responsible for most aspects of the professional development
	Sequential	
	Reciprocal	
Communication		Not addressed

Twin Falls—Curriculum improvement and alignment in middle school mathematics

This project was based in the Twin Falls School District and involved a partnership between the district and the College of Southern Idaho. The activities served 55 teachers in grades five through eight from nine schools in the district. The Twin Falls project conducted three types of activities, all of which took place during the

TABLE A3
Coeur d'Alene project features

Criteria	Subcriteria	Project features
Duration		Approximately 96–120 hours
Activity type	Traditional—institutes, workshops	Summer institute, workshops
	Reform—school- or classroom-based activities	No evidence identified
Collective participation	Teachers from the same school or district work together	Project focused on one school district; participants worked in grade-level teams
Content focus	Content knowledge	Targeted focus on number sense; specific topics identified (for example, fractions, proportional reasoning, whole number concepts, operations)
	Teaching specific content	Pedagogical emphasis on how to increase student number sense by using multiple representations
	How students learn content	No evidence identified
Active learning	Observing or being observed	
	Planning for classroom implementation	Participants planned and delivered lessons, and evaluated and reflected on the results
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	No evidence identified
	Aligned with standards and assessments	Statements that content and materials were consistent with state and National Council of Teachers of Mathematics standards; National Council of Teachers of Mathematics standard identified: representation
	Supports sustained communication	Opportunities to participate in online discussions
Partnership Preconditions	Existing relationships	No evidence of prior collaboration among the partners
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	
	Horizontal	Proposal explicit about collaborative decisionmaking
	Sector	
	Spatial	
Interdependence	Pooled	
	Sequential	
	Reciprocal	District staff and university faculty worked together to design project activities
Communication		Partners conducted face-to-face meetings, also communicated via online discussion forums

school year (table A5). Teachers participated in four day-long trainings focused on content strands; six half-day training sessions; and 10 1.5-hour planning sessions before each new unit of instruction. The content workshops were intended to bridge gaps in teachers' knowledge of algebra I concepts. The project was designed to support middle school teachers in implementing a new curriculum.

The Twin Falls MSP provided fewer hours of professional development than other projects and did not conduct a two-week summer institute. The activities were traditional forms of professional

TABLE A4
Developing Mathematical Thinking project features

Criteria	Subcriteria	Project features
Duration		Approximately 200 hours of professional development; amount of project time varied from teacher to teacher
Activity type	Traditional—institutes, workshops	Summer institute
	Reform—school- or classroom-based activities	Classroom-based activities, teacher teams
Collective participation	Teachers from the same school or district work together	Project designed for grade-level teams from the same school Funds used to provide time for collaborative work
Content focus	Content knowledge	Targeted focus on number sense; specific topics identified (for example, operations, place value, ratio and proportion, fractions, decimals, percentages) Content faculty helped to design the professional development
	Teaching specific content	Evidence not identified
	How students learn content	Emphasis on investigating how students learn
Active learning	Observing or being observed	Classroom modeling and coaching, peer observation
	Planning for classroom implementation	Participants engaged in collaborative lesson planning
	Reviewing student work	Participants analyzed student work
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Alignment with standards described in detail and participants used standards in their work Content focus was selected to address the content strands of the state test
	Supports sustained communication	Teacher teams met weekly
Partnership preconditions	Existing relationships	Project based on ongoing collaboration between school districts and university
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	Project led by university with school administrators in a supporting role
	Horizontal	
	Sector	
	Spatial	
Interdependence	Pooled	University responsible for almost all aspects of the project
	Sequential	
	Reciprocal	
Communication		Not addressed, although university faculty made weekly visits to school sites

development. There was a focus on content knowledge, although specific topics were not articulated, as well as some emphasis on analyzing how students learn. Twin Falls provided multiple forms of active learning and documented the alignment with standards in detail. The partnership had a horizontal structure and was guided by a project advisory committee that met on a quarterly basis. The school district had responsibility for most aspects of the project.

TABLE A5
Twin Falls project features

Criteria	Subcriteria	Project features
Duration		Approximately 60 hours of professional development
Activity type	Traditional—institutes, workshops	District-based trainings
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	Project focused on one school district Participants were organized into cadres by grade level
Content focus	Content knowledge	Content area identified: Algebra I; specific concepts and topics were not addressed Content faculty served as project advisors
	Teaching specific content	No evidence identified
	How students learn content	Participants analyzed how students solve problems, common misconceptions
Active learning	Observing or being observed	
	Planning for classroom implementation	Participants planned units and lessons collaboratively
	Reviewing student work	Analyzing how students solve problems
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Activities explicitly aligned with standards, organized around state assessment strands
	Supports sustained communication	Opportunities for communication via teacher cadres
Partnership preconditions	Existing relationships	No details about prior collaboration included in documentation; proposal identified an ongoing commitment between the college and the district
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	
	Horizontal	Project advisory committee included representatives from all stakeholders
	Sector	
	Spatial	
Interdependence	Pooled	Pooled: school district responsible for almost all aspects of the project
	Sequential	
	Reciprocal	
Communication		Advisory committee met four times per year

Montana

Montana funded six MSP projects in year one. Three projects focused on mathematics, two on science, and one focused on both. The projects served 165 teachers in the first year. Three projects served teachers in western Montana, one project was based in eastern Montana, and two projects served teachers from both sides of the state.

Billings

The partners in the Billings MSP project included Billings School District and Montana State University–Billings. The professional development

TABLE A6
Billings project features

Criteria	Subcriteria	Project features
Duration		Approximately 100 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, follow-up meetings
	Reform—school- or classroom-based activities	Classroom coaching
Collective participation	Teachers from the same school or district work together	Project focused primarily in one district Participants worked in teams
Content focus	Content knowledge	Multiple content areas: probability and statistics, geometry, and proportional reasoning Content faculty with dual appointments in mathematics and mathematics education helped plan the professional development and served as instructors
	Teaching specific content	Mathematics pedagogy focused on manipulatives and journals; not clear that strategies were tied to the specific content of the professional development
	How students learn content	No evidence identified
Active learning	Observing or being observed	Teachers participated in classroom modeling and coaching
	Planning for classroom implementation	Teachers designed and reflected on lessons
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Meetings with principals held during the year to address coherence
	Aligned with standards and assessments	Statements that project was designed around National Council of Teachers of Mathematics standards, specific standards not identified
	Supports sustained communication	Opportunities for collegial communication via teacher teams
Partnership preconditions	Existing relationships	Partnership was based on existing collaborations between district and university
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	
	Horizontal	Partners shared responsibility for planning and executing the project
	Sector	
	Spatial	
Interdependence	Pooled	
	Sequential	
	Reciprocal	Partners worked together to design and deliver the activity
Communication		Regular meetings, communication among partners

served 27 teachers in grades six through eight from eight middle schools and six elementary schools. Most of the participants taught in the Billings district, but five came from outlying districts and private schools. Teachers participated in a two-week summer institute, four meetings during the year to extend the focus on content knowledge, and at least three sessions of job-embedded coaching (table A6). The project focused on three strands in middle school mathematics: probability and statistics, geometry, and proportional reasoning.

The Billings MSP project provided sustained professional development that featured a balance of traditional and reform activities. There was a broad focus on content knowledge and the information about the pedagogical focus was not detailed enough to determine if it was tied to teaching specific content. The project featured multiple forms of active learning. Meetings were held with school principals to help ensure the coherence of the professional development. The partnership had a horizontal structure, with evidence of reciprocal interdependence among the partners and frequent communication.

Creating Opportunities in Mathematics for Exemplary Teaching

The partners in the Creating Opportunities in Mathematics for Exemplary Teaching project included seven school districts, the Montana Council of Teachers of Mathematics, the Montana Learning Center, Montana State University–Bozeman, and the University of Montana–Missoula. The project served 75 teachers—25 each from the elementary, middle school, and high school levels. Four content areas were identified for the professional development: number sense, algebraic reasoning, data and probability, and thinking mathematically. Because of the timing of the awards, the summer institute was postponed until the second year of the project. The Creating Opportunities in Mathematics for Exemplary Teaching project staff used the first year to recruit teachers, conduct school visits, and design the professional development (table A7).

The first year of the Creating Opportunities in Mathematics for Exemplary Teaching project was a startup year, focused primarily on planning and recruiting participants. The proposed professional development will address multiple content areas, with a general pedagogical focus rather than one tied to issues of teaching specific content (table A8). It was not possible to determine opportunities for active learning in the available documentation. The project was based on existing relationships and had a horizontal structure. The partners engaged in frequent communication.

Flathead and Salish Kootenai College

The Flathead and Salish Kootenai College project served 12 teachers from six schools on the Flathead reservation. The participants taught mathematics in grades 1–12, with at least half teaching multiple grade levels. In addition to the schools, the partners included Salish Kootenai College and the Northwest Regional Educational Laboratory. Teachers participated in a two-week summer institute and four workshops held during the school year. Participants also received three or four sessions of classroom coaching. The project focused on algebra with a pedagogical emphasis on teaching American Indian students and English language learners.

The Flathead and Salish Kootenai College project provided sustained professional development that featured a balance of traditional and reform activities. Although the project did not technically feature groups of teachers from the same districts, the participants worked in teams based on geographic location. This enabled a form of collective participation for the teachers in these small, rural schools. There was a targeted focus on content knowledge and the project featured multiple forms of active learning. There was some evidence of reciprocal interdependence among the partners and frequent communication.

High School Chemistry in Western Montana

The project partners included the University of Montana–Missoula and four school districts in western Montana. The professional development served 12 high school science teachers. The project conducted a two-week summer institute, and there were four one-day site visits during the school year (table A9). Chemistry was the content focus, organized around the history of science, and the pedagogical focus was inquiry.

The professional development provided in the High School Chemistry project was sustained, with primarily traditional activities in addition to site visits that can be characterized as reform

TABLE A7
Creating Opportunities in Mathematics for Exemplary Teaching project features

Criteria	Subcriteria	Project features
Duration		Approximately 10 hours for 80 percent of the participants
Activity type	Traditional—institutes, workshops	Workshop and meeting
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation Participants encouraged to collaborate, interact online
Content focus	Content knowledge	Multiple content areas: number sense, algebraic reasoning, data and probability, and thinking mathematically Project design team included mathematicians, mathematics educators, and statisticians
	Teaching specific content	Pedagogical goal general rather than specific: using reflection to improve teaching
	How students learn content	No evidence identified
Active learning	Observing or being observed	Learning experiences not described
	Planning for classroom implementation	
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Content of the professional development identified based on teacher needs
	Aligned with standards and assessments	Statements that project was designed around Montana standards and National Council of Teachers of Mathematics standards, specific standards not identified
	Supports sustained communication	Opportunities for participants to communicate online
Partnership preconditions	Existing relationships	Project based on a history of collaboration between the Montana Council of Teachers of Mathematics and state universities
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	Leadership shared between the Montana Council of Teachers of Mathematics and Montana State University
	Horizontal	
	Sector	
	Spatial	Project served small rural schools throughout the state
Interdependence	Pooled	Management and execution of the project
	Sequential	
	Reciprocal	Design of the professional development
Communication		Monthly meetings, ongoing communication via e-mail

based. The professional development was focused on chemistry with emphasis on how students learn. Active learning opportunities were provided via developing curriculum units. There was explicit and detailed information about the alignment with state standards. It is unclear whether there was a partnership involved in this project. Although high-need school districts were identified in the proposal, the university was responsible for all aspects of the project and individual teachers were listed as partners in the annual report.

TABLE A8
Flathead and Salish Kootenai College project features

Criteria	Subcriteria	Project features
Duration		Approximately 100–120 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, workshops
	Reform—school- or classroom-based activities	Classroom coaching
Collective participation	Teachers from the same school or district work together	Professional learning teams were based on geographical location
Content focus	Content knowledge	Targeted focus on algebra; specific topics identified (for example, pattern recognition, use of models and symbols to represent relationships, analysis of change) Content faculty member served as instructor
	Teaching specific content	No evidence identified
	How students learn content	Mathematics pedagogy focused on teaching American Indian students and English language learners
Active learning	Observing or being observed	Classroom coaching and modeling
	Planning for classroom implementation	Participants develop lessons and rubrics, worked with their curricula
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Statements that project was aligned with standards, specific standards not identified Participants used standards in their work
	Supports sustained communication	Opportunities for collegial communication via teacher teams
Partnership preconditions	Existing relationships	Partnership based on ongoing relationships between college and the schools
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	College had primary responsibility for almost all aspects of the project
	Horizontal	
	Sector	
	Spatial	
Interdependence	Pooled	Pooled: partners had separate responsibilities, although all had a role in designing the project Two organizations within college worked collaboratively to plan and deliver the professional development
	Sequential	
	Reciprocal	
Communication		Quarterly meetings

Improving Science Teaching

The Improving Science Teaching project served 19 teachers in grades K–12 from six schools in six districts. The project partners were the University of Montana–Missoula and the six school districts. The professional development included a two-week summer institute and additional one-day sessions during the school year—three in the fall and three in the spring (table A10). The content focus of the

TABLE A9
High School Chemistry project features

Criteria	Subcriteria	Project features
Duration		Approximately 104 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute
	Reform—school- or classroom-based activities	Site visits
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation There was collaboration among individual participants
Content focus	Content knowledge	Focus on chemistry; specific topics identified (for example, gas laws, atomic theory, periodic table) Content faculty conducted professional development
	Teaching specific content	Pedagogical focus on inquiry-based instruction
	How students learn content	Emphasis on how students learn science
Active learning	Observing or being observed	Some participants received classroom coaching
	Planning for classroom implementation	Developing curriculum units
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Activities explicitly aligned with standards
	Supports sustained communication	Goal to provide teachers with networking opportunities; not clear if the project supported ongoing communication
Partnership preconditions	Existing relationships	No information on prior collaboration
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	No evidence of partnership
	Horizontal	
	Sector	
	Spatial	
Interdependence	Pooled	No evidence of partnership
	Sequential	
	Reciprocal	
Communication		No evidence of partnership

professional development was watershed ecology with a pedagogical focus on teaching science through inquiry.

The professional development provided in the Improving Science Teaching project was sustained, with primarily traditional activities in addition to fieldwork with scientists that can be characterized as reform based. The project documentation identified watershed ecology as the focus, but there was no detailed information about the content. There was also a pedagogical focus on inquiry grounded in examining how students learn. There was no evidence of prior collaboration between the partners or that the organizations named as partners in the proposal were involved in developing the project. However, the project staff stated that the collaboration between the science faculty and the education faculty within the university was a positive outcome of the project.

TABLE A10
Improving Science Teaching project features

Criteria	Subcriteria	Project features
Duration		Approximately 128 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, workshops
	Reform—school- or classroom-based activities	Fieldwork with scientists
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation There was collaboration among individual participants
Content focus	Content knowledge	Content area identified: watershed ecology; not information on specific topics Content faculty involved in delivering professional development; opportunities to work with scientists and other specialists
	Teaching specific content	Pedagogical focus on teaching science via inquiry
	How students learn content	No evidence identified
Active learning	Observing or being observed	Participants observed modeled lessons and taught lessons in front of their peers
	Planning for classroom implementation	Teachers developed lesson plans
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Statements that project was aligned with standards, specific standards not identified
	Supports sustained communication	
Partnership preconditions	Existing relationships	No evidence of prior collaboration
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	University responsible for all aspects of the project
	Horizontal	
	Sector	
	Spatial	
Interdependence	Pooled	Only role for school district was to provide assessment data
	Sequential	
	Reciprocal	
Communication		Not addressed

Montana Science and Mathematics Consortium

The project partners included Libby School District, the University of Montana–Missoula, and eight additional school districts. Montana Science and Mathematics Consortium served 20 teachers from 13 schools in nine districts. Most of the participants taught at the elementary or middle school level, but there were also three high school teachers. In year one the Montana Science and Mathematics Consortium project deviated from the original plan due to the timing of the awards—a three-day institute was held during the summer instead of a two-week event, with an additional one-day follow-up during the school year (table A11). The full scope of activities was postponed until the second year.

TABLE A11
Montana Science and Mathematics Consortium project features

Criteria	Subcriteria	Project features
Duration		Four days of professional development
Activity type	Traditional—institutes, workshops	Traditional—workshop
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	Designed for teams from the same school or district
Content focus	Content knowledge	Data not available
	Teaching specific content	
	How students learn content	
Active learning	Observing or being observed	Data not available
	Planning for classroom implementation	
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Standards identified, but not clear how they were addressed
	Supports sustained communication	
Partnership Pre-conditions	Existing relationships	No evidence of prior collaboration
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	
	Horizontal	No clear lead organization
	Sector	
	Spatial	
Interdependence	Pooled	Partners had independent responsibilities
	Sequential	
	Reciprocal	
Communication		Not addressed

Very little documentation was available for the Montana Science and Mathematics Consortium project. The proposal was vague about the nature of the professional development and the project did not follow the design that was proposed. The partners had independent rather than shared responsibilities, with the higher education institute responsible for designing and delivering the professional development and the lead school district handling both evaluation and financial tasks. The role of the other school districts was to provide release time for teachers.

Oregon

In year one Oregon funded four projects. Three projects were focused on mathematics, and one was focused on science. The projects served approximately 142 teachers. Two projects were based in northwestern Oregon, one in the central region of the state, and one in the eastern region. The Oregon MSP program emphasized K–12 mathematics, although it did not exclude science-focused projects from eligibility. The state required a two-week institute with follow-up during the

year. All projects were expected to include an educational service district as one of the partners. Unlike the other states in the region, Oregon gave preference to projects that used an experimental or quasi-experimental design for the evaluation. Due to these requirements, the Oregon MSP program recommended that the projects limit the number of teachers served.

Greater Oregon Mathematics Partnership

The Greater Oregon Mathematics Partnership project provided a summer institute for eight teachers who were expected to go back to their schools and provide professional development for a total of 77 additional teachers over the course of the school year. The content focus was algebraic reasoning for grades four through eight and the project used an Annenberg course as its curriculum. The partners included the Region 18 education service district, Eastern Oregon University, the International Society for Technology in Education, and nine school districts. The institute provided two weeks of learning experiences for the core cadre (table A12). The core cadre members went on to provide 10 two-hour sessions for other teachers at their schools during the year. The modeling of the instructor during the institute was intended to address issues of instruction.

The Greater Oregon Mathematics Partnership project provided sustained professional development for a small group of participants via a training-of-trainers model. Most of the other participants received significantly fewer hours of service. The project had a targeted content focus with opportunities for active learning limited to the modeling of the instructor. However, the small group of core cadre participants had additional opportunities in the form of providing professional development for the other participants. The partnership had a vertical structure with pooled interdependence. According to the documentation, the involvement of the higher education partner was limited to oversight of credits.

High Desert

The High Desert project served 30 participants who taught grades three through eight at 22 schools in five districts. The activities emphasized both content knowledge and pedagogical content knowledge in mathematics. The project partners included Oregon State University, the High Desert Education Service District, the Northwest Regional Educational Laboratory, and the five school districts in central Oregon. The project provided two weeks of professional development during the summer and three terms of coursework during the school year (table A13).

The High Desert MSP project provided a sustained learning experience for teachers that featured traditional forms of professional development. The project not only provided opportunities for collaboration, but also sought to develop participants' abilities in this area. The project addressed multiple content areas with a focus on standards and pedagogical content knowledge. The education and mathematics faculty members conducted an analysis to ensure that the professional development was focused on content knowledge and aligned with the National Council of Teachers of Mathematics standards. The partnership had a vertical structure with the university responsible for most aspects of the project.

Northwest Regional Education Service District

The activities of the Northwest Regional Education Service District project were focused on probability and statistics. The project served 20 upper elementary and middle school teachers from the Hillsboro School District, including special education and English language learner teachers. The project partners were the school district, the Northwest Regional Education Service District, Pacific University, Linfield College, and the Northwest Regional Educational Laboratory. The project provided two weeks of professional development during the summer with follow-up activities during the school year (table A14). Teachers worked in school teams to

TABLE A12
Greater Oregon Mathematics Partnership project features

Criteria	Subcriteria	Project features
Duration		Core cadre: 56 hours plus 20 hours providing professional development Other participants: 20 hours
Activity type	Traditional—institutes, workshops	Summer institute, workshops
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	No evidence provided in documentation
Content focus	Content knowledge	Targeted focus on algebraic reasoning No evidence of content faculty involvement
	Teaching specific content	No evidence identified
	How students learn content	No evidence identified
Active learning	Observing or being observed	Modeling of instructor during summer institute
	Planning for classroom implementation	
	Reviewing student work	
	Presenting leading discussions, writing	Providing professional development (eight Core Cadre teachers)
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Project staff responsible for aligning activities with state standards, specific standards not identified
	Supports sustained communication	Opportunities for ongoing communication for core cadre; not clear for other participants
Partnership preconditions	Existing relationships	Proposal cited history of collaboration in the region; evidence of common projects conducted by the education service districts
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	Education service district served as lead organization
	Horizontal	
	Sector	
	Spatial	Project served small rural schools in a large geographic area
Interdependence	Pooled	Education service district was responsible for almost all aspects of the project
	Sequential	
	Reciprocal	
Communication		Not addressed

develop lessons and they observed each other in the classroom.

The Northwest Regional Education Service District project provided professional development that was sustained and that featured both traditional and reform activities. There was a targeted focus on content knowledge with multiple and varied opportunities for active learning. The project provided detailed information about the alignment of the professional development with standards. The documentation also addressed the collaborative process that the partners used to develop the project. The partnership had a horizontal structure with evidence of reciprocal interdependence.

TABLE A13
High Desert project features

Criteria	Subcriteria	Project features
Duration		Approximately 140 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, workshops
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	Teachers worked in district groups Project included activities to build participants' collaborative skills
Content focus	Content knowledge	Multiple content areas: probability and statistics, geometry and measurement, algebra and number sense Content faculty member a co-principal investigator
	Teaching specific content	Institute focused on standards and pedagogical content knowledge—how to teach specific content
	How students learn content	No evidence identified
Active learning	Observing or being observed	Teachers received classroom modeling and were observed by instructors
	Planning for classroom implementation	Participants developed lesson plans
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Activities designed to increase participants' understanding of National Council of Teachers of Mathematics standards; project activities analyzed to ensure alignment
	Supports sustained communication	Participants encouraged to participate in ongoing conversations via online work
Partnership preconditions	Existing relationships	Evidence of prior collaboration among four consortium districts; collaboration between schools and university not addressed
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	University was the lead organization
	Horizontal	
	Sector	
	Spatial	The project served teachers in a large geographic area
Interdependence	Pooled	University responsible for almost all aspects of the project
	Sequential	
	Reciprocal	
Communication		Not addressed

Willamette Valley Watershed Partnership Project

The Willamette Valley Watershed Partnership Project involved Oregon State University, Willamette Education Service District, Western Oregon University, and an unspecified number of school districts. The science project focused on watershed ecology and engaged teachers in many field-based experiences. In year one the project identified 22 teachers to participate in the project, 1 at the elementary level, 15 middle school,

TABLE A14
Northwest Regional Education Service District project features

Criteria	Subcriteria	Project features
Duration		Approximately 80 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute
	Reform—school- or classroom-based activities	Lesson study
Collective participation	Teachers from the same school or district work together	Activities focused in one district Teachers worked in school-based teams
Content focus	Content knowledge	Targeted focus on probability and statistics; specific topics identified (for example, measures of central tendency and spread, ratios and proportions, sampling) Professional development provided by content faculty
	Teaching specific content	No evidence identified
	How students learn content	No evidence identified
Active learning	Observing or being observed	Modeling of instructors, participants engaged in lesson study
	Planning for classroom implementation	Participants engaged in lesson study
	Reviewing student work	Participants engaged in lesson study
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Content selected based on teacher-identified needs
	Aligned with standards and assessments	Alignment between project activities and state standards described in detail
	Supports sustained communication	Ongoing communication supported via lesson study
Partnership preconditions	Existing relationships	Partnership the result of two years of planning and collaboration among organizations
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	
	Horizontal	Partners shared leadership responsibilities
	Sector	
	Spatial	
Interdependence	Pooled	
	Sequential	
	Reciprocal	Higher education partners, education service district, and school district worked together to design and deliver the professional development
Communication		Quarterly meetings

and 6 high school. Of this group, 12 served as the comparison group and 10 participated in the professional development during year one. In addition to a two-week summer institute, follow-up activities included three classroom visits from the faculty and three one-credit online courses during the school year (table A15). Teachers also observed and debriefed three demonstration lessons conducted by volunteer participants.

The Willamette Valley Watershed Partnership Project provided sustained professional development

TABLE A15
Willamette Valley Watershed Partnership Project features

Criteria	Subcriteria	Project features
Duration		Over 80 hours of professional development
Activity type	Traditional—institutes, workshops	Summer institute, online courses
	Reform—school- or classroom-based activities	Classroom visits, demonstration lessons
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation There was collaboration among individual participants
Content focus	Content knowledge	Targeted focus on watershed ecology; specific topics identified (for example, hydrology, landscape development) Professional development provided by content faculty
	Teaching specific content	No evidence identified
	How students learn content	Participants focused on misconceptions and how to promote conceptual change in students
Active learning	Observing or being observed	Modeling of instructors, classroom visits, peer observation
	Planning for classroom implementation	Developing and implementing units and lessons
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	
	Aligned with standards and assessments	Alignment between project activities and state standards described in detail
	Supports sustained communication	Opportunities to engage in ongoing conversations online
Partnership preconditions	Existing relationships	Evidence of prior relationships limited to the departments within the university
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	University served as the lead organization
	Horizontal	
	Sector	
	Spatial	The project served teachers in a large geographic area
Interdependence	Pooled	University responsible for designing and conducting professional development; education service districts handled administrative and financial tasks
	Sequential	
	Reciprocal	
Communication		Not addressed

that featured both traditional and reform activities. There was a target focus on content grounded in exploring how to teach specific content. The alignment between the project content and standards was described in detail. The partnership had a vertical structure with the university taking responsibility for most aspects of the project.

Washington

Washington funded four projects in year one. Two projects integrated mathematics and science, one project included both subject areas, and one project focused on mathematics. The partnerships served 258 teachers and were distributed across

the state—two were based in western Washington, one in central Washington, and one in the eastern region of the state.

The Washington MSP program required a two-week summer institute with follow-up. The state also tailored the requirements to emphasize Washington priorities for mathematics and science, placing emphasis on pedagogical content knowledge and teacher collaboration.

Eastern Washington Connections and Inquiry

The Eastern Washington project integrated mathematics and science around the theme of water quality. The project served 18 participants who taught at the middle and high school level at 10 schools. The partners included Education Service District 101, eight to 10 school districts, Eastern Washington University, Community Colleges of Spokane, and Whitworth College. The project provided a four-day summer academy in year one, four days of workshops during the school year, and an additional day of flexible time that participants could use at their discretion (table A16). The content of the follow-up workshops during the school year was tailored to the needs and requests of the participants. The pedagogical focus on the Eastern Washington project was inquiry, which was modeled for teachers through their participation in the summer academy.

The professional development provided in the Eastern Washington project was sustained, with primarily traditional activities in addition to site-based activities that can be characterized as reform type. The project had targeted focus on content that integrated mathematics and science and provided multiple forms of active learning. The activities were designed to address the needs of the participating teachers. The project addressed mutual goals by including higher education faculty in the needs assessment interviews that shaped the project and by identifying partnership-related goals. The structure of the partnership was vertical, with evidence of reciprocal interdependence in that representatives from all partner organizations contributed to the planning of project activities. Otherwise, the partners all had distinct roles. The project was geographically complex, serving small and isolated rural school districts.

Partnership for Reform in Secondary Science and Mathematics

The Partnership for Reform in Secondary Science and Mathematics partners included Washington State University–Vancouver, Education Service Districts 112 and 114, six school districts, and the Northwest Regional Educational Laboratory. The project served 45 middle school and high school teachers from 22 schools in six districts. Partnership for Reform in Secondary Science and Mathematics was designed around professional learning communities, with each group identifying the subject area for their professional development. The project provided a one-week summer institute and an academy day was held during the school year (table A17). Teachers were allocated time for monthly meetings of the professional learning communities and participated in peer observations.

The Partnership for Reform in Secondary Science and Mathematics project provided sustained professional development that featured primarily reform activities in addition to a traditional summer institute. The professional development did not focus on specific content—teachers worked in professional learning teams that determined individual areas of focus. The project provided multiple and varied forms of active learning, although the learning opportunities varied by team. The participants designed their work to meet their professional goals and the needs of their schools and districts. The partners pursued a mutual goal to develop new courses in science and mathematics for teachers. The structure of the partnership was vertical, but there was evidence that representatives from all partner organizations were involved in determining its design as well as additional evidence of reciprocal interdependence in the required coordination between district-based professional development activities and the projectwide activities.

TABLE A16
Eastern Washington project features

Criteria	Subcriteria	Project features
Duration		Approximately 88 hours of professional development
Activity type	Traditional—institutes, workshops	Academy, workshops
	Reform—school- or classroom-based activities	School-based activities varied: observing, team planning
Collective participation	Teachers from the same school or district work together	Teachers participated in school teams Opportunities for teachers from small districts to work together
Content focus	Content knowledge	Targeted focus on water quality, specific topics identified (for example, micro-invertebrates, water quality testing, measuring stream flow) Professional development provided by content faculty
	Teaching specific content	Project designed to integrate mathematics and science with pedagogical focus on inquiry
	How students learn content	No evidence identified
Active learning	Observing or being observed	Modeling of instructor, peer observation
	Planning for classroom implementation	Planning units, designing assessment items
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Project designed to address need identified by the teachers
	Aligned with standards and assessments	Statements that project was aligned with state standards and assessments, specific standards not identified Participants used standards in their work
	Supports sustained communication	Opportunities to engage in collegial conversations via teacher teams
Partnership preconditions	Existing relationships	Prior collaboration not identified
	Mutual goals	Project included mutual goals
Complexity	Vertical	Vertical structure: leadership shared by the education service district and university
	Horizontal	
	Sector	
	Spatial	Geographically complex, serving isolated schools in a large area
Interdependence	Pooled	In most aspects of the project, partners had independent responsibilities
	Sequential	
	Reciprocal	Planning project activities
Communication		Quarterly meetings

Watershed Investigation Partnership

The Watershed Investigation Partnership project served 25 middle school and high school teachers from 13 schools in 11 districts. The professional development integrated mathematics and science around the theme of stewardship of watersheds, with a pedagogical focus on inquiry. The partners included Quincy School District, the North Central Education Service District, and Central Washington University. Teachers participated in two summer

TABLE A17
Partnership for Reform in Secondary Science and Mathematics project features

Criteria	Subcriteria	Project features
Duration		Approximately 88 hours of professional development
Activity type	Traditional—institutes, workshops	Institute
	Reform—school- or classroom-based activities	Professional learning communities
Collective participation	Teachers from the same school or district work together	Teachers participated in district-based teams
Content focus	Content knowledge	No project-level content focus
	Teaching specific content	Most of the teams focused professional inquiries on how to teach content
	How students learn content	Evidence not identified
Active learning	Observing or being observed	Some teams engaged in peer observation
	Planning for classroom implementation	Some teams developed lessons and engaged in collaborative planning
	Reviewing student work	All participants analyzed student work
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Teams designed and selected their own work based on their needs
	Aligned with standards and assessments	One focus for project work was aligning instruction and materials to state standards
	Supports sustained communication	Opportunities to engage in collegial conversations via teacher teams
Partnership preconditions	Existing relationships	Project based on ongoing relationships and prior collaboration
	Mutual goals	Mutual goal to develop new courses for teachers
Complexity	Vertical	Project lead by university
	Horizontal	
	Sector	
	Spatial	The project served teachers in a large geographic area
Interdependence	Pooled	
	Sequential	
	Reciprocal	Partners involved in designing the project, coordinating district-based professional development with project activities
Communication		Leadership meetings: three per year; steering committee: monthly

institutes and during the school year, the project provided two days of on-site support and conducted distance learning activities (table A18). The pedagogical focus was inquiry—both engaging teachers in inquiry and how to apply inquiry-based education.

The professional development provided in the Watershed Investigation Partnership project was sustained, with primarily traditional activities in addition to on-site support. The project had an integrated content focus based on a watershed stewardship theme with multiple and varied opportunities for active learning. The structure of the partnership was vertical—the university and the lead school district took responsibility for the bulk of the project activities. The project was geographically complex, serving small and isolated rural school districts in a large area of the state.

TABLE A18
Watershed Investigation Partnership project features

Criteria	Subcriteria	Project features
Duration		Approximately 96 hours of professional development
Activity type	Traditional—institutes, workshops	Institutes
	Reform—school- or classroom-based activities	On-site support
Collective participation	Teachers from the same school or district work together	Teachers participated in school or district teams Some teachers from small, rural schools participated in cross-district teams
Content focus	Content knowledge	Theme: "Stewardship of the Environment and Watershed Investigation" Professional development provided by content faculty Designed to integrate mathematics and science
	Teaching specific content	Pedagogical focus on inquiry
	How students learn content	Evidence not identified
Active learning	Observing or being observed	Modeling of instructor
	Planning for classroom implementation	Developing projects, planning for assessment
	Reviewing student work	
	Presenting leading discussions, writing	Reporting on the results of classroom projects
Coherence	Connected to teachers' goals and other professional development	Participants conducted a needs assessment to plan their work
	Aligned with standards and assessments	Participants used state standards and assessments to guide their work
	Supports sustained communication	Opportunities to engage in collegial conversations via teacher teams
Partnership preconditions	Existing relationships	No evidence of prior collaboration
	Mutual goals	All goals teacher- or student-focused
Complexity	Vertical	Leadership shared by university and lead district
	Horizontal	
	Sector	
	Spatial	Geographically complex, serving isolated schools in a large area
Interdependence	Pooled	University responsible for most aspects of the project
	Sequential	
	Reciprocal	
Communication		Not addressed

Whatcom-Skagit

The project provided professional development in mathematics for 174 K–14 and preservice teachers. The partners included Western Washington University, 12 school districts, Bellingham Technical College, Skagit Valley College, and Whatcom Community College. The project conducted a one-week summer institute and provided monthly seminars during the school year in which the participants varied from activity to activity (table A19). The project was designed to represent the breadth of mathematics content rather than the depth of a specific content strand. There were also multiple pedagogical practices covered in the professional development.

TABLE A19
Whatcom and Skagit project features

Criteria	Subcriteria	Project features
Duration		Documentation does not provide information about how many hours of professional development participants received
Activity type	Traditional—institutes, workshops	Institute, seminars
	Reform—school- or classroom-based activities	
Collective participation	Teachers from the same school or district work together	Not designed to support collective participation
Content focus	Content knowledge	Professional development covered multiple content areas in mathematics Content faculty were identified in the proposal
	Teaching specific content	Professional development covered multiple pedagogical strategies
	How students learn content	Evidence not identified
Active learning	Observing or being observed	Modeling of workshop instructors
	Planning for classroom implementation	
	Reviewing student work	
	Presenting leading discussions, writing	
Coherence	Connected to teachers' goals and other professional development	Participants selected activities to participate in
	Aligned with standards and assessments	Statements that project was aligned with a variety of standards (for example, National Council of Teachers of Mathematics, American Association for the Advancement of Science, essential academic learning requirements), specific standards not identified
	Supports sustained communication	Project goal to develop a network of teachers maintained via e-mail
Partnership preconditions	Existing relationships	Based on prior collaboration
	Mutual goals	Mutual goal: improving teacher education program
Complexity	Vertical	University responsible for almost all aspects of the project
	Horizontal	
	Sector	
	Spatial	The project served teachers in a large geographic area
Interdependence	Pooled	In most aspects of the project, partners had independent responsibilities
	Sequential	
	Reciprocal	Planning activities
Communication		Monthly meetings

The Whatcom-Skagit project provided a series of workshops that addressed a variety of content areas in mathematics. Because participants varied from activity to activity, it is not possible to determine the duration of this project. According to the documentation, active learning opportunities were limited to observing the instruction modeled during the workshops. The partners pursued a mutual goal: one of the project objectives for year two was improving the teacher preparation program. The documentation indicated that the partnership had a vertical structure, with the university responsible for almost all aspects of the project.

APPENDIX B
ANALYSIS OF THE TITLE IIB MSP PROFESSIONAL DEVELOPMENT EVALUATION PROJECTS BY STATE

This appendix addresses the second research question, which asks about the nature of the evaluation of the Title IIB MSP projects in the Northwest Region. The project proposals, year one annual reports, and interview data were analyzed through the evaluation framework to examine the extent to which the Title IIB MSP evaluations addressed the criteria for quality in evaluation articulated in the Joint Committee on Program Evaluation Standards (JCSEE, 1994).

Alaska

Journeys in Mathematics

The purpose of the evaluation is not identified in either the proposal or the year one annual report. The evaluator is internal to the project and is one of the university faculty implementing the professional development. Evaluation questions were not specifically identified, nor was the methodological approach specified. Information sources included only the teachers and records of professional development activities. Data sources included the use of an efficacy instrument, the mathematics assessment developed by the Study of Instructional Improvement, and the Diagnostic Teacher Assessment for Mathematics and Science, number and computation test. Data collection procedures and schedule were not specified. Neither quantitative nor qualitative data analysis procedures were reported.

Idaho

All of the Idaho projects had relatively weak evaluation designs that provided minimal information about the nature and effect of the professional development implemented. These designs did not provide a clear alignment among project goals or objectives, evaluation questions, and data sources. Procedures and schedules of information collection were not well described. Information sources were not well identified, and data analysis procedures were not articulated. In the interview with the state education agency staff responsible for the administration of the Title IIB MSP program, lack of capacity in evaluation was identified as the crucial issue. In addition, this individual argued that the Title IIB MSP projects as implemented by the state education agency are not the proper venue for rigorous research on professional development.

Classroom Assessment for Mathematics Performance

The purpose of the evaluation was identified in both the proposal and the year one annual report as being both formative and summative in nature. An external evaluator was identified, but apparently not used. The evaluation questions were not specifically identified, and the number of objectives for the project were numerous. The methodological approach was not specified. Information sources, including teachers and students were vaguely described, and instruments included surveys of technology use, instructional practices, focus group interviews, and case studies. Data collection procedures and schedule were not clearly articulated, and neither quantitative nor qualitative data analysis procedures were reported.

Coeur d'Alene—Mathematics

The purpose of the evaluation was not specified in either of the documents as being either formative or summative in nature. Evaluation questions were articulated and focused on the impact of project activities on teachers' knowledge, beliefs, and practices; on students; and on school culture. An external evaluator was identified but not used, as project staff conducted the evaluation. The methodological approach was not specified. Information sources and sampling strategies were not clearly identified. Instruments included state test scores and nonspecific project developed surveys. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Developing Mathematical Thinking

No project-specific evaluation plan was communicated in either the proposal or the year one annual report. In an interview Idaho state agency staff indicated that the evaluation plan was included in a separate proposal. Five project goals were identified instead of evaluation questions. The evaluator is not specified and appears to be the principal investigator. The methodological approach was not specified. Information sources included only the teachers. Instruments included a project-designed knowledge and pedagogy inventory, and observations of teaching were conducted. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Twin Falls—Curriculum Improvement and Alignment in Middle School Mathematics

Purposes of evaluation were identified as both formative and summative in both the proposal and year one annual report. No evaluator was acknowledged, and the annual report was written by the school district personnel responsible for the coordination of the teachers in the project. The evaluation question appeared to focus on one objective, with additional mention of improving mathematics instruction and increasing student mathematics skills. The methodological approach was not specified, nor were the information sources and sampling specified. Instruments included state test scores, participant surveys, and review of project documents. The state test for middle school children was used as the only measure of increases in teacher content knowledge. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Montana

The evaluation designs of five of the six Montana projects were relatively weak and unspecific. Only one of the projects attempted a comparison group design and only at the student level. The other five projects articulated evaluation designs that did not provide a clear alignment among project goals or objectives, evaluation questions, and data sources. Procedures and schedules of information collection were not well described. Information sources were not well identified, and data analysis procedures were not articulated. The interview with the Montana Office of Public Instruction identified evaluation capacity as a key weakness of the partnerships.

Billings

The purposes of the evaluation were not articulated. The evaluation questions were a direct restatement of the project goals and were not well connected to data sources. The evaluator was external to the project, though credentials were not provided. The methodological approach was not specified, though there was some indication of the use of a comparison group. However, that comparison group was not identified and no data sources were put forward for additional teachers. Information sources included the teachers and their students. Instruments included a PRAXIS mathematics content test for teachers, tracking of number of highly qualified teachers, student Montana state assessment, and standardized scores. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Creating Opportunities in Mathematics for Exemplary Teaching

The evaluation purposes were not clearly identified in terms of formative or summative uses of the report. The evaluation questions were a direct restatement of project goals and were neither well specified nor connected to data sources. The evaluator was internal to the project, and credentials for evaluation were not clearly communicated. The methodological approach was not specified. Information sources were identified as impacts

on both teachers and students. Instruments included a teacher content instrument and survey designed by the project, teacher self-reports, and project documentation. Student achievement was measured with the Montana state assessment. Data collection procedures and schedule were not clearly described, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Flathead and Salish Kootenai College

Evaluation purposes were communicated as being both formative and summative. The evaluation questions were clearly articulated and related to project goals and objectives and to data sources. The evaluator was external to the project, and credentials were clearly communicated. A comparison group evaluation design was identified in the proposal, but only comparison student data were used. Information sources identified included treatment group teachers and both treatment and comparison group students. Instruments used included the Diagnostic Teacher Assessment in Mathematics algebra test, a project-designed test of teacher algebra content knowledge, and a technology survey. Student data included post test of student mathematics content knowledge using a project-designed instrument, mathematics self-efficacy survey, and Montana state assessment data. Data collection procedures and schedule were clearly specified. Descriptive and comparative statistics were described, and qualitative data use was not reported.

High School Chemistry in Western Montana

The purposes of the evaluation in terms of formative or summative use of information were not specified. The evaluation questions were the direct restatement of project goals and not well connected to data sources. The evaluator was internal to the project. The methodological approach was not specified. Information sources were project teachers and a subset of students. Instruments used to collect data about increases in chemistry content knowledge and instructional practices for teachers included the American Chemical Society content test for students, which indicated a ceiling effect, and the Learning Cycle Test. No student data were identified. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were described in the evaluation report.

Improving Science Teaching

The purpose of the evaluation was not specified. The evaluation questions were the project goals and not well connected to data sources. The evaluator is internal to the project. The methodological approach was not specified. Information sources were not well identified, but included both teachers and students. The instruments were not well characterized, and data sources included teacher lesson plans, classroom observations, and a modification of a teacher test from an Oregon Title IIB MSP watershed ecology project. Student-level data included a project-designed subset of test designed for an Oregon MSP project that included questions for students and an inquiry-based science attitude survey. Data collection procedures and schedule were not clearly specified though a comparison group of students is indicated. The comparison group is identified as a convenience sample without indication of the group with whom the group is to be compared. Some quantitative and qualitative data analysis procedures were reported in the evaluation report.

Montana Science and Mathematics Consortium

Evaluation purposes were characterized as formative, as continuous improvement of the project was identified as the key use of evaluation information. The evaluation questions are a subset of multiple project goals. The evaluator is not specified. The methodological approach was not specified. The information sources were not clearly identified. Instruments were not identified. Data collection procedures and schedule were not clearly specified, and neither quantitative nor qualitative data analysis procedures were reported in the evaluation report.

Oregon

The Oregon program included additional points for an experimental or quasi-experimental evaluation design. All four projects attempted a comparison design with varying levels of success. Small sample sizes were evident, and the description of sampling strategies was weak. Projects identified specific instruments or designed instruments to test teacher and student content knowledge, and the schedule of data collection was articulated. The Survey of Enacted Curriculum was used in two of the four projects. Quantitative data analysis procedures were more consistently identified than qualitative data analysis procedures.

Greater Oregon Mathematics Partnership

The purposes of the evaluation were not clearly identified. Evaluation questions were restatements of the project goals and were not aligned with data sources. The evaluator is co-principal investigator on the project. A comparison group evaluation design was included in the proposal, but there was no evidence of such in the year one report. Information sources included in the proposal were the project teachers and students. Instruments included a COMPASS pre-college mathematics assessment and project-specific instrument for teachers and the Oregon state assessment for students. Only minimal data were reported in the year one report. Data collection procedures and schedules were not specified. Quantitative data analysis procedures were not well described and the only qualitative data analysis was the identification of illustrative quotes.

High Desert

The evaluation purposes were identified as being both formative and summative. The evaluation questions were clearly articulated and related to project goals and objectives and to data sources. The evaluator was external to the project staff and credentials were included. An experimental design was included in the proposal, the school was the unit of random assignment, and the sample size was very small. The sampling strategy was conducted by project staff, and data collection processes were well identified. Specific instruments for teacher data included the Diagnostic Teacher Assessment in Mathematics (all four tests), PRAXIS, and a project-specific professional development survey. Student outcome data included the Oregon state mathematics assessment for students reported at the individual student level. Descriptive and comparison statistics were described to analyze quantitative data. No qualitative data analysis was reported.

Northwest Regional Education Service District

The evaluation purposes were identified as being both formative and summative. The evaluation questions were clearly articulated and related to project goals and objectives and to data sources. The evaluator was external to the project staff and credentials were included. An experimental design was implemented, the school was the unit of random assignment, which was conducted by project staff, and the sample size was very small. The sampling strategy was not adequately described. Specific instruments for teacher data included the Diagnostic Teacher Assessment in Mathematics (probability and statistics test), the Survey of Enacted Curriculum (instructional beliefs and practices survey), document analysis of lesson study reports, and the use of the Reformed Teaching Observation Protocol. Student outcome data included the Oregon state mathematics assessment for students reported at the classroom level. Descriptive and comparison statistics were described to analyze quantitative data. No qualitative data analysis was reported.

Willamette Valley Watershed Partnership Project

The evaluation purposes were identified as being both formative and summative. The evaluation questions were clearly articulated and related to project goals and objectives and to data sources. The evaluator was external to the project staff and strong credentials were included. A comparison group evaluation design was implemented, the

individual teacher was the unit of assignment, and the sample size was small. Teachers were allowed to self-select into treatment and comparison groups. Information sources included both project teachers and their students, though only students at the middle school level were administered the science content test. Specific instruments for teacher data included a project-designed test for teacher content knowledge, the Survey of Enacted Curriculum (instructional beliefs and practices), and documentation of inquiry science lesson plans. Student data included Oregon state science assessment for those students in grades five and eight and test of middle school student knowledge of watershed ecology, hydrology, and geology concepts designed and analyzed by the Northwest Evaluation Association. Descriptive and comparison statistics were described to analyze quantitative data; however, qualitative data analysis was not well specified.

Washington

Across the four projects in Washington evaluation design and implementation was weak. Several projects did not have well articulated goals and outcomes that demonstrated the impact of the professional development experienced by the teachers. Methodological approaches to the evaluations were not well characterized. Instrumentation included project-designed surveys of participant reactions, and the reporting of student data was at the school level. Data collection procedures and schedules were vaguely described, and data analysis was not well characterized.

Eastern Washington Connections and Inquiry

Evaluation purposes were not clearly identified in either the proposal or the year one annual report. Evaluation questions were clearly identified and tied to project goals. The evaluator was external to the project, and credentials were identified. The methodological approach for the evaluation was not specified. Information sources are not clearly identified, but they included project teachers and students at the school level. Instruments included a project-designed teacher survey, the Survey of Enacted Curriculum, a project-designed classroom observation protocol, student classroom assessments, an affective survey, and state assessment in data mathematics and science. Data collection procedures and schedule were not specified. Quantitative analysis procedures included descriptive statistics, but qualitative analysis was not well characterized.

Partnership for Reform in Secondary Science and Mathematics

The purpose of the evaluation was identified as formative. Evaluation questions were specified and based on objectives and benchmarks. The evaluator was external, and credentials were specified. The methodological approach was not specified, and information sources were not clearly identified. Instruments included a project-designed survey, use of Professional Learning Community survey (teacher self-report), focus group interviews, and student state assessment data reported by school. The Survey of Enacted Curriculum instructional beliefs and practices instrument was administered at the start of the project. Data collection procedures were identified. Comparative statistics on surveys were reported, and qualitative data analysis was not well characterized.

Watershed Investigation Partnership

The evaluation purpose was identified as being both formative and summative in nature. Evaluation questions were identified and aligned with the project objectives. The evaluator appeared to be internal to the project, but the relationship was not well characterized. The methodological approach was not well specified. Information sources were project teachers, document review of project activities, and student data. Instruments included an unknown teacher interview, surveys, and observations. Student data included teacher-developed content tests that were not described. The data collection procedures and schedule were not well specified. The analysis procedures were not described.

Whatcom and Skagit

The evaluation purpose was identified as being formative for the first year of the project. Evaluation questions were based on National Research Council principles for human learning, not project goals and objectives. The evaluator was internal from one of the participating schools. The methodological approach was not well specified. Information sources included teachers and students. Instruments included teacher reaction and perceptions to the project activities and workshops, interviews, and observations. Student information was the school-level state assessment in mathematics. Data collection procedures and schedule were not identified. Quantitative analysis was descriptive statistics of teacher reactions and perceptions, but qualitative data analysis was not conducted.

APPENDIX C
INTERVIEW PROTOCOL

A. What does the professional development look like implemented?

1. Describe the design of your professional development activity. (If I were a teacher in your project, what would I experience? Did you use a pre-set curriculum?)

   Probe: What variations have you had to make from your original design (that is, in the grant)?

2. What are the underlying theories about how people learn that support the professional development activity?

   Probe: Walk me through an example that would help me see these principles in action.

3. How is the math or science content evident in project activities?

4. How does content relate to pedagogy and strategies?

   Probe: Provide an example of what this relationship might look like in the professional development setting.

5. To what extent are collaborative networks of teachers evident in the project design and implementation?

6. How does your design call for the active involvement of your school partners? administrators?

B. How does your project relate to what is considered effective professional development?

7. *Duration:* For how much time are teachers directly engaged in professional development?

   Probe: Do you feel that is enough time to develop deep understanding and the skills to implement what was taught?

8. *Focused on teacher work:* How is the professional development activity directly linked to required school curriculum content and state and district standards?

9. *How students learn:* What provision is there for examining how students learn and how to effectively gauge or measure that learning?

10. *New learning curriculum:* How does the professional development activity prepare teachers to use the new content they are learning?

C. How do you know that your professional development activity is effective?

11. How is the evaluation designed to identify project outcomes and promising practices?

12. How do you know that the teachers learned the science or math content that was the focus of the professional development?

13. How do you know that the teachers have used the content that was the focus of the professional development?

14. How do you know that the teachers used pedagogical skills that matched what you presented?

    Probe: For instance, if your project focused on eliciting student misconceptions, do you have evidence of how the teachers tried that in the classroom?

15. What evidence have you collected that teachers implemented newly learned curricular activities?

    Probe: Can you give me an example of a math (or science) activity that you taught teachers during the summer and how it was implemented in a teacher's classroom?

D. What are the specifics of the evaluation design?

16. How did you determine how to measure the outcomes of the professional development activity?

17. Does your evaluation design use comparison groups of teachers? (If not, then why not?)

    Probe: Why did you choose to use a comparison group design?

    Probe: How were teachers assigned?

    Probe: If quasi-experimental, how have the comparison groups been identified (what characteristics?)

    Probe: How much attrition has there been?

18. Describe how your evaluation measures the changes in teacher science or mathematics content knowledge.

19. Describe how your evaluation measures the improvement in teaching or pedagogical skills.

E. How are you connecting the professional development activity to student learning (state tests and other measures)?

20. Describe how your evaluation measures project impact on student learning.

21. Describe how you have used state assessment data to measure change in student achievement resulting from project activities.

22. Describe how you link professional development, teacher knowledge, and instructional strategies with student achievement.

F. Involvement of the partners

23. How has the project strengthened the involvement of higher education in the professional development of teachers?

24. How were the content faculty involved in the design of the project activities?

Interview protocol—state education agency staff

1. Here is what we're doing—the question we will return to in the end of this conversation is . . . is this useful, and how?

2. What are the aspects of your work in directing the state projects?

3. You indicated that the request for proposals for these projects came from a template. Do you know where the template came from?

4. What do the projects in your state look like now?

5. Are you getting projects you want?

6. In our initial interview, you indicated that both teachers reaching highly qualified teacher status and adequate yearly progress were policy issues. Are those still the main policy focus?

7. Are there other policy issues that are emerging in Alaska on which the Title IIB MSP program has an influence?

8. Are there other programs that have an influence on highly qualified teacher and adequate yearly progress issues? If so, what is the relationship of these with the Title IIB MSP program?

   Does Title IIA still go to districts and then flow through to schools?

   How does Title IIB connect to Title IIA in terms of state policy?

9. What is it that this project can do to address policy issues and evaluation issues?

APPENDIX D METHODOLOGY

Data sources

The sources of data for this research include the text from the elementary and secondary education legislation that addressed Title IIB Mathematics and Science Partnerships (www.ed.gov/policy/elsec/leg/esea02/pg26.html). The year one requests for proposals initiated by the five states were collected. Each state education agency provided copies of the funded proposals and year one annual reports. Interviews were conducted with project principal investigators and evaluators at the end of the first year of the projects during the fall of 2005 as part of the scope of work of the Northwest Eisenhower Regional Consortium. A series of interviews were conducted with state education agency staff responsible for the implementing the Title IIB program in the five states. Table D1 indicates the total number of data sources used in this analysis. Interview protocols are included in appendix D.

Analysis framework—professional development

The nature of the professional development being implemented in each of the projects was examined using an analytic framework based on the National Evaluation of the Eisenhower Professional Development Program (Desimone et al., 2002; Garet, Birman et al., 1999; Garet, Porter et al., 2001; Porter et al., 2000). The framework is organized around six features of high quality professional development that were identified in that evaluation of mathematics and science programs: duration, activity type, collective participation, content focus, active learning, and coherence (table D2).

The Eisenhower framework is one of many possible lenses with which to analyze and describe professional development. A range of alternative frameworks were considered for use in the descriptive analysis (for example, American Federation of Teachers, 2002; Loucks-Horsley et al., 1998; National Staff Development Council, 2001). The Eisenhower framework was selected because it is grounded in existing research and was tentatively validated with self-report data from teachers, it is widely known in the field, and it is specifically related to the content areas of mathematics and science. The Eisenhower criteria are reflected in the definition of professional development put forth in the No Child Left Behind Act, which provides guidelines for designing projects such as the Mathematics and Science Partnerships. Some of the parameters of the definition include a focus on teachers' knowledge of academic subjects, skills to help students meet challenging standards, and understanding of effective instructional strategies that are grounded in scientifically based research. The definition establishes that professional development must be connected to school and district improvement plans and aligned with standards, curricula, and assessments. Another emphasis is on activities that are sustained, intensive, and classroom-focused rather than short-term workshops or conferences.

TABLE D1
Data sources

State	Year one request for proposal?	Funded proposals	Year 1 annual reports	Interviews
Alaska	Yes	1	1	3
Idaho	Yes	4	4	9
Montana	Yes	6	6	14
Oregon	Yes	4	4	13
Washington	Yes	4	4	10

TABLE D2
Analysis framework—professional development

Key feature and definition	Subcriterion
Structural features	
Program duration and frequency The number of hours of professional development provided by the project and the timespan are adequate to enable teachers to learn new ideas and incorporate them into their practice.	
Activity type Traditional activities are more likely to take place outside of the school, while reform activities are more likely to be integrated into teachers' work.	*Traditional activities* • Within-district workshops or conferences. • Courses for college credit. • Out-of-district workshops or conferences. *Reform activities* • Teacher study groups. • Teacher collaboratives, networks, or committees. • Mentoring. • Internships. • Resource centers.
Collective participation among teachers The project provides opportunities for participants to work with other teachers from the same school or district.	
Core features	
Content focus The professional development is grounded in subject matter and addresses how to teach specific content to students.	• Emphasis on content knowledge. • Emphasis on how students learn specific content. • Emphasis on methods of teaching specific content.
Active learning The project provides opportunities for teachers to actively use what they are learning.	• Observing or being observed. • Planning for classroom implementation. • Reviewing student work. • Conducting presentations or demonstrations, leading discussions, writing reports or plans.
Coherence The project activities are connected to other professional development, align with standards, and support ongoing communication.	• Connected to other professional development and teachers' goals. • Aligned with standards and assessments. • Supports teachers in developing sustained, ongoing communication.

Source: Adapted from the Professional Development Program Quality Rubric developed by the Council of Chief State School Officers.

The Eisenhower criteria are not based on conclusive evidence that the six identified features of professional development cause improvements in teacher knowledge or practice. In general, the field of professional development lacks such evidence because evaluations have typically focused on participants' satisfaction with their experiences and self-reports of impact. Programs such as the Mathematics and Science Partnerships are intended to begin filling this gap in the knowledge of effective professional development.

Development of the framework

The Council of Chief State School Officers (CCSSO) developed a rubric based on the Eisenhower criteria for their evaluation of MSP-supported professional development, *Improving Evaluation of Professional Development in Mathematics and Science Education* (Blank, 2006). In the CCSSO study the rubric was used to provide a rating for the 27 National Science Foundation and Title IIB MSP projects in 15 states included in the study based on

an expert panel analysis and moderation process. This rating was a quantitative judgment based on document analysis and repeated interviews with project principal investigators and evaluators. The rubric served as an initial model for the analysis framework in this Regional Educational Laboratory Fast Response Task, but the intended use of the framework was not to give a rating to each project because the analysis had to be made on existing documents and a single set of interviews with project staff that took place before the analysis began. Instead, the framework for this study was used to develop a profile of each project that describes the attributes of the professional development.

In the first stages of the Northwest Regional Educational Laboratory study it was initially planned that the CCSSO rubric would be used to analyze the professional development and develop the project descriptions. Closer examination of the rubric revealed that the original Eisenhower evaluation categories were a better fit to the Title IIB MSP projects in the Northwest Region given the intentional modeling of the programs on previous Eisenhower professional development. For example, the activity type feature was omitted from the CCSSO rubric. Collective participation was expanded to include teachers from the same grade level and content area, rather than focusing on teachers from the same school or district. CCSSO also added subcriteria to active learning and coherence that were not included in the original research. In addition, Northwest Regional Educational Laboratory staff did not have access to the rationale for the modifications that CCSSO made to the original Eisenhower rubric. This is not meant as a critique of the CCSSO process. Rather than modeling the framework directly on the CCSSO rubric, the analysis of the Northwest Region projects is based more closely on the definitions of each feature of professional development from the original research. Appendix E provides a comparison of the criteria from CCSSO with the analysis framework used in this report.

The analysis of the professional development also includes criteria that examine the nature of the partnerships that are demonstrated in project documents and through interviews. It has been more problematic to structure the criteria for what constitutes an effective partnership. The work of Gordon Kingsley and his group at the Georgia Institute of Technology has informed the development of the characteristics to describe "partnership" in the Title IIB MSP projects (table D3). A partnership, for the purpose of this analysis, is a group of entities (organizations such as schools, colleges or universities, and for-profit or non-profit companies) that work together to accomplish a set of mutual goals.

Key traits of successful partnerships include measures of supporting preconditions, complexity, interdependence, and communication (Kingsley & O'Neil, 2004; Kingsley & Waschak, 2005). Partnership preconditions include existing relationships between organizations prior to the development of the partnership. An additional precondition is the extent to which the needs of the partners are congruent and the partnership enables them to pursue mutual goals.

Complexity encompasses several dimensions to describe the structure of a partnership. A partnership with a vertical structure is hierarchical, and a partnership with a horizontal structure includes peer organizations on the same level. Partnerships with sector complexity include organizations with different areas of work. Spatial complexity refers to size of the geographic area that the partnership serves.

Interdependence characterizes the extent to which partners depend on each other for resources or materials and how they accomplish their work. Partners with reciprocal interdependence share their work back and forth. With sequential interdependence, the work of one partner will feed into the work of another. Pooled interdependence characterizes partnerships in which the members work independently for the most part.

The final partnership dimension is communication, which refers to the frequency of interaction among partners. The partnership characteristics of the

TABLE D3
Analysis framework—partnership

Key feature and definition	Subcriteria
Preconditions The extent to which the partnership is based on existing collaboration and mutual goals shared among the partners.	• Embeddedness (relationships between organizations prior to the development of the partnership). • Strategic needs (congruence of complementarity in the needs of the partners, mutual goals).
Complexity The number of different organizations and activities involved in the partnership.	• Vertical (hierarchy, clear lead organization with clear followers). • Horizontal (number of peer organizations on the same level with the same tasks). • Sector (number of partners from private, public, not-for-profit). • Spatial (number of different geographical locations).
Interdependence The extent to which partners depend on each other for resources or materials.	• Pooled (each works fairly independently). • Sequential (the work of one feeds into the work of another). • Reciprocal (each partner must share work).
Communication The frequency of interaction.	

Source: Adapted from the Professional Development Program Quality Rubric developed by the Council of Chief State School Officers.

projects in this analysis were more difficult to identify, and the inferences made are more tentative.

Data analysis

In conducting the descriptive analysis of the professional development, the proposals, year one evaluation reports, and interviews were examined to identify evidence related to each of the criteria and subcriteria in the analysis framework. The data were organized into an analysis framework matrix and then summarized into the project tables that are included in the analysis section of the main report.

The following guidelines were used to identify the project features that addressed or did not address the criteria for high-quality professional development. The guidelines were based on the findings that support the criteria (Garet, Birman, et al., 1999, Garet, Porter, et al., 2001; Porter et al., 2000).

For duration the documentation was analyzed for evidence that the project provided at least 80 hours of professional development. Activity type was determined by evidence that the project provided primarily reform-type activities. Such activities are school- or classroom-based activities that are incorporated into teachers' work.

The evidence of collective participation was identified as opportunities for teachers from the same school or district to work together. Projects that provided opportunities for collaboration among participants were not identified as meeting the criteria, although such opportunities are noted in the descriptions. While such opportunities may be valuable, they do not address the same issues that are reflected in the criterion for collective participation—fostering schoolwide or districtwide support for teacher growth and improved instruction.

The documentation of content focus included evidence that professional development was targeted on specific content knowledge, how to teach specific content, or how students learn. Projects that did not meet the criteria indicated coverage of multiple topic areas or failed to provide a detailed account of the content.

The evidence of active learning included descriptions of opportunities for participants to observe

instruction or to be observed, to plan for implementation, to analyze student work, or to present, lead discussions, or write reports. In particular, the descriptions identify projects that provided multiple forms of active learning, as well as projects in which only one form of active learning was available.

Coherence was assessed according to evidence that the projects were connected to participants' professional goals or other professional development opportunities, aligned with standards, or provided opportunities for ongoing communication. A report that a needs assessment was conducted—a requirement of the program—was not considered sufficient evidence. The documentation was analyzed for information about how the results of the needs assessment were used to design the project. Similarly, statements that the projects were aligned with standards were not considered sufficient evidence unless more detailed information was provided.

The categories related to partnership were treated somewhat differently than those directly related to professional development. They are intended to be descriptive rather than indicators of quality. Two types of evidence of preconditions were identified: information about prior collaboration among the member organizations and at least one project goal that was mutually beneficial to all partners.

There are several kinds of evidence related to complexity. The structure of the partnership was defined as either vertical or horizontal—it must be noted that one type of structure is not considered more effective than the other. Sector complexity was determined by identifying member organizations from fields outside of education. Spatial complexity is a feature of projects that attempted to serve participants from a large geographic region.

The category of interdependence addresses how the partners organized their work. It is possible for projects to be placed in more than one category because the partners may use reciprocal interdependence for some aspects of their work and sequential or pooled interdependence for others. Like complexity, one type of interdependence is not considered more desirable than the others. Evidence related to communication was identified as information about how frequently the partners interacted with each other.

Analysis framework—evaluation

The analysis of the evaluations of Title IIB MSP projects used a matrix of evaluation criteria developed by SRI International in the Online Evaluation Resource Library based on the program evaluation standards established by the Joint Committee on Standards for Educational Evaluation (JCSEE, 1994). The program evaluation standards focus on the utility, feasibility, propriety, and accuracy of evaluations of educational programs. Utility standards address the extent to which an evaluation is designed to provide information that serves the needs of the intended users of the evaluation. Feasibility standards address the extent to which an evaluation is practical, includes the perspectives of all stakeholders, and is cost effective. Propriety standards focus on the legal and ethical implementation of an evaluation to ensure that the welfare of stakeholders is sufficiently regarded. Accuracy standards address the technical quality of the evaluation to ensure that the processes used and information sources are sufficiently rigorous and sensitive to validly represent the program being evaluated.

The Online Evaluation Resource Library web site includes three matrixes focused around the quality criteria of evaluation plans, instruments (and processes), and reports that provide a descriptive framework of what should be included in an evaluation that meets the program evaluation standards. For instance, one evaluation design component involves the methodological approach used in an evaluation. The Online Evaluation Resource Library tools include a definition of the methodological components, quality criteria related to appropriate methodological approaches, and an articulation of the connection to the program evaluation standards.

TABLE D4
Analysis framework—evaluation

Key feature and definition	Subcriteria
Project description Inclusion in the evaluation of sufficient information about the project and key issues addressing implementation.	• Project features (goals and objectives tied to activities). • Stakeholders (identification of key people in the project). • Project context (factors that might have influenced project implementation).
Evaluation overview Extent to which the evaluation provides sufficient information and alignment with goals, objectives, and activities.	• Evaluation purpose (analysis of goals of project for formative and summative uses). • Evaluation questions (specific questions that align the evaluation with goals and stakeholders' use of information. • Evaluator credibility (identification and qualifications of evaluator to establish trust). • Stakeholder involvement (information about how stakeholders were involved in the evaluation plan and implementation).
Evaluation design Information about how the evaluation was designed and implemented.	• Methodological approach (how the evaluation links goals, evaluation questions, and data sources to present a coherent analysis). • Information sources and sampling (identification of groups and individuals that will contribute data to the evaluation). • Instruments (nature of the tools used to gather information). • Data collection procedures and schedule (indication of when, where, and how data collection was structured).
Data analysis	• Quantitative analysis (methods used to analyze quantitative data to answer evaluation questions). • Qualitative analysis (methods used to analyze qualitative data to answer evaluation questions).

Source: Adapted from the Online Evaluation Resource Library, Edys Quellmalz, Stanford Research Institute, Menlo Park, CA, http://oerl.sri.com/home.html.

The analysis of the Title IIB MSP evaluations focused most directly on the quality criteria of evaluation plans as the documentation included in the funded proposals and first-year evaluation reports did not provide sufficient detail to examine the instrument quality criteria. The criteria for evaluation reports are essentially identical to the criteria for evaluation plans, though the connections to the program evaluation standards are somewhat different (table D4).

Data analysis

Proposals and year one evaluation reports were examined for evidence that the above components were addressed. For instance, the proposal was examined to determine whether the evaluation process was structured to provide information that would be used formatively to improve the project. The year one evaluation report was examined to determine the extent to which the project staff indicated that they used the results of the evaluation to make project modifications. Matrixes were designed to ascertain the evidence of the components and the descriptive tables were built to summarize that evidence. These descriptive tables supported the summaries of quality of the evaluation plans and implementations as described in the next section.

Summarizing the qualitative analyses

At the request of the Institute of Education Sciences and the Northwest Regional Educational Laboratory external Technical Working Group, the authors developed a summary of the qualitative analysis in order to look at patterns in professional development and evaluation designs across the Title IIB MSP projects in the five-state region. To create this summary, the authors iteratively assigned projects to categories based on the available information related to the dimensions of the analysis framework. This categorization was determined by the extent to which the project

addressed the particular professional development or evaluation design issue.

The categories that were used to summarize the qualitative analysis included the extent to which the criteria were addressed, or reported. For example, a component of a project was assigned to the "Addressed" category if information related to the dimension was explicitly put forth in both the proposal and the annual report and evidence was found to support that aspect of professional development or evaluation. The "Somewhat addressed" category was assigned if the criterion was treated minimally or the information provided was incomplete. For example, in many of the proposals and annual reports, the evaluator was identified, but no information was provided about that person's experience to establish credibility. The category "Not addressed" indicates that there was evidence that the project did not include the aspect of professional development or evaluation, while "Not reported" indicates that the documentation does not provide sufficient information to assign the project to a category. More detail about how categories were assigned is provided in the summary sections for professional development and evaluation in the main report.

Limitations to data sources and analysis procedures

This analysis was based on the available documents produced by the states and funded projects and an interview structured around core programmatic issues of the professional development and evaluation designs. The documents included state requests for proposals, funded proposals, and year one annual reports. These are static documents that did not represent the projects as they unfolded and that indicate the starting conditions of the projects. The interview data were collected before the current analysis began and are also limited in the extent to which they are representative of the projects as they unfolded.

The qualitative data analysis procedures included only the two authors who independently coded the documents and interviews and then iteratively identified key lines of evidence of each of the criteria. The authors have considerable experience in the design, implementation, and evaluation of professional development for science and mathematics teachers. However, the authors recognize that an expert panel analysis would have been stronger methodology to conduct this research.

APPENDIX E
COMPARISON OF PROFESSIONAL DEVELOPMENT CRITERIA: COUNCIL OF CHIEF STATE SCHOOL OFFICERS AND NORTHWEST REGIONAL EDUCATIONAL LABORATORY

Key feature	Council of Chief State School Officers	Northwest Regional Educational Laboratory
Program duration & frequency		
Activity type	Not included	• Traditional activities (within-district workshops or conferences; courses for college credit; out-of-district workshops or conferences) • Reform activities (teacher study groups; teacher collaboratives, networks, or committees; mentoring; internships; resource centers)
Collective participation among teachers	• Participate in professional development with other teachers from their school • Participate in professional development with teachers from their department or content area • Participate in professional development with teachers from the same grade level	• Opportunities for participants to work with other teachers from the same school or district
Content focus	• Provides teachers with study of subject content or concepts of math (or science) • Provides pedagogical content knowledge in math (or science)—how to teach content to students in classroom and how to teach cooperative learning • Addresses identified content weaknesses or needs of teachers	• Emphasis on content knowledge • Emphasis on how students learn specific content • Emphasis on methods of teaching specific content
Active learning	• Demonstrating, modeling, or leading instruction, presenting or leading discussion • Developing or writing curricula or lessons • Coaching or mentoring in the classroom • Developing assessments or reviewing and scoring assessments of student work • Has teachers observing other teachers • Has teachers engaged in learning network or in regular discussion with teachers	• Observing or being observed • Planning for classroom implementation • Reviewing student work • Conducting presentations or demonstrations, leading discussions, writing reports or plans
Coherence of professional development	• Consistent with school curriculum or learning goals for students • Aligned with state or district standards for learning or student performance • Designed to meet state teacher certification or licensure standards • Consistent with state rules for highly qualified teachers under the No Child Left Behind Act	• Connected to other professional development and teachers' goals • Aligned with standards and assessments • Supports teachers in developing sustained, ongoing communication

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