rgi Corporation
Research, Grants & Information

MATH SCIENCE PARTNERSHIP PROGRAM

EXTERNAL EVALUATION REPORT

Presented To

EDUCATIONAL SERVICE DISTRICT 123

Ryan A. Landvoy, Ph.D.
Evaluator

Robert Ozuna, MPA
Evaluator

August 19, 2009

2650 Yakima Valley Hwy, Suite C | Sunnyside, WA 98944 | P. 509.839.2700 | www.rgicorporation.com

Table of Contents

Educational Service District 123
Math Science Partnership Program
External Evaluation Report 2009

External Evaluation Report

EXECUTIVE SUMMARY

The Educational Service District 123 (ESD 123), in partnership with Washington State University (WSU), Columbia Basin Community College (CBC), Laser Interferometer Gravitational-Wave Observatory (LIGO), Southeast Washington Leadership and Assistance for Science Education Reform, Pasco School District, and Othello School District was awarded a 3-year grant beginning in May 2007 from the Washington State Superintendent of Public Instruction. The program's core components consist of an annual two-week summer teacher academy/ WSU graduate course held at the LIGO facility focusing on science inquiry and knowledge of grade level content, and follow-up training for teachers throughout the year consisting of site-embedded professional development provided at each teacher's school and multiple science-based workshops. Over this second year of the program, there were 27 teachers served – 23 from the Pasco School District and 4 from Othello.

The external evaluation team have employed assessment instruments including participant surveys, staff and participant interviews, and partner surveys, and have analyzed associated program data to measure the program's goals of 1) improving the science achievement of students in grades 4 – 8 through growth in the quality of classroom instruction; 2) sustaining the project goals by building leadership capacity among the teachers and collaborative capacity between the institutions; and 3) establishing a comprehensive tracking system that documents teacher growth and student achievement resulting from the project. The following are the major findings of the program's second year activities.

- All second year MSP program components were successfully implemented. This includes the summer program, follow-up workshops, classroom observations, and the mentorship component.

- There were 27 teachers served – 23 from the Pasco School District and 4 from Othello. This represents an increase by 9 participants over the first cohort.

- Six individuals from the first cohort served as teacher-leaders and have provided mentorship and guidance to year two participants in the summer program, follow-up workshops, and within their school districts.

- One hundred percent (100%) of teachers completing the summer program reported that they are able to apply inquiry-based instruction in their current teaching position – an increase of 47.6% over the program pre-survey.

- One hundred percent (100%) of teachers completing the summer program reported that they understood Nature of Science concepts – an increase of 66.7% over the program pre-survey.

- Over ninety-two percent (92%) of teachers completing the summer program reported that they had the abilities to apply Nature of Science concepts in their current teaching position – an increase of 44.7% over the program pre-survey.

- Over eighty-five percent (85%) of teachers completing the MSP program reported that they have a good understanding of the Washington State EALRs and GLEs for the subjects they teach – an increase of 28.6% over the program pre-survey.

- Most participating teachers indicated that the program has significantly impacted their teaching practices and that their students are more engaged in the science classroom, have become more actively involved in their own learning, and are able to approach scientific processes more independently.

- Over ninety-two percent (92%) of teachers completing the MSP program reported that they effectively connect mathematics and science concepts in their classroom – an increase of 54.8% over the program pre-survey.

- MSP teachers reporting that they had strong content knowledge in science and mathematics increased by 28.6% and 31.0%, respectively over the program pre-survey.

- All program partners felt that the second year program has been very successful, has provided high-quality professional development opportunities to program teachers, and had continued to expand its broad range of educational and scientific partnerships.

- The Moodle online collaboration website continues not being utilized to its fullest potential. Efforts should be made to identify processes and incentives to ensure participants will visit the website to access content, interact with MSP staff and participants, and share their own experiences and knowledge.

- Many aspects of the first year of the mentor component have been successful. Formalizing mentor trainings, expectations, and schedules and investigating further opportunities for mentor – mentee interaction during the academic year could be enhanced over the coming program year.

- During year two, progress was made in collecting and maintaining participant data in a centralized location through the MSP "notebook." Additional development and formalization of the tracking system should be undertaken to include second and third year participants, electronic entry and access, and data on participants' students.

MATH SCIENCE PARTNERSHIP PROGRAM • AUGUST 2009

External Evaluation Report

Educational Service District 123 • Pasco, WA

1. INTRODUCTION

RGI Corporation is pleased to present this evaluation report for the Educational Service District 123 Math Science Partnership (MSP) Program *Southeast Washington Science Learning Community*. This report covers the second program year from July 2008 to the end of June 2009. RGI Corporation is a local consulting firm contracted by the ESD 123 to conduct the external evaluation of the MSP program.

The Math Science Partnership Program was authorized through the *No Child Left Behind Act of 2001*. This Act provided for funding to be awarded through a competitive grant process to encourage institutions of higher education, local school districts, elementary schools, and secondary schools to participate in professional development activities. The goal of these activities is to increase the subject matter knowledge and instructional skills of science, mathematics, and technical education teachers with respect to student achievement in science, mathematics, reading to learn, and technical writing, particularly with under represented student populations.

The Educational Service District 123 (ESD 123), in partnership with Washington State University (WSU), Columbia Basin Community College (CBC), Laser Interferometer Gravitational-Wave Observatory (LIGO), Southeast Washington Leadership and Assistance for Science Education Reform, Pasco School District, and Othello School District submitted a proposal to the Washington State Superintendent of Public Instruction for the 2006 fiscal year competition and was awarded a 3-year grant that began in May 2007. The primary goals of the ESD 123 MSP Program are: 1) Improve the science achievement of students in grades 4 – 8 through growth in the quality of classroom instruction; 2) Sustain the project goals by building leadership capacity among the teachers and collaborative capacity between the institutions; and 3) Establish a comprehensive tracking system that documents teacher growth and student achievement resulting from the project. The program's core components consist of an annual two-week summer teacher academy/ WSU graduate course held at the LIGO facility focusing on science inquiry and knowledge of grade level content, and follow-up training for teachers throughout the year consisting of site-embedded professional development provided at each teacher's school and multiple science-based workshops.

Participating teachers were drawn from elementary schools in the Southeast Washington State School Districts of Pasco and Othello. The Pasco and Othello School Districts are

experiencing low academic achievement in meeting science and math state standards. These districts have a large Hispanic student body (70.2% and 79.7%, respectively), high poverty (72.3% and 80.4% low-income) and a high migrant population (26.6% and 35.8%). According to the Office of Superintendent of Public Instruction (OSPI), Pasco students scored significantly lower on the 2008 5th grade Washington Assessment of Student Learning (WASL) in science (27.0% passing compared to State average of 43.0%) and in math (37.1% compared to State average of 61.2%). Othello students also scored significantly lower on the 5th grade WASL in science (20.5%) and in math (42.2%).

2. EVALUATION BACKGROUND AND METHODOLOGY

2.1 Evaluation Team

The local program evaluation is being conducted by the educational research firm RGI Corporation. This independent consulting corporation has extensive experience in evaluating federal and state educational projects within local and regional school districts including those funded by the U.S. Department of Education and the National Science Foundation. RGI Corporation is a Washington State Minority Business Enterprise (MBE) specializing in evaluation services for projects serving minority and under-represented populations. The evaluators are Ryan A. Landvoy, a doctoral-level mathematician with over 16 years of experience in secondary and post-secondary education, and Robert Ozuna, MPA, a Harvard educated professional with extensive evaluation experience. Both principals of RGI Corporation have broad knowledge of scientifically-based evaluation methodologies, evaluation design and implementation, and reporting requirements of federal and state-funded programs.

2.2 Methodology

The goal of the evaluation is to measure, in both qualitative and quantitative terms, the effectiveness of this program from its inception through its current implementation. An evaluation plan was developed in coordination with the MSP planning team that centered on the measurement of the program's primary goals and objectives. The principal sources of data are participant pre- and post-surveys, summer program surveys, participant and program staff interviews, and partner surveys.

This evaluation report covers the second program year/ cohort of the MSP program. This evaluation report will focus primarily on program implementation objectives and the professional growth of the second group of educators to participate in the program. An analysis of quantitative data obtained from participant pre-and post- surveys for both the summer program and the overall program, and partner surveys will be provided. Information derived from participant interviews and other qualitative data sources is also included. Comparison of applicable data between year one and two of the program is also provided.

2.3 Data Sources

Qualitative and quantitative data and information pertaining to the Math Science Partnership program was collected from several of sources. The following are the types of data obtained and the manner in which they were acquired.

- **Participant Pre-Surveys** – This survey was provided to participating teachers prior to the 2008 summer program before any MSP professional development activities had been conducted. It was designed to establish a baseline for program goals and outcome measures for each cohort. It asked participants to rate their level of understanding and confidence in nature of science and inquiry-based instruction concepts, state academic standards, and content knowledge.

- **Summer Program Post-Surveys** – This survey was provided to participating teachers following the completion of the two-week summer program. It was designed to measure growth in course content areas including nature of science, inquiry-based instruction, and design and evaluation of scientific experiments. It also asked to what extent their expectations for the course were met.

- **Participant Post-Surveys** – This survey was provided to participating teachers in May 2009 following the completion of their professional development activities. It was designed to measure the professional growth of each cohort of participating teachers with respect to the program goals and objectives.

- **Participant Interviews** – These telephone interviews were conducted with most participating teachers during February and March of 2009. The goal of these interviews was to solicit qualitative information regarding program activities, and how these activities have impacted their classroom instruction and student learning. Suggestions on program improvements were also solicited.

- **Program Staff Interviews** – These formal and informal interviews were conducted intermittently throughout the year with program staff and stakeholders regarding the program, its successes and challenges, and its progress in meeting its goals and objectives.

- **Partner Survey** – This online survey was provided to program staff, partners, and other stakeholders regarding partnerships, collaboration beyond the scope of the MSP program, and relationships between participating organizations. Feedback on program successes, challenges, and suggestions for improvement were also solicited.

3. PROGRAM IMPLEMENTATION EVALUATION

The following section details progress made in the implementation of the MSP program over the past twelve months. It also describes the successes, challenges, and highlights of program operations. All program activities including the two-week intensive summer program, follow-up site visits to observe participants, and professional development seminars have been implemented as described in the grant proposal.

3.1 Program Management

The project is managed by the MSP Core Planning Team (CPT) which is made up of program administrators and stakeholders from the ESD 123, LIGO, WSU Tri-cities, and the Pasco and Othello School Districts. The team plan and schedule program activities, make operational decisions, and assess program successes, challenges, and impacts. In addition, the team regularly communicate via e-mail, telephone, and meet in sub-groups as necessary to develop educational content and conduct program business.

3.2 Participants Served

The MSP program model provides cohort-based training to elementary and middle school teachers in the Pasco and Othello school districts. Teachers from the Pasco and Othello schools were recommended and/or recruited by district administrators to participate in the program. As this project requires a year-long commitment, potential candidates were carefully screened to ensure that the individuals selected were able to fully meet their time and work responsibilities to the program. As the MSP program is cohort-based, one group of teachers is served each year. Over this second year of the program, there were 27 teachers served – 23 from the Pasco School District and 4 from Othello. Six of these individuals from the first cohort were identified as teacher-leaders and served as mentors to the year-two participants.

3.3 Summer Program

The MSP two-week intensive teaching seminar was conducted in July 2008 and served as the project's central supporting activity. The program was held at the LIGO Hanford Observatory, a world-class research facility located Northwest of Richland, Washington. It was taught by Washington State University faculty in collaboration with MSP team members from LIGO. This seminar, also a WSU graduate course provided participants graduate credit. During their two weeks at LIGO, teachers completed readings on scientific inquiry and Nature of Science (NOS), participated in instructor-led and group discussions where they talked about their reactions, ideas, reflections, and questions about NOS and inquiry. They explored and developed their own inquiry-based lessons designed for their own classroom, and presented their lessons during the final two days of the course. Teachers also created their unique Instructional Improvement Plan (IIP) based upon their assessment of their own teaching strengths and

"The summer program was great – one of the best I have ever been to."

MSP Participant

weaknesses. In addition, teachers met and interacted with scientists and technicians from the LIGO facility who provided tours, opportunities for job shadowing, and access into careers and cutting-edge applications of science.

Prior to the start of the summer program, a pre-program survey was given. In this assessment, participants were asked to respond to a series of eleven statements by rating the extent to which they agreed or disagreed. These questions established a baseline not only for the shorter term goals of the summer course but the longer-term project goals as well. At the completion of the summer course, participants were asked to complete a summer program post-survey that was designed to measure growth in core MSP summer program objectives. This survey therefore only addressed six of those questions that directly pertained to objectives for the two-week course. These areas included nature of science, inquiry-based instruction, and design and evaluation of scientific experiments.

The following table gives results for these six questions. The value in the pre- and post-survey categories represents the percentage of respondents who strongly agreed or agreed with the statement. The percentage change between pre- and post-survey results is also provided.

MSP Summer Program 2008 – Pre/Post Comparison			
	Summer Pre-Survey (Strongly Agree or Agree)	Summer Post-Survey (Strongly Agree or Agree)	Change
I understand the concept of inquiry-based instruction.	81.0%	100.0%	+19.0%
I (have the skills to) apply inquiry-based instruction in my current teaching postion.	52.4%	100.0%	+47.6%
I understand Nature of Science concepts.	33.3%	100.0%	+66.7%
I (have the skills to) apply and/or communicate Nature of Science concepts to students in my current teaching postion.	47.6%	92.3%	+44.7%
I am confident in designing scientific experiments.	33.3%	81.5%	+48.1%
I am confident in evaluating scientific experiments.	14.3%	74.1%	+59.8%

For all statements, participants indicated an improvement in their skill level, understanding, and confidence. Particularly dramatic were the changes in 1) Understanding of Nature of Science concepts (+66.7%); and 2) Confidence in evaluating scientific experiments (+59.8%).

As part of the summer program post survey, participants were also asked to describe how their expectations for this course were or were not met. The following quotes are representational of the overall set of responses:

- "*The course has allowed me to increase my teaching knowledge, and has taken me outside my comfort zone allowing for personal growth. Excellent."*
- *My expectations were not only met but my learning was extended way past my expectations. In short, I was wow-ed!"*
- *"I was very uncomfortable with teaching science prior to this class. This course has helped me understand how to implement science inquiry in my class and ways of getting students excited to learn about science."*
- *"I feel much better equipped to teach science. My confidence has grown in my ability to teach inquiry-based science."*

3.4 Follow-Up Activities

A number of regularly scheduled follow-up workshops were provided to program participants. In addition, program staff conducted site visits to observe the classrooms of MSP teachers and teacher-leaders mentored second-year participants. The following sections describe these and other follow-up activities as well as the program's online communication tool, the "Moodle" site.

Workshops. As a follow-up to the summer program, five professional development workshops were offered to participating teachers over the academic year. These opportunities were hosted at the ESD 123 and took place in October, November, December, February, and May of the 2008 – 2009 academic year and provided participants clock hours for State certification requirements. These three-hour workshops were structured events, each with formal agendas and stated goals that aligned closely with MSP

program objectives. Each session was held in the late afternoon and typically involved presentation and discussion led by project team staff, small group discussion and presentations, hands-on activities, and dinner.

- The first follow-up workshop was held on October 2, 2008 from 4 – 7 p.m. at the ESD 123. Participants discussed the summer program, shared experiences teaching science lessons using inquiry in their classroom, and participated in small and large group discussions.

- On November 25, 2008, Kris Lindeblad, a distinguished mathematics teacher and educational leader from the Powerful Teaching and Learning Group delivered professional development specifically designed for the Math Science Partnership program. This workshop focused on teaching and learning strategies that could be immediately applied to the classroom.

- The next follow-up workshop was held on December 4, 2008. In this workshop Nature of Science and Nature of Math concepts of were considered through videos, discussion, and small group activities. Activities included large group discussions and exploratory stations on concepts such as states of matter, fractals, Fibonacci numbers, waves and fossils.

- Another follow-up workshop for program teachers was held at the ESD 123 on February 19, 2009 from 4 – 7 p.m. This workshop included participant led activities, small group discussions, and science kit exercises and demonstrations.

- The final workshop for this cohort of MSP teachers was held on May 21, 2009. This session included a report on a National Science Teachers Association (NSTA) presentation that was made at a recent national meeting, large group discussions on how scientific inquiry has been implemented in participants' classrooms, next year's plans for inquiry and NOS implementation, and sharing of instructional materials. Personal growth reflections, Views of Scientific Inquiry (VOSI) surveys, and external evaluation surveys were also completed at this workshop. Mentors-teachers also worked with program staff to revise a student version of the VOSI.

Program teachers generally had positive feedback regarding the follow-up workshops based upon survey results and participant interviews. Most felt that the workshops provided effective strategies on science content and delivery and that they came away from them with great ideas that have helped engage their students in the classroom. Most teachers appreciated the sharing of grade-specific activities and pedagogical approaches and felt that they could take this knowledge back to their

classroom. Several expressed that time spent sharing experiences among participants could be limited so as to allow more time to cover additional science content.

As part of the mid-program year evaluation, participants were interviewed about whether the follow-up workshops have been helpful. The following quotes are representational of the overall set of responses:

- *"The follow-up workshops were a great help because it gave me the opportunity to listen and share ideas with other teachers in the same grade level and what worked and what didn't."*

- *"I would say the nature of science activities were very helpful because I can turn around and use them in class. Hearing what others are doing and gathering ideas has also been helpful."*

- *"It is nice to hear from other teachers and what they have tried. A lot of the ideas that I have tried have come from others.*

- *"When they covered specific content for different grade levels it was more beneficial for me."*

Teaching Observations. Program staff also visited the classrooms of program teachers to observe, mentor, and help reinforce and build upon the experiences from the summer course. A primary objective of these visits was to help participants improve their own ideas about inquiry science, the nature of science, and specific science activities and content. MSP program staff including representatives from Washington State University and Columbia Basin College, and LIGO visited each classroom twice during the academic year and provided detailed feedback on science content and inquiry. The first classroom observations were conducted in late 2008 while the second follow-up visits were made in Spring 2009. Program staff observed lessons prepared by MSP teachers based upon their Instructional Improvement Plan. The first lesson was critiqued primarily on science content while the second observation focused upon how rigorously teachers were implementing scientific inquiry. Discussions with participants followed the observations where in many cases content-based guidance on LASER kits was provided.

Presentations and Publications. In March 2009 WSU faculty member and MSP project principal Dr. Judith Morrison and two teacher-mentors presented at the 2009 National Science Teachers Association (NSTA) National Conference in New Orleans. This team presentation, titled "Overcoming the Odds: Supporting 4th – 8th Grade Teachers in their

Implementation of Inquiry Science" focused of the MSP project, the administration of the Views of Science Inquiry (VOSI) assessment, and the analysis of results.

In addition, MSP project staff Dr. Judith Morrison of WSU, and Dr. Fred Raab and Mr. Dale Ingram of LIGO co-authored the paper "Factors Influencing Elementary and Secondary Teachers on the Nature of Science." This paper was published in the Journal of Research in Science Teaching in 2009 and focused on findings of NOS professional development for the LIGO summer course. The paper was distributed and discussed at the year's final follow-up workshop.

Moodle Site. To enhance collaboration between program participants and project staff, the ESD 123 hosted a "Moodle Site" – a web-based application that is designed as a vehicle for online collaboration, dialogue, feedback, and sharing of resources and information. The site also provides feedback and on-going communication/information to school administrators, teachers, and other interested educators on the progress of the project.

Although the Moodle site was demonstrated and utilized in several of the follow-up meetings during years one and two of the program, the tool has continued to not be used to its fullest potential as a mechanism for participants to share and discuss program content, and regularly communicate throughout the academic year. Project staff posted required readings and supplementary materials to the site although in some instances these documents were also e-mailed to participants. However, many program stakeholders and participants believe that the Moodle site has significant potential although a different format and set of incentives may be necessary to increase its use.

4. OUTCOMES EVALUATION

As described above, the goals of the ESD 123 MSP Program are to: 1) Improve the science achievement of students in grades 4 – 8 through growth in the quality of classroom instruction; 2) Sustain the project goals by building leadership capacity among the teachers and collaborative capacity between the institutions; and 3) Establish a comprehensive tracking system that documents teacher growth and student achievement resulting from the project.

The primary data sources utilized in the outcomes evaluation that follows are participant pre- and post- program surveys, participant interviews, and the partner survey. All survey instruments can be found in the appendices.

4.1 Growth in the Quality of Classroom Instruction

As described previously, prior to the start of the summer workshop in July 2008 participants completed a pre-program survey that assessed their level of understanding and confidence in nature of science and inquiry-based instruction concepts, State

academic standards, and content knowledge. At the final meeting for the first cohort in May 2009, teachers completed a post-survey which again asked them to rate the same series of statements from the pre-survey.

The following table gives results for these eleven questions. The value in the pre- and post-survey categories represents the percentage of respondents who strongly agreed or agreed with the statement. The percentage change between pre- and post-survey results is also provided. Note that the first six of the questions were evaluated as part of the summer program assessment where the interval between pre- and post-surveys was two weeks. In the following case, the period between pre- and post-surveys was approximately 11 months so as to capture teacher growth over the entire program year.

MSP Program: Cohort 2 – Pre/Post Comparison			
	Program Pre-Survey (Strongly Agree or Agree)	Program Post-Survey (Strongly Agree or Agree)	Change
I understand the concept of inquiry-based instruction.	81.0%	100.0%	19.0%
I apply inquiry-based instruction in my current teaching postion.	52.4%	92.9%	40.5%
I understand Nature of Science concepts.	33.3%	100.0%	66.7%
I apply and/or communicate Nature of Science concepts to students in my current teaching postion.	47.6%	71.4%	23.8%
I am confident in designing scientific experiments.	33.3%	50.0%	16.7%
I am confident in evaluating scientific experiments.	14.3%	50.0%	35.7%
I have strong mathematics content knowledge for my current teaching position.	47.6%	78.6%	31.0%
I have strong science content knowledge for my current teaching position.	42.9%	71.4%	28.6%
I have a good understanding of the Washington State EALRs and GLEs for the subjects I teach.	57.1%	85.7%	28.6%
I connect the Washington State EALRs and GLEs to the content I teach.	90.5%	92.9%	2.4%

I effectively connect mathematics and science concepts for my students.	38.1%	92.9%	54.8%

For all statements, participants indicated an improvement in their skill level, understanding, and confidence. There was strong improvement in the level to which participants understood and were able to apply both inquiry-based and Nature of Science concepts in their classroom. Teachers who were able to apply inquiry based instruction in their classroom increased from 52.4% to 92.9% of the cohort. In addition, teachers who understood Nature of Science concepts in their current teaching position jumped from 33.3% to 100% - an increase of 66.7% - over the duration of the program.

Participants also expressed increased science and mathematics content knowledge over the program year. The percentage of individuals who reported that they "had strong content knowledge for my current teaching position" increased by 28.6% in science and 31.0% in math. There was also a gain by 28.6% of teachers who had a good understanding of Washington State EALRs and GLEs.

The increase in participants who felt that they effectively connected mathematics and science concepts in the classroom is very significant. Only 38.1% of teachers reported in the pre-survey that they effectively connected the two areas for their students. Following the completion of the MSP program, this jumped to 92.9% for a net increase of 54.8%.

Participant interviews. During February and March 2009 participant interviews were conducted to gather qualitative data regarding program activities, and how these activities have impacted classroom instruction and student learning.

When teachers were asked *to what extent their participation in the MSP program impacted classroom instruction*, all respondents indicated that the program has significant impacted how they teach science. Most said that they approach the teaching of science very differently compared to what they did prior to the MSP program. Most stated that they have revamped content and lesson structure so as to utilize inquiry-based methodologies. A number said they adapted their approach to provide more hands-on activities and significantly more inquiry, and to allow for the integration into reading, writing, and mathematics into science lessons. Others felt that they now don't teach science so much out of the book and that students are retaining, and are able to apply the science knowledge.

"Doing more inquiry, letting kids try to figure things out on their own. I wouldn't have done it without this program."

MSP Teacher

MSP Teachers were also asked *how their participation in the MSP program impacted understanding in designing and evaluating scientific experiments*. Most teachers interviewed answered affirmatively – that their participation in MSP had at some level increased their knowledge in the design of experiments for their classroom. A number stated that through the program they learned how to better design experiments to

maximize impact for their students, and they now had the skills to adapt experiments to better measure "how students understood concepts rather than what they had memorized." Other teachers expressed that they now were able to create less structured learning opportunities and they now had the confidence to "go outside the box."

"My students absolutely love science. They can't wait until science time. My learning has also positively impacted my entire team of teachers."

MSP Teacher

All teachers interviewed responded very positively when asked *how their participation in the MSP program impacted their students*. Most said that their students were much more excited about learning science and that they appreciated the opportunity to express their questions and ideas and to test them out. Program teachers felt that students were more comfortable asking questions and that they were significantly more engaged and involved in their learning. Several teachers said that their students now "can't wait for science."

4.2 Leadership and Collaborative Capacity

Teacher Mentors. The second program goal involved the building of leadership capacity among the teachers and collaborative capacity between the institutions. At the completion of the first program year, six program participants were identified as teacher-leaders and agreed to serve as mentors to the year two participants. These leaders provided expertise to second year MSP teachers as well as other teachers in their respective districts on inquiry-based instructional methods, science content, and best practices. They also supported MSP program staff in the summer program and at follow-up workshops, and served as a liaison between district administrators and MSP staff.

Stakeholders in general felt that this first year of the mentor component of the program was effective but indicated that they were several areas that could continue to be strengthened. Mentoring was particularly effective during the 2009 summer program as mentors were able to spend quality time with those that they mentor, to collaborate among the group of mentors, and to meet with program staff to plan for the coming academic year. Program staff and teacher-mentors interviewed believed that this component has reached a "critical mass" where there is sufficient representation by MSP mentors in the participating school districts as well as buy-in of district administrators.

Academic year processes for the mentor program are currently being standardized and enhanced. There were several factors that impacted mentors' abilities to observe mentee classrooms such as limited release time and coordination of schedules. There were a number of comments from participants and other stakeholders regarding the need for more mentors interaction with program teachers. Formalizing mentor trainings, expectations, schedules and communication networks between program staff, mentors, and participating teachers are several areas that could be extended over the coming academic year.

Mentor-teachers presented at Pasco and Othello School District board meetings about the MSP program and its benefits to participating teachers' schools and their students. These presentations have provided additional support to the MSP program within these districts by helping educate administrators, teachers, and other stakeholders on the program. This had led to better program visibility, alignment of resources, and increased interest and participation in MSP activities.

Program Partnerships. There have been numerous opportunities for program staff, partners, participating teachers and their districts to interact and strengthen educational opportunities for students. To gauge the quality of collaboration and relationships between MSP program partners, an online survey was administered to program partners and other stakeholders in June 2009. The following table gives the results of each question of the partnership survey broken down by response percentage.

MSP Program Partnership Survey Results						
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Don't Know**
The MSP program has provided high-quality professional development opportunities for participating teachers.	57.1%	42.9%	0.0%	0.0%	0.0%	0.0%
The MSP program has established a broad range of educational and scientific partnerships.	71.4%	28.6%	0.0%	0.0%	0.0%	0.0%
Over the past year, my district/school/organization has participated in collaborative science education projects with other project partners outside of the scope of the MSP program.	28.6%	57.1%	0.0%	0.0%	0.0%	14.3%
Strong relationships have formed between my district/school/organization and other participating MSP organizations.	42.9%	42.9%	14.3%	0.0%	0.0%	0.0%
Overall, this past year's Math Science Partnership program has been very successful.	57.1%	28.6%	14.3%	0.0%	0.0%	0.0%

All respondents felt that this past year's program had been successful and had provided high-quality professional development opportunities to program teachers. The goal of the third question above was assess the extent to which additional collaboration was conducted beyond the scope of the MSP program. This is particularly important as a measure of how the MSP program helps facilitate additional educational partnerships. Except for one individual that did not know the status of these additional collaborative endeavors, all respondents either strongly agreed or agreed that the MSP program helped further science education partnerships within the participating school districts.

LIGO Partnership. In addition to providing the venue for the summer program, LIGO staff have provided significant support to cohort one and two MSP teachers, their students, and students' families over the past academic year. Students have been served by field trips to the LIGO facility as well as by presentations by LIGO staff and researchers at science fairs, career fairs and classroom visits. Over the period from November 2007 to June 2009 there were 13 events serving over 1200 students and their family members from seven schools represented by MSP participants.

"The MSP Program staff have demonstrated extraordinary leadership."

District Administrator

4.3 Tracking System

The third program goal involves the establishment of a comprehensive tracking system that documents teacher growth and student achievement resulting from the project. This system is to maintain a database of MSP program participants, the grade levels they teach and their teaching credentials, their students including demographics, and academic indicators including student WASL scores and grades. This tracking system is under development but progress has been made in organizing important demographic, academic, and professional development for cohort participants. This data has been compiled in a program "notebook" which has been updated with all first year cohort participant information.

5. COMPARISONS BETWEEN FIRST AND SECOND PROGRAM YEARS

During the second program year, 50% more participants were served in the summer program than the first year – 27 teachers for cohort two compared to 18 for cohort one. As in the first year, there was strong growth in second year program outcomes as measured by survey instruments, particularly in the areas of inquiry-based instruction and Nature of Science concepts. Partner survey results for year two were again strong and there was significant positive feedback on both the summer program and follow-up workshops.

There were marked differences between the two cohorts related to their confidence in designing and evaluation scientific experiments. Cohort one participants began the summer program far more confident in the design and evaluation of scientific experiments than cohort two. But while there were increases for both cohorts in these areas over the summer program, cohort two saw the most dramatic increases. However, at the conclusion of the program, cohort two's confidence in the design and evaluation significantly declined. This change did not occur to this extent in cohort one, nor did this trend occur as appreciably with other outcome statements. The following table gives the pre-, post-summer, and post-program results in these areas for cohort two.

MSP Program Cohort 2 – Pre/Post-Summer/Post-Program Comparison			
	Pre-Survey (Strongly Agree or Agree)	Summer Post-Survey (Strongly Agree or Agree)	Program Post-Survey (Strongly Agree or Agree)
I am confident in designing scientific experiments.	33.3%	81.5%	50.0%
I am confident in evaluating scientific experiments.	14.3%	74.1%	50.0%

While these differences are certainly related to the grades that cohort participants teach as well as their experience levels, this observation may indicate the need to revisit the design and evaluation of experiments during the follow-up workshops, particularly for those teachers with limited exposure in this area.

The 2007 - 2008 MSP external evaluation report made several recommendations for program adjustments and/or adaptations for the second program year. The following provides an update on the status of these recommendations over the 2008 – 2009 program.

- **Moodle site.** During the first program year the Moodle site was not being used to its fullest potential as a mechanism for staff and participants to share and discuss program content, and regularly communicate throughout the academic year. Although program staff have used the Moodle site to post required readings and supplementary materials this program year, the site continues to be underutilized.

- **Follow-up workshops.** Based upon staff and participant survey data and interviews, the first program year's follow-up workshops were valuable but sometimes lacked the quality and focus of the summer program. In the first year report, it was recommended that efforts should be made to build upon the successes of the year one workshops and strengthen the content, delivery, and interactions between participants at these meetings. During the second program year, there were almost no concerns about the quality and focus of the follow-up workshops based upon interviews and survey data. In almost all cases, participants felt that the workshops were of significant value and have positively impacted their classroom teaching.

- **Tracking system.** The first year report also recommended that the development of the comprehensive system for documenting MSP teacher growth and student academic progress as described in goal three should be initiated. During year two, progress was made in collecting and organizing participant data in a MSP "notebook" for first year participants.

6. ACHIEVEMENTS AND RECOMMENDATIONS

Overall, the Math Science Partnership program has had a successful second year. The following are the major second year achievements of the MSP program:

- All second year MSP program components were successfully implemented. This includes the summer program, follow-up workshops, classroom observations, and the mentorship component.

- There were 27 teachers served – 23 from the Pasco School District and 4 from Othello. This represents an increase by 9 participants over the first cohort.

- Six individuals from the first cohort served as teacher-leaders and have provided mentorship and guidance to year two participants in the summer program, follow-up workshops, and within their school districts.

- One hundred percent (100%) of teachers completing the summer program reported that they are able to apply inquiry-based instruction in their current teaching position – an increase of 47.6% over the program pre-survey.

- One hundred percent (100%) of teachers completing the summer program reported that they understood Nature of Science concepts – an increase of 66.7% over the program pre-survey.

- Over ninety-two percent (92%) of teachers completing the summer program reported that they had the abilities to apply Nature of Science concepts in their current teaching position – an increase of 44.7% over the program pre-survey.

- Over eighty-five percent (85%) of teachers completing the MSP program reported that they have a good understanding of the Washington State EALRs and GLEs for the subjects they teach – an increase of 28.6% over the program pre-survey.

- Most participating teachers indicated that the program has significantly impacted their teaching practices and that their students are more engaged in the science classroom, have become more actively involved in their own learning, and are able to approach scientific processes more independently.

- Over ninety-two percent (92%) of teachers completing the MSP program reported that they effectively connect mathematics and science concepts in their classroom – an increase of 54.8% over the program pre-survey.

- MSP teachers reporting that they had strong content knowledge in science and mathematics increased by 28.6% and 31.0%, respectively over the program pre-survey.

- All program partners felt that the second year program has been very successful, has provided high-quality professional development opportunities to program teachers, and had continued to expand its broad range of educational and scientific partnerships.

Recommendations

The following recommendations are based upon observations made and conclusions drawn during the second year of the program.

- **Increase Moodle site participation.** Based upon interview and survey feedback from MSP staff and participants, the Moodle online collaboration website continues not being utilized to its fullest potential. Efforts should be made to identify processes and incentives to ensure participants will visit the website to access content, interact with MSP staff and participants, and share their own experiences and knowledge.

- **Continue to strengthen mentor program.** Many aspects of the first year of the mentor component have been successful. Formalizing mentor trainings, expectations, and schedules and investigating further opportunities for mentor – mentee interaction during the academic year could be enhanced over the coming program year.

- **Continue to develop tracking system.** During year two, progress was made in collecting and maintaining participant data in a centralized location through the MSP "notebook." Additional development and formalization of the tracking system should be undertaken to include second and third year participants, electronic entry and access, and data on participants' students.

The ESD 123 Math Science Partnership program has had a successful second year in terms of both its implementation and the achievement of its goals. It has implemented all of its program components, and has been particularly successful in achieving key program objectives relating to teacher understanding and confidence in applying inquiry-based instruction, nature of science concepts, and connecting science and mathematics within the classroom. The MSP program, as it enters its third program year has a solid foundation in which to build upon these successes to further impact Washington State teachers and the students they serve.

Instructions – Please select one response for each of the statements below. Thank you.

MSP Program Pre-Survey					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. I understand the concept of inquiry-based instruction.	❍	❍	❍	❍	❍
2. I apply inquiry-based instruction in my current teaching postion.	❍	❍	❍	❍	❍
3. I understand Nature of Science concepts.	❍	❍	❍	❍	❍
4. I apply and/or communicate Nature of Science concepts to students in my current teaching postion.	❍	❍	❍	❍	❍
5. I am confident in designing scientific experiments.	❍	❍	❍	❍	❍
6. I am confident in evaluating scientific experiments.	❍	❍	❍	❍	❍
7. I have strong mathematics content knowledge for my current teaching position.	❍	❍	❍	❍	❍
8. I have strong science content knowledge for my current teaching position.	❍	❍	❍	❍	❍
9. I have a good understanding of the Washington State EALRs and GLEs for the subjects I teach.	❍	❍	❍	❍	❍
10. I connect the Washington State EALRs and GLEs to the content I teach.	❍	❍	❍	❍	❍
11. I effectively connect mathematics and science concepts in my classroom.	❍	❍	❍	❍	❍
12. What are your expectations for this program?					

What is the month of your birthday? _____
What is the date of your birthday? _____
What is the number of your house or P0 box? _____

Instructions – Please select one response for each of the statements below. Thank you.

MSP – Summer Program Post-Survey					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. I understand the concept of inquiry-based instruction.	❍	❍	❍	❍	❍
2. I have the skills to apply inquiry-based instruction in my current teaching postion.	❍	❍	❍	❍	❍
3. I understand Nature of Science concepts.	❍	❍	❍	❍	❍
4. I have the skills to apply and/or communicate Nature of Science concepts to students in my current teaching postion.	❍	❍	❍	❍	❍
5. I am confident in designing scientific experiments.	❍	❍	❍	❍	❍
6. I am confident in evaluating scientific experiments.	❍	❍	❍	❍	❍
7. Describe how your expectations for this course were or were not met.					

What is the month of your birthday? _____
What is the date of your birthday? _____
What is the number of your house or P0 box? _____

Instructions – Please select one response for each of the statements below. Thank you.

MSP – Year-End Teacher Survey					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. I understand the concept of inquiry-based instruction.	❍	❍	❍	❍	❍
2. I apply inquiry-based instruction in my current teaching postion.	❍	❍	❍	❍	❍
3. I understand Nature of Science concepts.	❍	❍	❍	❍	❍
4. I apply and/or communicate Nature of Science concepts to students in my current teaching postion.	❍	❍	❍	❍	❍
5. I am confident in designing scientific experiments.	❍	❍	❍	❍	❍
6. I am confident in evaluating scientific experiments.	❍	❍	❍	❍	❍
7. I have strong mathematics content knowledge for my current teaching position.	❍	❍	❍	❍	❍
8. I have strong science content knowledge for my current teaching position.	❍	❍	❍	❍	❍
9. I have a good understanding of the Washington State EALRs and GLEs for the subjects I teach.	❍	❍	❍	❍	❍
10. I connect the Washington State EALRs and GLEs to the content I teach.	❍	❍	❍	❍	❍
11. I effectively connect mathematics and science concepts for my students.	❍	❍	❍	❍	❍

-Please continue on the other side-

12. What apects of the MSP Program did you like the most?	
13. What apects of the MSP Program did you like the least?	
14. What suggestions would you make to improve the program?	

What is the month of your birthday? _____
What is the date of your birthday? _____
What is the number of your house or P0 box? _____

MSP Teacher Participant Interview

Teacher Name _____ School _____ Date _____

- Was the summer program helpful for you professional development? How so?

- Have the follow-up workshops been helpful? How so?

- To what extent have you applied what you have learned in the summer program and follow-up workshops?

- Are you using any online resources – the Moodle site?

- Has your participation in the MSP program impacted your classroom instruction? How so?

MSP Teacher Participant Interview

- Has your participation in the MSP program impacted your confidence in science content or instruction?

- Has your participation in the MSP program impacted your understanding of the science EARL and GLE's? How so?

- Has your participation in the MSP program impacted your understanding in designing and evaluating scientific experiments?

- Has your participation in the MSP program impacted your students? How so?

- Do you have any suggestions for improvements in program?

MATH SCIENCE PARTNERSHIP

Partner Survey

INSTRUCTIONS: As part of the evaluation for the Math Science Partnership (MSP) program, we would appreciate your feedback in the following survey. You are asked for your e-mail address only to ensure the completeness of the survey - no individual responses will be reported.

Please select one response for each of the following statements.

The MSP program has provided high-quality professional development opportunities for participating teachers.

○ Strongly Agree ○ Agree ○ Neutral ○ Disagree ○ Strongly Disagree
○ Don't Know

The MSP program has established a broad range of educational and scientific partnerships.

○ Strongly Agree ○ Agree ○ Neutral ○ Disagree ○ Strongly Disagree
○ Don't Know

Over the past year, my district/school/organization has participated in collaborative science education projects with other project partners outside of the scope of the MSP program.

○ Strongly Agree ○ Agree ○ Neutral ○ Disagree ○ Strongly Disagree
○ Don't Know

Strong relationships have formed between my district/school/organization and other participating MSP organizations.

○ Strongly Agree ○ Agree ○ Neutral ○ Disagree ○ Strongly Disagree
○ Don't Know

Overall, this past year's Math Science Partnership program has been very successful.

○ Strongly Agree ○ Agree ○ Neutral ○ Disagree ○ Strongly Disagree
○ Don't Know

What have been the MSP program's primary successes this first project year?

Type response here

What have been the MSP program's primary challenges this first project year?

Type response here

Do you have any comments or suggestions for program improvements?

Type response here

Email:

Send Information | Reset Form