Final Project Progress Report

June 1, 2006 through May 31, 2007

Extension

PR/Award No: P116Z040095 – Year Four Award

Integrating Strategies and Technology into Education Practice (InSTEP™)

Kathleen Norris, Principal Investigator/Project Manager

Overview

In 2001 the InSTEP™ program debuted, mixing the latest in classroom technology with a nontraditional, inquiry-based way of teaching that let educators actually put their new tech tools to use.

Six years later it's fair to conclude the program worked. And well.

Since 2001 InSTEP has reached more than 10,000 West Virginia K-16 teachers both in person and online. Factor in the amount of students those teachers work with, and it's clear that InSTEP's scope has extended to thousands of students in the Mountain State, working to improve the math and science skills of those students and better preparing them needed in a 21st century workforce. Table 1 shows the participation in InSTEP by year and overall.

Table 1. Attendance

Year	Step I	Step II	Step III [1]	Total
2001 Summer	256	0	0	256
2002 Summer	248	74	16	338
2003 Summer	289	88	39	416
2003 Online (+2004 Spring)	57	20	0	77
2003 In school	20	0	0	20
2004 Summer	280	107	55	442
2004 Fall Online	8	16	0	24
2005 Summer	29	43	25	97
2005 Online	35	11	0	46
2006 Online	53	12	0	65
	1,275	**371**	**135**	**1,781**

[1] The first three years of the program featured a Step II+. Returning teachers could elect to meet the requirements of Step II+ instead of moving into Step III. Because of the similarities of the requirements, Step II+ was eventually folded into Step III.

In 2007 InSTEP winds down, reaching the end of a second no-cost grant extension from the U.S. Department of Education to the original four-year grant. This report examines InSTEP's performance in four objectives approved in 2006 as part of the program's year four award:

1. Continue to extend the reach of the InSTEP program through a study of the model that will be done in partnership with the Center for Professional Development. Fifty to sixty teachers will participate in Step I Online as part of this partnership. Forty of the teachers will then participate in the face-to-face model of Step II through the West Virginia Governor's Summer Academy.
2. Prepare the final report of the evaluation of InSTEP professional development activities that will include a longitudinal study of student learning in regard to analytical and problem-solving skills and the use of technology.
3. Continue the support and recruitment of West Virginia InSTEP teachers seeking National Board for Professional Teaching Standards certification.
4. Continue the development of the College of Education master's degree program for InSTEP teachers who have completed at least two tiers of the InSTEP program.

In addition this report will review some key facts and figures relating to the program overall since 2001.

Background

InSTEP, which stands for Integrating Strategies and Technology into Education Practice, began with a four-year grant to the Center for Educational Technologies® in 2001 from the U.S. Department of Education. InSTEP acknowledged that the Information Age has put more and

more technology at the fingertips of teachers. But the program recognized that the new technology did educators little good if, one, teachers weren't comfortable using it, and two, they didn't have lesson plans designed to incorporate those tech tools.

Starting in 2001 with a series of summer workshops at the Center for Educational Technologies at Wheeling Jesuit University in Wheeling, WV, and at a couple of sites in other regions of West Virginia, InSTEP began its task of putting technology into the hands of West Virginia science and math teachers and technology coordinators (see Table 2 for a breakdown of InSTEP participants according to subject level taught) and helping those people become comfortable with it. InSTEP believed that there was one way that would guarantee the teachers would be as comfortable with the technology as their students—hands-on practice. So the summer workshops didn't just introduce teachers to software like Kidspiration, handheld computers, and portable GPS units. No, the teachers had to use these new tools to design lesson plans around them. This immersion worked as teacher after teacher wrote to InSTEP administrators about how the teachers once feared the technology, but now were amazed at how comfortable they were working with it and teaching it to others.

"I already had some computer skills," wrote Tonya Chicchirichi, a teacher at Harpers Ferry Junior High School, "but the experience with the InSTEP program has increased them dramatically. My students are doing more on the computer than they ever have before. I have been to our computer room 10 days from September to November, compared to previous years when I only took my classes down to the computer room five to seven days total for the entire year. Also, my classes mainly went down to in previous years to research astronomy topics on

the Internet. I never really expected my classes to present a lab using a software program like PowerPoint. InSTEP has helped me raise my technological level of expectation for my students as well as my own."

Table 2. Teachers per Content Area

	2001-2005	2006
Math	568	19
Science	595	19
Technology	387	2
Other	94	13

The second key to InSTEP's success was putting the teachers into an inquiry, or problem-based learning (PBL), environment. If the teachers were going to design a lesson plan, InSTEP believed, then that plan should use a problem-based learning approach. This open-ended tact introduced students to a problem. The answer to it was not clear-cut. In fact, many answers could be correct. The learning comes in the students' teaming up to research the problem and possible solutions.

To demonstrate problem-based learning, again teachers got hands-on practice. During their weeklong summer workshops they would go through a problem-based learning scenario coming from the award-winning Exploring the Environment® online series of modules created through the Center for Educational Technologies and the NASA-sponsored Classroom of the Future housed there. In later years of InSTEP the program used problem-based learning scenarios based on the Lewis and Clark exploration that were created through InSTEP.

“I thoroughly enjoyed this course,” wrote Lori Uram, one of the teachers who completed Step I Online of InSTEP in 2006. “I learned so much about PBL. I am now a firm believer of this teaching strategy.”

Amanda Knapp, whoa participated in Step II Online in 2006, also supported InSTEP’s problem-based learning approach.

“I am glad that I participated in the PBL project, and the kids really learned a lot from it, as evidenced in their reflection essays. The students felt that they learned more and retained more information doing a project. One boy admitted that he just learns information for the test and then forgets about it afterward. The students agreed that they learned more in PBL than they would have using traditional methods. I look forward to trying PBL in my classes next year. Both the teacher and the students benefit from the PBL experience.”

That was the basic recipe for InSTEP success—give teachers hands-on practice in using tech tools and give them a grounding in problem-based learning as a template on which they could create lesson plans using those tech tools.

To expand InSTEP’s reach, participants in the summer workshops were then charged with going back to their home schools and delivering two sessions on technology and problem-based learning. That approach exponentially increased the amount of teachers exposed to the InSTEP methodology. Based on an average of five participants in each of the two hometown sessions, an additional 2,000-plus teachers learned about InSTEP’s plan of combining classroom technology

and problem-based learning. In five full years of the program, that amounted to more than 10,000 teachers who experienced the program in some form. See Table 3 for a breakdown of hometown professional development sessions by year.

Table 3. Hometown Professional Development Sessions

	Number of InSTEP summer workshop graduates	Number of InSTEP professional development sessions held by graduates	Number of InSTEP teachers attending development sessions
2001	257	405	2,025
2002	322	408	2,040
2003	432	404	2,020
2004	440	410	2,133
2005	97	19	103
2006	53	50	250

To provide ongoing professional development and support, InSTEP graduates could rely on InSTEP regional coordinators based in each of West Virginia's eight Regional Education Service Agencies. These local coordinators ensured that InSTEP graduates conducted their local workshops, and they helped to arrange for the delivery of classroom materials that teachers could order through the program to conduct distance learning and problem-based scenarios, such as the Lewis and Clark lesson offered through InSTEP. Table 4 lists the technology tools that could also be loaned out to teachers through their regional InSTEP coordinator.

Table 4. Technology Tool Loaner Set Availability

	Total	Breakdown
Casio GV10 digital camera	48	6 in each of the 8 RESAs
Palm m130 handheld computer	48	6 in each of the 8 RESAs
Global positioning system unit	48	6 in each of the 8 RESAs
Imagiprobe	8	1 set at each RESA

Another feature of InSTEP that helped the program thrive was the ongoing training it offered. InSTEP featured four levels: Step I, Step II, Step II+, and Step III. New participants would take part in the Step I workshop. They would learn the basics of working with some tech tools as well as delivering a problem-based learning lesson. Those Step I graduates were then welcomed back for more training in Step II. In those later workshops participants would delve deeper into problem-based learning through the Academy of Problem-based Learning that InSTEP created. These teachers would move beyond simply being able to lead students through an inquiry session. Instead, in the later InSTEP workshops they would create their own problem-based scenarios and have them peer reviewed. Those who completed all the levels of the program were certified as problem-based learning instructors.

There were other rewards for progressing through the levels of the program. For instance, those who made it through Step III earned their own laptop computer purchased through InSTEP. Those who completed Step II earned a tech tool—either a digital camera, a Palm handheld computer, a handheld global positioning system (GPS) unit, a thumb drive, or classroom software. See Table 5 for how many technology tools were distributed.

Table 5. Technology Tool Distribution

	2001-2005	**2006**
Digital camera	562	53
Geometer's Sketchpad	13	0
Inspiration	18	0
Kidspiration	10	0
Laptops	132	11
Palm handheld computer	504	0
Thumb drive	0	12
Handheld GPS unit	28	0

As InSTEP matured, the program developed an online component. Beginning in 2003 Step I of the program was offered online during the school year to reach teachers who could not commit to a week during the summer.

InSTEP Online typified the program's approach in making InSTEP accessible to teachers everywhere in West Virginia—a state that offers its own geographic challenges with its two panhandles, mountain chains, and areas like the southern part of the state that are mostly rural and not served by interstate highways. Combined with InSTEP's home base at Wheeling Jesuit University in the state's Northern Panhandle, extending the program's reach to teachers throughout the state was always a prime consideration. In its first year InSTEP conducted weeklong workshops in Southern West Virginia through Forward Southern West Virginia, an economic development organization working in the lower 17 counties of the state. In the program's second year, workshops were also held in the Eastern Panhandle. See Table 6 for a breakdown of which region InSTEP participants came from.

Table 6. RESA Representation

	2006	**Percentage of 2006 Participants**
Resa I	3	6%
Resa II	6	11%
Resa III	1	2%
Resa IV	6	11%
Resa V	7	13%
Resa VI	4	8%
Resa VII	13	25%
Resa VIII	5	9%
Other	8	15%

In its quest to improve the teaching skills of West Virginia teachers, InSTEP partnered with the National Board for Professional Teaching Standards. Through InSTEP teachers could choose an online curriculum that would allow them to eventually earn their National Board certification. The National Board is an independent, nonprofit, nonpartisan, and nongovernmental organization dedicated to advancing the quality of teaching and learning. Certification is achieved through a rigorous, performance-based assessment that takes between one and three years to complete and measures what accomplished teachers should know and be able to do. By the end of InSTEP, 12 teachers had achieved National Board certification through InSTEP.

Year Four Second No-Cost Extension (2006) Goals

In the final year of InSTEP funding the program faced four specific goals:

1. Continue to extend the reach of the InSTEP program through a study of the model that will be done in partnership with the Center for Professional Development. Fifty to sixty teachers will participate in Step I Online as part of this partnership. Forty of the teachers will then participate in the face-to-face model of Step II through the West Virginia Governor's Summer Academy.
2. Prepare the final report of the evaluation of InSTEP professional development activities that will include a longitudinal study of student learning in regard to analytical and problem-solving skills and the use of technology.
3. Continue the support and recruitment of West Virginia InSTEP teachers seeking National Board for Professional Teaching Standards certification.
4. Continue the development of the College of Education master's degree program for InSTEP teachers who have completed at least two tiers of the InSTEP program.

This section will review each of these objectives.

Objective 1. Continue to extend the reach of the InSTEP program through a study of the model that will be done in partnership with the Center for Professional Development. Fifty to sixty teachers will participate in Step I Online as part of this partnership. Forty of the teachers will then participate in the face-to-face model of Step II through the West Virginia Governor's Summer Academy.

InSTEP succeeded in this objective as 53 teachers participated in Step I Online in 2006. The program ran from March 20 to June 9, 2006. The West Virginia Center for Professional Development helped make the online class a possibility by funding and helping to organize and publicize the Step I program through its resources.

The mission of the West Virginia Center for Professional Development, according to its website, "is to advance the quality of teaching and management in the schools of West Virginia through (1) the implementation of statewide training, professional staff development, and technical assistance programs and practices to assure the highest quality in such teaching and management; and (2) the provision of technical and other assistance and support to regional and local education agencies in identifying and providing high quality professional staff development and training programs and implementing best practices to meet their locally identified needs."

InSTEP certainly fit well into both parts of that mission statement. The online classes originated out of the Center for Educational Technologies at Wheeling Jesuit University. An InSTEP facilitator led the online participants through the coursework. For their completion of Step I, the 53 participants each received a thumb drive, making the transfer of files, especially large ones, convenient from one computer to the next.

The second part of this objective saw 12 Step I graduates further their InSTEP knowledge by participating in Step II of the program. Although, as stated in this objective, the Step II workshop was to be held face to face, the session actually took place online. The facilitator of Step II said that the teachers, because of their busy schedules and their increasing comfort with learning in an online environment, requested that the session be delivered online. The Governor's Academy for Teaching Excellence sponsored the Step II session. The academy provides education and instruction ensuring that the state's teachers, instructional aides, principals, administrators, and teacher education faculty at colleges and universities are focused on state laws, policies/regulations, and State Board of Education goals and are working together in a coordinated effort.

Objective 2. Prepare the final report of the evaluation of InSTEP professional development activities that will include a longitudinal study of student learning in regard to analytical and problem-solving skills and the use of technology.

The Center for Educational Technologies contracted with Denis W. Jarvinen, Ph.D. of Strategic Measurement and Evaluation Inc. to complete the program evaluation and longitudinal study. That report is included as Appendix A of this report.

In developing the evaluation plan, the Center for Educational Technologies adopted a multidimensional framework that included attention to the design of the InSTEP program, the implementation of the InSTEP training, and the measurement of key teacher and student outcomes associated with program participation. In addition, the center commissioned a study to provide background information related to the context in which the program would operate.

Figure 1 illustrates the overall evaluation framework. Each of the evaluation efforts is assigned to one of the three sections.

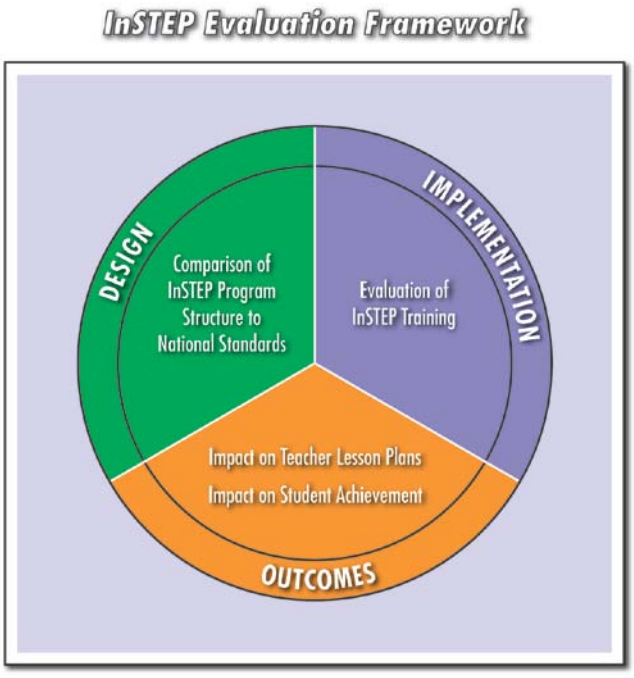

Figure 1: InSTEP Evaluation Framework.

To evaluate the design of the InSTEP program, one evaluation team compared the elements of the InSTEP professional development program to elements associated with well-designed professional development programs as identified in the research literature and outlined in No Child Left Behind guidelines for teachers' professional development.

To evaluate the quality of InSTEP implementation, the InSTEP staff collected evaluation ratings from program participants at the close of each training session. In addition, a second evaluation team collected survey data and conducted in-depth interviews with samples of participating teachers. The focus of the survey and interviews was to assess teacher attitudes and expectations related to important elements of the InSTEP program.

The final set of evaluation activities assessed teacher and student outcomes related to the InSTEP training. An effort was made to assess the impact of the InSTEP training on teachers' attitudes and classroom practices, the ability of the teachers to create well-designed problem-based learning sequences, and the quality of student products produced in response to the problem-based learning lessons.

InSTEP Design Evaluation

Based on a review of the literature on the professional development of teachers and No Child Left Behind guidelines, the following characteristics were found to be most critical to successful professional development program design:

- Focus on subject matter expertise.
- Focus on effective instructional practices.
- Collaboration and collegiality.
- Community of learners.
- Integration of technology in instruction.
- Evaluation and assessment.

Here are the findings in each of those areas:

Subject Matter Expertise. Singh and Luketic (2005) found that InSTEP provided a threefold approach to the program's learning objectives that incorporated subject matter expertise, a pedagogical framework, and a technological structure for use in instruction. They concluded that the pedagogical approach and the hands-on activities that InSTEP used created an environment where teachers' subject knowledge was enhanced as they learned about problem based learning and use of appropriate technologies. Overall, the focus on content knowledge was evident in the program implementation.

Pedagogical and Instructional Expertise. Singh and Luketic found that the program hired "master" teachers to facilitate problem-based learning training and interactions during the weeklong sessions at all program levels. The training agendas reflected time dedicated to having the master teachers share expertise regarding key ideas related to problem-based learning, such as concept mapping, problem based learning, and inquiry-based problem solving.

Collaboration and Collegiality. Singh and Luketic reviewed program materials and interview data and concluded that InSTEP clearly emphasized the notion of creating a learning community among the participants. Teachers had extensive opportunities to work with each other during the program as well as after hours through socialization and informal activities. The evaluation team felt the residential training program was especially helpful in supporting the development of collegial relationships.

Community. Singh and Luketic found that many of the same factors that supported the development of collegial relationships helped to support the development of an active learning community within InSTEP. Participants were required to depend on each other and the individual expertise of each group member. Much of the weeklong program was structured to facilitate learning and problem solving among members. When participants returned to their home schools, they continued to expand and enhance the community of learning begun at the CET center.

Appropriate Uses of Technology in Instruction. Given InSTEP's strong focus on the integration of technology tools in instruction, not surprisingly Singh and Luketic concluded that the program was effective at providing teachers with guidance on the appropriate application of technology in instruction. Teachers had many opportunities to learn new technologies and to integrate these in instruction and presentations. Based on the review of materials and interview data, teachers learned new technologies and their appropriate uses for instruction. The tasks and activities related to teaching new technology were implemented successfully in the program.

Evaluation and Assessment. Singh and Luketic found that in the initial InSTEP proposal to the Department of Education, evaluation components were provided and briefly described. As the program developed, the evaluation efforts were developed and implemented. Given the nature and range of the evaluation efforts, it is reasonable to conclude that the InSTEP program included a comprehensive and detailed evaluation agenda.

InSTEP Quality Evaluation

An evaluation of the quality of the implementation of the InSTEP program was completed by Hernandez (2005). The study's core questions focused on assessing teacher's perceptions of the quality of the InSTEP training and on determining whether participation in the InSTEP program had a positive impact on program completers (i.e., those who completed the entire series of workshops).

Two strands of data were used to gauge the impact of the program. The first strand of data was tied to a workshop survey used to document perspectives on the quality of program implementation. The second strand was grounded in interview data generated from program participants in summer 2003 and summer 2004.

The Workshop Survey. At the end of every summer workshop, all participants were required to complete an evaluation survey to collect their perspectives on the quality of their experiences. The survey was modeled after a NASA survey used to evaluate educational events. The short survey collected demographic information, feedback on program participation (i.e., ratings on the value and benefits of participation), and satisfaction level with a variety of workshop factors (e.g., content, organization).

To complete the survey, participants were asked to rate their level of agreement with a series of statements. The response scale was a 5-point Likert scale ranging from "Strongly Disagree" (scored as 1) to "Strongly Agree" (scored as 5). The results indicate that program participants were consistently positive in rating the InSTEP training. Year after year, average ratings remain

very high. Teachers reported that participation was a valuable experience and that they expected to apply what they learned. The teachers also felt the workshops were well organized, and indicated they would highly recommend participation to others. Overall, the majority of teachers felt participation in the workshops adequately prepared them to immediately implement what they learned.

Interviews with InSTEP Program Participants. To gain a deeper understanding of the views of program participants about their training experience, interviews were conducted with teachers who completed InSTEP training in the summer of 2003 and 2004. These interviews were transcribed and a content analysis was conducted to identify common themes across participants.

In general, the interviewees in the 2003 cohort were predominantly female, teaching in middle or high school, and teaching science or mathematics. Interviewees in the 2004 cohort were also predominantly female, but the majority of them were teaching either in kindergarten or elementary schools, followed by science teachers in middle schools.

Consistent with the workshop survey data, Hernandez's (2005) review of the interview transcripts found that participants held consistently positive views on both the quality of their participation and the impact of the training on their classroom practices. One of the factors contributing to the positive appraisal of the program was teachers' belief that the program met their expectations. For example, many of the interviewees indicated that they chose to participate in the InSTEP program because they were interested in using and integrating technology in their classroom lessons. They looked forward to being exposed to a variety of technology tools and

experiencing a hands-on approach to using those tools. These participants felt that the InSTEP program delivered on both counts.

Another reason cited by participants for choosing to participate in the InSTEP training was a desire to learn about alternative teaching strategies and to bring new ideas to their classrooms. For many participants, the introduction to constructivist teaching principles and problem-based learning met this need. They felt the principles were clearly explained and that the hands-on application of the principles required to create their own problem-based learning sequence was exactly the type of practical experience they needed develop a deeper understanding of the approach.

Finally, many teachers choose to attend the InSTEP training because they were looking for new ways to motivate their students. They were searching for ways to actively engage their students in the learning process, to capture their student's attention, and to generate active student involvement. Again, these teachers felt the InSTEP training introduced them to an approach that would accomplish these goals.

Program participants also were asked to compare the InSTEP training to other professional development activities they had experienced. Although the teachers were generally positive about all professional development experiences, they consistently cited the InSTEP program as one of the best they had ever attended. In particular, they mentioned that the InSTEP program provided a working understanding of how to use a problem-based approach and how to integrate technology into classroom lessons. The InSTEP participants also reported liking how the

program required them to interact and network with other teachers with similar professional backgrounds. Taken together, the data from the workshop survey and the in-depth interviews provide strong evidence of the success of the InSTEP training.

Teacher and Student Outcomes Related to InSTEP Training

To gauge InSTEP's impact on teacher attitudes and behavior and student achievement, the evaluation relied on a number of separate studies.

An evaluation study by Wolfe and Jarvinen (2005) focused on assessing the impact of the InSTEP program on teacher attitudes, classroom practices, and curriculum planning. The evaluation team sought evidence to demonstrate 1) that participation in the InSTEP program was associated with more positive attitudes toward technology, 2) that InSTEP teachers were more likely to use technology in the classroom, 3) that InSTEP teachers were more likely to develop classroom practices consistent with a constructivist approach, and 4) that teachers who participated in the InSTEP training were able to translate what they learned into well-designed lessons that integrated technology within a problem-based learning environment.

Wolfe and Jarvinen compared survey and observational data on both InSTEP and non-InSTEP-trained teachers to assess the program's impact on teacher attitudes and classroom behaviors. To assess InSTEP's impact on participants' ability to create a well-structured lesson plan incorporating technology within a problem-based learning lesson, a random sample of lesson plans was drawn from the complete set of products produced by InSTEP teachers at each of the

training levels (Steps I, II, and III). These plans were then rated using a rubric that assessed 10 lesson plan elements.

Teacher attitudes toward technology were compared across InSTEP and non-InSTEP schools by analyzing the responses of mathematics, science, and technology teachers at these schools to the Teaching, Learning, and Computing (TLC) Survey. Classroom practices and class climate variables were compared across groups by using the ratings of trained observers who completed a formal observation form after observing math and science teachers delivering instruction at both groups of schools.

TLC Survey. InSTEP participants completed an adapted version of the original TLC Survey. Surveys were completed near the end of the school year (after teachers in InSTEP schools had participated in InSTEP for at least one academic year). Teachers in InSTEP schools reported higher levels on all attitudinal and self-report behavioral scales with the exception of Attitude Toward Technology. Teachers in InSTEP schools reported levels of Constructivist Teaching Philosophy, Technology Skills, and Constructivist Uses of Technology that were higher than those of non-InSTEP teachers to a statistically significant degree. The data support the assertion that InSTEP training has a positive impact on a number of teacher attitudes related to the value of constructivist teaching principles and the value and usefulness of technology. The data suggest that InSTEP-trained teachers, through the professional development activities they engage in once they return to their home schools, are able to positively impact the attitudes of their peers.

Observational Ratings. An evaluation team composed of Center for Educational Technologies staff and independent evaluators conducted classroom observations. Observers rated each classroom using a rating scale that asked observers to evaluate four broad categories of classroom activities:

- The degree to which the lesson was developed around an inquiry or problem-based teaching strategy (including factors such as disciplinary understanding, inquiry focus, and value beyond the class).
- The degree to which technology was included in the lesson.
- The quality of the general classroom environment (including factors such as locus of control, substantive conversation, and student engagement).
- The types of assessment strategies incorporated into the observed lessons.

InSTEP ratings were higher for five of the eight comparisons, and InSTEP ratings were greater than non-InSTEP ratings to a statistically significant degree for Technology Use and Student Engagement. In addition, any differences in favor of non-InSTEP teachers were small.

Teacher-developed Lesson Plans. One goal of InSTEP is to ensure that the participants can use their new knowledge to improve classroom instruction. To this end, teachers at all levels of the program are required to produce a lesson plan that incorporates both technology and constructivist principles. To determine whether or not the principles taught during the InSTEP training were being appropriately incorporated into classroom lessons, Wolfe and Jarvinen (2005) collected a sample of lesson plans produced by the InSTEP-trained teachers and rated the quality of the lesson plans across a number of InSTEP-relevant dimensions. To determine

whether or not continued involvement in the InSTEP program led to higher quality lesson plans, samples of lesson plans from participants at three levels of the InSTEP program (i.e., Level I, Level II, and Level III) were included in the coding process.

A random sample of 50 lesson plans was identified from the set of plans completed and submitted by program participants during the 2003-2004 and 2004-2005 training cycles. The rubric used to rate the lesson plans focused on 10 separate aspects of the lesson plan. These rubric dimensions were developed based on a content analysis of InSTEP lessons currently posted on the InSTEP website. The posted lessons have been peer reviewed and represent a sample of the best products produced to-date by InSTEP participants. Therefore, they provide an appropriate reference point for the analysis of any lesson plan.

The lesson plan elements that were rated included the degree to which the plan: 1) identified the prior knowledge required to by the students, 2) identified a problem that had some relevance to the students 3) provided an interesting and ill-structured problem for the students to solve, 4) was aligned with identified learning standards, 5) followed a problem-based learning model, 6) allowed for student exploration and elaboration, 7) required student products, 8) clearly defined how the students would be assessed, 9) provided resources for the students to access, and 10) integrated technology into the lesson.

The lesson plans were grouped by InSTEP participation level and an analysis of variance was conducted to compare the average ratings across the three levels. The analysis revealed a significant affect for level of participation ($p < .001$) with the average rating of plans drawn from

Level II participants significantly higher than the average rating of plans drawn form Level I participants, and the average rating of plans drawn form Level III participants significantly higher than the average rating of plans drawn from Level II participants. This suggests that each level of the training may add to the overall impact of the professional development training.

To investigate the upward growth in the total lesson plan ratings across InSTEP training levels, a second set of analyses was completed. These analyses sought to determine if the growth in the total rating score could be accounted for by increased ratings for a few lesson plan elements or whether the growth in the total rating score reflected a more general pattern of improvement across all the lesson plan elements. This analysis indicated that the growth in the lesson plan ratings was related to a general pattern of improvement across each of the lesson plan elements rated by the evaluation team.

The evaluation findings indicate that participation in the InSTEP program had a significant and positive impact on teacher attitudes towards constructivist teaching and their willingness to use technology in the classroom. In terms of classroom practices, the results indicate that InSTEP-trained teachers are more likely to have higher levels of student engagement and are more likely to incorporate technology into their lessons than non-InSTEP trained teachers. Finally, the analysis of the lesson plan rating data indicates that InSTEP-trained teacher are able to develop lesson plans that integrate technology within a constructivist teaching approach. Moreover, the quality of the lesson plans improve significantly as teachers participate in higher levels of the InSTEP training.

Objective 3. Continue the support and recruitment of West Virginia InSTEP teachers seeking National Board for Professional Teaching Standards certification.

One of the benefits for participants in InSTEP has been the close ties the program developed with the National Board for Professional Teaching Standards. An important goal of the InSTEP program is to empower teachers to be educational leaders and members of professional communities of practice. Through InSTEP teachers could work toward achieving the highly sought after, distinguished National Board certification.

The National Board is an independent, nonprofit, nonpartisan, and nongovernmental organization dedicated to advancing the quality of teaching and learning. According to its website, the National Board for Professional Teaching Standards advances the quality of teaching and learning by:

- Maintaining high and rigorous standards for what accomplished teachers should know and be able to do.
- Providing a national voluntary system certifying teachers who meet these standards.
- Advocating related education reforms to integrate National Board certification in American education and to capitalize on the expertise of National Board certified teachers.

Since 1987 more than 55,000 teachers have achieved National Board certification.

InSTEP called its National Board option Mission to Accomplished Teaching. This aspect of the InSTEP program debuted in 2002. The InSTEP project manager developed two courses through Wheeling Jesuit University to support the candidates. The courses are offered at a greatly reduced cost to InSTEP teachers. To date 12 InSTEP teachers have certified through the Mission to Accomplished Teaching program.

During the 2006-2007 school year InSTEP supported three West Virginia teachers through the National Board for Professional Teaching Standards certification process:

- Janene Reddy, Triadelphia Middle School, intermediate science
- Marsha Roth, Triadelphia Middle School, intermediate special education
- Marsha Roberts, Marshall County Schools, elementary physical education

All three of the teachers participated in both Step I and Step II before applying for National Board certification. The teachers participated in the two courses at Wheeling Jesuit University and received three hours of graduate credit for each course at no cost. They also received materials such as National Board workbooks to further help them through the application process. InSTEP contracted with Mary Jo Guidi of the National Board to facilitate the classes and read the entries for the candidates. All three candidates completed and submitted the required portfolio entries and completed the assessment component. At this writing, though, none of the three has achieved full National Board certification.

Objective 4. Continue the development of the College of Education master's degree program for InSTEP teachers who have completed at least two tiers of the InSTEP program.

Unfortunately, plans for this objective did not go further with Wheeling Jesuit University. The university chose not to continue the development of its College of Education master's degree at this point.

Summary

As InSTEP concludes on May 31, 2007, the program can certainly be considered a success. When it started in 2001, InSTEP outlined certain goals:

- Broadly develop effective teaching practices based on problem-based learning and the constructivist approach; provide program participants thorough knowledge of the theory and practice of problem-based learning.
- Become skilled in the sound uses of technology to enhance classroom learning (with special emphasis on science and mathematics learning); technology should be integrated in instruction and/or used as a teaching tool.
- Create classroom environments that encourage collaborative and cooperative learning among students.
- Develop learning community and collegiality with other educators.
- Influence the classroom practices of West Virginia teachers by peer learning.
- Learn to develop and implement appropriate and alternative assessment methods for student performance.
- Provide teachers with technology tools they can use locally.

InSTEP accomplished all of these goals. More than 1,800 teachers received the direct benefits of the program, and 10,000 more experienced it thanks to the dissemination efforts of the 1,800. InSTEP established a professional development model that worked for West Virginia teachers—and a model that could be replicated successfully elsewhere as well.

Perhaps the best expression of InSTEP's effectiveness comes from Anita Dennison, a teacher who participated in the Step II Online session in this final year of InSTEP:

> "InSTEP I and II both provide opportunities for teachers to learn how to implement PBLs. I think it is important to use PBLs in the classroom for our future. Our students are our future. Do we want robotic people who can spit out rote fact? Or do we what problem solvers and self motivated thinkers?
>
> "I try to share the information I have learned with fellow teachers. After InSTEP I, two coworkers and I held our professional development session promoting InSTEP. I thought this was a great way to 'spread the word.' We had a good attendance and the participants seemed to gain an understanding of PBLs based in their reflections and evaluations. Personally, I had never previously presented a professional development session and grew from the experience. I have since then not shied away when asked to make presentations. In the past I would have not had the courage to be a speaker, even though I love to talk!

> "Overall, InSTEP has taught me to be more confident in myself and my teaching. I have learned the importance of PBLs and how to utilize the process. The PBLs naturally cover national and state content standards but most importantly teach students to become critical thinkers, problem solvers who can work in groups using technology to their advantage. These things seem to be a weakness in students today. I think it is due to changes in society, but it is our job as teachers to make the necessary changes to get students back on track Time spent on a solid PBL is time well spent in a classroom."

Satisfied, rejuvenated teachers and better performing students. That's a combination that any educational initiative would be happy to achieve.

References

Hernandez, V. M. (2005). *InSTEP: A study of impact on program completers.* Wheeling, WV: Center for Educational Technologies.

Singh, K., & Luketic, C. (2005). *Professional development of teachers: The InSTEP program compared to the extant literature and the guidelines provided by No Child Left Behind.* Wheeling, WV: Center for Educational Technologies.

Wolfe, E., & Jarvinen, D. W. (2005). *An evaluation of the InSTEP Professional Development Program: 2004-2005.* Wheeling, WV: Center for Educational Technologies.

Appendix A