



Professional Development of eMINTS Teachers: A Comparison of Delivery Methodology Between eMINTS Staff and PD4ETS Participants



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This report presents results from an examination of the professional development of eMINTS teachers in the FY03 cohort. The purpose of the study was to assess differences and similarities between the efficacy of professional development delivered by eMINTS Staff (Cluster Information Specialists - CIS), and by participants in the eMINTS Professional Development for Educational Technology Specialists (PD4ETS) program, a train-the-trainer program. Previous analysis of eMINTS teachers' perceptions of their professional development found that CIS played a crucial role in the development of teachers. Evidence from the current study suggests that both types of professional development delivery produce similar results and assist in preparing eMINTS teachers to support student learning.

Background

Before the fall of 2003, eMINTS staff employed as Cluster Information Specialists (CIS) were the sole providers of eMINTS professional development to eMINTS teachers. Individuals were hired to be CIS because of their existing knowledge of multimedia instructional technologies as well as their understanding of inquiry-based and cooperative learning strategies. CIS receive no formal training subsequent to hiring; however, they participate in individual professional development experiences and they meet monthly with their area instructional specialist (AIS) for support and direction. CIS are also in constant contact with eMINTS leadership team members for "on-the-job" preparation and supervision.

A previous analysis of eMINTS teachers' perceptions of their eMINTS professional development experiences found that the CIS played a crucial role in preparing teachers to use the eMINTS instructional model (eMINTS Evaluation Project, 2000). "The character of the relationship between the teachers and the CIS was key to teachers' learning to use the technology and applying the technology to their teaching. In most of the clusters the teachers felt that their CIS made a personal commitment to the teachers' learning and professional development." (eMINTS Evaluation Project).

Because of an increased demand for eMINTS professional development and a limited number of CIS, the eMINTS National Center implemented the Professional Development for Educational Technology Specialists (PD4ETS) program in the fall of 2003. The eMINTS PD4ETS program is part of a strategy to expand eMINTS to more classrooms

throughout the state of Missouri. Districts that expect to maintain or expand the eMINTS program may obtain eMINTS certification for one or more of their district employees through the PD4ETS program. The program is a way to meet the challenge of providing eMINTS professional development for teachers who replace eMINTS teachers that retire or leave the district and for teachers in additional district-funded eMINTS classrooms.

The PD4ETS program is a 2-year, train-the-trainer program to prepare individuals already employed in their school district to deliver eMINTS professional development to teachers in their school or district. Professional development is provided in both multimedia instructional technologies and in inquiry-based and cooperative learning strategies, along with specific instruction in providing the in-classroom coaching and mentoring that is a hallmark of the eMINTS comprehensive professional development program.

A variety of formats, including face-to-face, online, e-conferencing, video teleconferencing, and on-site visits, are used to deliver the professional development sessions to PD4ETS participants over a two-year period. While participating in the PD4ETS program, participants are allowed to deliver eMINTS professional development programs to teachers. There is a certification process throughout the PD4ETS program. If successful, the participant receives the title of “Certified eMINTS Instructional Specialist” at the conclusion of the program. Only certified eMINTS instructional specialists are allowed to continue accessing eMINTS professional development materials and preparing official eMINTS teachers.

To maintain program integrity and reliability through both methods of delivering eMINTS professional development, CIS-trained eMINTS teachers and PD4ETS/Certified eMINTS Instructional Specialist-trained eMINTS teachers have similar curricular and pedagogical requirements. For example, both follow the same scope and sequence of instruction. In addition, both have their schedule for professional development approved by the eMINTS National Center office, both use the same professional development materials, and both follow the same facilitator guides when delivering the professional development sessions.

The purpose of this study was to examine the similarities and differences in professional development as delivered by PD4ETS participants/Certified eMINTS Instructional Specialists and by CIS, as well as their impact on eMINTS teachers. This was accomplished by analyzing the extent to which the method of professional development delivery impacted student performance on the Missouri Assessment Program (MAP) tests, as well as analyzing how teachers participating in method of professional development deliver perceived themselves as learners and teachers in the context of that professional training.

Research Design and Data

This study used a mixed methods design that included both focus group interviews and statistical analysis of achievement data. Mixed methods design is useful when explaining

or illustrating the findings of one method (e.g., statistical analysis of student achievement data) by using the findings of another method (e.g., focus group interviews of teachers) (Greene, Caracelli, & Graham, 1989). It may also assist with data triangulation by elucidating the extent of consistency among sets of findings using different data gathering techniques (Greene et al.).

2004 student MAP test data were used to measure student performance for this study. Because MAP achievement scores for grade 3 in communication arts and grade 4 in mathematics were used in the statistical analysis, each school in this study had an eMINTS classroom in grade 3, grade 4, or both grades 3 and 4. Forty schools constituted the FY03 cohort (see Bickford, 2005); eMINTS teachers in the FY03 cohort schools received professional development from only CIS.

There were 19 additional schools with eMINTS classrooms in FY03. Teachers in those schools received professional development from PD4ETS participants, with one exception: two of the 19 schools had at least one teacher receiving professional development from a CIS and at least one teacher receiving professional development from a PD4ETS participant. Depending on the school with PD4ETS participants, the grade levels with eMINTS classrooms ranged from grade 2 to grade 6; there were also eMINTS classrooms for grade 8. Only 18 of the 19 PD4ETS schools were included in the statistical analyses, however, as one school did not have an eMINTS classroom in grade 3 or grade 4, this brought the total number of schools in the study to 58.

Table 1 shows the distribution of students in the study according to the type of delivery of eMINTS teacher professional development and eligibility for the federal free or reduced-price lunch program (FRL). FRL is a proxy for student socioeconomic status, and it was used to categorize students because of its significance in predicting how students perform on the MAP examinations, as shown below.

As presented in Table 1, of the 2,520 students in the study, 1,718 were in eMINTS classrooms taught by teachers who received professional training from CIS. The remaining 802 students were in classrooms with teachers who received professional development from PD4ETS participants all of whom eventually successfully completed program requirements for certification to become Certified eMINTS Instructional Specialists.

The vast majority of students in eMINTS classrooms were in schools with teachers who received eMINTS professional development from only CIS or in schools with teachers who received eMINTS professional development from only PD4ETS participants. There were 5 fourth grade teachers across two schools; however, who received professional development from CIS, while the other eMINTS teachers in those schools received professional training from PD4ETS participant. A total of 106 students were in those classrooms. The extent to which this may have impacted the findings, if at all, was not known. No findings emerged from the analyses that indicated an impact.

Of the 1,718 students in eMINTS classrooms with CIS-trained teachers, 50.5 percent were eligible for the federal free/reduced price lunch program. This was about fifteen percent lower than the 66.2 percent of students in classrooms with PD4ETS-trained teachers.

Table 1
Distribution of Students by Teacher-Training and Free/Reduced Lunch Eligibility

	Grade 3	Grade 4	All Grades	Number of Students
<i>All Teachers</i>				
Free/Reduced Lunch Student				
Yes	52.6	57.4	55.5	1398
No	47.4	42.6	44.5	1122
All Students	100.0	100.0	100.00	
Number of Students	1020	1500	2520	
<i>CIS-Trained Teachers</i>				
Free/Reduced Lunch Student				
Yes	46.3	53.4	50.5	867
No	53.7	46.6	49.5	851
All Students	100.0	100.0	100.0	
Number of Students	713	1005	1718	
<i>PD4ETS-Trained Teachers</i>				
Free/Reduced Lunch Student				
Yes	67.4	65.5	66.2	531
No	32.6	34.5	33.8	271
All Students	100.0	100.0	100.0	
Number of Students	307	495	802	

Table 2 presents the distribution of teachers (in the statistical analyses) by type of professional development delivery. The numbers represent the number of teachers in their second year of eMINTS professional development, who either taught grade 3 and had students tested in communication arts, or taught grade 4 and had students tested in mathematics. Teachers in their second year of eMINTS professional development were the focus of the study, as prior research evidenced important differences in instructional practice between teachers in their first year of professional development and those in their second year (see Bickford, 2005; eMINTS Evaluation Project, 2001, 2002). First year teachers were found to be in the process of changing toward the eMINTS model of instruction and technology use, while second-year teachers were found to better demonstrate that model. Some schools in the FY03 cohort also had eMINTS teachers in their first year of eMINTS professional development; those teachers were therefore not included in the study.

As shown in Table 2, of the 53 teachers in grade 3, 17 received their professional development from PD4ETS participants, and 36 received professional development from

CIS. In grade 4, 23 teachers received professional development from PD4ETS participants, and 51 teachers received professional development from CIS. In total, 127 teachers were included in the statistical analyses.

Table 2
Distribution of eMINTS Teachers by Grade Level and Professional Development Type

Grade Level	Professional Development Delivery Type		All Teachers
	PD4ETS	CIS	
3	17	36	53
4	23	51	74
All Teachers	40	87	127

For the teacher focus group interviews, all second-year eMINTS teachers in the 58 schools in the study were invited to participate. This included teachers who received professional development from either PD4ETS participants or CIS. It also included teachers who taught grades other than those included in the statistical analyses (i.e., grades 3 and 4); the grades ranged from 2 through 6, and grade 8. A total of 27 teachers participated: 16 CIS-trained teachers and 11 PD4ETS-trained teachers. Therefore, 19.4 percent of the 139 invited teachers participated in the focus groups.

Data Analysis and Findings

This section presents the methods of analysis and the findings. First, data were analyzed according to a multilevel statistical analysis by delivery methodology of teacher professional development, while controlling for student eligibility for the federal free/reduced-price lunch program (FRL). Then, focus group interviews of teachers were analyzed using the constant comparative method to explore differences and similarities in teachers’ perspectives regarding their professional development.

Total MAP Scores by Teacher Training and Free/Reduced-Price Lunch Eligibility

Differences in total MAP scores by teacher professional development delivery methodology (e.g., CIS or PD4ETS participant) and FRL eligibility are presented. For each subject area (e.g., communication arts and mathematics), a plot and model present findings that resulted from analysis that addressed the following research questions:

- Was there a difference in mean performance scores between students in eMINTS classrooms with teachers who received professional development from CIS and students in eMINTS classrooms with teachers who received professional development from PD4ETS participant?
- Did teacher professional development delivery type differentially impact the performance of students according to free/reduced-price lunch eligibility?

Results from multilevel statistical analyses are presented in the plots and models. Those analyses regressed the student-level MAP score on teacher training and student FRL eligibility. Multilevel analysis provides for testing main effects and interactions within

and between levels (e.g., student level and classroom level) of data. The model for communication arts was a random intercept model. The assumption of this model was that the mean MAP scores varied across classrooms, but that the effect associated with FRL eligibility remained constant across all classrooms. For mathematics, the model presupposed both a random intercept and random slope, which assumed that both the mean MAP scores and the effect of FRL eligibility varied across classrooms. For instance, the impact of FRL eligibility may be different in classrooms with a majority of students eligible for FRL than in classrooms with fewer students eligible.

Figure 1 presents the model for the 2004 MAP test in communication arts. The results showed that students enrolled in an eMINTS classroom taught by a PD4ETS-trained teacher scored just 0.29 points on average higher than students taught by CIS-trained teachers, after controlling for the effect of family socioeconomic status using free/reduced-price eligibility (FRL) as a proxy. This small difference in average performance was not statistically significant. The impact of FRL, however, was statistically significant, with students eligible for FRL scoring 11.22 points on average lower than students not eligible. The interaction term was not statistically significant; therefore, student MAP scores were not differentially impacted by delivery methodology of teacher professional development and FRL.

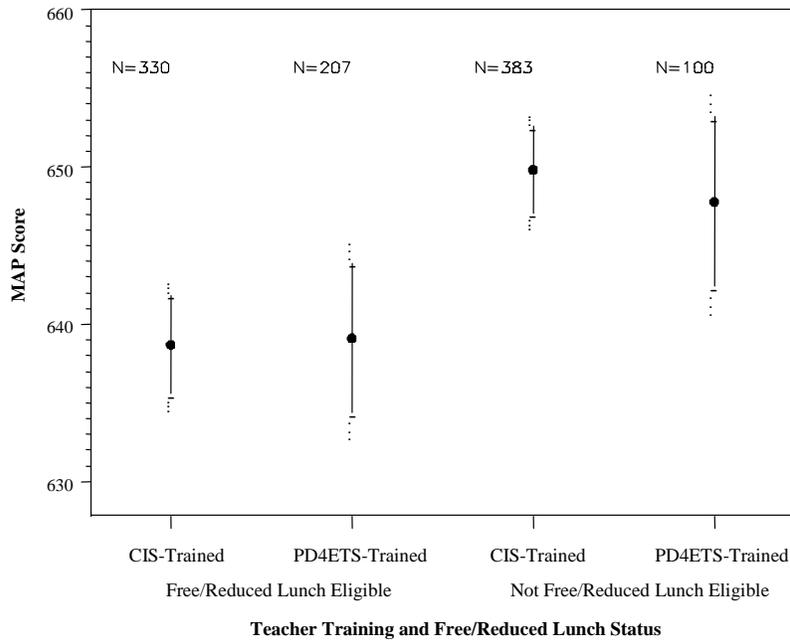
The overall fit of model 2 was improved by 3.10 percent over model 1, when FRL and teacher professional development were included.

The model for the 2004 MAP test in mathematics is presented in Figure 2. Those results showed that the performance of students in an eMINTS classroom taught by a PD4ETS-trained teacher was on average slightly higher than the performance of students taught by a CIS-trained teacher; students taught by a PD4ETS-trained teacher scored 1.56 points on average higher than those taught by a CIS-trained teacher, after controlling for the effect of FRL. This small difference was not statistically significant. FRL, however, was statistically significantly related to student performance, with students eligible scoring 14.92 points on average lower than students not eligible. The interaction term was not statistically significant; therefore, student MAP scores were not differentially impacted by delivery methodology of teacher training and FRL.

The overall fit of model 2 was improved by 6.91 percent over model 1, after FRL and teacher professional development methodology were included.

Figure 1
2004 MAP Communication Arts Results by Teacher Training and Free/Reduced Lunch
Two-level HLM Model

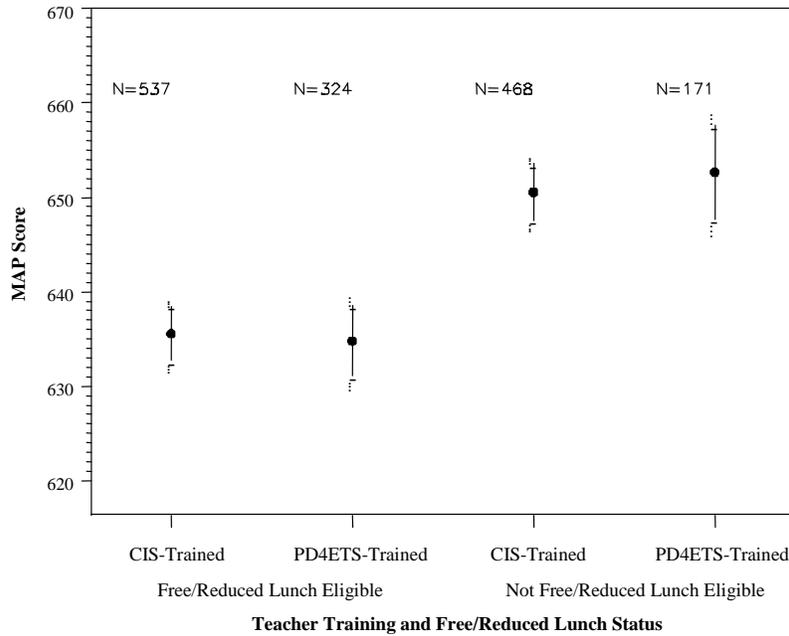
2004 MAP Communication Arts by Teacher Training and Free/Reduced Lunch Status



	<i>Model 1</i>				<i>Model 2</i>			
	Coefficient	Standard Error	Df	P-Value	Coefficient	Standard Error	Df	P-Value
Intercept	644.10	1.80	52	<0.0001	650.09	2.45	51	<0.0001
Free/Reduced Lunch								
<i>No</i>								
Yes					-11.22	2.26	965	<0.0001
Student Enrolled in a PD4ETS Classroom								
<i>No</i>								
Yes					0.29	4.79	51	0.9520
Interaction					0.15	4.40	965	0.9728
Model P-Value	<0.0001				<0.0001			
Residual Variance	767.63				743.80			
% Improvement					3.10			
Number of Students	1020				1020			
Number of Classrooms	53				53			

Figure 2
2004 MAP Mathematics Results by Teacher Training and Free/Reduced Lunch
Two-level HLM Model

2004 MAP Mathematics by Teacher Training and Free/Reduced Lunch Status



	<i>Model 1</i>				<i>Model 2</i>			
	Coefficient	Standard Error	Df	P-Value	Coefficient	Standard Error	Df	P-Value
Intercept	641.92	1.74	73	<0.0001	650.54	2.18	72	<0.0001
Free/Reduced Lunch								
No								
Yes					-14.92	2.45	1424	<0.0001
Student Enrolled in a PD4ETS Classroom								
No								
Yes					1.56	4.13	72	0.7069
Interaction					-2.68	4.53	1424	0.5548
Model P-Value	<0.0001				<0.0001			
Residual Variance	1022.02				951.35			
% Improvement					6.91			
Number of Students	1500				1500			
Number of Classrooms	74				74			

Summary

This analysis of total MAP scores of students in eMINTS classrooms according to delivery methodology of teacher professional development and student eligibility for the federal free/reduced-price lunch program (FRL) suggests that students in classrooms with PD4ETS-trained teachers performed similarly on average to students in classrooms with teachers who received professional development from CIS, after controlling for FRL. This was true for both communication arts and mathematics. The impact of FRL, however, was statistically significant, with FRL eligible students performing 11.22 to 14.92 points lower on average than students not eligible. The relationship between delivery methodology of teacher professional development and FRL, however, did not differentially impact student MAP scores.

eMINTS Teachers' Perceptions of Their Professional Development

This part of the study examined qualitative data gleaned from focus group interviews, with the aim of triangulating the findings from the statistical analysis. In the initial stage of the qualitative data collection and analysis, five focus groups were conducted in fall 2004. Three of the focus groups consisted of eMINTS teachers trained by CIS; the other two focus groups represented eMINTS teachers trained by PD4ETS participants. The two-hour focus group discussions were tape-recorded and transcribed. The intent of the focus groups was to ascertain differences and similarities concerning how experienced eMINTS teachers perceived their eMINTS professional development, as well as to understand the strengths and challenges of professional training.

Data were analyzed using a modified constant comparative method. The constant comparative method facilitates the emergence of conceptual constructs from the data by comparing one datum (e.g., a statement or phrase regarding limitations of time in professional development) with other data in the category, with a goal of assembling salient patterns and theory that are grounded in the sociality of human experience (see Glaser, 1965; Glaser & Strauss, 1967).

Two research questions guided the focus group interviews and their analysis:

1. What were the strengths and challenges of the professional development of eMINTS teachers from their perspective?
2. Did experiences of eMINTS teachers who received professional development from PD4ETS participants differ from experiences of eMINTS teachers who received professional development from CIS ? If so, how did they differ?

Three broad areas of teachers' perceptions emerged from the data:

1. Teachers need additional integration of the constructivist instructional practices and technology training in the modules to effectively apply their training in the classroom
2. Both PD4ETS and CIS-trained teachers identified a set of desirable trainer characteristics.

3. Teachers' time commitment required to successfully implement eMINTS in classrooms presents real challenges to their professional and personal responsibilities.

The Integration of Constructivist Instructional Practices and Technology Training in Modules for Effective Classroom Application

As eMINTS teachers shared their perspectives, they discussed several characteristics of eMINTS professional development that they considered effective. These perceptions were mostly similar across the two types of professional development, as like experiences were voiced by CIS-trained and PD4ETS-trained teachers. eMINTS teachers gained the most when two pieces – the constructivist, inquiry-based practices and the technology training – worked together for effective application in the classroom. In the words of one teacher, “The inquiry-based instruction is as important as having the technology.” The two components of the professional development program were valuable when the ideas could be easily implemented within the classroom and the result was beneficial to students. One teacher said that the technology piece together with the inquiry-based learning “...all ties in when it is applicable to me and I can use it.” Another teacher talked about the importance of application in a classroom setting:

I'd used a lot of technology before I started eMINTS. . . I was efficient at Excel and I knew my way around Microsoft Word, I had seen the SMART Board in action, I knew those kinds of things. But then applying the technology to specific lessons or having [CIS] stand up and say you can use Inspiration (software) for this. . . then I knew where to go and how to use all the features . . . how to apply it to my classroom of 4th graders.

Teachers in four of the five focus groups conveyed that they were making progress in integrating technology with the inquiry-based teaching strategies. Participants in one of the PD4ETS-trained focus groups were still struggling with this integration. They said both the technology and inquiry-based professional development were each appropriate and adequate, but there was a gap in how to use inquiry-based learning with technology. The single exception was that they were aware that WebQuests could effectively integrate technology and inquiry-based practices. One said, “I couldn't make the connection, there was a gap.” Another said, “I'm having a difficult time getting to the point where I feel very proficient.” And a third said she still needed to learn how to implement inquiry-based instruction in the classroom while using technology.

Constructivist Teaching Practices. Professional development related to inquiry-based and constructivist teaching practices proved to be important to the discussion. Both CIS and PD4ETS-trained teachers cited this topic as most beneficial in the five focus groups. To quote a CIS-trained teacher new to this practice:

Two years ago I didn't know what inquiry-based teaching was; I had heard it thrown out . . . I actually learned how to use it. . . Because we did so much with it and saw how different people used it and how they

incorporated it into the WebQuest that really brought it home. . . It was our CIS who really brought it home, what it is and how to use it.

A similar sentiment was heard from a PD4ETS-trained teacher who was already using inquiry-based teaching methods. She said the most beneficial professional development related to the constructivist approach to teaching and learning. Even though her school already used an inquiry-based approach, the eMINTS professional development allowed her to “get deeper into it,” allowing her to get across a more “well-rounded view of whatever concept you’re trying to teach.”

Teachers were enthusiastic about the different inquiry-based teaching might make for their students. They called inquiry-based teaching “the most wonderful tool.” Teachers were aware that they did not need computers to use inquiry-based teaching practices, but that technology could play an integral part of the student learning process. One teacher said, “You can start with a question and then they [students] search and the information they can find is just amazing and it has meaning for them.” They described their students as “risk-takers” a number of times. Examples of teachers’ comments regarding the effectiveness of the constructivist approach include: “very eager to be at school” and “hungry for more” and “more engaged in reading” and “wanting to learn more” and “they wanted to go explore.” A CIS-trained teacher described the student benefits this way:

One of the beneficial things that I found was that it really engages all the learners and nobody is left out. Everybody is taking part in some shape or form and they really seem to enjoy that. And they do become risk-takers and they do want to share with other groups and we just become a family in that classroom because of this difference in teaching style. . . It engages everyone where they’re at and the fact that your high [performing] kids can continue to move forward without being held back and free you to work with those kids that are low [performing] and everyone is where they need to be. You can meet everybody’s needs.

A PD4ETS-trained teacher addressed the student benefits similarly:

It actually gets the kids engaged more and they’re learning more. They’re interested more in whatever it is that you are teaching at the time. It’s a lot of work for the instructor, but you see the benefits of it in the end . . . The kids... just go forward because they are excited about it.

The expectation that all students would be actively engaged in learning affected the classroom climate. Many teachers noted the value of inquiry-based teaching for lower-achieving students. One participant provided an example of a non-reader who was able to contribute to a project-based task. The student-to-student interaction encouraged the student’s participation and cooperation was valued. The teacher emphasized, “Everyone in the classroom was responsible for learning. [Each student] could contribute to that project. They all contributed in some way.”

Both CIS- and PD4ETS-trained teachers recognized the value of inquiry-based teaching for students and recognized the value of this teaching strategy for themselves. A representative comment was “It’s a wonderful way to teach.” A teacher, who described herself as “slightly constructivist” prior to professional development, now claimed a deeper understanding of constructivism. She described it as a “spark” that has ignited her teaching. A second teacher remarked that constructivist teaching was exciting for her. Another teacher captured this sentiment by saying:

I was very bored of the traditional textbook teaching style . . . I needed something to keep me going. I needed to make it interesting for me. It’s kept me motivated and kept me into teaching. It’s always interesting, it’s always changing, it’s always moving.

Regardless of the method in which their professional development was delivered, eMINTS teachers also described the benefit to students of inquiry-based learning. They described their students as needing the skills to solve problems, communicate effectively, and engage in decision-making based on higher-level thinking. As one teacher said:

I think that the trends in the United States are in end-thinking and problem-solving. That whether you have the eMINTS technology or not, you know that’s a philosophy of teaching that I think our country needs to swing towards, so that we have problem solvers.

The general consensus of teachers interviewed was that inquiry-based teaching was initially more work, but it was also more enjoyable and beneficial for students and for teachers. Although the teachers agreed that inquiry-based teaching was possible without technology, the use of technology created powerful new learning environments.

Technology Training. Technology training surfaced as another beneficial component of eMINTS professional development. Even the basics were viewed as important: A PD4ETS-trained teacher said that to get started in an eMINTS classroom, “We’ve got to know how to turn on the buttons.” Another teacher voiced appreciation for the power of technology:

I’m enjoying all the things you can do to enhance your curriculum. There is just an abundance that we wouldn’t be exposed to in our classroom. We can take a tour to England’s King Garden; we can go into a dinosaur museum. . . That’s particularly advantageous for our students who are [in the] low socio-economic [group].

An array of skills is required to implement the eMINTS technology-rich environment. Specific technical topics cited in order of prevalence included: developing web pages; experiencing WebQuests; familiarity with online resources (ikeepbookmarks.com was most often cited); fluency with Microsoft Suite (including Excel and PowerPoint); and using the equipment (including the SMART Board, scanner, and digital camera). For the CIS-trained teachers, familiarity with online resources and experiencing WebQuests

topped their list, while PD4ETS-trained teachers ranked developing Web pages and experiencing WebQuests highest.

A CIS-trained teacher said that she used the online resource, ikeepbookmarks everyday. She knows they are safe and knows students cannot access inappropriate sites. Before her professional development, she had no idea that it was available. Now she says, “I could not teach without it.” Another teacher said that ikeepbookmarks is the thing that she uses the most. A CIS-trained teacher said WebQuests were the tool she used most frequently that she learned of through the training. She explained her reasoning as:

I like how everything was organized and all right there together. The kids could stay on task; they knew exactly what steps and what was expected from them and it was exciting for them because they are just getting used to becoming more independent researchers. . . And then you start seeing more teamwork as far as cooperating with each other.

A PD4ETS-trained teacher, who also praised WebQuests, said that in the beginning it was difficult. “I have to tell you I hated writing them.” However, their merit became evident:

The kids were learning. They were moving around the room; they were doing all this stuff across the curriculum. . . I’ve never seen them so focused on doing something they thought was so much fun.

A PD4ETS-trained teacher said she struggled with creating her classroom Web page, but it ultimately proved a useful tool:

My students cannot use their technology unless they have gone through my Web page. . . I’m constantly adding to it and changing it and I had to learn that from scratch and so we spend a great deal of time on that. That’s probably the thing that I rely on the most consistently.

Learning practical, procedural application of the Microsoft Suite was mentioned as an important skill, as was the use of other equipment (e.g., SMART Board, computer). Teachers described how these skills assisted instruction. A PD4ETS-trained teacher said, “I’ve learned how to use the SMART Board in a way to make my lessons more engaging and I’m grateful for that.”

Modules. Modules provided by the eMINTS program through password-protected web access organize eMINTS professional development delivered by both CIS and PD4ETS participants. eMINTS professional development modules are instructional guides on specific topics (i.e. inquiry-based lessons, cooperative learning, Inspiration software, and questioning strategies) that include support materials.

The format of eMINTS modules includes a central question, participant outcomes or objectives, related instructional strategies, Web resources, as well as more advanced

techniques. Some modules are focused on the classroom application of technology, while other modules focus on pedagogy and instructional strategies. Four of the five focus groups discussed the organization and content of the training modules. The comment most frequently made concerning the modules was that they were a “good learning tool.” Representative comments about the modules from the CIS-trained teachers were the following:

There are still some things that I refer to those modules for, if I get stuck on something. . . I’ll always have them around as a reference for myself.

I thought the modules were applicable to teaching and I thought they helped me and . . . they’re a good reference; I can go back to them and have a little security.

Representative comments about the modules from the PD4ETS-trained teachers were also positive:

I felt like the modules were wonderful because if . . . I didn’t get what was said, I could go back and look at that and it told me step by step.

The modules were topic-appropriate.

One suggestion that emerged from a CIS-trained focus group was that the ‘advanced techniques’ sections of the modules could be more advanced. A teacher said, “Sometimes I don’t think that they were as advanced as maybe I would like them to be.”

While most teachers described the modules with enthusiasm, two CIS-trained teachers from the same cluster stated that one of the modules was of “inferior quality.” To elaborate, one of those teachers made this remark, “That [particular] module needs to be rewritten because that’s boring. And I don’t know who is writing them, but it’s not a classroom teacher that is writing them, because it doesn’t work.” Another CIS-trained teacher said that some of the lessons were written for high school level students and did not apply to 3rd and 4th grade students.

In this same focus group, those with a different CIS explained that their trainer realized a high school unit did not make sense and together they talked about how they make the concept and lesson more applicable.

Accordingly, it was the quality of content of the modules, as well as their delivery, that shaped teacher’s professional development experience. While most teachers found the modules useful, a few CIS-trained teachers found specific modules lacking in quality and not age-appropriate.

Desired Characteristics of CIS and PD4ETS Participants Delivering Professional Development

The teachers identified what they considered to be the most important qualities of their CIS or PD4ETS trainers. eMINTS teachers mentioned positive interpersonal skills, knowledge, and classroom experience as important qualities most frequently. These findings were consistent with what was reported by eMINTS teachers in the summer of 2000 (eMINTS Evaluation Project, 2000).

Positive interpersonal skills. All focus groups identified positive interpersonal skills as important. Positive interpersonal skills influenced the extent to which eMINTS teachers perceived their professional development to be effective. Those skills were also perceived to enhance their excitement for learning. A teacher expressed how the quality of her experience was enhanced by her trainer's positive orientation:

I was thinking what a positive experience it was to have the CIS that we had who was so knowledgeable but also personable . . . It was a wonderful experience.

Effective CIS or PD4ETS participants were perceived as communicating care and concern, as illustrated in these testimonies:

Our trainer found the time during every meeting to come seek us out and say 'How are you doing? How is it going in your school? Is there anything I need to know? Is there anything I can help you with?' It wasn't, 'How are the computers working or how do your kids do with the computers?' But, 'How are you doing juggling training and working in the school?' . . . 'How are you feeling about this process?' You could really tell [CIS] was very concerned with us as individuals and as students at the same time.

One thing [PD4ETS participant] stresses at the beginning of every training session is take care of yourself first. 'If something happens at home and you can't be here, your family comes first; if you need to go to the restroom, your needs come first – before eMINTS, before school.' And [PD4ETS participant] makes me want to work harder because I know that [PD4ETS participant] is considerate of my needs.

Knowledge. Four of the five focus groups ranked knowledge of the technology as an important quality of a trainer. A teacher said the eMINTS professional development was a good experience because the CIS "knew everything there is to know and still to this day, I think she does."

Conversely, the fifth focus group reported that their CIS did not demonstrate adequate knowledge. "I felt like a lot of times ours [CIS] couldn't help us, and we sat through two whole classes stuck because no one could help us. But we had to go to class and we couldn't do anything. It was frustrating."

Classroom experience. Likewise, four of the five focus groups reported classroom teaching experience as an important quality of a trainer. Having classroom experience was viewed as an asset, because the trainer had relevant wisdom. Two PD4ETS-trained teachers shared their views of the importance of teaching experience:

If you're going to tell me something, I also want to know why you think I need to know it and I want to know how I'm going to be able to use it to be a better, more effective educator, and how my children are going to benefit from it. I want to see examples.

That always helps because she's always thinking towards the kids, "What would keep the kids attention?" And if it wouldn't keep our attention, how could it keep the kids attention? There's always focus on the students . . . everything is focused on the children.

Another benefit of a trainer with classroom experience was the opportunity to have teaching strategies modeled in the classrooms. One teacher said her trainer, "always fit right into the classroom." The CIS would frequently teach part of a lesson to model instruction.

Another reported asset of trainers with classroom experience was their ability to relate to teachers, and in particular what teachers faced in their workday. Teachers viewed this as important, in part, because of pressure surrounding the stakes attached to performance on the MAP examinations. This is illustrated by the following remark by one teacher:

We were all doing the same thing: stressing over MAP. And [our CIS] would come in and I would say, "Don't even think that you're going to see something exciting today because... we are reviewing for MAP." [Our CIS] would say "You have to do what you have to do." She was very understanding.

Not all trainers with teaching experience were perceived as helpful in this way, however. The following example illustrates this difference:

We were getting a lot of pressure for MAP tests last year, to the point where I was crying a lot. [Our CIS] would say, "You just need to close your door to that and not listen to it." And I'd say, "You don't understand, I'm being force fed, I'm after school in meetings, I'm spending all my prep time in meetings, I'm hearing it every single day." And [our CIS] would say, "Yes, when I was a teacher we had that too and you just close your door, I know what it was like." And I'm sitting there going "You don't remember this, you can't close your door."

Challenges for Professional Development Delivery

Although eMINTS teachers were generally enthusiastic about their professional development, they were almost unanimous in suggesting two challenges: (1) issues regarding time and (2) the need for differentiated instruction. Both of these challenges emerged in all focus groups.

Issues regarding time. Many teachers considered the number of professional development hours appropriate for the amount of content. “I think the time was totally necessary for me to learn everything I needed to learn,” concluded one PD4ETS-trained teacher. Another PD4ETS-trained teacher echoed this remark, “It was a lot of time; I thought it was a lot of time. However, I know it had to be a lot of time just to learn it.” Regardless of need, time concerns were consistently expressed during the focus groups.

Although teachers were aware of the positive consequence that professional development would bring to their classrooms, most shared a concern about finding time to implement what they had learned. A PD4ETS-trained teacher illustrated her problem as “probably stems from the fact that we went straight from an 8 ½ hour teaching day immediately into a four hour evening.” Another teacher was uneasy about finding the time with her current heavy workload. Teachers said because they were not teaching the way they taught in the past, others did not realize how much time it took to implement the eMINTS strategies. They emphasized that it took time to apply their learning as well as to integrate it into their curriculum. One teacher indicated that her curriculum required significant revision.

Teachers stressed that the time commitment required to effectively implement eMINTS far exceeded attendance at professional development events. “You have to go home and you have to prepare to use what you’ve learned. It’s not just 175 hours,” was one teacher’s message. Similarly, another teacher stated, “You’re spending tons of hours implementing everything.” In order to make changes, some teachers described needing time to think about what was learned. In general, teachers agreed, “It’s so hard to get that time.” Other comments illustrating the importance of the time commitment from the CIS-trained participants include:

One hundred hours, that’s a killer, especially like you said, you were driving an hour one way.

You’ve worked all day, you’ve gotten up at 6:00 a.m., and then they expect you to come and actually think and work and do something and remember and function.

It’s hard, after teaching all day to do something else for four hours.

A similar picture emerged from the PD4ETS-trained teachers:

It was grueling.

I don't want to go through that 100-hour-marathon year again, ever. It was terrible.

All of us have huge constraints on our time when we walk out this door everyday; all of us do.

Some teachers suggested delivering some of the professional development material during the school day and extending the training period from two to three years. Teachers also suggested meeting occasionally on Saturday for an eight-hour session. Three teachers advocated the merits of meeting fewer days, but more time each day: "If I'm going to drive an hour, hour and a half, make it an eight hour day." Another teacher agreed that an eight-hour training period would "make it worth my childcare arrangements." The third teacher said, "I think it's easier to focus if you were there all day."

Need for differentiated instruction. Teachers in all focus groups voiced the need for differentiated instruction, which they perceived to be missing from their professional development experience. As analogy, teachers compared their need to differentiate instruction for their students to their own needs for differentiated instruction in their eMINTS training. A CIS-trained teacher illustrated this concept by saying, "They expect us to individualize for our kids and differentiate instruction, but they don't do it for the teachers." A PD4ETS-trained teacher shared her perception:

I do think that eMINTS might in the future tailor the programs and the training more individually. . . . Finding out what the teachers already know and start from there. I just don't see how you can't pay attention to that.

Teachers reported that a result of the lack of differentiation was the ineffective use of training time. Moreover, one teacher suggested that there was no easy solution: "It's just a lot for one person to do, not that [our PD4ETS trainer] wasn't willing to help us, but when you have that diverse a group . . . it's just too much for one person."

eMINTS teachers reported significant variation in technology skills within their professional development clusters. Teachers possessed skills ranging from very basic computer literacy to holding graduate degrees in technology. The difference in technology skills and subsequent frustration experienced by some teachers were illustrated by remarks from CIS-trained teachers:

I was really at a loss; I didn't have much technology background and I felt sometimes that I was the only one who had never done PowerPoint or who didn't know how to do Excel. I think our CIS felt like pretty much everybody understands this, so I don't have to go over it in depth – and I didn't, and I was struggling. More than once I was in tears. I was just frustrated and you feel like such a dummy. You don't want to say, "I don't get this." You don't want to hold other people back, if they're all sitting there bored. .

Personally, I grew up with computers. So, the first two months I was kind of bored. I understand that some people needed that. . . I was ready to get into a WebQuest when they were still talking about what Word is or Excel is, or how they do a PowerPoint.

The same frustration was voiced by PD4ETS-trained teachers:

I had to learn so incredibly much because I was really backwards about technology . . . I was one of the weakest links in the chain when we began. I had a lot of questions and a lot of times I would just have to sit for long, long periods of time.

I realize that for some people who had no experience whatsoever with the computer, four hours of Microsoft Word is necessary. But it's really not necessary for me – not even 15 minutes of Microsoft Word is necessary.

Teachers made several suggestions to differentiate instruction: decrease class size; assess eMINTS teachers' knowledge before training in order to group teachers by skill level; divide a class with diverse skills into smaller homogeneous groups with the trainer focusing on the more novice group; use the first half the class period for direct instruction and demonstration and the second half for review of basic skills by the novices while allowing more proficient teachers to work at an advanced pace.

Summary

Three broad themes emerged from the findings of the focus group interviews: (1) the need to integrate of constructivist instructional practices and technology training in the modules to emphasize effective classroom application; (2) the desired characteristics of trainers; and (3) the challenges of time constraints and conflicting responsibilities that teachers must deal with in order to participate in the eMINTS training. These findings showed that eMINTS professional development delivered by PD4ETS participants and CIS, provided teachers coherent and effective professional development. eMINTS teachers found the delivery of professional development by both CIS and PD4ETS participants to be useful in preparing them to meet the learning needs of students.

Teachers identified the integration of inquiry-based teaching practices, technology training, and support materials in the modules as the most useful element of their professional development. While most teachers agreed that these three worked well together to facilitate effective classroom instruction and learning, some PD4ETS-trained teachers discussed a gap in linking inquiry-based instruction with technology.

eMINTS teachers defined three important qualities for eMINTS trainers to possess: positive interpersonal skills, knowledge of instructional technology, and classroom experience. Two additional salient challenges emerged from both professional development experiences. The first challenge for teachers involved managing time in

order to participate in the required training activities, to integrate the learning acquired into the classroom, and to balance these tasks with other professional and personal responsibilities. The second challenge teachers presented was the need to differentiate instruction in the eMINTS training environment to facilitate teachers' success regardless of their skill level at the initiation of training.

Discussion and Conclusion

This report presents the first effort to examine the effectiveness and capacity of the eMINTS Professional Development for Educational Technology Specialists (PD4ETS) program in relation to delivering professional development to eMINTS teachers when compared to the same eMINTS teacher professional development delivered by cluster information specialists (CIS). Evidence exists that this program is serving its purpose. The results of the qualitative and quantitative analyses suggest that the PD4ETS program is effective in preparing eMINTS teachers to support the educational achievement of their students.

Findings from the multilevel analysis of FY03 schools and schools with PD4ETS showed no statistically significant differences in student performance on the MAP examinations between students in classrooms taught by PD4ETS-trained teachers and students taught by CIS-trained teachers, after controlling for student eligibility for the federal free/reduced-lunch program (a proxy for student family socioeconomic status). This result was consistent across both subject areas: communication arts and mathematics. An earlier study of FY03 schools found that students in eMINTS classrooms taught by CIS-trained teachers scored higher on the 2004 MAP exams than students not in eMINTS classrooms (Bickford, 2005). Taken together, the results from these two studies suggest that the PD4ETS program facilitated positive student achievement similar to that produced in classrooms taught by CIS-trained teachers.

The findings from the focus group interviews of teachers both confirmed and expanded the results from the multilevel statistical analysis. Like the multilevel analysis, the qualitative analysis presented the perceptions of teachers that the two professional development delivery methods were similar across three broad areas of teacher experience.

Taken together, results suggest that eMINTS teacher professional development is a necessary component of successful eMINTS program implementation. CIS and PD4ETS professional development routes were determined useful in producing positive results for teachers and students. While some challenges emerged regarding the pedagogy, organization, and training culture that might be modified to enhance the professional development experience of future eMINTS teachers, both the outcomes for students and perceptions by teachers of the value of the experience was positive and found to facilitate learning in eMINTS classrooms.

References

- Bickford, A. (2005). *Analysis of 2004 MAP results for eMINTS students*. Retrieved January 25, 2005 from <http://www.emints.org/evaluation/reports/map2004.pdf>.
- eMINTS Evaluation Project (2000). *Teacher perceptions of Cluster Information Specialists (CIS)*. Retrieved January 15, 2005, from <http://www.emints.org/evaluation/reports/cis.shtml>
- eMINTS Evaluation Project (2001). *A general typology of eMINTS lessons*. Retrieved January 15, 2005, from <http://www.emints.org/evaluation/reports/lesson-typology.pdf>
- eMINTS Evaluation Project (2002). *Analysis of 2001 MAP results for eMINTS students*. Retrieved January 15, 2005, from <http://www.emints.org/evaluation/reports/map2001-emints.pdf>
- Glaser, B. G. (1965). The constant comparative analysis method of qualitative analysis. *Social Problems*, 12(4), 436-445.
- Glaser, B. G., Strauss, A.L. (1967). *The discovery of grounded theory*. Hawthorne, NY: Aldine.
- Greene, Jennifer C., Caracelli, Valerie J. and Graham, Wendy F. 1989. Toward a conceptual framework for mixed-method evaluation design. *Educational Evaluation and Policy Analysis*, 11(3), pp. 255-74.