

Can Teacher Technology Integration Training Alone Lead to High Levels of Technology Integration? A Qualitative Look at Teachers' Technology Integration after State Mandated Technology Training

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Abstract

This study investigated the impact of state mandated technology integration training on classroom teachers based on analysis of two qualitative datasets. Data collected from social studies teachers focused on post training teacher technology integration levels and data from elementary teachers focused on the use of mentoring after technology training in order to enrich technology integration experiences for teachers and students. Data analysis indicated technology integration training is effective at a basic level, but it alone cannot lead to higher levels of technology integration. Examining the two datasets, the researchers found a majority of social studies teachers expressed a desire for one-on-one follow up support to training and elementary teachers reported mentoring experiences to be the most positive technology related staff development they have experienced. Although technology training opportunities have become widely available to teachers, this study indicates a need for more post training or one-on-one mentoring experiences in order to better support teachers' integration of technology.

INTRODUCTION

Given the technology driven nature of our global, information based society, lack of technology integration among teachers in American classrooms is a major concern in education today. In a large scale, nationwide survey of teachers, students, and administrators conducted for the Gates Foundation, Abbott (2003) found that over 53% of the teachers they surveyed do not routinely use technology in the classroom and over half the students responding to questionnaires reported they use technology no more than once a week. Little improvement is noted in the more recent 2005 National teacher survey commissioned by CDW-G. This survey found that 80% of K-12 teachers are using computers mainly for administrative functions and only slightly more than half are integrating computers into their routine instruction (National Teacher Survey, 2005). The survey revealed teacher technology training has focused on administrative applications, rather than instructional applications. Even more concerning is approximately one third of teachers have received little or no training with integrating computers into lessons or training on instructional software.

A large body of literature supports the idea that technology training is the major factor that could help teachers develop positive attitudes toward technology and integrating technology into curriculum (Berson, 1996; U.S. Department of Education, 2005; Reynolds & Morgan, 2001; Yildirim & Kiraz, 1999; Yildirim, 2000). Of course, technology training that simply focuses on teaching basic computer skills is unlikely to ensure the successful infusion of technology into the classroom. To effectively infuse technology into the curriculum, teachers need to participate in intensive curriculum-based technology training that move them beyond the attainment of basic computer skills to activities that teach them how to seamlessly integrate technology into the curriculum (Baylor & Ritchie, 2002; Becker, 2001; Redish, 1997; Reynolds & Morgan, 2001; Roberts, 2003; VanFossen, 2001; Wenglinisky, 1998).

Recognizing teacher development needs, in recent years, many states have initiated curriculum-based integration training programs to help teachers integrate technology into

classrooms. Research shows that while trained teachers did demonstrate positive attitudes toward using technology and used more technology than teachers who had no such training, they did not show significant changes in frequent classroom integration of technology with students and more student-centered learning (Di Benedetto, 2005). One factor which may contribute to a lower than desirable rate of integration even after technology integration training, may be the lack of ongoing technical and curriculum and technology integration idea support after the initial training. Although states are recognizing the need for technology integration training, training is usually short term with no to minimal follow up support after training classes. May (2000) evaluated mentoring follow up to technology training and found that when one teacher serves as a mentor to other teachers receiving technology integration training a three times greater gain on teacher Profiler scores was achieved versus traditionally trained teachers. In addition, teachers indicated that the mentor promoted confidence in using technology, increased their ability to work through technical issues, and they demonstrated a desire to continue to integrate technology. Davis (2002) in an evaluation of the effectiveness of one-on-one follow up with Georgia Technology Integration (InTech) trained teachers found participants who received one-on-one follow up assistance in integrating technology had higher levels of technology integration, but participants who did not receive follow up indicated they were not able to incorporate lessons learned in InTech.

It is argued that follow-up programs or mentoring systems are necessary after the initial technology integration training to foster collaboration and support, to address daily challenges, and ultimately to have more frequent and effective use of technology in the classroom (Carlson, 2002; Di Benedetto, 2005; May, 2000; O'Dwyer, Russel & Bebell, 2004).

Given that most states have invested largely on technology integration training programs and they highly expect that teachers will be able to integrate technology effectively in their classrooms after technology integration training, it is necessary to understand the impact of technology training on the trained teachers and what needs to be done to improve the training programs and to enrich technology integration experiences for both teachers and students.

This study attempted to address this issue by examining two qualitative datasets related to technology integration training. The first dataset collected from social studies teachers focused on post training teacher technology integration levels, and the second dataset collected from elementary teachers focused on the use of mentoring after technology integration training in order to enrich technology integration experiences for teachers and students. Four questions guided the research: (a) how do these teachers perceive the technology integration training they received? (b) what impact does technology training have on their use of technology in the classroom? (c) what are the barriers that still exist inhibiting these teachers from more frequent and effective use of technology? and (d) what effect does peer coaching/mentoring after the training have on these teachers' use of technology in the classroom?

Research has repeatedly shown that social studies teachers are less likely to use technology in the classroom than teachers of other disciplines (Anderson & Becker, 2001; CEO Forum on Education and Technology, 1997; Cummings, 1998; Dawson, Bull, & Swain, 2000; Martorella, 1997). Even if they participate in technology training, social studies teachers do not appear to apply what they have learned (Anderson & Becker, 2001), and when they do, they tend to use technology for the primary function of facilitating students' access to content (Whitworth & Berson, 2003). Examining data of how social studies teachers perceive and perform after technology integration training with no mentoring support helps answer the first three questions of the study and may guide schools and training programs in making adjustment to better serve

these teachers after initial training. Similarly, it is necessary to understand how teachers in general classes (in this case elementary teachers) perceive and use technology after technology integration training and how use of mentoring after the training might affect and enrich teachers' technology integration experiences. Using these two datasets will allow a more holistic knowledge of teacher technology integration experience and staff development needs.

Understanding teachers' perceptions of technology integration training and its impact on their instructional practice will help both the technology training programs and social studies and elementary education programs to improve the technology use of in-service and pre-service teachers to better serve our students who grow up with technology. Knowledge of how follow-up mentoring systems will help teachers better integrate technology may also inform school administrators and policy-makers in regards to providing more effective instructional and technology support, gaining the most benefit from investments made on professional development related to technology integration.

METHODOLOGY

Research Context and Participants

Georgia was one of the first states to mandate technology integration in the classroom. As part of state teaching recertification guidelines, Georgia required all k-12 teachers to participate in a technology staff development. The majority of Georgia teachers met this requirement via a staff development called InTech, short for Integrating Technology. Participants in this study were classroom teachers who successfully completed this statewide curriculum-based technology integration training in the past three years at one of the 13 InTech training centers or via district sponsored staff development in which instructors were certified InTech instructors through one of these centers. The 50-hour semester-long InTech training was designed to prepare teachers with the skills to: 1) incorporate technology into curriculum standards; 2) utilize various technological resources; 3) incorporate these resources into new designs for teaching and learning; 4) develop effective classroom management strategies; and 5) develop a new and enhanced classroom pedagogy with technology (State Data and Research Center, 2002-2003). The same training curriculum is used across 13 centers. The InTech is leveled by elementary, middle, or secondary in order to better integrate state curriculum, which also allows teachers to learn how to integrate software which is age appropriate.

Participants in the first dataset were 17 social studies teachers (6-12 grade), six female and eleven male, with an average of 11 years of teaching experience. The sample was predominately white with the exception of two African Americans. They were drawn from four middle schools and four high schools in six school districts. The schools, mostly rural and suburban, varied from technology-rich environments to technology-poor environments. In one middle school, all teachers and students were provided with a wireless laptop. In another high school, each classroom was equipped with eight computers. Most of the other schools had one or two computer labs (25 to 45 computers), with 2-3 computers in each classroom.

Five participants in the second dataset were all Caucasian, female, general education teachers. They represented a spectrum of grade levels (grades k-5 except 4th grade), ages (20-50), class size (14-25), personal technology skill, and frequency of technology integration. The school is located in a large metropolitan area. Hispanic, African-American, and Caucasian students are almost equally represented in the student population. The school has no computer lab, but three, 3-year-old Dell laptop computer carts with 16 wireless internet accessible laptops and a printer on each cart are available within the main school building. Each classroom has at least one computer, but the classroom computers seemed to be outdated and slow.

All the schools involved in this study have technical human resource support available for technical maintenance and instructional support via technology integration specialists assigned to multiple schools within the school system. Participants in the first dataset did not participate in any follow-up training or sought mentoring from technology specialist after the InTech training. Participants in the second dataset were supported by a technology integration specialist who served as a mentor to these teachers in technology use after InTech training.

Data Collection and Data Analysis

Data about social studies teachers was mainly collected through interviews, classroom observations, and document analysis. The purpose of the interviews and observations were to understand how trained teachers perceived technology training and how it affected their teaching. A variety of documents were also collected, including participants' reflection journals and lesson plans during their InTech training, participants' current lesson plans, instructional web pages, handouts and assignments, slides from teachers' PowerPoint presentations, as well as students' technology-based projects. These documents were coded and analyzed to compare themes generated from the interviews and classroom observations. Constant comparative method (Glazer & Strauss, 1967) was used to analyze the data. Using this method, the researcher first examined and compared themes and categories generated from different data sources. Then some categories were combined with others that had similar properties.

Five elementary teachers in the second dataset agreed to use the laptop computer carts or media center computers with their whole class for a one-hour block once weekly for six consecutive weeks. Based on communication with these participants, weekly peer coaching for the six week experience with a technology integration specialist was arranged by the researcher for three of the teachers and two others received peer coaching support in the last half of the study. The researcher observed the classrooms and conducted three open-ended interviews and written surveys, one at the beginning, one at the middle, and one at the end of the study with all participants. Research questions centered on comfort level of using technology, teachers' perceptions of how support or lack of additional support assisted technology integration, and feelings toward using technology within the classroom. The three-stage responses were reviewed for reoccurring themes and coded. Member checking and triangulation of responses was conducted for more accurate data reporting. Themes generated from the first dataset were compared and combined with themes from the second dataset. Research findings were then analyzed based on these combined themes.

RESULTS

Teachers' Perceptions of InTech Training

Overall, data analysis indicates that participants possessed different views toward their InTech training experiences. InTech training was found to have different impact on novice technology users, experienced technology users, and new teachers.

Eight participants considered themselves as novice technology users before the training. They considered participation in the training as an enlightening experience. Before the training, these participants had a very limited use of technology in the classroom. Lack of computer skills and fear of failure made them unwilling to try. With the training, they became more comfortable in using technology, as evidenced in one social studies participant's response:

I'm pretty much a novice [before the training]. I had a computer [and later two] in the classroom for about 10 years, and have learned basic things about word processing, knew how to type letters, but other than that I had no idea how to use it for instruction. They [instructors at InTech] gave us a lot of things about what to use and how to use resources for social studies... [It is] very enlightening to me, because, before, I just really wasn't comfortable, but now it's not a big deal. I think it's been very beneficial for me as an educator to grow.

To the six more experienced teachers, the training proved to be an opportunity to obtain new ideas and new ways of integrating technology and participation in the training was considered a refreshing experience. These participants reported that through InTech they learned how to feel better with different programs and how they could actually incorporate some of them into a lesson. Participants claimed that InTech training enabled them to design some meaningful technology-related lessons that students really enjoyed and at the same they can modify to fit different subjects they teach.

Participants with less than two years of teaching experience mentioned that they learned new strategies of using technology for instructional purpose, yet they did not feel they benefited much from the training, nor did they feel they used technology as much as they should since InTech training. These participants felt frustrated and explained that InTech might work better for teachers who have been teaching for a long time and do not know anything about technology or for teachers who have taught for a while and used some technology and InTech would help them learn how to actually integrate more into their classrooms. They did not feel they were ready or comfortable enough to use what they learned at InTech while they were trying to get familiar with their teaching content and figure out what was worth the period.

Almost all the participants in this study had such mixed reactions toward InTech training. On the one hand, participants indicated that due to InTech training they developed positive attitudes toward technology and learned new ideas and insights for teaching and learning with technology. They reported that InTech tried to help them move beyond basic personal use of Word Processor and the Internet to more complicated use of computer technology, including different functions of Word Processor and programs such as Excel, Publisher, PowerPoint, Inspiration, Timeliner, a digital camera and camcorder, and a scanner. On the other hand, participants felt frustrated or overwhelmed about InTech class, which offered too much information and introduced too many software programs in a limited time and were leveled at different grades rather than teachers' previous technology ability. Participants with different

technology ability felt that the classes were either too challenging or not challenging enough for the background knowledge of the participant, which caused frustration because lessons learned can not be transferred back to the technology resources available within the teacher's home school.

Impact of InTech Training on Teachers' Instructional Practice

Data analysis revealed that most social studies teachers were willing to integrate technology into curriculum and they made efforts to implement what they learned from InTech. Some of them were able to use technology in many and varied ways for some projects. Many teachers were found to use technology for lecture presentation and for involving students in the Internet exploratory research activities.

However, technology training alone did not necessarily ensure that these teachers would infuse technology into their routine instruction and a radical change in their instructional practices would occur. Teachers consented that technology integration training is critical in helping them really think about technology integration and make attempts to use technology with students. However, they need to get technical and human resource support for continuous technology integration after the training. Compared with elementary teachers in the second dataset, social studies teachers in the first dataset seemed to work in more technology-rich school environment and had more computers available in their classrooms, yet, they did not demonstrate frequent use of technology after the technology training. Many attributed this to lack of follow-up support after the training.

Teachers listed a variety of factors that affected whether and how they would use technology routinely in the classroom. These included technology access, integration support, time constraint, and curriculum coverage. Participants in both datasets indicated a strong desire for learning to integrate technology more effectively and frequently with their students. They were honest with themselves about their personal technology skill level and were open for guidance from others. Many mentioned that they lost their skills obtained from InTech for lack of practice and follow-up support. Over half of the social studies teachers expressed the desire to attend a follow-up training or have technology mentor to help them reinforce or familiarize themselves with the technology skills and software programs they learned at InTech, share integration ideas and assist them in incorporating technology into curricular content. The elementary teachers who received mentoring support after the training shared the same frustration about their InTech experience but confirmed the idea that support leads to a greater willingness to try new technology. Here is one typical response from these teachers about their technology experience and how they felt about follow-up support:

I was overwhelmed because computer has so many capabilities and we had such a small amount of time. I would like to have a technology specialist to help me. When I took InTech, it was all new. It's difficult to comprehend that much new materials, and I didn't use much technology as I should because I forgot them. With the specialist help, that will be different.

Impact of Mentoring on Teachers' Technology Integration

All five of the elementary teachers received follow-up support from the technology integration specialist and they found the mentoring of the specialist to be the most beneficial technology integration support received after InTech training because it catered to their

individual learning needs. They felt the mentoring allowed them to expand their technology integration skills based on their current skill level, provided ideas for integrating with state curriculum standards they were currently teaching, and in their own classroom with their students. These teachers were able to integrate technology more efficiently and meet required curriculum standards without compromising limited academic time. Also, teacher preparation time for integrating technology was reduced because someone who was more familiar with technology was providing integration ideas. Here is a sampling of quotes from participants regarding the mentor support:

It has helped me increase my confidence and knowledge.

It has made it easier for me having another adult in the room to help. It also has shown me many different ways to integrate.

It was easier [to integrate technology] because I could tell her what we're studying and she would give suggestions. Then we would come up with a plan.

This has been infinitely different because of the one-to-one help I received from TIS [the specialist]. A difference also existed in the fact that there was an immediate chance to try new skills with real-life students in a classroom setting.

It allows more flexibility and a chance to focus on specific student/teacher needs rather than just a general lesson that works for some and not at all for others. Technology support is far more beneficial than taking a general class.

Data analysis revealed that these teachers became far more willing and comfortable to integrate more technology into their classroom to enhance student learning as the weekly mentoring continued. They would actively seek for technology help and integration ideas when needed and try to teach their classes in more creative and fun ways. With mentor support, they were able to utilize technology resources regularly to move toward more student-centered learning.

A noticeable fact is that teachers in both datasets were not fully aware of the different kinds of support available to them and how to access this support although it did exist in most of the schools involved in this study. One of the elementary teachers stated, "I did not know much about what technology specialist was willing and able to do in my classroom... the instigator of this project made me aware of the services available to me." More work needs to be done in raising awareness of teachers to technology support available to them on an individual basis and using technology available within their own school.

DISCUSSION

In general, technology integration training has positively affected participants' attitudes toward technology and confidence in using technology for instructional purposes. Yet, improvement to the InTech training needs to be made in two major areas: class format and follow-up support. In terms of class format, questions need to be addressed as to whether the InTech class should be divided by levels of grade, participants' technology ability or subject area.

Currently most InTech training classes are offered in seven full days at training centers and teachers are divided into three levels: elementary, middle, and high school grades. Such an arrangement helps participants get to know software programs that are student-age appropriate. However, it can be a challenge, as participants may teach different subject areas and there is no way to introduce a growing number of software programs. Actually participants complained that InTech training, to a certain degree, introduced more software programs than integration strategies and not all the schools purchased those software programs. Both elementary and middle/secondary social studies teachers indicated frustration with the classes not being divided according to technology ability and the effectiveness of the class was likely limited due to this frustration. The elementary teachers all reported the mentoring met both their individual technology ability and their curriculum integration needs, referring to this experience as the best technology related staff development they had received because of these two factors. The middle/high school social studies teachers reported a loss of InTech skills because of lack of support and practice after training and expressed a desire for follow-up support within their own classrooms. Classes that accommodate participants' technology ability, subject background, and follow up mentoring sessions within teachers' own classrooms may be more effective in helping them become more competent technology users.

Of course, technology training alone did not lead to teachers' frequent and high levels of technology use in the classroom. Technology mentor or follow-up training is necessary to help InTech trained teachers to digest and implement what they obtained from the initial technology training, to better prepare them in addressing challenges in using technology, and to guide them to utilize technology and technological resources to enhance teaching and student learning more frequently and effectively. Technology mentoring can help teachers with differing technology ability to improve the ways they integrate technology within their classrooms. InTech training centers need to collaborate more with the schools to make sure trained teachers are technically supported by the school and mentored by InTech instructors and school technology integration specialist so that they will be able to try new technology tools and strategies. School districts also need to better inform teachers of resources available. The elementary teachers reported they were not aware of the support the Technology Integration Specialist can provide until they received mentoring arranged by the researcher. Mentoring allowed these teachers to make better use of student instruction time via technology integration without demanding more preparation time on the teachers. All the elementary teachers consented that mentoring helped them develop into more frequent and enthusiastic technology users.

The findings of this research match other research findings that stress the importance of technology integration training and follow-up support while creating a teaching and learning environment rich in technology integration. Teachers are advocated and pushed to use technology by various agencies including media, educational government, professional associations, and parents. At the same time, they are teaching in a high stakes, standardized testing focused time, which makes it harder for teachers to integrate technology. It is more challenging to social studies teachers because social studies has not been considered a priority of school curriculum and its status is getting worse with current emphasis on reading and math. A technology mentor such as the school integration specialist or InTech facilitator who can come to classrooms to give one-on-one mentor support after initial technology training will definitely help teachers feel less stressed and grow more rapidly in seamless technology integration.

The current teaching force needs to be better supported through provision of technology integration specialists who can support classroom technology integration via mentoring and/or team teaching. In order to insure this support is available, state teaching allotments dedicated to technology integration need to be spent on teachers who have technology expertise and mentoring capabilities to assist others in integrating technology.

Contributors

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