Teacher Attitudes on Integrating Technology in Elementary Curriculum

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Abstract

In this action research study of teachers at Field Club Elementary in grades 3 through 6, I investigated teacher attitudes toward technology and uses of technology for meaningful instruction when I offered on-site training and increased my collaboration with elementary teachers in the building. I discovered that increased collaboration did have a positive impact on the attitudes most teachers had about using technology during instruction, and it also had an impact on some of the teachers’ instruction and use of technology. Due to the short amount of time the study was conducted, however, my findings are limited. As a result of this research, I plan to continue planning and working collaboratively with teachers and offering training on the available technology in the building again in the future. A longer period of study is needed to better determine the long-term impact that such changes in my instruction and interaction with other teachers in the building might have on teachers’ attitudes about technology and their inclusion of technology in their instruction.
**Introduction**

As the technology teacher for the building, the situation I wanted to improve was teacher attitude about the importance of integrating technology across the curriculum. Many teachers did not value "technology" as an important component of the curriculum; rather they viewed it as a set of separate skills that someone else was responsible for teaching their students. This set of skills was often viewed as not nearly as important as students learning to read or mastering their basic mathematical skills.

Many teachers saw their time with me as a time to "drill and kill" basic mathematics skills, or to spend time word-processing to create a "final draft," and did not use much technology in their own classroom (other than to take attendance or check their e-mail). They did not see the same possibilities that I did for ways to use technology in exciting and meaningful ways to enhance their instruction. I wanted this study to be a way to increase teachers’ awareness of the different ways in which they could integrate technology into their classrooms, and by offering a strong foundation of technical and instructional support, teachers could gradually become more comfortable with the idea of integrating technology into their instruction on a regular (weekly or even daily) basis.

There were several factors that I saw affecting the situation. One was the teachers’ current attitudes, which were affected by the previous administration’s approach to “teaching technology” in the building vs. that of the new administration (a “separate entity” vs. an embedded component of their curriculum). A second factor was the teachers’ own comfort level with technology use for more than just administrative duties (e-mail, lesson planning, etc.), and their own set of values of the importance of and place of technology in instruction. Lastly, their beliefs and concerns about the amount of time that would have to
be put forth to plan effective lessons which integrate technology was a critical factor in determining the types and frequency of technology that teachers were using in their instruction.

I hoped that promoting professional development opportunities for the teachers, both during and outside of instructional time, would help teachers in the building be able to see the relevance and importance of using technology in their own lessons, not only when they are working with me. This fit into the International Society for Technology in Education (ISTE) Teacher standard #5, “Engaging in professional growth and leadership.” Through my research, I wanted to do this by: exhibiting leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others. This would require evaluating and reflecting on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning, and contributing to the effectiveness, vitality and self-renewal of the teaching profession and of the school and community.

**Problem Statement**

Through my research, I wanted to increase the confidence and willingness of the teachers to use technology to create rich and meaningful instruction for their students on a regular basis. I wanted teachers to view technology as a tool that could be used to help increase student motivation and engagement, and hopefully their academic achievement as well. I wanted the lessons and tools they gained from this experience to provide a foundation for further growth in their use of technology rich instruction in the future.
If it continues, resistance to integrating technology is a problem for teachers because the technology standards are now being embedded in the content standards at each grade level across the state, and teachers are expected to evaluate their students on certain technology skills on our new report cards. Another piece of evidence was that the current attitude about technology and its place in the curriculum held by many staff members was NOT the same one that was held by the district or even our building administration. In my ideal classroom (and that of the principal), I wanted to be working collaboratively with teachers to develop lesson plans and activities that embedded technology into curriculum rich lessons that were meaningful to our students.

**Literature Review**

Although digital technologies have become part of people's everyday lives, teachers still struggle to integrate these technologies into their everyday lessons (Cuban, 2001). The purpose of my study was to investigate teacher attitudes toward technology and uses of technology for meaningful instruction when I offered on-site training and increased collaboration with elementary teachers in the building. After reviewing the available literature, several themes related to my research emerged, including: teacher beliefs and belief systems, the value of professional development in creating competent users of technology, the effect that peer collaboration has on technology integration, and how (if at all) technology integration affects instruction. These themes highlighted the issues that I faced in my daily attempts to increase technology integration in the building.

**Teacher Beliefs and Belief Systems**

Understanding teachers’ beliefs about the value of technology integration is a key factor in my ability to collaborate with teachers in creating technology-rich lessons and to
provide technology training in meaningful ways for the staff. Lumpe and Chambers (2001) built on previous research regarding teachers’ beliefs and how those beliefs can affect their instructional decisions in order look at why teachers may or may not integrate technology into their instruction. Lumpe and Chambers used two groups of teachers- a group of 20 teachers participating in technology-related graduate studies to develop formal questionnaire instruments and determine content validity, and a second group of 307 teachers who were participating in a professional development program through a grant funded by the U.S. Department of Education to test the items in order to study teachers’ capability beliefs and self-efficacy beliefs in regards to technology. The study focused on determining teachers’ core beliefs, such as establishing which curricular topics are most important to the teacher, or what value they placed on integrating technology. It also looked at how those core beliefs were affected by teachers’ self-efficacy beliefs (the extent to which teachers believed they could be successful in implementing such things in their instruction).

Lumpe and Chambers (2001) found that although teachers in the study agreed that technology integration was valuable for their instruction, their likelihood of using technology was found to be significantly lower in the survey conducted (due to factors such as access to hardware and software, Internet connections, limited time and lab space, available professional development, administrator/teacher/parent support, etc.). Lumpe and Chambers cautioned that if people’s beliefs do tend to lead toward action (or inaction, as the case may be), then these people need to be reinforced with positive contexts and opportunities. Thus, if teachers do not perceive that they have the means or opportunities to pursue technology integration, they most likely will not.
Albion and Ertmer (2002) suggest that computers, although more accessible than before, have had a limited impact on schools and instruction, at least in part due to teachers’ core beliefs and their teaching styles. Albion and Ertmer cite several studies (including Anderson, Becker, & Dexter 1999; Becker, 2001; and Chambers & Lumpe, 2001) that point out the difficulties in changing core beliefs, and mention the importance of the school environment “...as an influence on how teachers’ beliefs about technology will be developed and implemented” (2002, p. 36). This indicates that the difficulties no longer stem so much from a lack of available technology as it does from the teachers themselves.

Ertmer (2005) again comments on the difficulty of changing a teacher’s core beliefs to include positive values regarding technology integration. Ertmer cites that the majority of teachers would not have experienced such instruction their own K-12 experiences. This makes it less likely that they would have any pre-formed ideas about how they could or should integrate technology into their current teaching practices. Albion and Ertmer (2002) go on to suggest that schools should provide opportunities for teachers to observe their peers while working with technology and that teachers should have access to peer coaches as they try to implement changes to their instruction that include technology in order for such efforts to achieve success.

Park and Ertmer (2007) conducted a study using 48 education students at a large Midwestern university to determine whether a specific teaching approach, such as Problem Based Learning, could affect pre-service teachers’ beliefs and intended teaching practices regarding their perceived value of integrating technology into their instruction. Pre- and post-surveys and lesson plans were used to determine the impact that Problem Based Learning (an approach that utilizes reflection on personal beliefs, hands-on instruction and
authentic problem solving) had on the teachers’ beliefs about technology integration. Although the surveys regarding teachers’ beliefs about technology did not yield significant results, Park and Ertmer’s comparison of the control and treatment group with regards to change in their lesson planning did. Overall, Park and Ertmer concluded that teachers who participated in the class using the Problem Based Learning approach showed a significant shift from teacher-led to student-led activities. These activities included more student choice in research topics and products, leading not only to more widespread technology use during instruction, but higher level thinking and synthesis on the part of the students as well.

Bai and Ertmer (2008) demonstrated similar findings in their study of 96 preservice teachers and the 11 instructors who taught a series of three education courses in the College of Education at a large Midwestern university in 2005. Bai and Ertmer stressed that teacher educators must act as role models for pre-service teachers and help to prepare them to use technology effectively in their future profession. Bai and Ertmer stated, “An important goal of teacher education programs is to help pre-service teachers identify and develop their beliefs about teaching” (2008, p. 94). This study showed that the teacher educator’s beliefs about learner-centered and teacher-centered instruction had a significant effect on pre-service teachers’ beliefs. The authors went on to suggest providing pre-service teachers with an educational technology course that presents ideas about how to integrate technology in order to provide them with foundational skills and facilitate positive attitudes about technology. Studies such as those with the pre-service teachers show promise that effective professional development and collaboration could have similar impacts on the beliefs of practicing teachers as they did with the pre-service teachers.
Several of these studies looked at the current situation regarding teacher beliefs and the use of technology, and made suggestions as to how these beliefs could be changed and the situation improved. These studies did not examine these suggestions, however, or pursue them further. Lumpe and Chambers' (2001) study looked at teachers’ core beliefs and how those beliefs related to their use of technology instruction. The authors made suggestions as to how a school or district could go about implementing changes to improve teachers’ beliefs about and use of technology in their instruction. Likewise, Albion and Ertmer (2002) suggested that it is difficult to change these beliefs and suggest that schools provide more support for their teachers. The researchers did not conduct any research on the effectiveness of providing such additional support, however, so gauging the effectiveness of such suggestions was not done. This study will look at whether providing teacher support and education about different uses of technology in instruction can affect change in teachers’ beliefs and use of technology.

In Park and Ertmer’s (2007) study, implementing support and education did occur, but using one specific approach, Problem Based Learning. One of the major similarities between this study and the one done by Park and Ertmer is that consistent teacher support will be offered throughout the course of the study. In this study, however, a mixed approach of teacher training and peer collaboration will be used to try to affect change in teachers’ beliefs.

**Professional Development**

Teacher beliefs, as several of these studies have indicated, are difficult to quantify. One of the major suggestions made by researchers, therefore, has been to look carefully at ways in which teachers’ underlying beliefs can be changed to include seeing value in
technology integration. In his report, Becker (1994) named four characteristics that made computer-using teachers more likely to be “exemplary” computer-using teachers: ongoing collaboration and discussion between computer-using teachers, sustained use of computers in classes, organized support that includes staff development and a computer coordinator, and resource requirements for computer use being met. The study, conducted using national survey data from third- through 12th-grade teachers, found that out of the 516 total teachers identified as “computer-using,” only 45 of those were considered “exemplary.” In order to be considered “exemplary,” teachers were examined for their goals of computer use, frequency of teacher and student computer use, the types of programs utilized and the general function of computers in their lessons. Becker pointed out that these exemplary teachers were most successful in environments that promoted their technology use, including ones that had consistent support and training available.

As Lumpe and Chambers (2001) suggested, if teachers do not participate in professional development, they are less likely to feel that they can be successful in changing their teaching practices, creating a constant negative cycle in their beliefs about technology integration. In order to foster change, opportunities must be provided for teachers to see technology integration in a positive and successful context, so that they become self-motivated to attempt new things. Cuban (2001) also suggested that inconvenient or inadequate training of teachers on available software and technologies may be contributing factors to the low technology use in many classrooms despite availability of technology today.

Similar sentiments were echoed by Glazer, Hannafin and Song (2005), where they cite that teachers often learn technology skills in “intensive seminars,” stating that these
seminars are an ineffective means of professional development because the experiences are not often transferred to instruction. The authors go on to state that, “...effective technology integration requires teachers to obtain learning experiences within the context of their teaching so they can practice, reflect and modify their practice” (2005, p.57).

Ertmer (2005) concurred in her article when she suggested three strategies for helping to change teachers’ beliefs about technology integration, which include: personal experiences (teachers learn about the value of technology through their own experiences), vicarious experiences (teachers learn about the value of technology by observing and working with their peers), and social-cultural influences (including professional learning communities).

Bai and Ertmer’s study (2008) is another example of research that demonstrates the positive effect that professional development and learning experiences can have on teacher beliefs. Pre-service teachers in their study demonstrated significantly more value in incorporating technology in their lessons, and Bai and Ertmer suggested that providing such training could help to foster positive beliefs about technology integration in pre-service teachers as well as teachers with experience.

Peer Collaboration and Technology

As several of these studies have shown, offering teachers support in their attempts to integrate technology into their instruction can prove effective. Becker’s study (1994) on exemplary computer-using teachers defined one of the main characteristics of the environment common to exemplary teachers as having constant support, in both the form of professional development and a full-time technology coordinator with whom to collaborate. This indicates that having a consistent resource for teachers to rely on is imperative.
Glazer, Hannafin and Song (2005) also support the idea of having ongoing support for teachers, particularly in the form of ideas being shared and strategies emerging from a community of teachers. Glazer’s team suggested the idea of a “Collaborative Apprenticeship,” in which continual on-site support is offered to teachers by their peers, and a mentoring relationship is created that helps teachers to move along a continuum from novice technology users to experts through a system of gradual release. This idea of collaboration is very similar to the strategies that Ertmer (2005) mentioned that are necessary for changing teacher beliefs (personal experiences, vicarious experiences and social-cultural influences). Glazer et al. caution, however, that the success of a Collaborative Apprenticeship requires shared time and commitment on the part of the teachers, as well as experience and structure to hold it together.

In order for an approach such as Collaborative Apprenticeship to be effective, not only must the teachers involved in the learning process receive support and training continually, but also so must the “expert” teachers. Grove, Odell and Strudler (2006) explored the importance of the “expert teacher” guiding their mentee in a principled and systematic approach to teaching and learning so that the mentees may gain an understanding of more than simply how the software operates. Their study focused on a student teacher/master teacher relationship, and described how even pre-service teachers who had positive beliefs about technology and were strong home technology users did not translate this into classroom instruction without the modeling and consistent support of their cooperating master teacher.

The authors point out that in their study the master teachers were enrolled in four monthly workshops, during which half of the day was spent focusing on the mentoring
relationship and the other half was spent focusing on technology-rich learning activities for use with their student teachers. Having consistent support allowed the master teacher to provide the necessary support for their student teacher in the way of tutoring, modeling, making connections between technology and the curriculum, using questioning, and challenging their mentees in a positive environment. If such approaches are successful in helping pre-service teachers to use technology effectively in their lessons, it follows that such methods could be effective for practicing teachers as well.

**Technology’s Effects on Instruction**

One major factor that could change teachers’ beliefs about the value of technology integration, thus opening their minds to the idea of professional development and collaboration, would be to see the end result. Teachers need to see how technology infusion in the curriculum can impact their instruction in order to make a decision about its value. In Cuban’s (2001) report, only four of the 21 teachers interviewed stated that their instruction had changed in a major way due to technology (structure of the classroom changed, teachers lectured less, conducted more student centered learning), despite the fact that all of the teachers in the study had access to more technology than in years past. These findings point out that computers alone cannot be the driving factor for change in instructional styles. What effect, then, does technology have on instruction?

As Becker and Ravitz (1999) point out in their study of more than 400 teachers in the National School Network, “Teachers’ pedagogical philosophies and practices are not static” (p. 356). Teachers’ beliefs about teaching and their practices will change, and so will teachers’ uses for computers and technology in instruction. Jonassen, Carr and Yueh (1998) expanded on idea this with regards to technology when they described computers as being
like "mindtools," which "...require learners to think harder about the subject matter domain being studied while generating thoughts that would be impossible without the tool" (p. 30).

Becker and Ravitz looked at how viewing computers as "mindtools" instead of a new medium to maintain old teaching practices could affect teachers’ instructional practices. The study focused on teachers who were identified by the networking coordinator as being active Internet users, as well as a random sampling of the remaining teachers. A majority of teachers involved reported a change in teaching style, moving away from teacher-centered instruction and toward learner-centered instruction. Interestingly enough, elementary teachers self-reported more changes in this direction than did middle and high school teachers in the study, as did those teachers who had been using technology the longest/most frequently. Although it was not concluded that computers were a major catalyst of change for these teachers, the study had positive connotations for the use of technology and its possible effects on instruction.

Dexter, Anderson and Becker (1999) also reported that teachers in their study felt that computers played a role in helping them to develop more progressive teaching strategies over time, although the 47 K-12 teachers in this study cited reflection on experiences, classes and professional development, and school culture as major reasons for change to their teaching styles, rather than technology. The authors of this research also described technology-using teachers as being on a continuum where their teaching methods ranged from “instruction” to “construction.” Many of the teachers in this study referred to technology as a tool that allowed them to make changes in their instruction that they already wanted to make, shadowing Jonassen’s (1998) comments about how
computers as “mindtools” can allow students to create and construct in ways that they couldn’t without the technology. Although teachers did not see technology as the main reason for the changes, there appeared to be definite connections between extended technology use in instruction and learner-centered instructional tendencies.

Yet another example of technology’s effect on instruction can be seen in the study done by Park and Ertmer (2007). The implementation of Problem Based Learning as a teaching approach showed significant beginnings of change in the lesson planning and instructional styles of pre-service teachers. Park and Ertmer reported uses of technology that were more student-centered following treatment than preservice teachers in the control group. Whereas before treatment, lesson plans might have included technology in ways that promoted teacher lecturing (such as using PowerPoint to display notes), post-treatment plans showed more variety and student engagement using technology (like allowing students to research information about a country and its culture). Examples of studies such as this suggest that technology integration, when implemented consistently and over an extended period of time, could have strong impacts on both teacher instruction and student learning in the classroom.

**Conclusion**

I have witnessed in my own building a wide range of teacher beliefs regarding the place of technology in education, a continuum that many of the articles presented have echoed is a nationwide phenomenon. In order to affect change in the building, it is important to understand the nature of teacher beliefs and how they can affect a teacher’s instructional styles and decisions. It is also important to realize that inconsistent or inadequate professional development opportunities and support will not be enough to
affect such change. Studies such as Glazer e. al. (2005) and Park and Ertmer (2007) have shown that support and collaboration must be constant, positive and structured in a way that will benefit the teachers in the building. In my study my hope was to affect change in teachers' beliefs about the value of technology integration in education through on-site, effective professional development as well as consistent, positive peer collaboration.

Unlike many of the previous studies, in which only a survey or interview was used to gather data about teachers' beliefs and practices regarding technology integration, this study focused on giving teachers actual support and collaborative tools to aid them in building technology rich lessons to teach their grade level curriculum. Bai and Ertmer's study (2008) and Park and Ertmer's study (2007) focused on using support systems and training to affect change in pre-service teachers' beliefs, but did not focus on current classroom teachers' beliefs or instruction. This study looked specifically at giving support to current elementary classroom teachers, grades 3 through 6, in order to affect change in their beliefs regarding the value of technology and to increase the level of integration of technology in their instruction.

**Purpose Statement**

The purpose of my study was to investigate teacher attitudes toward technology and uses of technology for meaningful instruction when I offered on-site training and increased my collaboration with elementary teachers in the building. I examined the research themes of

- Teachers having adequate awareness and training on available building technologies
- Teachers using technology for meaningful instruction on a regular basis
- Teachers collaborating with myself and their grade level peers to create meaningful lessons that integrate technology, in seeking to answer the research questions:
  - What will happen to elementary teachers’ uses of technology during instruction when I offer on-site training about the available technology in the building?
  - What will happen to teachers’ attitudes toward the value of technology integration after collaboration time and receiving instructional design support?
  - What does my classroom instruction look like after collaborating with teachers to create technology rich lessons?

**Method**

At the beginning of the second semester in January of 2010, I began collecting data to inform my research. Data were collected from 16 teachers at an elementary school. The teachers ranged from 1 to 20+ years of experience working with students in grades 3 and above in the district. Data were gathered through surveys, interviews, lesson plan analysis and field notes from January 4, 2010, until April 21, 2010, in order to get a well-rounded picture of teachers’ beliefs about the value of technology and about the type of technology lessons being taught at the school.

In the building, all classroom teachers had their own laptop, ELMO and projector for use during instruction. They also had access to two mobile computer labs, one with 20 macbooks and the other with 25 ibooks for student use, as well as access to the lab beyond their assigned classroom time for the week. Besides the computer lab, there are two classrooms with mounted Smartboards, as well as two portable Smartboards in the building. One sixth grade teacher has had a portable Smartboard in the classroom since
January, while the second portable Smartboard has sat in storage since September. In my study, I wanted to look at why teachers were not utilizing this technology more frequently in their instruction, despite it being readily available for classroom use.

One form of data collection utilized was a pre- and post-survey (see Appendix A) that was used to briefly assess teachers’ beliefs about the value of technology in instruction, their current practices with technology, and their willingness to change their current practices (through training and collaboration) at the beginning and end of the study. The pre-surveys were handed out during the first week in January and collected within a two-week period, and the post surveys were handed out during the third week in April and collected by April 30. Fourteen teachers completed the pre-survey, and 12 teachers completed the post-survey.

Besides surveys, written records were also kept of my observations regarding teacher attitudes toward technology, teachers’ integration of technology in their instruction, and teachers’ efforts to collaborate with me in planning technology rich lessons. These field notes were taken in order to verify that information received through the surveys and interviews was accurate, as well as to gain an outsider’s perspective on teachers’ beliefs and practices. From January 4 to March 26, I kept weekly journals in which I recorded my observations of instances of teacher remarks, suggestions, and complaints or praise of technology integration. Also included were reflections that described teachers’ collaboration with me to create technology rich lessons, as well as a journal describing my efforts to offer on-site technology training throughout the semester for classroom teachers. Due to the implementation of online testing this year, most of the time teachers spent in the computer lab after the week of February 15 was preparing for testing. The students took
predictive reading tests, did tutorials and practice tests with the new state testing software, and completed the Nebraska State Assessment (NesA) Reading test and Mathematics pilot test. My reflections from February 22 to March 26 were sparse, as my role as test administrator for the building did not allow me time to observe teachers in their classrooms or time for teachers to work in the computer lab on curriculum.

Besides journals, I also conducted interviews of intermediate grade classroom teachers several times throughout the semester. Between January 19 and January 30, I individually interviewed six teachers in grades 3, 5 and 6 (two at each grade level) regarding their current use of technology in instruction (see Appendix B). Of the two participating fourth-grade teachers, one declined to participate in the interviews, and the other was absent the week of the first interview and could not coordinate open times with me for the second interview. This same group of teachers was interviewed again on February 25 regarding their attitudes about the value of technology integration after receiving additional technical and instructional support. They were interviewed one final time during the first week in April regarding their ideas about collaborating on lessons that integrate technology into the curriculum. The interviews allowed for more detailed insight into the classroom teachers’ thoughts and beliefs regarding technology and their teaching practices.

The final component of my data collection was to keep and analyze copies of lesson plans that utilized technology and which were taught throughout the course of the semester. A checklist was devised using the ITSE standards and the National Educational Technology Standards for Teachers (NETS-T) to track the effective use of technology during instruction (See Appendix C). The checklist was supplemented with a series of
questions regarding content integration, student engagement, and overall impressions of the lesson by the classroom teacher and me. A sampling of lessons was recorded between January 12 and March 29; however, after February 19 most of the intermediate teachers were having their classes complete the online tutorials and practice tests for the NeSA reading test. Therefore lessons recorded between February 19 and March 29 for participating teachers was nearly negligible. Due to a lack of teacher response for copies of lesson plans completed outside the computer lab, all plans that I collected and analyzed were ones completed in the lab with the classroom teacher and myself.

I organized my data chronologically as I collected it in my binder throughout the study. Each week I would include my journal, any lesson plans that were analyzed along with the lesson plan checklist, and if an interview occurred that week, I included the transcript as well. This made it easier to link instances from my journal to my other forms of data collection. I used an Excel spreadsheet to track teacher responses on the pre- and post-surveys, as well as to compare pre- and post-responses for change.

I analyzed my data by looking at my three research questions and highlighting journal responses, interview responses and survey responses that I felt were relevant to each question. With such low study participant attendance in the on-site training sessions, I did not have much data to analyze for this research question, and had to draw my own conclusions as to why there was such little interest. In looking at teacher attitudes, I was able to group evidence in two categories. The first was those teachers who were not comfortable increasing the types and frequency of technology they used in their own instruction, and the second was those teachers who wanted to increase the types of and frequency of technology. For the third research question, I relied heavily on my journals
and lesson plans to analyze what my classroom instruction looked like after collaborating with classroom teachers to create technology rich lessons.

**Findings**

In a roughly 12 week period, I did not expect to see drastic changes in teachers’ beliefs or teaching practices regarding technology integration. Interruptions in my schedule due to snow days, online testing and personal issues made it difficult for me to provide as much support to classroom teachers (by way of on‐site training, collaborative planning and technical support) as I had originally anticipated. However, this is not to say that I did not observe some notable trends. In looking at my three research questions, I saw the beginnings of change most evident in answering questions two and three; my findings for the first research question are less clear at this point.

*How does offering on-site training about the available technology in the building affect teachers’ use of technology during instruction?*

One assertion that I made based on the literature I read regarding teachers’ reluctance to integrate technology into their instruction was that one reason (perhaps not the main or only reason) that teachers did not use more technology in their instruction was due to a lack of knowledge and/or comfort using the available technology in the building. My district offers technology-training courses at the administration building, both during the summer and in the evenings during the school year (teachers are even paid a small stipend for attending). However, I was aware that few teachers from my school (about 33% of study participants) attended any optional training sessions this year or last from their January interview responses. Based on conversations that I had in the past with several teachers, as well as personal experience, I assumed that many teachers did not have the
time to go to a two-hour training session across town after teaching all day, nor did they want to give up their free time during the summer to go to training. My goal was to bring the training to the teachers, at a site and time that was convenient for them. I also wanted to slim down the sessions to a half hour, in an effort to engage their interest in the different technologies available in our building. My hope was that, after some initial introduction and instruction, teachers’ interests would be piqued and they would be more willing to try out new things when co-teaching with me in the lab, as well as in their own classrooms.

At the end of January I sent a questionnaire to all staff members, regardless of their participation in the study, inquiring what types of technology training they might be interested in attending at the school, as well as what days and times they would be available to attend sessions (see Appendix D). Included in the list of topics was an overview of the Macintosh software included on the new lab iMacs, each of the Microsoft Office programs, Pixie and Tux Paint (drawing and creativity software), Garage Band (music editing and creation, as well as podcasting), iPhoto, Photobooth and iMovie. I also offered an open space for additional suggestions. After compiling the 13 surveys that were returned (only two of which were from study participants), I selected the five most popular topics to include in my before- and after-school technology training sessions. The five topics were: “Macs 101,” “PowerPoint,” “Photobooth,” “iPhoto” and “iMovie.” When scheduling the sessions, I compiled the most popular days and times for each topic based solely on responses provided by teachers who expressed an interest in that particular topic.

The first session, “Macs 101,” was offered because before last year, our entire staff was working on Windows based computers, while students were using Macs. Last year, as
teacher laptops began wearing out, the administration chose to replace them with Macbooks. Many of our staff members had little or no experience using Macintosh products for administrative or instructional purposes, and initially there was much verbal interest in this session. The session, held on Monday, February 8, from 4:00-4:30PM, was attended by one kindergarten teacher (two teachers had signed up for the training). She received instruction on how to maneuver to different programs and components of the desktop, as well as an overview of the different applications included on her new computer.

The second session, “An Introduction to PowerPoint,” was slightly better attended when I offered it on Thursday, February 18, from 4:00-4:30PM, with six attendees (12 total teachers had signed up for the training). This course offered an overview of PowerPoint 2003 for Windows and 2007 for Macintosh. Of the attendees, only one, a fourth-grade teacher, was a participant in this study. Based on records of lesson plans she and I co-taught in the computer lab this year and records of the mobile computer lab check out (the cart was never checked out by her class), her class never used PowerPoint this school year, even after she attended the session. Due to the limitations of this study it is unclear whether the teacher used PowerPoint that she created during her instruction this semester.

The third and fourth training sessions were over iPhoto and Photobooth, software that is unique to Macintosh computers. The third session, “Introduction to iPhoto 2008,” was offered on Tuesday, March 2, from 4:00-4:30PM, and was attended by three classroom teachers (two of whom were study participants, neither of which have Macintosh laptops, but have access through the computer lab to the software). The fourth and final session, “Introduction to Photo Booth,” was offered on Wednesday, March 3, from 4:00-4:30PM, and
was attended by two teachers, (both of whom were study participants). Neither teacher has a Macintosh laptop, but both have access to the software through the computer lab.

Before the final session, which was to be offered at the beginning of April, I decided to change topics from “Introduction to iMovie” to “Ideas for Integrating Technology in Science and Social Studies.” This change came about due to feedback from teachers in the pre-survey and the first interview. Question 15 of the survey asked, “What professional educational technology assistance would best help to meet your educational goals for your classroom of learners?” During the pre-survey conducted during the first week in January, 21% of the teachers asked specifically for application based training, such as PowerPoint. However, 14% of teachers also asked for help finding or creating activities that integrated technology into their curriculum standards instead. In their January interview, 50% of the teachers directly stated that they wanted help generating ideas of how they could better
integrate technology into their curriculum. In the January interviews, one third-grade teacher, Amy¹, explained her lack of participation (in on-site training) when she said,

I know if I want to learn how to do a PowerPoint I can go and do that at TAC and get paid for it and they can show me how to do a PowerPoint and I can apply what I learn on this computer here. I want to learn about what's out there. What's out there that I can use in my classroom and how can I integrate things that are out there into my classroom. I don't even really know what's out there but I'm like not one of those people that are afraid to learn about it or afraid to touch it. Just bring it in.

After hearing this, I hoped that focusing on curriculum integration specifically, rather than on a particular computer application, might draw more teachers to participate in the training. Unfortunately, due to a lack of interest in the session (only two teachers signed up to attend) and a weeklong absence in April due to a family emergency, I was unable to hold this final training session. I was disappointed that none of the study participants who had stated an interest in learning new ways to integrate technology into their curriculum (either in their January interview or on their pre-survey) had signed up to attend. Due to a lack of time, this last session was unable to be rescheduled.

After looking at the types of assistance teachers requested during the pre-survey, the types of training teachers requested in January versus the attendance at the training sessions throughout the spring semester, as well as my journals regarding the training sessions, it is inconclusive at this time whether on-site training could affect change in teachers’ use of technology during instruction. Teachers who completed both surveys answered question 12, “If offered, how likely would you be to participate in on-site

¹ All names are pseudonyms.
technology training either before or after school?” with a response of “somewhat likely” or “very likely.” Of those responses, 5 out of the 12 participants increased their response from “somewhat” to “very likely” on the post-survey. This indicates that teachers have an interest in learning more about technology for their instruction; however, outside factors make it difficult to determine why more did not attend training sessions this spring. Further investigation of this topic is necessary in order to draw conclusions whether on-site technology training has any marked impact on the types and frequency of technology that teachers are utilizing during their instruction.

**Teacher Likelihood of Participation in On-Site Technology Training**

![Bar chart showing teacher likelihood of participation in on-site technology training.]

*What will happen to teachers’ attitudes toward the value of technology integration after collaboration time and receiving instructional design support?*

This school year, the classroom teachers in the building had a new opportunity available to them in the way of collaborating with me to teach lessons in the computer lab
or their classroom. Most teachers, however, seemed happy to have me plan and teach the technology-related lessons in the lab, and some gave the impression that the students’ time spent in the lab could be better served doing other educational things instead. This spring I made a focused effort to encourage the teachers to try new topics and ideas in the computer lab, ones that still closely relate to the curriculum that students need to know, but in more engaging and meaningful ways. For example, I encouraged my 75% of the fourth-grade teachers to try a new lesson involving students using drawing software to create a Native American mask. This lesson, taught between January 5 and January 15 of 2010, involved drawing on students’ prior knowledge about Native American customs and art from their classroom and field trip experiences. Unlike previous lessons that may have only met one or two of the ITSE and NETS-T standards on my lesson checklist, this activity met four of the seven items.

In making this effort, I began to notice in most teachers small changes happening in beliefs and teaching practices regarding technology. However at the extremes, two distinct types of teacher began to emerge. The first type included several teachers with whom I have struggled in trying to collaborate and create more meaningful lessons. A few of these teachers are ones who refused to participate in the study, refused to attending on-site training sessions, or as my January 15 journal shows, often refused to participate in instructional planning for their classes with me:

The other …teacher, however, was one whom I was having a hard time having meaningful conversations with regarding curriculum and how I could help integrate it into our lab lessons. He was not really forthcoming with any ideas beyond a topic word or phrase that we could cover. For example, he told me for this week that is class was learning
about time and measurement. Since I do not teach [that] grade, I do not know how accurately they practice telling time, or if they work on elapsed time at all either... I had no previous experience with what the standards covered in these areas, but the classroom teacher did not sit and discuss with me what skills he was working on specifically or what approaches he was using to teach the concepts. He simply handed me a copy of the district tests that students would be taking down the road and let me figure out the rest for myself. (Personal Journal, January 15, 2010).

Another classroom teacher, a study participant, was another example of a teacher who was not willing to have open-ended discussions with me regarding plans for her class. In my January 15 journal, I described in detail a multicultural lesson I had been doing with the other classes at her grade level, which this teacher had declined to participate in doing. The other teachers worked with me to design a lesson in which the students studied masks of the Native Americans and learned how they were used traditionally (after attending Native American Days at the Ft. Crook campus of Metro Community College), then discussed modern ways in which we use masks and compared them. The students then used Pixie (a drawing and creativity application available in our computer lab) to create their own virtual mask, and used Microsoft Word to publish a short description of their mask, detailing the symbolism behind the design.

This lesson was one that met four of the seven ITSE and NETS-T standards on my lesson plan checklist (designing a relevant learning experience that incorporates digital tools to promote student learning and creativity, providing students with multiple and varied formative and summative assessments aligned with content and technology standards and using resulting data to inform learning and teaching, demonstrating fluency in technology systems and the transfer of current knowledge to new technologies and situations,
communicating relevant information and ideas effectively using a variety of digital age media and formats). Although I made note on the lesson plan evaluation form that next year expectations of the final product need to be clarified (via a rubric or other agreed upon means), overall the lesson was a highly engaging on that was positively received by both teachers and students.

The study participant opted not to do this lesson, but asked for her students to practice rounding and determining place value of six-digit numbers. According to my Journal entries on January 15 and the following week, she opted to repeat the activity twice. In my lesson plan evaluation, the lesson partially met two of the seven ITSE standards on the checklist (partially because the first item on the checklist, “design or adapt relevant learning experiences that incorporate digital tools to promote student learning and creativity,” did not promote student creativity). At the bottom of the evaluation form, I commented, “I thought the lesson matched the skills the teacher had requested, but again would love to extend beyond just skills practice.”

In looking at my master lesson plans for the 2009-2010 school year (not just the plans that were copied and evaluated for the study), this teacher has requested to work on Math skills practice every week. The only exceptions this school year were the weeks where classes were canceled due to online testing and the final week in the second quarter when her class was assessed for a keyboarding grade. When comparing lesson plans for her class with responses from her survey, the survey data suggests that the teacher does not feel knowledgeable or comfortable using the available technology in the building (responding that she uses it rarely in her own instruction and is not very confident or aware of the available technologies). Unfortunately, the teacher was not available to be
interviewed, leaving me to question if teacher discomfort in the area of technology could be a possible factor in the breakdown of communication when I have tried to plan collaboratively this year with the first type of teacher.

The second type of teacher that began to emerge from the group was at the other end of the spectrum - those teachers who were willing to try new ideas and projects in the lab and who began to broaden their technology experience base with my help. Interestingly enough, some of these teachers were the ones who were self-professed “technology novices,” but as my journals expressed, these teachers were willing to have open and meaningful conversations with me regarding their goals and expected learning outcomes. These teachers were willing to explore new ideas that I gave them to try out.

My January 22, 2010, journal describes one such incident, highlighting the idea that even doing a lower level activity like an online “game” can enrich a student’s learning experience, creating excitement for a teacher who feels she has little knowledge or expertise using a computer herself:

The 5th grade Science lesson on light, even though it was perhaps a low-level of technology, was one of the richest activities that I helped present this week. The teacher is a self professed “computer novice,” and had told me the previous week that she hated teaching the Science unit on light because she thought it was boring. In “Alien Attack,” the students are detectives trying to solve the mystery of which alien tried to blow up the earth. To solve the mystery, they must gather background info about each alien, which of course are somehow related to an aspect of the unit on light. Each portion of the game had a “hands-on” activity where the students would manipulate virtual materials to learn about the effects of light. The teacher was amazed at how highly engaged her class was for the
entire period, and we both felt that the activity presented a large amount of highly relevant material in an engaging and memorable way for the students.

Other teachers, such as a fourth grade teacher who collaborated with me frequently throughout the school year, also found technology as an easy way to help engage students in Science - an area that can be difficult to teach effectively without access to “hands-on” materials. Using online resources as a virtual way to look at physical objects helped her students to learn about the different types of rocks, as I described in my January 29, 2010 journal:

The class began a Web quest about rocks and the rock cycle. This was a fun activity that I helped put together for her class because many of the Web sites we found on rocks were not very interactive, so we used a Cloze question format that I developed to help students maneuver through the module and understand the “big ideas” about the three different types of rocks. She was then able to use this activity as a formative assessment for her students to see how their understanding of the rock cycle was coming along. We also used a virtual activity to explore the properties of and identify different rocks, which the kids really enjoyed (especially since we don’t always get great “real” rock samples to show them in the classroom).

Although these lesson plans only included two to three of the seven ITSE and NETS-T standards on the evaluation checklist, both the teachers and students found the lessons to be highly engaging, and the teachers were able to use the online resources as instructional and even evaluative tools.
How Teacher Lesson Plans Met the ITSE and NETS-T Standards Checklist

<table>
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<th>Number of items included from ITSE and NETS-T checklist</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
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<td>3</td>
<td>5</td>
<td>1</td>
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</tbody>
</table>

I also had several teachers who tried out new ideas and software to create unique and creative projects with their students. My journal described how one such teacher, another fifth-grade teacher who claimed not to know much of anything about technology, attended one of the teacher training sessions. She saw that something she had previously thought was beyond her capability, podcasting, could be done quite easily with a little guidance. In my entry for March 5, 2010, I wrote, “A fifth-grade teacher and self-proclaimed technology-illiterate, was impressed with the ease of using the software [Photobooth] to create a video. We talked about possibilities for projects, and how I can help her display the finished product.”

In my February 25, 2010, interview, this same fifth-grade teacher described to me, how, even though she felt she was not good at using the technology herself, there is inherent value in using technology during instruction so that students are engaged.

They [students] are doing it hands-on and they're exploring on their own computer and they are doing it at the same time I am showing them. Teach them to do what I’m doing up there [gestures at the front of the room] on the computer so that they can do that on their own when they are on their computers at their house.

Interestingly enough, across the board, teachers who participated in the study seemed to feel that technology was extremely significant in student engagement and at least
somewhat significant in student achievement, according to the pre- and post-surveys.

Regardless of how teachers ranked their awareness, comfort and regular use of technology in their instruction, all teachers answered that they felt technology was extremely significant in impacting student engagement. Twenty-five percent of the teachers increased their answer from believing technology to be “somewhat significant” to “extremely significant” on the post-survey.

*Positive and Negative Change in Teacher Responses From Pre to Post Survey*

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<th>ID Number</th>
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<th>Q2</th>
<th>Q3</th>
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<td>3</td>
<td>1</td>
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</table>

Median Changes in answer: 0.5 0 1 1 1
In looking at the survey results, I compiled a chart showing how teachers’ responses to questions changed from pre- to post-survey. Most responses had no change or a positive change; however, several responses did have a negative change. I am not sure if the negative change was intentional, as the change was generally small from their original response. The fact that I did not show teachers their pre-survey responses before filling out the post-survey (four months later) may have led to the discrepancy in responses. Interestingly, I saw the greatest median change in responses for questions 7 and 9, the questions asking teachers to rate their own comfort level and their students’ comfort level using the available building technology. Both questions yielded a positive median change of 1.5, demonstrating that despite the fact that teachers are not always utilizing technology in their lessons currently, they are beginning to feel more comfortable using the technology.
Hopefully this will lead to a gradual increase in technology use during instruction for classroom teachers in the building.

Since all of the participants claim to see the relevance of utilizing technology in their instruction, the question remains why some teachers are more willing to dive in and try new things in their instruction when others are not. As the pre-survey results showed, only one of the one teachers surveyed uses technology daily during instruction, while the majority of teachers claim to only use technology several times a month.

All of the teachers in the building, regardless of their participation in the study, were offered the same opportunities to collaborate and plan lessons with me, all had equitable access to the resources in the building, and all were offered on-site training to support their knowledge and experience using the available technology. There are many possible factors, such as age and experience of the teacher, use of technology outside of school, their
comfort level in co-teaching, their comfort level in utilizing me as a resource, etc. as to why more teachers will not branch out. Without more time to study the similarities and differences in teachers who were and were not willing to collaborate effectively with me it is not possible to determine exactly why certain teachers were more willing than others to take bigger risks in trying to utilize technology at higher levels in their instruction.

*What does my classroom instruction look like after collaborating with teachers to create technology rich lessons?*

Last year when I became the technology teacher at my building, I did not have a clear picture of the content standards at each grade level. I had minimum communication with classroom teachers regarding the types of lessons and activities that were going on inside their classrooms, and thus had to use my own judgment as to the types of technology lessons and activities that each grade level was capable of doing. By working directly with classroom teachers to plan and co-teach a technology lesson in the computer lab this year, my instruction has changed as well. In looking at all of the lesson plans I created this year, I touched upon grade level content standards for every classroom, often creating unique lessons that could be repeated and enhanced from year to year. Since lesson topics were left in the hands of the classroom teacher, my lessons did not always integrate technology at the same levels (some lessons were very low level technology, like practicing math facts or keyboarding). Despite this, at least one of the ITSE standards from the lesson plan evaluation checklist was always met, and the average number of standards met in recorded lessons was about 2.6 out of 7.

My journals also show evidence that working with classroom teachers gave me new ideas to try out using technology that even I had not previously used. On January 29, 2010, I
described a project that I was working on with a small group of sixth-grade students for writing.

My small group of sixth graders began using Pixie to creatively explore their storytelling abilities. They were given a paper storyboard and were asked to choose their favorite fairytale to retell. After completing their storyboard, the students used Pixie to create the individual pages of their story (complete with text and illustrations). The students could then add music or narration to their story before we turned it into a QuickTime video that we could present to their class. The sixth grade teachers were very excited to have some of their more gifted students working on a challenging and creative activity with me in the lab.

This project was one that was met with a lot of positive feedback, both from the students, classroom teachers and other elementary teachers from the district when I presented the project during a district-wide curriculum day presentation on February 16, 2010.

Another instance where a classroom teacher actually prompted me to try something new in my instruction was when a fifth-grade teacher approached me about a project she was doing in Social Studies. Her students had been studying the 13 colonies, and she wanted them to present their research in a unique way. My March 5, 2010, journal described the situation,

I have been working with several teachers to help them come up with meaningful, technology-rich projects that their students can work on. In particular, one of the fifth-grade teachers wants to have her students do research on the 13 colonies and wanted to do something “different” and technology infused for a final project. At my suggestion, she is going to try using Photobooth to create video podcasts that can be played via CD, or uploaded to her Web page. Despite the fact that she did not attend the training, she is
willing to trust my expertise and commence with the project anyway. We are both very excited about the project and how easy but effective the end project should be.

In the same journal entry, I described how she and another fifth-grade teacher were always coming to me with ideas for projects, and looking for new ways to use technology to present these projects. On March 5, I wrote,

Overall I would say that these two teachers have shown the most growth in their willingness to use technology in their classroom lessons without my guidance, and are also the most willing to seek me out for new project ideas that infuse technology. Despite the fact that neither of these teachers would consider themselves extremely comfortable with all of the available technology in the building, since we have been working together I have seen them more willing to take risks in their instruction to try and incorporate technology in increasingly meaningful ways.

My journals have shown that collaborating with classroom teachers more effectively this year has had an impact on my classroom instruction as well as their instruction. Since such projects were so positively received, and somewhat easily implemented, it was important to look at why they were not done previously. Several of my March interviews with teachers alluded to the fact that classroom teachers did not feel they had time to research and develop such technology-rich activities on their own, and that having an “expert” to assist them this year made the difference. As one sixth-grade teacher put it, “I think that two heads are always better than one. If I come up with something…your expertise in finding that information is priceless because I really don’t have time to do that.”

Despite the fact that at the beginning of the school year some classroom teachers were dubious about having to co-teach in the computer lab with me, their survey results
also indicated that they are becoming more receptive to the idea of working together and collaborating to create technology rich lessons. When asked on the post-survey how likely it was they would be willing to have the technology teacher come into their classroom to teach a technology rich lesson, 75% of the respondents answered “extremely likely.” The other 25% of respondents increased their likelihood by one ranking. This seems to show that, despite the slow progress of some classroom teachers to try new things and collaborate in planning, with study participants at least, teachers are beginning to recognize the value of technology and how having on-site support can help them to more easily integrate technology into their lessons.

Although not all teachers placed the same degree of value on integrating technology into the curriculum, one fifth-grade teacher made a revelational statement during her March 2010 interview,

> It [being in the computer lab during instruction] only supports what I already know to be true in that it is so important to teach this generation of kids in a way that’s different than what we had, not so much you but me, because of what they are going to have thrown at them as they continue to age. The technology that is coming at them, they are so willing and they so want it. Like, they want it SO BADLY. They’re so in tune with it and wanting to know about it. They are so willing to listen and watch and learn in a way that you don’t see in a classroom with just a book and a desk and a teacher standing in front of the room. I mean, it completely reinforces what I already believe. I just wish that I were more literate in the technology myself so that I could give them what they want, what they deserve, what they should have.

This type of response, from a teacher who only ranked herself 5 out of 10 (1 being “Not at all” and 10 being “Very knowledgeable/ very comfortable”) on the pre-survey when asked
to rate her overall knowledge of how to use the technology and comfort level using the available building technology, is exactly the type of beliefs and values I want all teachers in the building to have. I know that she is only one case in a staff of about 50, but if a 12-week study can produce that type of response from one classroom teacher, I feel that more time needs to be spent investigating this topic in the building in order to understand any possible long-term implications.

**Conclusions**

My findings, although somewhat inconclusive at times, indicate to me as a teacher that more time is needed in order to determine if visible changes will occur with a larger percentage of teachers in the building. I saw enough positive evidence that I would find continuing my current practices of offering on-site training, technical support and instructional collaboration with teachers to be a worthwhile endeavor in the future. In looking back on how my study was supported or challenged by the available literature, I would say that as a whole my study was supported by the previous research.

Like Lumpe and Chambers (2001), I found that although in writing teachers profess the importance of integrating technology into their lessons, often teachers’ practices did not reflect this. My pre- and post-surveys both indicated that regardless of teachers’ proclaimed proficiency at using technology, all agreed that integrating technology into the curriculum was at least somewhat important in increasing student engagement and achievement. Despite this claim, very few teachers (about 36%) said that they used technology during their lessons more than “several times a month.” Lumpe and Chambers suggested that such teachers needed to be provided with positive experiences using technology and plenty of support, both of which this study attempted to do.
While the study met with some success in attempting to change teachers’ beliefs regarding the value of using technology during instruction, as Albion and Ertmer (2002) cautioned, changing the core beliefs of teachers is very difficult to do and cannot be done quickly. Examples of lesson plans that were focused on skills-based instruction, lack of communication in planning lessons with teachers as evidenced in my journals, and results from my survey questions all indicate that, at least to some degree, this is extremely accurate. The teachers I was able to impact the most appeared to be those teachers who already valued technology but sought guidance and support in order to begin to more effectively utilize that technology.

Park and Ertmer (2007) and Bai and Ertmer (2008) conducted studies in which providing instruction that focused on the value of integrating technology into the curriculum for pre-service teachers had a direct impact on their lesson planning. In my study, offering on-site training did not appear to have any impact on the types of lessons that teachers planned; however, collaborating and offering support to teachers sometimes did. Again this may go back to teachers’ core beliefs, many of which are formed before a teacher begins their career in the classroom. It may also stem from unaccounted for factors, such as time and availability for teachers to attend training outside of the workday. As Lumpe and Chambers (2001) suggested, however, if teachers do not participate in professional development, they are less likely to feel that they can be successful in changing their teaching practices. Perhaps a way to combat lack of participation in the future would be to plan training sessions on teacher workdays as well as before and after school. Future questions need to be asked of teachers to determine the most effective steps to take next regarding training.
In regards to collaboration and support, Becker’s study (1994) claims that in order for teachers to become exemplary users of technology they must have constant support, both in training and having an on-site coordinator. In this study, my journals and data have seemed to indicate that I did a better job of offering on-site assistance in collaborating and planning than I did at offering constant training support. One difficulty in achieving a balance of both is again the factor of time. Most of my workday is spent teaching in the computer lab, and my open times for planning do not always match up with those of classroom teachers. Without a common time to work together, it is difficult to offer ongoing support for teacher training to everyone.

Another aspect of collaboration that was missing from this study was the use of peer collaboration and mentoring within grade levels. Glazer, Hannafin and Song (2005) stressed that ongoing support should come from the community of teachers. At this time, many of our grade levels do not plan as a team for their regular instruction, thus it is very difficult to have classroom teachers collaborate with their peers to create technology rich instruction. Future studies conducted at this school might do well to explore the area of peer collaboration within a grade level as well.

**Implications**

As a result of this study, I plan to continue offering support and training to all staff members in the building. I hope to continue collaborating with classroom teachers to create technology-rich lessons, not only in the computer lab, but in their classrooms as well. I hope to present some of the progress and projects that I have observed teachers doing this spring to other teachers, in hopes of enlightening them as to the possibilities that exist with technology in the building. I would like teachers to understand that they have a
constant support in me to help them as they begin to design and expand on their
technology use in the future.
References


## Appendix A-Teacher Attitudinal Surveys

Survey (to be used beginning and end of semester) On Current use of technology & Attitudes about Technology

1. **Indicate the degree of your overall knowledge of current technology and terminology.**
   
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<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Very knowledgeable</td>
<td>Considerably</td>
<td>Somewhat</td>
<td>Only partially</td>
<td>Not at all</td>
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2. **To what extent are you aware of the available technology in your building?**
   
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<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Very Aware</td>
<td>Considerably</td>
<td>Somewhat</td>
<td>Only partially</td>
<td>Not at all</td>
</tr>
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</table>

3. **Please rate your overall knowledge of how to use the technology available in your building.**
   
   | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
   | Very knowledgeable | Not at all |

4. **Please rate your comfort level with using the available technology in the building.**
   
   | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
   | Very Comfortable | Not at all |

5. **How important do you feel it is to use technology during instruction?**
   
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6. **How often do you use technology during your instruction?**
   
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</tr>
<tr>
<td>Daily</td>
<td>Several Times/Week</td>
<td>Several Times/Month</td>
<td>Rarely</td>
<td>Never</td>
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7. **Please rate your comfort level with using technology during your instruction.**
   
   | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
   | Very Comfortable | Not at all |

8. **How often do you have your students use technology during instruction?**
   
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<td>Several Times/Month</td>
<td>Rarely</td>
<td>Never</td>
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9. **Indicate the overall comfort level of your students with using technology during instruction.**
   
   | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
10. How significant do you feel is the impact of technology on student engagement?

4 3 2 1  
Extremely Significant  Somewhat Significant  Of Little Significance  Not Significant

Comment:

11. How significant do you feel is the impact of technology on student achievement?

4 3 2 1  
Extremely Significant  Somewhat Significant  Of Little Significance  Not Significant

Comment:

12. If offered, how likely would you be to participate in on-site technology training either before or after school?

4 3 2 1  
Extremely Likely  Somewhat Likely  Somewhat Unlikely  Extremely Unlikely

Comment:

13. If offered, how likely would you be to have your technology teacher come into the classroom to model a technology-rich lesson?

4 3 2 1  
Extremely Likely  Somewhat Likely  Somewhat Unlikely  Extremely Unlikely

Comment:

14. If offered, how likely would you be to participate in planning and co-teaching technology-rich lessons with your technology teacher?

4 3 2 1  
Extremely Likely  Somewhat Likely  Somewhat Unlikely  Extremely Unlikely

Comment:

15. What professional educational technology assistance would best help to meet your educational goals for your classroom of learners?
Appendix B- Teacher Interview Questions

Interview 1: Regarding on-site training

- Have you attended any technology training sessions at Field Club or the administration building this year?
- If yes, which sessions? Describe any impact you feel these sessions have had on the way in which you integrate technology in your instruction?
- If no, what factors may have led you to not attend training sessions? Do you feel attending future training sessions would have an impact on the way in which you integrate technology in your instruction?
- Describe the big ideas you have learned from participation in technology training sessions.
- In thinking of your classroom activities, describe the goals/dreams you have for using technology with your instructional areas. What additional resources are you needing to realize this dream? What challenges do you face to experience this dream?

Interview 2: Regarding co-teaching with Technology

- This year, you have been co-teaching with me in the computer lab and have had direct input on the types of lessons I do with your students. How has being in the computer room during this time had an effect on your views about the value of technology integration in the curriculum?
- How has working with me in the computer lab affected your use of technology in classroom instruction outside of our time together?
- Describe any impact you feel collaborating in the computer lab this year may have on your future instruction with regards to technology integration.

Interview 3: Regards to the use of collaboration during instruction

- Describe the value you see in collaborating with myself or your peers to create technology-rich lessons.
- Describe how collaborating with me this year has been easier or more difficult in allowing you to create meaningful, technology-rich lessons for your students.
- Describe any benefits you see in using collaborative instruction and planning to develop technology-rich lessons.
Appendix C-Lesson Plan/Activity Checklist

(Items are taken from the ITSE and NETS-T standards to track the effective use of technology during curricular instruction).

_____ Design and Develop Digital Age Learning Experiences and Assessments
   _____ design or adapt relevant learning experiences that incorporate digital tools to promote student learning and creativity
   _____ develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
   _____ provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

_____ Model Digital Age Work and Learning
   _____ demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations
   _____ collaborate with students, peers, parents, and community members using digital tools and resources to support school success and innovation
   _____ communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats
   _____ model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate and use information resources to support research and learning

Based on the provided checklist items, how would you rate your lesson as to the extent of technology being integrated in a meaningful way?

___ No technology involved
___ Little technology and/or lower level technology integrated (i.e. skill practice, word processing, etc.)
___ Moderate level of technology integrated (i.e. web quests, research online, creating a Power Point presentation or visual model, etc)
___ High level of technology integrated (students are using multiple technology tools to synthesize and construct meaning from their learning)

Additional Items to Consider from Lesson Plans (Self Reflection for teachers):
- How closely did the lesson relate to grade level curriculum?
- What were the classroom teacher’s beliefs about the success of the lesson?
- What were my beliefs about the success of the lesson?
- How well did the activity relate to the content it was intended to cover?
- What areas do I feel I still need to make improvements to? What things can I do to improve the overall quality of this lesson?

Notes:
Appendix D- Training Session Survey

As part of my graduate studies, I would like to start offering some 30 minute, on-site training sessions for our staff on a variety of technology related topics that we have here in the building. Before setting up a schedule, I would like some teacher input as to the type of sessions I should offer and the times that work best for teachers. If you could please return this to me by Friday, January 22\textsuperscript{nd} I would greatly appreciate it!

~ Paula Jakopovic

Name (optional): _______________________

Please check any session offerings that you would be interested in attending:

___ Macintosh 101, a basics class for beginning Mac users
___ MS Word
___ MS PowerPoint
___ MS Excel
___ Pixie (drawing software, intermediate)
___ Tux Paint (drawing software, primary)
___ Photo Booth (take and edit both still and video pictures)
___ Garage Band (music creation)
___ Garage Band (creating a podcast)
___ iPhoto (photo storage, editing, project creation)
___ iMovie (video editing)
___ Other (please specify ________________________________)
___ None

Please check any and all times that you would be available to attend sessions:

Mondays _____ before school _____ after school
Tuesdays _____ before school _____ after school
Wednesdays _____ before school _____ after school
Thursdays _____ before school _____ after school
Fridays _____ before school _____ after school

_____ Workdays _____ None of these times work for me