INTEGRATING TECHNOLOGY INTO CLASSROOM INSTRUCTION

DISSEMINATION SUBMITTED TO
THE DWIGHT SCHAR COLLEGE OF EDUCATION
ASHLAND UNIVERSITY

In Partial Fulfillment of the Requirements for
The Degree
Doctor of Education in Educational Leadership
Mark Daniel Ritzenthaler, B.S., M.Ed.

ASHLAND UNIVERSITY
ASHLAND, OH
2009
A Dissertation

Entitled

Integrating Technology Into Classroom Instruction

By

Mark Daniel Ritzenthaler

In Partial Fulfillment of the Requirements for

The Degree

Doctor of Education in Educational Leadership

Dr. Carla Edlefsen, Committee Chair

Dr. Howard Walters, Committee Member

Dr. James Van Keuren, Committee Member

Dr. Judy A. Alston, Director of Doctoral Studies

Dr. James Van Keuren, Dean, College of Education

Dr. W. Gregory Gerrick, Dean, Graduate School

Ashland University
March 2009
INTEGRATING TECHNOLOGY INTO CLASSROOM INSTRUCTION

By

Mark Daniel Ritzenthaler

ASHLAND UNIVERSITY, 2009

Dr. Carla Edlefsen, Committee Chair

Abstract

Technology has become increasingly saturated into the very fabric of students’ daily lives. They are exposed to and use technology in every facet of their lives, including their schoolwork. With millions of dollars being spent by school districts on technology and its infrastructure, this study used an on-line survey to gather data on how teachers in one school district assessed their use of technology in their classrooms. Teachers also submitted detailed lesson plans as examples of best practices using technology integration. The study found that there were several barriers to the full integration of technology into teachers’ classrooms, and that teachers rated themselves much higher on the on-line survey in terms of technology integration than what their lesson plans indicated they were doing.
DEDICATION

This dissertation is dedicated to my lovely wife Jennifer. Without her love and support, I would never been able to finish on time. This dissertation is also dedicated my son, Dylan. Watching him overcome the daily struggles as he has grown has helped me realize that I could overcome my struggles and achieve great things, too.
ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to my committee chair Dr. Carla Edlefon, who not only encouraged me, but also made me reflect on my personal and professional life journey as I grew throughout this process. Without her support, I would have never have been able to finish. I would also like to thank Dr. Howard Walters whose statistical guidance in this process helped me understand and appreciate research better and more deeply. I would also like to thank Dr. Van Keuren in his help on this study. His insight was greatly appreciated.

I would like to also thank my wife, family and friends for their support and encouragement. My wife Jennifer’s support and sacrifice, even as she was finishing her own fellowship, was especially appreciated as I know the time and energy it took to support each other as we both went through a similar educational process.
TABLE OF CONTENTS

CHAPTER

I.

BACKGROUND OF THE STUDY ................................................................. 1

Introduction ......................................................................................... 1

Identification of the Problem ............................................................... 2

Purpose of the Study and Research Questions ..................................... 3

Significance of the Study ..................................................................... 4

The Professional Significance of the Study .......................................... 5

An Overview of the Methodology ......................................................... 6

The Limitations of the Study ............................................................... 8

Definitions of Key Terms .................................................................. 8

II.

REVIEW OF THE LITERATURE .............................................................. 11

Introduction ......................................................................................... 11

Technology Integration’s Effect on Learning ....................................... 17

Current Use of Technology in the Classroom ...................................... 19

Educational Technology-Specific Gains/Specific Circumstances .......... 34

Educational Technology-More Evidence ............................................ 36

Barriers to the Integration of Educational Technology ...................... 39

Summary and Research Questions .................................................... 41
III.

METHODOLOGY ................................................................................. 46

Methodology .................................................................................. 44
Research Questions ........................................................................ 44
Design .............................................................................................. 44
Sample ............................................................................................... 45
Data Sources ..................................................................................... 49
Procedures ......................................................................................... 50
Data Analysis .................................................................................... 57
Research Bias ................................................................................... 58
Expected Findings ............................................................................ 60
Limitations ........................................................................................ 61
Summary ............................................................................................. 61

IV.

RESULTS ............................................................................................. 62

Introduction ....................................................................................... 62
Responding Participants .................................................................... 62
LoTI Survey Framework and Results ................................................. 63
Personal Computer Use (PCU) Framework ...................................... 68
Current Instructional Practices (CIP) Framework ............................. 72
District Wide Results ....................................................................... 77
Research Questions ......................................................................... 78
Lesson Plan Analysis ....................................................................... 83
Unanticipated Outcomes.................................................................96
Summary..........................................................................................97

V.

SUMMARY........................................................................................100
Introduction......................................................................................100
Discussion of Results.......................................................................100
Conclusions and Recommendations..............................................106

REFERENCES....................................................................................110

APPENDICES

Appendix A: LESSON PLAN TEMPLATE............................................124
Appendix B: ISTE NETS* STANDARDS FOR STUDENTS..................126
Appendix C: SURVEY INSTRUMENT, LETTER OF INTRODUCTION,
AND STEP SHEET PACKET.............................................................128
Appendix D: RUBRIC FOR LESSON PLANS......................................147
Appendix E: JOB DESCRIPTION.......................................................150
Appendix F: INTERVIEW QUESTIONS...............................................153
Appendix G: PERMISSION TO USE SURVEY INSTRUMENT
AND REFERENCES............................................................................155
Appendix H: PERMISSION TO USE ISTE NET*S STANDARDS.........157
LIST OF TABLES

Table 1: Number of Participants by Grade Level……………………………………..47
Table 2: Comparison of Total Survey Mean Scores and Sub-Sample Mean Scores……………………………………..85
Table 3: Spearman correlations among indicators……………………………………94
LIST OF FIGURES

Figure 1:  LoTI Level and Cumulative Percentage of Respondents………………..64
Figure 2:  PCU Level and Cumulative Percentage of Respondents……………….69
Figure 2:  CIP Level and Cumulative Percentage of Respondents……………….73
CHAPTER I

Background of the Study

Introduction

It seems that everywhere you turn today, technology is being used in a new and fascinating way. Technology has grown so diverse in the past 20 years that it has become almost synonymous with change. Technology components are in every facet and phase of our modern day life. From computers to iPods to cell phones to the Internet, modern day students are exposed to a vast array of changing technologies at an ever-increasing pace. Schools are not immune to this influx of changing technology. Students come to school listening to MP3 players while on the phone and surfing the web. They seem to be masters at multitasking. For many, access to the newest and best technologies has become an expectation.

Education institutions are not untouched by the newest technological advancements. There seems to be no end to the number of companies, studies, reports, and salespeople touting the benefits of educational technology in the classroom. It seems that not a day goes by that a newscaster reports the vast educational gains that can be had if technology would simply be used in the classroom. Billions of dollars have been spent on infrastructure, hardware, software, training, and the staff to support these technologies used by teachers in the classroom (Software & Information Industry Association, 2000, The State Educational Technology Directors Association, 2006). In fact, the faith in the Educational Return on Investment (eROI) is so great that many states, including Ohio,
are setting in motion one-to-one computing initiatives hoping for large educational payouts (eTech Ohio, 2007).

Identification of the Problem

The Buckeye School District, not the district’s real name, is an upper-socioeconomic school district that has long prided itself as being at the forefront of education. Standardized state test scores, and state report cards have consistently been equal to, or higher, than comparable school districts around the state. Curricula and programs are constantly scrutinized to assess and make them better. In the early 1990s, there was a multimillion-dollar infusion of monies into educational technology for hardware, software, and teachers to help implement technology into the classroom. For over a decade the on-going program and capital outlay was never fully assessed. This study conducted an assessment of the use of educational technologies in the classroom.

There were many reservations in Buckeye School District on how, if at all, teachers in general were integrating technology into their everyday teaching experiences. With billions of dollars being spent nationally, and millions district wide, on educational technology each year, what evidence was there that educators were integrating educational technology into their everyday lessons? Could it be that educational technology usage by teachers in the classroom was just another thing to cover and to make sure you do in order to justify the monies spent on it? This district had excellent access to modern technologies, but excellent access did not mean that it was used properly or used at all. In this case, access to the best hardware and software was not at issue in this district, but integration and usage of the technologies was less understood.
Purpose of the Study and Research Questions

The purpose of this study was to understand the depth and breadth of how technology was being integrated into the classroom in a well equipped, high socio-economic status (SES) district in Ohio, as well as the expectations of its use by the district’s central office. This study tried to understand if and how technology was being integrated in the classroom and how the teachers and students were using it. It has been a basic assumption in many districts that the millions of dollars spent on educational technology each year is being used in the classroom to enhance and further the educational process. This case study was designed to investigate how, and to what extent, teachers were integrating technology into their instructional practices in the Buckeye City Schools District. There were three basic questions addressed in this case study:

Research Question 1: How is educational technology presently being implemented in the classroom in the general teaching environment?

Research Question 2: What policies and professional development are in place to use these new technologies?

Research Question 3: Do the responses that educators give on educational technology surveys match the actual lessons they are teaching in the classroom? Are teachers integrating educational technology in the classroom? Are students using educational technology in the classroom?

Data were gathered through an on-line survey and supported by sample lesson plans that teachers submitted. A qualitative analysis looking for themes and trends was done. Analysis of the data was done and disaggregated by district and grade level.
Through this analysis of teacher reported qualitative data a picture of instructional practices was discerned.

Significance of the Study

With so much invested in educational technologies, the question is asked, in what way is educational technology currently being used in the classroom? Can it be said with confidence that educational technology does, in fact, help the educational process and it is money well spent? Are teachers, in fact, integrating technology in the classroom or simply giving it lip service to justify the monies spent on it and district expectations for use? Though questions abound, clear answers are not easily had. Few districts across the state have adequately studied technology usage in their district, instead relying on vendor’s studies, insight, and sales pitches as well as newspaper articles and trade magazines.

This study investigated teachers’ usage of educational technologies using the Levels of Technology Integration survey (Learning Quest, Inc., 2008). This survey, backed with teachers’ sample technology-integrated lesson plans, shed some light on technology’s place in the learning environment in this district. As part of the survey instrument, teachers were given a score indicating where they were in technology integration as well as giving them insight as to where they could improve. The district also used this same data for self-assessment of educational technology policies and programs already in place as well as determining areas of need as part of their continuous improvement plan.
The Professional Significance of the Study

The pressure put on teachers to use technology in their classroom is enormous and competition for teachers’ focus is intense. No Child Left Behind (NCLB), Adequate Yearly Progress (AYP), Progress Monitoring (PM), inclusion, Individual Education Plans (IEPs), grades, lesson plans, Professional Learning Communities (PLCs), and the like, coupled with the lack of sufficient planning time, compete for teachers’ limited time and energies. Teachers must pick-and-choose what they focus on and make choices as to what they feel will be most beneficial to their students while balancing their legal and contractual obligations and duties. That delicate balance means that some educators might be inclined to put less energies into initiatives than others, depending upon their personal guiding principles, ideals, and overall school support.

In the recent past there have been many new educational initiatives that have focused on individual student success, none of which has garnered more attention or money spent than that of technology in the classroom (Software & Information Industry Association, 2000, The State Educational Technology Directors Association, 2006). The concept that technology can improve individual student learning has been around for a long time (Moersch, 1999, Papert, 1994). Over the decades, educators have learned to adapt and incorporate the newest theories and ideas into their everyday teaching. Chalk and a blackboard, pencil and paper, overhead projectors, and so forth, were all new at some point and teachers picked and chose what they felt they could integrate based on their teaching style. Teachers were, for the most part, autonomous in how they taught the curriculum and standards given to them. With the introduction of high-stakes testing and the influx of technology, however, there has been a twist. Imagine teachers being forced
into the use of a new technology in their classrooms simply because they were told they had to use it because of the vast amount of monies spent on the hardware and software by the district. Imagine teachers being told they must use this new technology because it might raise test scores. How successful could it be if it did not match up with their current teaching practices or if professional development was an afterthought? Some feel that teachers do not seem to utilize these new technologies in their classrooms as was expected and that educational technology is not the answer to all of the educational system’s problems, but, instead, can be another tool to help the teacher in the classroom (Becker, 1994, Cuban, 2001).

This study sought to help understand how, and to what degree educational technology was being used and integrated in this district’s classrooms. Additionally, it helped individual participants understand how well and how deeply they were integrating technology in their classrooms. The benefit to each survey participant included a confidential evaluation of their own educational technology strengths and weaknesses, as well as tips on how to improve upon them provided by Learning Quest, Inc. The benefit to the school district will include information on how educational technology is currently being utilized as well as an assessment of where professional development in the technology integration arena can be targeted across the district as well as in individual schools.

An Overview of the Methodology

Teachers in the Buckeye School District were invited to take part in a voluntary survey either by my designee or me. My designee, who was trained so that the message
was delivered the same way to each school, or I explained the purpose and voluntary nature of the study. An online survey was then given to the teaching staff in this district. The survey instrument gave a technology integration level and score for each participant and building. Additionally, each participant was asked to submit a sample best-practice lesson plan integrating educational technologies (Appendix A). After two weeks, teachers failing to complete the survey or turn in a lesson plan were sent a reminder e-mail requesting that they complete the survey and send in a lesson plan. Data analysis compared the levels of technology integration, as determined by the survey instrument, with activities described in the sample lesson plans submitted by the teacher. Quantitative data were supplemented with qualitative case study data of the district. Case study data included interviews with technology coordinators and document and artifact collection.

The survey was on-line and the survey data were collected by Learning Quest, Inc. The survey was chosen because it had been tested for both validity and reliability. Learning Quest, Inc. is a not for profit organization whose purpose is to help teachers and schools understand how well they are utilizing educational technologies in the classroom. Their web site is http://www.loticonnection.com/. Participants entered information such as their name, e-mail address, grade and subject, and school, in addition to answering the survey questions. I was the only person to receive and review survey responses and lesson plans with individual identifying information. Qualitative audio taped interviews of central office personnel augmented survey data.
The Limitations of the Study

There were three primary limitations in this study. Being a case study, the first limitation is that the study is not generalizable. This study was a snapshot of what was going on in this district at this time. Second, the teachers turned in a lesson plan after they filled out the survey, and they got to choose what to turn in to me. This means teachers had the opportunity to try to match their lesson plans with what was asked for on the survey. Third, because the survey portion of this study was on line, this means teachers who did not know how to follow technical instructions or did not have the skill level to fill out a survey on line were left out of the study. This may skew the survey results indicating higher than actual integration and skill levels than they may normally show because only more computer literate educator might reply.

Definitions of Key Terms

Access to technology - having the opportunity or means of using up-to-date technologies to enhance the educational process. This includes computer, printers, Internet access, e-mail, and educational and desktop publishing software.

AYP – Average Yearly Progress, as defined by the state in response to NCLB.

BETA Survey – According to the eTech website, “the Biennial Educational Technology Assessment (BETA) is a K-12 public school census comprised of two surveys that collect school district self-reported data regarding technology accessibility and usage in Ohio's public schools. Surveys are:

- Teacher Survey: explores teacher and student use of technology.
- Building Survey: reports technology resources available at the building level.
Completion of the BETA Teacher and Building Surveys are required for districts to be eligible for the following eTech Ohio grants and programs: SchoolNet Plus, Professional Development, Enhancing Education Through Technology (EETT), and Competitive Professional Development Grants” (eTech Ohio, 2007).

*Cross-platform Savvy* – The ability to easily use technologies across both Macintosh and Windows computing structures.

*Differentiated instruction* - Educational instruction that focuses teaching and learning at the individual skill level at which the student is currently performing.

*eROI* - Educational Return on Investment. The educational benefit attributed to the integration and use of technology in the classroom as observed in increased standardized test scores at national, the state and the local levels.

*Educational technology* - Technology used in an educational setting to bolster and enhance the learning processes.

*IEP* – Individual Education Plan, required for students receiving special education services under the Individuals with Disabilities Act.

*PLC* – Professional Learning Community, educators with similar interests and students working together in an ongoing processes of inquiry and action research to get better results for their students. They assume that the key to improvement for students is continued learning for educators (DuFour, 2006).

*Step sheets* – Detailed instructions developed for teachers to follow to complete a technology driven task. They are task specific.
Technology - Any of a variety of digital media including, but not limited to, computers, hardware, software, e-mail, peripheral devices (scanners, printers, flash drives), the Internet, music players, et cetera.

Technology integration - For purposes of this research paper, technology integration is defined as using digital technologies such as computers, the Internet, e-mail, software, digital cameras, and the like, to improve teaching and learning (International Society for Technology in Education, 2008, U. S. Department of Education, 1996).
CHAPTER II

Review of Literature

Introduction

It is generally agreed upon in the popular media that educational technology in the classroom has a positive effect on the educational experience, furthering the educational process, assisting teachers in their teaching, closing the achievement gap, and engaging a broader spectrum of students in their own education (Becker, Kottkamp, Mann, & Shakeshaft, 1999; Bowerman, 2005; Burchett, Cradler, McNabb, & Freeman, 2002; Chapman, & DeBell, 2006). It has been a commonly held belief that educational technology could improve teachers’ instruction and the education of students (Ascione, 2006; Cohen, 1990; McGillivray, 2000a, 2000b). It has also been suggested that educational technology could be a solution for many of education’s current ills and shortcomings (Means, & Olson, 1995; Moersch, 1999; Papert, 1993).

Billions have been spent on infrastructure, hardware, software, training, and the staff to support educational technology use in the classroom. In fact, educational institutions have almost tripled their expenditures on educational technology from $2.1 billion in 1990, to $6.2 billion in 2000, and those expenditures continue to go up (Software & Information Industry Association, 2000; The State Educational Technology Directors Association, 2006). Globally, the k-12 and higher education e-learning market is expected to reach $52.6 billion dollars annually by the year 2010, up from the current $17.5 billion dollars spent annually (Campus Technology, 2007). Through state and local initiatives, student to computer ratios have come down to 5 to 1 (eTech Ohio, 2007).
over the past decade, and one-to-one initiatives are spreading across many states (Apple Computers, Metiri Group, 2006, Penuel, 2006).

Still, with all these educational technology advancements and enhancements, student achievement outcomes have not lived up to the expectations or predictions (Becker, 2000b; Cuban, 1986, 2001; Cuban, Kirkpatrick, & Peck, 2001). Some researchers suggest that teachers do not seem to utilize these new technologies in their classrooms, as was it was expected they would by those touting its use. These researchers suggest that educational technology is not the answer to all of the educational system’s problems, but, instead, can be another tool to help the teacher in the classroom (Becker, 1994, 2000a; Cuban, 2001; Means & Olson, 1995; Wenglinsky, 1998).

With so much time and money invested in these educational technologies, the question must be asked, in what way is educational technology currently being used in the classroom? One measure of academic success, in addition to state mandated testing, is the long-term data from The National Center for Education Statistics (NCES), which is housed within the U.S. Department of Education. Longitudinal mathematics and reading data are less than stellar. Scaled reading scores actually dropped 4 points from a 289 in 1984 to a 284 in 2004; a statistically significant amount. Mathematics scaled scores fair somewhat better by raising 5 points from 302 in 1986 to a 307 in 2004; also a statistically significant amount (NCES, 2008). Although both of these scores were statistically significant, they are far from the vast gains anticipated by many educational prognosticators. With this in mind can it be said with confidence that educational technology does in fact help the educational process, enhancing learning, and it is money well spent? In short, with billions of dollars being spent on educational technology each
year, what evidence is there – if any – that educators across the nation are integrating educational technology into their everyday lessons? Instead, could it be that teachers use educational technologies to help justify the monies spent on it or because they feel they are supposed to be using it? (Cuban, 1998; Kelly & Ringstaff, 2002; Marcinkiewicz, 1994; Means & Olson, 1995; Sandholtz, 2001; Schofield, 1995; Tourangeau, Rips, & Rasinski, 2000).

Access in the classroom to educational technology has continued to soar (Hernández-Ramos, 2005; Software & Information Industry Association, 2000; The State Educational Technology Directors Association, 2006). In fact, in Ohio there was an initiative through SchoolNet and SchoolNet Plus whose focus was to lower student to computer ratios to 5-1. This was done with the belief that this would augment the educational process, with positive educational results including increased test scores and reduced achievement gap between subgroups in standardized testing. Since its launch in 1995, the SchoolNet Plus program has given districts the funds to purchase multimedia computers, related hardware, software, and other services for their public classrooms to obtain the goal of one computer for every five students (eTech, 2007). However, it should be noted that access to these educational technologies is not the same as their proper use and integration into the educational model (Cuban, 2001; Hernández-Ramos, 2005).

It is a tenet in the research on educational technology that teaching a computer or technology skill by itself in a classroom is not the same as integrating it into the educational process (U. S. Department of Education, 1996; International Society for Technology in Education, 2008). Access to the proper technologies and learning how to
use them is a small part of the integration puzzle. The mere use of computer technologies in a lesson not directly related to the concepts being taught does not constitute technology integration. As a whole, and in its simplest form, the literature defines educational technology integration as using digital technologies such as computers, the Internet, e-mail, software, digital cameras, and the like, to improve teaching and learning (U. S. Department of Education, 1996; International Society for Technology in Education, 2008). Educational technology integration is vastly different than teaching simple word processing and spreadsheet skills, or taking students down to a lab to produce slide show presentations. Earle (2002) noted as he spoke of the state of educational technology, “Integration is defined not by the amount or type of technology used, but by how and why it is used.” Integration means that the educational technology skills that are taught must be directly related to the lessons and to the classroom assignments that are given. The technology skills themselves must be brought together in an understandable and systematic model of teaching (Earle, 2002; Eisenberg, & Johnson, 1996, 2002; International Society for Technology in Education, 2008; Moersch, 1999;).

Developed from research, the International Society for Technology in Education (International Society for Technology in Education) developed National Educational Technology Standards (NET Standards). They are a set of internationally recognized, research based technology standards premised on the principle that technology is more than something to do in the classroom, and actually furthers the educational process already happening in the classroom (Appendix A). They effectively broke down the standards into six Performance Indicators for Students. These student indicators are:
1. Creativity and Innovation: Taps student’s ability to apply existing knowledge to new situations using technology. Problem solving.

2. Communication and Collaboration: In short, team work.

3. Research and Information Fluency: Find and use appropriate research and data in processing information and problem solving.

4. Critical Thinking, Problem Solving, and Decision Making: Student-driven critical thinking and problem solving skills including identification of the problem, the necessary process, and tools needed to solve the problem.

5. Digital Citizenship: Students demonstrate a high level of safe, legal, and ethical use of technology behaviors.

6. Technology Operations and Concepts: Students learn and understand how different technologies work and are interconnected.

These indicators are not taught in a vacuum, but each performance indicator works in unison with the state standards to help teach the concepts teachers must already teach. Not all student NETS indicators need to be taught with every lesson, however, a quick look at these standards reveals that most can be taught within almost any given academic standard. Proper integration of educational technologies is occurring when these performance indicators are met.

The literature is in agreement that integration happens when three basic elements are met (Earle, 2002; Eisenberg, & Johnson, 1996, 2002; Moersch, 1999). First, teachers are trained in how to use many different types of technologies in the educational process. This includes on-going professional development, modeling of the desired behavior, training in the use of equipment and its integration. Second, both teachers and students
should be given choices as to which technologies can be used to further their educational process. Teachers and students should have a variety of technologies at their disposal. Both teachers and students would have been given instruction on how to use these technologies before an integrated lesson or project had begun, thus ensuring that the technology of choice is best suited to the lesson or educational project at hand. And lastly, integration is being achieved when both teachers and students understand how to choose and routinely use the proper technology they need for their particular needs (Earle, 2002; Eisenberg, & Johnson, 1996, 2002; Moersch, 1999).

Among the harder to define concepts for this type of educational technology initiative and its implementation is what constitutes a sufficient multimedia computer or related hardware in a classroom? What may be high-end educational technology for one teacher or project may be completely inappropriate for use in another classroom with a parallel lesson. For example, if all teachers in a particular school were given the identical, top of the line hardware from the onset, there is no guarantee that it would be properly used or implemented by teachers and students. Teachers, as well as students, come to the teaching environment with different experiences, pedagogical beliefs, agendas, skill levels, and learning and teaching styles, making it impossible to expect that the educational technology would be immediately used to its maximum educational benefit by everyone. In fact, educational technology is very different today than it was five, ten, or even twenty years ago. High speed Internet, multimedia computers, and peripherals, didn’t even exist when the more senior staff in the district started teaching. Newer educators coming out of college may, or may not, have had a technology course focusing in on how to integrate technology educationally in the classroom. This has
made it hard to know who has had what training and how good, or bad, it was. Given that everyone is at a different level from the onset, what may be sufficient for a novice user may be antiquated for another at a higher skill level (Atkinson, 2004; Becker, 1994, 2000a; Buck, & Horton, 1996; Hernández-Ramos, 2005; Moersch, 1999).

The same can be said for software. Software vendors tend to tout the virtues of their products they are selling, citing their own research for claimed results. However, a recent U.S. Department of Education study has shown that the academic gains garnered by using educational software are marginal at best (U. S. Department of Education, 2007). This study investigated 33 districts, and 439 teachers in a variety of grade levels. It was found that even though teachers were trained in the use of the educational software and had adequate support for it, the academic gains were limited. Similar to simply having access to the best hardware, having access to software does not guarantee academic gains, that it is used properly, or in some cases, that it is used at all. It is the teacher that has the greatest impact on how much a student learns (Atkinson, 2004; Becker, 1994, 2000a; Buck, & Horton, 1996; Moersch, 1999; U. S. Department of Education, 2007).

Technology Integration’s Effect on Learning

Studies of educational technologies’ effectiveness on the educational process have produced mixed findings in several large research studies (Wenglinsky, 1998; U. S. Department of Education, 2007; Strudler, & Wetzel, 1999; Software & Information Industry Association, 2000). However, most research studies have concluded that there is at least some positive benefit from the integration of educational technologies into the
classroom when implemented in certain, specific ways. Some of these benefits are academic in nature and some are related to student self-efficacy and self-confidence. These research studies have been very specific in their focus and their methodologies. The sheer weight of this literature indicates that there is some benefit from access and specific use of these technologies (Software & Information Industry Association, 2000; Strudler, & Wetzel, 1999; Wenglinsky, 1998; U. S. Department of Education, 2007).

For example, a statistical reanalysis of the Programme for International Student Assessment (PISA) data from 2000 found that after extensively controlling for certain variables, such as family background, school characteristics, and the like, there were no statistically significant positive effects on academic achievement for any subgroups from merely having access to computer technologies. However, dependent upon the focused use and nature of those technologies some subgroups benefited from having access and using these computer technologies. Those that did benefit had academic gains that were statistically significant (Bielefeldt, 2005). Although not all subgroups benefited from access to these technologies, what was clear is the nature of the use of the technology to an end. Other studies have delivered similar findings regarding the positive results that can be had through proper use of educational technologies (Durndell, & Haag, 2002; Dwyer, Ringstaff, & Sandholtz, 1997; Kelly, & Ringstaff, 2002; Kulik, 2003; Metiri Group, 2006; Sandholtz, 2001; Software & Information Industry Association, 2000; The State Educational Technology Directors Association, 2006; U.S. Department of Education, 1996; U.S. Department of Education, 2003).

In short, what these studies have found is that, on the whole, when educational technologies are employed in the classroom students remain highly engaged in their
classroom studies that emphasize cross-curricular, project-based lessons. This leads to higher achievement scores than in classrooms that do not integrate educational technologies. Additionally, researchers’ findings have shown similar increases with regard to student motivation (Golan, Korbak, Means & Penuel, 2000; Sølvberg, 2003).

There is additional evidence to support secondary, indirect benefits of integrating educational technology into the classroom. Those benefits include the leveling of the playing field with regard to gender, race, and self-efficacy, and empowerment (Ames, 2003; Bhattacharya, & Oubenaissa-Giardina, 2007; Cooper, 2006; Davis, Leonard, & Sidler, 2005; Horne, 2007; Kay, 2006; Perkins-Gough, 2006; Tsai, & Tsai, 2003). Although most of the literature focuses in on student achievement as measured on standardized tests, gains in these other areas should not be marginalized as they are contributing to the academic process in a basic and foundational way; laying the background knowledge and skills for future learning that is individual to each learner.

Current Use of Technology in the Classroom

Large-scale Implementations

With the large infusion into the classroom of educational technology, most notably multimedia computers, many recent studies have evaluated the impact, if any, it is having. Despite some evidence to the contrary, there are studies that have shown positive, precise educational outcomes when educational technology is applied in a specific, systematic and, thoughtful way. These studies indicate that some districts are on a positive educational path with respect to how they are using their educational technology.
For example, a 10-year long West Virginia study, found that as much as one-third of the academic gains made by that state’s K-6 students could be credited to their Basic Skills/Computer Education (BS/CE) program (Becker, Kottkamp, Mann, & Shakeshaft, 1999). The effective and efficient use of educational technology ushered in significant gains in mathematics, and reading and language arts skills. The program’s objective was to use the technology, in this case personal computers, as “a tool for improving the basic skills and to provide comprehensive teacher training on utilizing computers in the classroom”. They took into account many of the inherent issues that arise in such a project and dealt with them before hand. Issues like the system’s design, teacher and student training, educational technology hardware and software needs, technical support needs, and a means of measurement as the study progressed, were all present and accounted for in this implementation.

It is important to note that the West Virginia study indicated that educational technology could be significantly successful, but only if that educational technology was placed in the hands of highly trained teachers who knew how to be productive with it. This study shows that educational technology can support and further both the basic skills in reading, writing, and mathematics, as well as the students’ capacity to think critically and creatively. It should also be noted that the West Virginia study was shown to be cost-effective, increased socio-economic and gender equity, and was extremely successful in leveling the playing field with respects to opportunity for low-income and rural students, even students without computers at home (Becker, et al., 1999).

For all of this to work, however, the study drew three important conclusions. The first conclusion was that educational technology must be integrated into the instructional
programs, and not taught as an isolated skill. It becomes part of the very fabric of the lesson. The second conclusion was that educational technology was more effective when it was utilized inside the classroom and not in a central location, like a separate computer lab. This way technology was more likely to become part of the teacher’s lessons. And lastly, training that was timely and comprehensive was a key factor in the success of the program. These three factors collectively were essential in the success of the program as a whole (Becker, et al., 1999).

Other programs have shown similar, positive educational results. In 2002, the North Carolina school systems were awarded an Enhancing Education Through Technology (EETT) grant that enabled them to implement a school reform program in 20 of their schools, infusing technology into every aspect of the educational environment. Ten of those schools were Title I schools and ten were comparison schools. Title I schools are schools with high percentages of poor students that receive federal financial assistance to help ensure that all children meet state academic standards. Title I funds can be used to pay for additional academic support, tutors, and other learning opportunities to help low-achieving children meet the demanding curriculum and meet state standards in core subjects. Each school was given $450,000 to fund the hardware, software, personnel, connectivity, and professional development. The EETT grants also supplied them with funds for the hiring of a school level technology facilitator who worked closely with the state-funded school library media coordinator. This provided the foundation of a resource-rich, educational backbone for everyone in each school to utilize (North Carolina Public Schools, 2005).
The schools were free to develop and implement their own technology-rich, educational environments based on the North Carolina Educational Technology Plan and IMPACT, which are the guidelines for their media and technology programs. The IMPACT program model of integrating educational technology into the learning environment was aligned to the International Society for Technology in Education (ISTE) National Education Technology Standards, and Information Power: Building Partnerships for Learning, a set of guidelines for library media specialists (American Library Association & Association for Educational Communications and Technology, 1998). The subject matter addressed in IMPACT was designed to guide and assist work in three areas: learning and teaching, information access, and program administration. Additionally, the IMPACT model illustrated how skills and strategies in collaboration, leadership, and technology can support these efforts. North Carolina Public Schools believe that an important aspect of the IMPACT model was that it is based on the idea of shared leadership. The principal, technology facilitator, and library media coordinator, work in conjunction with one another to provide for the modeling of educational technology integration, provide the professional development, and provide leadership during the change process (International Society for Technology in Education, 2007; North Carolina Public Schools, 2005).

After three years, North Carolina Public Schools began evaluating the effects of the IMPACT model. They found several important results. First, they found that being a transformational leader was important in moving the school towards successfully implementing the IMPACT model. They measured the transformational leadership
practices (Kouzes & Posner, 2003) of these principals with respects to five areas, which in this case included:

1. Challenging the Process: A willing to take risks and question the status quo.
2. Inspiring a Shared Vision: Setting and articulating a clear and energizing vision for other stakeholders to buy into.
3. Enabling Others to Act: Encouraging and engaging in a cooperative decision making process. Giving a ‘say’ to all stakeholders.
5. Encouraging the Heart: Giving positive feedback and recognizing others' accomplishments.

A transformational leadership style shares roles and responsibilities in the decision making process with all the stakeholders. The more a principal was a transformational leader, sharing that decision making process with the other stakeholders, the more likely the school was to successfully move towards the IMPACT model of integrated educational technology. They found that those principals that shared the decision making process with the technology facilitator, library media coordinator, and all teachers, opened avenues for all of these educators to take risks, share experiences and knowledge that they had gained, and in the end be successful in their implementation process (North Carolina Public Schools, 2005). In fact, one of the key commonalities found in the literature in the most successful implementations was a strong leadership style, specifically transformational leadership (Kouzes & Posner, 2003). A lack of transformational leadership from the administration meant failure for the implementation
project regardless of technology accessibility and training (Davidson & Olson, 2003; Diamond, Halverson, & Spillane, 2001; North Carolina Public Schools, 2005; Schmeltzer, 2001; Telem, 2001).

They also recognized the vital importance of staffing each school in this program with both a school library media coordinator and a technology facilitator. Their expertise, support, knowledge, modeling, and consistent roadmap for integration across the schools they brought with them to the classroom were critical for this to work.

And finally, they found that within the first year, the students in the IMPACT schools showed stronger academic gains with respect to those in the comparison schools. The students in the Title I schools usually started behind their comparison school peers, and yet were able to catch up in a year. Generally speaking, the more challenged an IMPACT student was, the more growth they showed, regardless of gender and race (North Carolina Public Schools, 2005).

Project MEET (Massachusetts Empowering Educators with Technology) is yet another example of large scale educational technology implementation with positive outcomes on a statewide scale. The state of Massachusetts used a focused method to implement a five year long, three-tiered systematic approach regarding teaching, support, and policy to integrate educational technology into the classroom to enhance the current educational practices (Botman, Driscoll, & Negroni, 1999; Hubbard, & Nave, 2004). An evaluation at the end of the five-year period garnered generally positive results; Project MEET did accomplish most of its major goals. Although the goal of reaching 85% of the state’s educators for professional development was stated as being achieved, no data were collected to quantify the total number of teachers Project MEET actually reached. The
Indirect impact of the professional development was impressive, and not expected. Educators sharing personal technological experiences, conversations regarding teaching practices and educational technology, technical knowledge and expertise, planning of technology professional development at a building level, and heightened awareness of educational technology integration all played a part in providing extensive professional development whether it was directly or indirectly done (Botman et al., 1999; Hubbard, & Nave, 2004).

An additional goal was to get 50% or more of the educators that received the Project MEET educational technology professional development to become proficient in using it to improve students’ learning within the structure set down by the Massachusetts Curriculum Framework. Over 60% of those educators that received the training implemented an educational technology integrated lesson plan at least once a week. However, without continued technology support and leadership, integration waned over time, although integration and use did not go back to the previous levels before the professional development trainings (Botman et al., 1999; Hubbard, & Nave, 2004).

A final goal of Project MEET was to have educators use assistive technologies (AT) to support access for all students, including those with disabilities, to the state’s curriculum and instruction. Although there were other avenues and instructional professional development learning opportunities given in this area, it was found that educators left the Project MEET trainings with a clearer understanding of the uses of AT technologies, but those educators did not consistently implement them in the classroom. Again, it was found that insufficient follow up and support led to the lack-luster implementation and use of these technologies for this subgroup (Botman et al., 1999;
Hubbard, & Nave, 2004).

There were three important factors that played a role in the success of this project. Those factors were careful design and implementation, the principal’s transformational leadership style, and the ability to provide long-term support to educators in the realm of classroom and infrastructure personnel. As in the other large-scale studies, no one factor was in and of itself the silver bullet to make an execution of an educational technology plan successful. A combination of factors led to success, and the lack of a structured model taking into account all stakeholders needs, both short term and long term, led to failure of all or part of an implementation section (Botman et al., 1999; Hubbard, & Nave, 2004).

A final example of a large-scale implementation of educational technology into the classroom with positive results is the Middle-school Mathematics through Applications Program (MMAP). Funded primarily by the National Science Foundation (NSF), it was started in 1992 as a way to integrate educational technology (i.e. computers and specific computer programs) into the sixth through eighth grade mathematics curriculum to engage students and deepen their understanding and skills in algebra, geometry, statistics, and real world, open-ended problem solving using mathematical expressions and mathematical constructs (Goldman, & Knudsen, n.d.). It is based on a constructivist approach to learning that engages the students’ past experiences and knowledge in the activities and expertise that an engineer, mathematician, scientist, and the like, might employ (Cox, Fields, & Rakes, 2006; Eisenberg, & Johnson, 1996; Goldman, & Knudsen, n.d.; Grant, & Nanjappa, 2003; Howland, Jonassen, Moore, & Marra, 2003). It was integrated into the curriculum of many districts in several states,
including Alaska, California, Florida, Michigan, New York, Oregon, and Washington.

A 1994 survey of 24 MMAP educators and 42 students found positive perceptions of the program by both teachers and students, especially from the typically underserved populations such as those in the following groups: special education, lower socio-economic status, racially diverse, and English as a Second Language (ESL) populations. In 1995, another external evaluation of the MMAP program, this time involving 10 of its original teachers, provided anecdotal evidence that the MMAP program was beneficial to the students’ educational process (Goldman, & Knudsen, n.d.). That particular survey provided evidence that the teachers felt that the MMAP program was quite beneficial to their students as well as the teachers having a positive perception of the program a year later. Results were similar across special education and gender statuses.

A 1997 internal study evaluated videotaped lessons, and reviewed report cards, and school and student test data. Students in the MMAP program, compared with students that had the same teacher in non-MMAP program classes, had higher scores in algebra readiness. Additionally, MMAP students had a one hundred percent passing rate in eighth grade algebra, whereas those not in the MMAP program achieved the school average of a fifty percent passing rate (Goldman, & Knudsen, n.d.).

Small-scale implementations

Not all educational technology initiatives, large or small, are this well thought out, though. In an exploratory study of best educational technology characteristics and practices the findings were less than stellar. Researchers explored the characteristics among the teaching practices of seventeen perceived exemplary educational technology
educators with descriptions of exemplary educational technology users as provided in the literature (Ertmer, Gopalakrishnan, & Ross, 2001). The study encompassed educators from several school district sizes and make–ups. Small town, urban, public, and private districts were all represented. They found that educational technology use, as it was perceived and practiced by the educator, did not match the descriptions of exemplary educational technology use found in the literature.

In general, the literature describes exemplary educational technology educators as possessing six characteristics. The first was having extensive teaching experience. Typically, exemplary educational technology educators had thirteen or more years of teaching experience, on average (Becker, 2000a). This seemingly gave educators the educational background and experience needed to know how to teach students well and then incorporate the tool “educational technology” for the teacher to use in conjunction with their students. Beginning year teachers are typically overwhelmed with a multitude of job responsibilities and learning the ins-and-outs of teaching. Their stress levels are high and the addition of technology in the classroom can be overwhelming (Berger, & Novak, 1991; Jones, McKinney, Quinn, & Strudler, 1999).

Second, the literature indicates that exemplary educational technology users have obtained more advanced degrees and class credits than their peers. This includes masters, doctorates, as well as other educational endorsements, typically technology related. Exemplary technology-using teachers tend to be more seasoned than their younger counterparts, are solidified in their jobs, tend to model the life-long learner attitude that they would have their own students emulate. They have had the time to master teaching, and are furthering their careers (Becker, 2000a; Hadley, & Sheingold, 1993).
A third characteristic of exemplary technology users is that they have had extensive technology training and educational technology experiences. Some of these may be formal and some of these may be quite informal. This would include professional development opportunities put on by the school district, as well as outside classes and inservices that the educator may have taken on their own. Self-education, whether on-line, reading of manuals, or with a colleague, would also be considered here. (Becker, 2000a).

Having a higher confidence level in the use of technology in educational realm is the fourth characteristic. Barriers to integration, such as lack of support, training, or malfunctions did not deter these exemplary technology users. Instead they found ways around the issues and forged ahead in the educational process. They found new and unique ways to use educational technology to enhance the learning environment in their classroom (Ertmer, 1999; Marcinkiewicz, 1994; Sølvberg, 2003).

Access alone to the technologies was not sufficient for these positive gains in achievement. Support for the hardware, software, and infrastructure; on-going and timely professional development; modeling of the desired behaviors, including integration strategies, by the administrators and implementation team; strong transformational leadership; a clear and well defined vision of technology integration; and assessment of teacher teaching, student learning, and class activities were all found in this study to be critical in its successful implementation (Hannafin, & Hill, 1997; Sølvberg, 2003).

The fifth characteristic flows from the fourth; having a higher level of innovativeness in the ways they use educational technologies in their teaching. When confronted with barriers or obstacles in using educational technology, (such as class time, limited access, personal skill level, and the like), they found ways to work around them
and utilized the technologies in new, unique educational ways. Many times the educator would have to learn to use the technology on their own as well as how it could be used to enhance the educational process (Ertmer, 1999; Marcinkiewicz, 1994).

The sixth characteristic is having timely and relevant on-going staff development and on-site support was crucial for success. For exemplary educational technology educators, it was not enough to have a training session here and there. Focused educational technology training and modeling of its use in the classroom on a continuing basis was critical. However, most of the exemplary educational technology users still received their technical expertise with these technologies on their own time, through on-line sources, technical manuals for the hardware and software, and connections with other innovative teachers throughout the world (Becker, 2000a; Ertmer, 1999; Hadley & Sheingold, 1993).

These characteristics were extremely prevalent in each of the ideal technology-using educators who were examined. Collectively, these characteristics bolstered the impact that educational technology can have in the educational process. Together, they formed a solid basis from which educational technology could be used to enhance the education of students.

There is no disputing the commonalities within these studies regarding what works:

1. Access to the technology, software, Internet, and infrastructure.
2. Support for the hardware, software, and infrastructure.
3. On-going and timely professional development.
4. Modeling of the desired behaviors, including integration strategies, by the administrators and implementation team.

5. Strong transformational leadership.

6. A clear and well-defined vision of technology integration.

7. Assessment of teacher teaching, student learning, and class activities.

When these characteristics are employed in specific educational environments, it has been shown that great gains can be seen at all levels of education. For example, in a 1993 study of 170 elementary school educators regarding the factors influencing the use of educational technologies in the classroom, Marcinkiewicz (1994) found many of these characteristics. These research studies, as well as others, give credence to the characteristics of a successful implementation of educational technology, both large and small (Buck, & Horton, 1996; Marcinkiewicz, 1994).

Other examples abound on every level and across the nations. In a long-term study of computer-related control beliefs and motivation, using a sample of 103 lower secondary-school students in Norway, Sølvberg (2003) found a strong, positive relationship between computer integration and personal control beliefs. Integration of educational technologies over one and a half years led to a decrease in students’ failure expectations and a statistically significant increase in students’ confidence in their own academic success. As was consistent with most other studies, the same commonalities used in successful implementations were key to the successes (Atkinson, 2004; Becker, 2000a; Bowerman, 2005; Buck, & Horton, 1996; Etrmer, & Ottenbreit-Leftwich, 2007; Ferdig, 2006; Sølvberg, 2003).
Though most of the research focuses on K-12 teachers’ and students’ use of educational technologies and whether it has a positive effect, there have been recent studies of technology adoption and usage by faculty members at the college level. Sahin and Thompson (2007) found that personal beliefs regarding informational technology sources, collegial support and interaction, and personal use of data analysis tools were significant predictors of the adoption of the educational technologies by the college of education faculty. As a whole, this study’s findings, as well as findings from similar research studies, suggested the importance of technology support networks, and personalized professional development for faculty members (Anderson, Campbell, & Varnhagen, 1998; Sahin, & Thompson, 2007; Strudler, & Wetzel, 1999).

In a different study of higher education professionals, a study looked to a professional development model that infused technology into the teacher education program to address gaps in the curriculum. Noting that faculty on a university level are typically not collaborative, they used technology to address the issue. What they found was that educators who embraced the use of these technologies, became more collaborative, and addressed the gaps in the curriculum using them (Foulger & Williams, 2006). As has been seen at other educational levels, technology leveled the playing field and was able to facilitate the exchange of ideas, concerns and solutions in a non-threatening environment.

Other studies, at all educational levels, found similar results. The commonalities among these studies, when used in concert with one another, show that positive educational results can be had. The focused use of educational technologies in the classroom led to increased self-confidence and motivation, increased sense of personal
control, and an increase in self-efficacy, which, in turn, can lead to positive educational gains (Bong, Choi, & Joo, 2000; Broiher, & Krendl, 1992; Christensen, 2002; Durnell, & Haag, 2002; Torkzadeh, & Van Dyke, 2002).

Additional studies on educational technologies have focused on other outcomes besides motivation and personal control. Debevec, Kashyap, and Shih (2006) found that giving university students in a Promotional Strategy course access to a course web site where they could download Power Point slides for note taking and exam preparation purposes led to some surprising results. They found that students who were both high technology users and low traditional learning methods learners as well as students who were low technology users and high traditional learning methods learners had better attendance records for the class and performed better on the class’s exams.

Further studies at the university level have found relatively similar results and gains given the specific and focused use of educational technologies in different courses. Studies finding specific pieces of educational technology being used, leading to specific and measurable academic gains, abound (Devadoss, & Flotz, 1996; Foulger, & Williams, 2006; Mann, Moores, & Ott, 1990; Yip, 2003). It is important to understand that given these great educational gains that educational technology has shown to bestow upon us in the hands of exemplary educators, it is not a solution to a teacher’s shortcomings or for general educational ills (Becker, 2001; Cuban, Kirkpatrick, & Peck, 2001; Sahin, & Thompson, 2007). Educational technology used as an instructional tool by technology savvy educators, as demonstrated throughout these studies, can actively engage a more diverse section of the student population in their own academic endeavors and lead to higher academic success.
Educational Technology – Specific Gains/Specific Circumstances

Taking into account that some of the research suggests that there are few or no gains that can be had from using educational technologies, the greatest body of the research does show that educational technology can have a positive, educational impact on the teaching and learning process in very specific situations and applications. These findings have been shown at all educational levels. The research suggests that for educational technology to be effective, there needs to be a systematic approach, which includes not only the access to the hardware, software, Internet, and infrastructure, but also a change in the way teachers are trained and teachers and administration do their jobs in their schools (Dwyer, Ringstaff, & Sandholtz, 1997; Fullan, 1995; Means, & Olson, 1995; Strudler, & Wetzel, 1999; Telem, 2001). Attention to easy access, having an administrator that has a transitional leadership style, ongoing and timely professional development, and both technical and curricular support are all critical for change to happen and educational technology integration to be successful (Apple Computers, Metiri Group, 2006; Ausband, 2006; Becker, 1994; Diamond, Halverson, & Spillane, 2001; Dwyer, Ringstaff, & Kelly, 1997; Eisenberg, & Johnson, 2002). That being said, much of the most prominent research giving us this indication lays in very specific research studies showing specific gains in specific circumstances.

For instance, integrating educational technologies into the educational environment has been shown to help level the playing field with respect to gender equity in some cases. For example, in a 2002 research study of 150 Romanian college students (74 female and 76 male) it was found that males had higher computer self-efficacy, lower
anxiety towards and higher use of the Internet, as well as a positive outlook of the Internet than females. Additionally, it was also found that lower Internet use by females in the study was the only variable linked to their lower self-efficacy, higher computer anxiety, and negative attitudes towards the Internet. Increased exposure and use of these technologies led to greater academic gains for all participants in the study, not just the males. The research suggested that the autonomy afforded on the Internet let females take greater educational risks and chances without fear of being ridiculed by male counterparts in what was seen as a predominately male dominated area. This in turn led to greater academic gains (Durndell & Haag, 2002). Other gender and technology studies have found similar leveling of the playing field results across the globe (Ames, 2003; Cooper, 2006; Hannafin, & Hill, 1997; Mayer-Smith, Pedretti, & Woodrow, 2000).

Academic gains when exemplary educators use educational technology in a specific way have been demonstrated in the research at all academic levels and in a variety of different academic areas. Whether it is in large-scale implementations like MMAP and the West Virginia Study, or in small-scale implementations, it is clear that the commonalities among the studies separate an outcome that will produce a positive educational benefit from those that do not. These studies have been fairly consistent in the ways that educational technology needs to be integrated into the classroom to yield these positive results. Although many educators have found noninstructional uses for technologies in their classrooms, such as typing up assignments and e-mail, it is the focused use of educational technologies for instructional purposes that have been shown to increase achievement for all students (Becker, 1994; Becker, 2000b; Becker et al., 1999; Bell, & Tai, 2003; Botman, et al, 1999; Bowerman, 2005; Cuban, 2001; Oates,
Having clear goals and focused professional development regarding educational technologies are all key elements in the integration equation.

In summation, what the research suggests is that an educator well trained in educational technology and its integration picks different pieces of the available technology to use in a particular educational setting based upon the student’s needs and educational circumstances, in order to maximize the educational situation. Essentially, they are finding the right tool for the job at hand.

Educational Technology – More Evidence

However, not all the literature shows such a dramatic, positive impact in the educational process as a whole when educational technology is employed. Some recent research has questioned the validity and findings of many of the educational technology studies and their implementations that show huge gains when technology is employed.

One of the first researchers to question the impact these new educational technologies were having in the classroom was Cuban (Cuban, Kirkpatrick, & Peck, 2001). Cuban and his research team performed a qualitative study regarding the attitudes, assumptions, and use of educational technologies within the classrooms of two technology rich high schools in California’s Silicon Valley. After interviews and observations of 21 teachers and 26 students, the findings clearly demonstrated that mere access to the best available hardware and software rarely led to ubiquitous teacher and student use and integration. When teachers were exposed to a variety of educational technologies, they were likely to maintain their current teaching practice patterns, rather than change them. Interestingly, teachers were much more likely to pick and choose
from these technologies without changing the way in which they taught. They would use and integrate the technologies based on their current teaching styles, their comfort levels, and their attitudes on how important they felt that educational technology was in their classroom (Cuban, Kirkpatrick, & Peck, 2001).

In a later study, Cuban (2001), looked at the use and practices of educational technologies in classrooms at the pre-school, kindergarten, high school, and higher education levels. These schools were, for the most part, very well equipped with labs and classroom computers and Internet access, with special effort being made to support the new technologies as they came on board. Again, they followed a group of teachers and students through their schedules, and interviewed both the teachers and the students, and made qualitative observations. The findings of this expanded study were the same as the original studies at all levels: despite high access to the newest technologies, teachers picked and chose what technologies they would use and integrate, based on their teaching styles, their comfort levels, and their attitudes on the importance of educational technology. Acceptance of the new educational technologies and proper professional development was lacking and inadequate (Cuban, 2001). This is important to note because unlike what has been touted by politicians, reformers, computer companies, and the media, educational technology is not the panacea that everyone has thought it would be, especially if teachers do not change how they teach. In short and again, access to these computers in the classrooms and in labs does not equate to integration by teachers (Becker, 2000b; Cuban, 2001).

There is additional research that illustrates similar results and barriers to technology’s integration. The same population of teachers and students in Santa Clara
County’s Silicon Valley was the subject of an educational technology survey (Hernández-Ramos, 2005). Access to educational technologies in the classroom and in labs including hardware, software, the Internet, infrastructure, and its support was plentiful and not at issue. Quite similar to what was found in earlier studies, teachers’ personality, resistance to change, ability to be flexible, and belief systems about education and technology in the classroom were all factors in whether a teacher would integrate technology into their classroom. In short, teachers had to be willing to change the way they taught with this new technology and needed the technological tools and support, as well as the ongoing, timely professional development to make this happen. Unfortunately, these schools in the heart of Silicon Valley, like many across the nation, came up short, even though they had all plenty of access.

Becker (2001) examined a sample of more than 4,000 fourth through twelfth grade teachers in over 1600 schools, regarding how teachers were actually utilizing educational technology in their classrooms. With the exception of computer education and exploratory specific classes, rarely were educational computer technologies found in classrooms. Few students used these technologies to demonstrate learning, convey ideas, investigate and acquire new information, or critically analyze facts, ideas, and problems (Becker, 2001). Limited access to the technologies in the teachers’ classrooms, as well as in the computer labs was found to play a part in the lack of use in teachers’ classrooms. The findings also illustrated that the teachers’ lack of computer expertise, poor class scheduling, and attitudes toward the role of educational technology in their classrooms all played a part in the minimal use of these technologies, thus giving support to other
research studies (Becker, 2000b, 2001; Cuban, 2001; Cuban, Kirkpatrick, & Peck, 2001; Ertmer, 2005; Hernández-Ramos, 2005).

One of the most critical pieces of research on the effectiveness of educational technology and software in the reading and mathematics classroom comes from a 2007 report to Congress (Institute of Education Sciences, 2007). This study took a look at 10,000 first and fourth grade reading students across 132 schools, as well as sixth and ninth grade mathematics students. In short, the findings indicated that the impact of 15 software products on students’ standardized scores was not statistically significant when compared to classrooms that did not have the same exposure to the software products.

The findings of the study suggest that although teachers received an adequate, albeit brief, training at the start of the school year, ongoing training, modeling of the desired implementations, and support waned over time. This led to a decrease in teachers’ confidence in using the new technology packages, and to a decrease in the proper usage and implementation of that software. Additionally the study found that there was ample access to software and educational technologies, but typically it was without the type of support and leadership that has been seen to work in successful implementations. Employing only one or two of the seven common characteristics of a successful implementation at a time has been shown to doom an educational technology initiative (Becker, 2000a; Berger, & Novak, 1991; Ertmer, 1999; Hadley, & Sheingold, 1993; Jones et al., 1999; Marcinkiewicz, 1994).

Barriers to the Integration of Educational Technology

Although the literature shows much promise for educational technology usage,
there are barriers to its successful implementation and integration into the classroom. Although not every district that is unsuccessful in full implementation of educational technologies into the educational process experiences the same set of implementation barriers (i.e. every district’s situation is unique and different), there are some commonalities in the barriers that have risen to the top in the literature. Although no single barrier is more important than another, careful planning and strategies need to be put into place and assessments talked about before rolling out any new program of this magnitude in order to ensure success.

Regardless of the industry or implementation strategy used, it is a given that issues and barriers to that implementation will be encountered. Although the research looks at a variety of different barriers, they may be classified into two general categories; first-order and second-order barriers (Ertmer, 1999). These two types of barriers impede teachers' technology implementation efforts and they can sabotage the success of the integration process.

First-order barriers are those that are outside the control of the individual educator; they are external and institutional in nature. These first-order barriers include limited or absence of access to the technologies, insufficient planning and collaboration time, and lack of support for both the infrastructure and meaningful professional development.

Second-order barriers are those that the educator has control over; they are internal and personal in nature. These second-order barriers include teachers’ personal pedagogical belief systems, feelings about educational technologies and their usefulness, and teachers’ resistance to change. These are harder to address as they are specific to the
individual. The implementation team needs to give the educators and stakeholders reasons to change their practices and model the desired changes that are expected and preferred. How those that are implementing the change address these first and second-order barriers will be crucial in the process and eventual success (Becker, 1994, 2000a; Ertmer, 1999; Ertmer, 2005; Judson, 2006; Kadijevich, 2006; Sarason, 1971).

Summary and Research Questions

The overall findings are not as cut and dried as they may seem. There is evidence in the literature of large and small-scale implementations that are highly successful, and other large and small implementations that have been abject failures. The key seems to be finding the commonalities among the successful implementations, both large and small, that lead to successful integration and student achievement. As the literature clearly indicates, educational technology can have a positive effect on the educational process especially when implemented in a specific and systematic method. Mere access to educational technology does not indicate that it will be integrated into the very fabric of the teachers’ repertoire. There must be adequate technology and access to be sure, however, in order for the teacher to integrate it into their lessons there must be proper and on-going professional development, modeling of the behavior, and leadership from the highest of offices at the district level. The International Society for Technology in Education (ISTE) developed the National Educational Technology Standards (NET Standards) to address just this. This set of internationally recognized, research based technology standards understands that technology is more than something to do in the classroom, but actually furthers the educational process already happening in the
classroom (Appendix B). By properly incorporating these research based technology standards into the teacher’s lessons, the integration of educational technology can further the educational process enhancing the learning environment.

Today educational technologies are everywhere and teachers must learn and understand technology’s role in the classroom and use all tools at their disposal. Simply giving the technology tools to a teacher does not automatically make them skilled at using them, nor does it ensure that they will learn to use those technology tools on their own. An educational tool is only as good as the person trained in using it. So, teachers must be trained, and hone their skills to a fine edge. It is up to the leadership of an educational technology implementation –large or small - to provide for the on-going training, provide appropriate leadership, as well as the other commonalities we find in a successful implementation. It takes many educational tools to properly educate a child, as each child is different and may require a different tool to help them learn the same lessons as their other peers. Picking the right technology tool to use means that, teachers must have an arsenal of technology to choose from and they must be able to skillfully use it.

As a particular school district considers the use of technology in its classrooms, the implications of the literature and the promise that educational technology holds suggest these research questions:

Research Question 1: How is educational technology presently being implemented in the classroom in the general teaching environment?

Research Question 2: What policies and professional development are in place to use these new technologies?
Research Question 3: Do the responses that educators give on educational technology surveys match the actual lessons they are teaching in the classroom? Are teacher integrating educational technology in the classroom? Are students using educational technology in the classroom?
CHAPTER III

Methodology

The principal purpose of this study was to determine how, and to what degree, teachers in the Buckeye City Schools district were integrating educational technology in their classrooms. This chapter outlines the research methodology used in this study to answer this and related questions.

Research Questions

There were three basic questions addressed in this case study:

Research Question 1: How is educational technology presently being implemented in the classroom in the general teaching environment?

Research Question 2: What policies and professional development are in place to use these new technologies?

Research Question 3: Do the responses that educators give on educational technology surveys match the actual lessons they are teaching in the classroom? Are teacher integrating educational technology in the classroom? Are students using educational technology in the classroom?

Design

The research design was a case study using mixed methods. Quantitative data from an on-line survey were supplemented with lesson plans from teachers and interviews of administrators. The qualitative lesson plan data were compared with the
responses given on the survey. An on-line survey consisting of 50 items was given to the staff in the Buckeye City Schools District (See Appendix C). Sample technology-rich lesson plans were also collected. The on-line survey gave three scores, called levels, for each teacher and building in three areas. First of these levels was the Level of Technology Integration (LoTI) score. This measured the degree to which educational technologies are used in the educational setting. Next, was the level for their Personal Computer Use (PCU). As the name implies, it measures the degree to which a respondent feels comfortable with technology. And the last is the Current Instructional Practices (CIP). The CIP measures the degree to which a respondent’s class is student focused and student involved as opposed to teacher centered and teacher lead.

Quantitative data analysis was correlational between the LoTI and PCU scores; the LoTI and the CIP scores; the CIP and the PCU scores. Support for the quantitative data findings came from analyzing the lesson plans and administrative interviews.

Sample

The Buckeye City Schools District, a pseudonym for the real district, was a large district located in an upper socio-economic suburban community. Its students lived in the city of Buckeye as well as in parts of the surrounding counties. As of 2000, the community had approximately 30,000 residents. The median household income for Buckeye residents was more than double the state median household income of $43,493.

Enrollment had continued to grow for the 30th straight year. There were approximately 20 schools operating. There were approximately 14,000 students enrolled in the district, of which there were 1,000 English Language Learner (ELL) students who
spoke 51 different languages. As of the 2006-2007 school year, per pupil expenditures totaled approximately 20% more than the total state average per pupil expenditures of $9,587, and approximately 20% more than the state average instructional per pupil portion of $5,335.

The Buckeye City Schools had a mission statement posted on their web site’s home page as well as in various handbooks for students and staff that encouraged collaborative working conditions and creative solutions to challenging curriculums. The Instructional Vision of the Buckeye City Schools stated (2008):

We believe that all students can and must learn at high levels of achievement. It is our job to create an environment in our classrooms that results in this high level of performance. We are confident that, with our support and help, students can master challenging academic material and we expect them to do so. We are prepared to work collaboratively with colleagues, students and parents to achieve this shared educational purpose.

It was a basic assumption that access to high-end technology had been superior in this district for more than a decade. In 1993, $24 million dollars were infused into the district to buy computers, software, printers, scanners, and Internet access. Computers were put into academic rooms, labs filled, and a 5-1 computer to student ratio implemented, years before that was the state standard. Because of the high access, it should have been observed that adequate integration of educational technologies into the classroom should have been seen at all grade levels, that individual scores on the survey instrument should have been high in all three areas, and that sample lessons submitted should have correlated closely with the high levels garnered by the survey.
For the purposes of this study, I invited all certified educators from preschool through twelfth grade and all administrators in the district to participate in the survey. Approximately 915 certified teaching staff were made aware of the study and were requested to fill out the voluntary survey and sample technology lesson plans. Of these educators, 28% had their undergraduate degree and 72% had their masters degree or above. The average years of teaching experience in this district was about 13 years. Approximately 60 administrators worked in the 20 schools and the central office. I interviewed three central office administrators of which all directly had educational technology responsibilities as part of their job descriptions. One interviewee was the superintendent designee that supervised all curricular aspects including educational technologies. These three people were chosen due to their intimate knowledge about and responsibility for district technology at the highest levels. It is through their guidance that technology takes the shape that it does for the district.

<table>
<thead>
<tr>
<th>School level</th>
<th>Total number of teachers</th>
<th>Number of teachers participating in study</th>
<th>Percent of teachers participating in study by grade level</th>
<th>Percent of teachers participating in study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>392</td>
<td>40</td>
<td>9.95%</td>
<td>4.37%</td>
</tr>
<tr>
<td>Middle</td>
<td>223</td>
<td>53</td>
<td>23.77%</td>
<td>5.79%</td>
</tr>
<tr>
<td>High</td>
<td>300</td>
<td>43</td>
<td>14.33%</td>
<td>4.70%</td>
</tr>
<tr>
<td>Total</td>
<td>915</td>
<td>136</td>
<td>14.86%</td>
<td></td>
</tr>
</tbody>
</table>

The disparity between the number of on-line surveys that were completed (136) and the number of sample lesson plans received (43) was surprising. Although insight into how educational technologies were being used in the classroom in this district was
gained, the small number of lesson plans received relative to the those that completed the on-line survey made me wonder why so many chose not to submit a sample lesson plan. Respondents to the on-line survey reported hesitancy in submitting a lesson plan due to a possibility that it may be “used for other purposes.” Even after assurances from me that the lessons would only be used for his dissertation and confidentiality would be maintained, the hesitancy remained. Although I didn’t understand the hesitancy at the time, I respected the teachers’ position and collected data from the on-line survey alone for them.

The answer to their tentativeness may lie in a conversation and subsequent letter I had with a central office employee after the study was completed and analysis had begun (Personal communication with Central Office employee, 2008). Evidently, several years back, in conjunction with a vendor, someone else in the district had requested lesson plans of “best practices” within the district to be uploaded into a database. The database was a joint venture with the vendor as they tried to develop an in-house, student information system. Unbeknownst to the district or teachers, these best practice lesson plans were going to be bundled with software the vendor had developed in conjunction with the district. The vendor did this without telling the teachers that the database and best practices were to be sold, and that they had planned on selling those lesson plans for a profit. The profit from the lessons would not have come back to the school district or the teachers. When word of this got back to those teachers that had uploaded their plans, there was a lot of concern as to how those plans were being used and where the money was going. After several years of legal battles, the planned database was dropped. The situation caused a rift in relations between the teachers and the central office staff.
Ultimately, an agreement was reached between the union and the district and formalized in the *Negotiated Agreement*, article 50.4, *Development of Copyright Materials, Media, and Online Projects*, which reads in part:

Any staff member who produces educational materials, media or online projects (for classroom, educational, or professional purposes) … shall maintain full rights for the copyright, and to any royalties or profits resulting from said publication or products. Furthermore, said materials shall be considered the property of the creator, and the District may not use, reproduce, edit, modify, publish or license said materials without a negotiated agreement with its owner. (pg 79)

After analysis of the lesson plans and speaking to many classroom teachers on all levels, I believe the qualitative data garnered in the 43 lesson plans that were turned in are representative of the teachers as a whole, regardless of the reluctance by some teachers regarding turning in lesson plans for evaluation brought on by past actions of a few in the district.

Data Sources

*On-line Survey*

The questionnaire was chosen because it has proven to be both a valid, and reliable survey instrument (Stoltzfus, 2005). The on-line survey instrument consisted of 50 questions and was first tested for reliability in 1998 using Cronbach’s Alpha (Moersch, 1998). A reliability measure of .74 was found for the LoTI portion of the survey, .81 for the PCU portion and .73 for the CIP portion. A subsequent study by Stoltzfus in 2005 found similar very results. Higher-order factor analysis, (coefficient
alpha - communality) was used to determine the validity of the survey instrument. The specificity values that were above error variance (1 – alpha) were determined to be significant in determining the proportion of both unique and reliable variance. Unique variance was greater than the common variance for all first-order factors and as such the survey was determined to be valid (Stoltzfus, 2005).

Lesson Plans

I requested sample technology-rich lessons from the teachers. I made clear that I was looking for best practices lessons where technology was integrated into teaching the state standards. A blank template was made available to them, although they were able to submit plans using their own structures as well. (Appendix A) Provided on the lesson plan template was a section for free response where teachers could write in any comments regarding anything having to do with educational technology, professional development, or concerns they may have had. Only lessons that had proper identifiers on them were scored. No identifiers were made known to the district or anyone else, other than the dissertation committee and myself.

Procedures

As per university policy, prior to beginning the research study, a Human Subjects Review Board (HSRB) application was submitted in March 2008. Approval to conduct the study was subsequently given, committee convened, and the research begun (Appendix G).
Certified teachers and administrators in the district were introduced to the research study and survey in person, whenever possible. Of the 19 buildings, I was able personally to go to all three high schools, all four middle schools, and nine of the twelve elementary schools. Before the visits an e-mail was sent to all teachers in the building stating why the district and researcher were doing the survey, what the survey instrument was, step sheets on how to access it, what was needed in the way of sample lesson plans, and that participation was completely voluntary. I then went to each school and again explained why the district and researcher was doing the survey, what the survey instrument was, how to access it, what was needed in the way of sample lesson plans, and that participation was completely voluntary. Informed consent sheets were handed out at that time and collected. Teachers could think about it and send their informed consent documents to me later. Teachers who could not be at the meeting had step sheets and consent forms put in their mailbox that explained everything that was discussed in the meeting. Step sheets were passed out and e-mailed to all participants in the sample. If teachers did not complete the survey or hand in a lesson plan within two weeks, a reminder e-mail was sent to them, prompting them to turn them in to me. (See Appendix B for e-mail messages, consent forms, and step sheets.)

An on-line quantitative survey called Levels of Technology Integration (LoTI) developed by Learning Quest, Inc. was given to each participant in the study (See Appendix C). Fifty questions, based on the ISTE NETS•S standards, were asked regarding the participant’s access to technology and their integration practices. The survey then generated a score, also called a level, based on the respondent’s answers. The score was broken down into three areas. In general, the higher the participant’s score
in any one particular area on the survey, the more integration practices were reported by the teacher and more ISTE NETS standards were covered. The first of the three areas addressed was the Current Instructional Practices (CIP) level. This area focuses on the methods that teachers use to deliver instruction, how involved the students are in the decision-making process within the classroom, and the degree to which students have any say in the final product they produce to show comprehension. The higher the score, the more student oriented the classroom, and the lower the score the more teacher directed and led the classroom. The second area was Personal Computer Use (PCU). This area addressed the comfort level of the respondents with using educational technologies and ease they felt in integrating it. Questions regarding access to technology, use at home as well as at school, and types of software used were asked. The third area, Level of Technology Implementation (LoTI) assessed the breadth and depth of respondent’s level of integration and curricular support through use of technology.

In addition to the on-line survey, each teacher was asked to supply a sample lesson plan and to fill out a questionnaire about it. (Appendix A) Personal identifiers were used so that individual teachers’ lesson plans and survey results could be compared. These identifiers included respondent’s name and the building in which they taught. Only the dissertation committee and I had knowledge of the personal identifiers given and no identifiers were made available to district administrators.

Lesson plans were evaluated by two research assistants that had no knowledge of the district’s technology infrastructure or policies. Neither evaluator knew the other and neither was associated with the district in any way. I met with each rater individually to discuss and practice using the rubric they would use as they evaluated teacher’s lessons.
I developed a rubric using the 2008 ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students for the raters to use (Appendix D). The ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students is a research based set of international standards developed to help further the educational process and to get students ready for the 21st century skills they will need in a digital world (Appendix B). There are six student indicators of which five were chosen for the rubric.

This rubric was based on the 2008 ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students which also closely paralleled the survey instrument. The most noticeable difference was that the survey instrument was based on an eight point scale (0, 1, 2, 3, 4a, 4b, 5, 6) and the rubric was based on a seven point scale (0, 1, 2, 3, 4, 5, 6). Because the scales were so similar in the content that was assessed, and similarity in scale size (they only differed by one point) to adjust the seven point lesson plan scale to the eight point survey instrument scale as best I could, a simple mathematical adjustment was made. To equate the scales, the ratio of 1:8::x:7 was used. The variable x was calculated to 1.14. This result was used to multiply the lesson plan mean data to get the adjusted score.

Based on the rubric, which also closely paralleled the on-line survey instrument’s indicators and the 2008 ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students, each lesson obtained a score between zero and 6 based on the strength of that standard in the lesson (Appendix D). To make grading easier, the rubric was broken up into three color-coded sections: red for low (0-1), yellow for moderate (2-4), and green for a high (5-6) indication of those standards on the rubric
in each of the 5 areas. Knowing that not all standards may be present in every lesson, a score of n/a was given if that indicator did not fit the lesson plan or standard taught and was not counted in the score. Only if all sub-indicators were not present on an indicator was a score of zero recorded.

There were seven possible scores (zero – 6) for each of the five indicators on the rubric. For grading purposes, they were broken into three basic levels: low, moderate, and high. Each indicator had four sub-indicators (See Appendix D). A low score on a lesson plan (zero – 1) had little to no technology integrated into the lesson. This content lined up closely with survey scores of 0, 1, and a low 2. Typical sample lessons that were turned in at this score included lessons indicating they did not use technology in the classroom; that was scored a zero. A score of one was given for standards in those lessons that attempted to integrate technology, but fell short in most indicators and sub-indicators. An example would be a lesson where students, at any grade, may go to a lab as a group to type up a paper they were doing. Technology is not an integral part of the lesson at this scoring level. Standards are not taught integrating technology tools at this low of score.

A moderate score of two through four was given to those lessons that attempted to have a technology integration component and succeeded in some indicator areas, but fell short overall. This content lined up closely with survey scores of a high 2, 3, and 4a. These lessons include low scoring lessons, a score of two through a low three, such as lessons where the teacher presents a slide show and then has her students mimic a similar slide show using hers as a template. Students are learning how to make a slide show or presentation, but the Performance Indicators such as Creativity and Innovation,
Communication and Collaboration, Research and Information Fluency, Critical Thinking, Problem Solving, and Decision Making just are not there. In short, they are doing technology for technology’s sake.

Higher-end moderate lessons, scores from a high three through four, begin to include a variety of the Performance Indicators. This content lined up closely with survey scores of 4b, and 5. Student control of the learning process begins to be evident through the integration of the technology to learn the state standards and demonstrate knowledge. The use of technology is integral to the learning process. Although not many different indicators are present in the lesson, there are more than in the low-moderate lessons. An example of this type included a lesson where a science teacher at the middle school level had students go to web sites he had already checked out to find and gather information to answer questions in a packet. The information was then presented to the class using a slide show presentation template the teacher had set up. Here, technology is being somewhat integrated in to the classroom as students got to pick and choose what information they should use from the limited sites they were given. The demonstration of knowledge and understanding was locked to a preconceived package dictated by the teacher – a slide show presentation.

A high score of five or six was garnered by those lessons that excelled in integrating most of the Student Performance Indicators. This content lined up closely with a survey score of 6. Those lessons integrated more than three or four standards of the five Performance Indicators and their sub-standards. No lessons in this study were graded this high, although a few had received a five or six in one or two indicator areas. One such lesson, a high school science lesson on biology, gave the students an authentic
problem to investigate, explained all the tools available to them, including both technology and non-technology related tools, put the students into diverse groups based on academic and technology related skill sets, and let them begin their investigations. The end product merely needed to be shared with the class. The technology used to demonstrate learning and achievement - presentation, student made movie, web site, or a variety of other formats - was up to the students’ discretion, with guidance from the teacher.

I practiced with each rater on how to score lessons on the rubric. The lesson plans that were used for the rater’s practice were actual lesson plans turned in by the teachers, but those lessons and their scores were not counted in the final statistical analysis. Once I had practiced with the raters individually and was confident that both raters were competent in assessing the plans, they were given time to rate the lesson plans based on the rubric (Appendix D). Inter-rater reliability was correlated over the entire 43 lessons and a positive Spearman correlation value of .82 was obtained. The raters scored two of the lessons very differently. When those two scores were removed, an inter-rater Spearman correlation of .92 was obtained on the remaining 41 lessons. These strong positive correlations indicated that the inter-rater reliability was quite high and thus the lesson plan scores obtained using this rubric are reliable.

Interviews were conducted with key district level administrators to gather insight on the current use of technology, as well as any significant particular issues that had arisen integrating educational technologies into the classroom. These interviews were semi-structured interviews and were limited to 25-35 minutes due to busy schedules of the administrators. Each interviewee was given the same set of questions and was able to
see and discuss the survey results, although the order in which they were covered varied depending on the direction the interviewee took the discussion based on their particular position and focus. Each interview was transcribed and then they were evaluated for themes using the triangulation process. Triangulation is the process where quantitative data, in this case interview transcripts, are analyzed for corroborating evidence of particular themes based on the qualitative answers given to the interview questions. Member checking of interviews was done for accuracy of quotes and context. This was done to make ensure the accuracy of the themes that bore out during analysis. Common evidence and themes support conclusions made by the researcher about a research question and add to the accuracy and credibility of the conclusions (Creswell, 2005). If common themes and evidence do not arise then either the researcher has asked the wrong questions or there is no agreement among those interviewed regarding the topic being researched. Additionally, policy documents were collected, including job descriptions and organizational charts reflecting who reports to whom.

Data Analysis

I calculated descriptive statistics on the survey data, and prepared graphs for their presentation. Central office staff were interviewed using the same basic set of qualitative questions for each interviewee, using a semi-structured format (Appendix F). I prepared transcripts of the interview data and analyzed them for themes that would help answer the research questions. The teachers’ responses to the open-ended questions on the survey and on the lesson plan template were also analyzed qualitatively. The quantitative data
analysis consisted of calculating Spearman correlations. Teachers’ scores on the LoTI, CPU, and CIP were correlated with lesson plan scores.

Researcher Bias

I have always had high interest in technology and its use to enhance and differentiate the curriculum. My interest in technology began in the mid-1980s when I began to learn basic programming. By the early 1990s, I was one of the first educators in the Buckeye School District to have a computer that was used with students in the classroom. Soon, I was out of the classroom and was providing technology integration professional development and support for teachers across the district. Additionally, I was writing technology manuals, making videos, presenting at other schools and conferences, and the like. I was one of the alpha testers of OS X for Apple. Integration of technology into the classroom has always been at the forefront of everything I have done as an educator. As technology’s role in the classroom expanded in the 1990s, I wrote a personal philosophy on technology’s place in education that closely resembles the tenets of technology integration that researchers now say are the hallmarks of proper integration. I called it “The ‘Ritz’ Philosophy” and in part it reads:

The Instructional Technology Department (Mark Ritzenthaler) believes that for technology instruction to be effective, there must be structure and planning, just like any other project. Teachers need to have a plan when using technology in their classrooms; technology for technologies sake isn’t a reason to use it. It needs to further the educational process. Just about everything can be taught without technology; verbs are verbs and numbers will always be numbers. HOWEVER,
technology can inspire imagination, spark interest and make teachers and students more productive, thus enhancing learning and developing life long learners. By modeling many of the same successful teaching styles and techniques we’ve used in teaching technology, teachers excelled at teaching with technology.

Technology is a tool, and like a tool it is best used by those trained to use it. The best “tool users” are the ones that find a new or different way to use what may be considered an “ordinary tool.” We try to get our teachers to look for that novel way to use an application when teaching their subject matter. They need only to ask themselves, “How will using this technology help me convey my information in a better way to my students? How will it help my audience (students) understand my material better, faster or more in-depth?” These types of questions will focus the direction of each school’s technology plan and likewise each individual teacher’s lesson plans. Finding Africa on a map may show a student where Africa is, but by using various technologies, they can experience Africa.

We recognize that every teacher is at a different level; some come with a lot of technology skills, ability and comfort level, and others, less. The IT staff must identify and contend with these differences. Whole staff instruction may be great for overviews, but does little to advance the usage of technology in the classroom. Just as we look for the teachable moment when instructing students, we must strive to find the teacher teachable moment. We must give them a purpose, and reason to embrace technology. Learning is the common goal for all of us in the classroom and we are trying to develop life long technology learners. Students and teachers alike need variety to keep learning fresh and new. If they
use the same techniques and styles in their teachings, learning becomes unappealing and stunted.

We try to model the behavior we expect out of our teachers, make sure we are clear as to the educational outcome we want them to have at the end of the project, lesson, and above all, learn with the students. There is no way one person can be an absolute expert on everything in technology. Teachers should not be afraid to learn from their students and show them that even the teacher is a life long learner.

By mid1999, I was cross-platform savvy, being the only Apple Certified Technician in the district, as well as having training and experience with all the Windows platforms. In the early 2000s, the district’s technology focus went away from technology integration with, among other decisions, the elimination of the Technology Academy classes. A variety of other interests surfaced and took precedence. This change in direction bothered me, and I decided to do research into it to see how technology was being implemented to help students learn.

Expected Findings

Because the technology focus in this district has moved over the last several years from focus on integration to other areas (primarily data manipulation for teachers such as grades, attendance, and specialized data bases), I expected the data to come out in a particular way. After the data were collected, I expected the data to show that the scores on the LoTI were in the lower region. Also, the scores on the CIP would be low. However, because teachers are required to use technology to manipulate and access data,
I expected the scores on the PCU section of the survey would be high. Additionally, I expected that the sample lesson plans would not closely match what teachers reported they are doing in their classes, as educational technology professional development in the district has waned over the years. Finally, I believed the qualitative data from administrators would not match what is currently being done in the classroom.

Limitations

There were two primary limitations in this study. Being a case study, the first limitation is that the study is not generalizable. This study is a snapshot of what was going on in this district at this time. Secondly, the teachers turned in a lesson plan after they filled out the survey, and they got to choose what to turn in to me. This means teachers had the opportunity to try to match their lesson plans with what was asked for on the survey.

Summary

This chapter presented the methods used to study the extent that technology was currently being integrated in the classrooms in Buckeye City Schools. A quantitative survey was given to certificated teaching staff from preschool through twelfth grade. Quantitative methodologies were used to analyze the survey data. Interviews were conducted of the administrators in the district and sample lesson plan in which educational technology was integrated were collected from teachers. A qualitative methodology was used to analyze the interviews and lesson plans. The next chapter presents the statistical results and analysis of these data.
CHAPTER IV

Results

Introduction

This chapter reports the results of the on-line survey and the analysis of sample lesson plans. Comparisons of the 43 lesson plans and the respondents’ self-assessment on the on-line survey were interpreted. Underlying themes garnered from the free response section of the lesson plans and survey results were also examined. Qualitative interviews with several key administrators were conducted to lend additional support and insight on the present and future role of educational technologies in the school system and its expectations.

Responding Participants

An on-line survey and lesson plan request was sent out to 915 certified teachers in the Buckeye City Schools District. Teachers needed only to have students and be a certified teacher in the district to be in the possible respondent pool. A total of 136 on-line surveys were filled out and 43 lesson plans were turned in. Forty-three of the 136 on-line survey respondents were from the high school level (9-12), 55 respondents from the middle school level (6-8), and 38 from the elementary level (1-5). The district wide response rate to the technology survey was 14.86%. One elementary school had no respondents, and two schools, also elementary schools, had one respondent each. The district wide response rate to the lesson plan request was 4.48%, which was 30.15% of all those who filled out an on-line survey.
The on-line LoTI survey was used to gain insight about each participant’s level of technology implementation and integration in his or her respective classroom environment. It measured three important criteria associated with integrating and implementing the instructional use of educational technology in their classrooms. The questionnaire helped generate a personal profile for each participant as well as a district profile in the three domains discussed below.

LoTI Survey Framework and Results

The Levels of Technology Implementation (LoTI): The various LoTI levels approximate the amount each educator supports and implements the use of educational technologies in a classroom setting to further the educational process. The district modal level was three, Infusion, on the LoTI section of the on-line survey, with most respondents at the lower end of the scale (Figure 1). There are eight levels, each with their own characteristics. The eight LoTI Levels listed below were developed by Learning Quest, Inc., who also developed the survey instrument (Learning Quest, Inc., 2008).
Figure 1. LoTI level and cumulative percentage of respondents.

<table>
<thead>
<tr>
<th>LoTI Level</th>
<th>Cumulative Percent</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7.35%</td>
<td>7.35%</td>
</tr>
<tr>
<td>1</td>
<td>28.68%</td>
<td>21.32%</td>
</tr>
<tr>
<td>2</td>
<td>38.24%</td>
<td>9.56%</td>
</tr>
<tr>
<td>3</td>
<td>68.38%</td>
<td>30.15%</td>
</tr>
<tr>
<td>4a</td>
<td>87.50%</td>
<td>19.12%</td>
</tr>
<tr>
<td>4b</td>
<td>95.59%</td>
<td>8.09%</td>
</tr>
<tr>
<td>5</td>
<td>100.00%</td>
<td>4.41%</td>
</tr>
<tr>
<td>6</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Level 0 – Nonuse: An apparent lack of access to educational technology-based tools exists (e.g. computers, printers, scanners, peripherals, appropriate software, etc.) or a lack of time and professional development to pursue electronic technology implementation is expressed. Accessible educational technology is primarily text-based (e.g. photocopies, dittos, a chalkboard, an overhead projector, dry erase boards, etc). Ten of the 136 respondents indicated their LoTI level as being zero; nonuse. This represents 7.35% of all respondents district wide.

Level 1 - Awareness: Technology-based tools are either something done outside the classroom teacher’s realm (e.g. technology education labs, learning to type programs,
computer-based pull-out programs, word processing labs), or something used by the classroom teacher for teacher productivity (e.g., attendance, using grade book programs, email, or using the Internet), and used to embellish teacher directed lessons and lectures (e.g. PowerPoint presentations, slide shows, electronic guided notes). Twenty-nine respondents indicated their LoTI level being Level One; Awareness. This represents 21.32% of all respondents district wide.

Level 2 - Exploration: Technology-based tools augment teachers’ present instructional practices (e.g. tutorials on CD or the Internet, educational games, basic skill applications). Teachers may also supplement their practices with selected multimedia and web-based projects (e.g. Internet-based research papers, informational multimedia speeches and presentations) at the basic knowledge or comprehension level. The technology being used is employed either as extensions, enrichment, or technology-based tools, and bolsters lower skill development relating to the content being studied. Thirteen of the district’s respondents indicated they were at this level. This constitutes 9.56% of the total respondents.

Level 3 - Infusion: Technology tools such as databases, spreadsheets and graphing programs, multimedia applications, desktop publishing, and Internet are used to supplement selected instructional moments (e.g. investigations using spreadsheets and graphs to analyze results), or multimedia and web-based projects that analyze, synthesize, and evaluate at higher levels. Emphasis is placed on higher cognitive processes and comprehensive treatment of the subject matter using a variety of thinking strategies (e.g. problem-solving, decision-making, reflective thinking, experimentation, scientific
inquiry). Forty-one respondents placed themselves at this LoTI level, Infusion. This represents 30.15% of all respondents.

Level 4a - Mechanical Integration: Technology-based tools begin to be integrated in an unthinking or mechanical way. Students do get a wider context for their understanding of the concepts, themes, and processes they are studying. There is a heavy reliance on prepackaged CDs, DVDs, and other materials and outside resources (e.g. assistance from other teachers, Technology Specialists (TS), Teacher on Special Assignment (TOSA), or Technology Support Teachers (TST)), and interventions (e.g. professional development workshops) that help the teacher in the daily management of required standards and curriculum. Educational technology (e.g. multimedia, desktop publishing, databases, spreadsheets, word processing, the Internet, etc.) is perceived as a tool to identify and solve real problems as perceived by the students directly related to the overall theme or concept being studied. Emphasis is placed on the student’s actions and on higher level thinking skills. Twenty-six of the 136 respondents indicated that they were at the LoTI level 4a, mechanical integration. This represented 19.12% of all respondents.

Level 4b - Routine Integration: Technology-based tools are integrated in a routine way that provides a broad context for students' understanding of the concepts, themes, and processes they are studying at the time. Teachers can readily design and implement learning experiences (e.g., lessons, thematic units, experiences) that empower students to learn and show what they have learned in a variety of different ways. Students are able to identify and solve thematic problems using the concepts they have learned using the available technology (e.g., multimedia applications, Internet, build web
pages, databases, spreadsheets, word processing, desktop publishing, etc.) with little or no assistance. Emphasis is placed on students’ actions and on issues that require higher level thinking skills. Eleven of the 136 respondents indicated that they were at this level on the LoTI survey; routine integration. This represented 8.09% of the total number of respondents district wide.

Level 5 - Expansion: At this level technology use and access is extended beyond the classroom walls. Teachers actively use applications and networking from other schools, businesses, governmental agencies, and the like (e.g., contacting NASA to establish a link to an orbiting space shuttle via internet, electronic fieldtrips, etc.). Additionally, research institutions, and universities may be contacted to expand student learning opportunities and experiences such as problem solving, issues and their resolutions, and student-centered learning regarding a major academic theme or concept. Educational technology tools used in the learning environment are now appropriate with the diversity, inventiveness, and spontaneity of the teacher's student-centered approach to teaching and learning, and the students' level of critical thinking (e.g. analysis, synthesis, assessment). Six teachers placed themselves at this LoTI level. This accounted for 4.41% of the total district wide response rate to this section of the LoTI section of the survey.

Level 6 - Refinement: At this level, technology is used in the classroom as part of the process, and as a product (e.g., invention, patent, new software design), and as a tool for students to find solutions to real world problems and issues of interest to them. There is no longer a glaring division between classroom instruction and educational technology use in the classroom. Educational technology offers a transparent and seamless method
for information gathering, problem-solving, product development and assessment. Students have easy access and complete understanding of a large collection of age and skill level appropriate technology based tools to accomplish their task. The curriculum and instructional method is entirely learner based. The content and standards addressed emerge based on the students’ interests, needs, and goals, and are supported by unlimited access to the most current software applications and infrastructure available. No respondent indicated they were at this level, refinement, which is the highest possible level to achieve.

Personal Computer Use (PCU) Framework

The PCU addresses each teacher’s personal comfort level and proficiency level with using technologies. The district wide modal level was 5, on the PCU section of the on-line survey with most respondents skewed towards the high end (Figure 2). There are eight levels, on a scale from 0 to 7, each with their own characteristics. The levels below were developed by Learning Quest, Inc., who also developed the survey instrument (Learning Quest, Inc., 2008).
Figure 2. PCU level and cumulative percentage of respondents.

<table>
<thead>
<tr>
<th>PCU Level</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Percent</td>
<td>0.00%</td>
<td>0.00%</td>
<td>1.36%</td>
<td>10.92%</td>
<td>32.24%</td>
<td>66.06%</td>
<td>91.06%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Percent</td>
<td>0.00%</td>
<td>0.00%</td>
<td>1.36%</td>
<td>9.56%</td>
<td>21.32%</td>
<td>33.82%</td>
<td>25.00%</td>
<td>9.56%</td>
</tr>
</tbody>
</table>

PCU Intensity Level 0: A PCU Level 0 indicates that the teacher does not feel comfortable or have the skill level to use computers for personal use. These teachers tend to use whiteboards, overhead projectors, chalkboards, and traditional paper and pencil activities rather than using computers and other technologies for conveying curriculum or classroom management tasks. No respondent indicated they were at this level, zero, which is the lowest level they could have reported.

PCU Intensity Level 1: A PCU Intensity Level 1 indicates that the teacher demonstrates little skill with using computers for personal use. Teachers at this level tend to have a general awareness of various technology-related tools such as word
processors, spreadsheets, and the Internet, but generally are not using them. Again, no respondents in the district indicated they were at this level.

PCU Intensity Level 2: At this level the teacher demonstrates little to moderate skill level with using computers for personal use. Teachers at this level may occasionally browse the Internet, use e-mail, or use a word processing program, however they may not have the confidence or skill to troubleshoot simple technology problems and malfunctions as they arise. The use of computers may be limited to a grade book, e-mail, or attendance program. One respondent indicated they were at this level, which represented 1.36% of all respondents.

PCU Intensity Level 3: Teachers will demonstrate moderate skills with computers and technologies for personal use when they are at this level. Teachers may be regular users of selected applications, such as Internet browsers, e-mail, or word processing programs. They may also feel comfortable troubleshooting simple technology problems such as rebooting a machine that has frozen or pressing the "Back" button on an Internet browser. Most teachers, however, still rely on technology support staff and others to assist them with any more complicated troubleshooting issues. Thirteen respondents indicated they were at this PCU level. This represents 9.56% of all respondents.

PCU Intensity Level 4: At level 4 the teacher will display a moderate to high skill level with using computers and technologies for personal use. Teachers at this level routinely use a broader range of software applications including multimedia (e.g. Microsoft PowerPoint), desktop publishing, spreadsheets, and simple database applications. Teachers usually are able to troubleshoot simple hardware, software, and
peripheral problems without assistance from technology support staff or others. Twenty-nine respondents signified that they were at this level, which accounts for 21.32% of the total.

PCU Intensity Level 5: A teacher at a level 5 competence will demonstrate a high skill level with using computers for personal use. Teachers at this level are routinely able to use the computer and peripherals to create their own web pages, produce sophisticated multimedia products, and effortlessly use common productivity applications (e.g. Microsoft Excel, Word, FileMaker Pro), desktop publishing software, and web-based tools. They are also able to easily and confidently troubleshoot most hardware, software, and peripheral problems without assistance from technology support staff or others. Forty-six respondents indicated they were at this level. This represents 33.82% of all respondents district wide.

PCU Intensity Level 6: A teacher that has gotten to this level demonstrates a high to extremely high skill level with using computers and technologies for personal use. Teachers at this level are experienced in the use of most, if not all, multimedia, productivity, desktop publishing, and web-based applications they have at their disposal. They are typically the troubleshooters that other teachers turn to for assistance and sometimes seek some sort of technology certification for achieving selected technology related skill sets. Thirty-four of those surveyed indicated they were at a level 6. This is a full 25% of the total respondents.

PCU Intensity Level 7: A teacher at this level will demonstrate an extremely high skill level with using computers and technologies for personal use. Teachers at this level are expert computer users, troubleshooters, and technology coaches. These teachers
typically are involved in training others on a variety of technology-related tasks, applications, and hardware use. They are also typically involved in electronic bulletin boards and support groups from around the world that allow them access to answers for all technology-based inquiries they may have. Thirteen respondents indicated they were at this level of competence. This represents 9.56% of all respondents.

Current Instructional Practices (CIP) Framework

Current Instructional Practices (CIP) addresses each teacher’s personal implementation of instructional practices with regard to a student-centered or student-based curriculum. The district modal level was 4, with the majority of scores in the upper half of the scale (Figure 3). There are eight levels within this framework, zero through 7, each with their own characteristics. The levels below were developed by Learning Quest, Inc., who also developed the survey instrument (Learning Quest, Inc., 2008).
CIP Level 0: A Level 0 means that one or more of the survey statements or choices regarding their current instructional practices in the classroom did not apply to them. Four respondents fell into this level. That represented 2.94% of the total respondents.

CIP Intensity Level 1: At CIP Level 1, the teacher’s current instructional practices align exclusively with a subject matter, and a teacher-led approach to teaching and learning. Teaching strategies tend to lean toward lectures and teacher presentations. Curriculum materials are aligned to specific content standards that serve as the focus for student learning. Activities for learning tend to be sequential and uniform for all students. Assessment methods focus on traditional measures such as essays, quizzes,
short-answers, and true-or-false questions. Students’ projects tend to be teacher-directed in terms of project outcomes as well as requirements for project completion. Four respondents fell into this level as well. This accounted for an additional 2.94% of all respondents.

CIP Intensity Level 2: The teachers at a Level 2 support instructional practices consistent with a subject matter based approach, but the teaching and learning of it is at a higher level of intensity and commitment. Educational strategies still tend to lean toward lectures and teacher-centered presentations. Curriculum materials aligned to specific content standards serve as the focus for student learning. Learning activities still tend to be sequential and uniform for all students. Assessment methods focus on traditional measures such as essays, quizzes, short-answers, or true-or-false questions. Students’ projects tend to be teacher-directed in terms of identifying project outcomes as well as requirements for project completion. Six respondents indicated they were at this level. That represented 4.41% of the total.

CIP Intensity Level 3: At CIP Level 3, the teacher supports instructional practices that are somewhat aligned with a subject matter based approach to teaching and learning. Practices still tend to be characterized by sequential and uniform learning activities for all students, teacher-directed presentations, and the use of traditional assessment strategies. The teacher, however, may also support the use of student directed assignments and projects that provide opportunities for students to determine the look and makeup of a final product based on specific content standards set forth by the teacher. Twenty-four respondents indicated they were at a level 3. This represented 17.65% of all district wide respondents.
CIP Intensity Level 4: At CIP Level 4, the teacher may now feel comfortable supporting and using a subject-based or learning-based instructional method with the content being addressed. In this subject-matter-based approach, learning activities tend to be sequential, student projects tend to be uniform for all students, lectures and teacher directed presentations are still typically use traditional assessment methods such as multiple choice tests and essays. In a learner-based approach, learning activities are diversified and based mostly on student questions. The teacher serves more as a co-learner and facilitator in the classroom. Student projects are primarily student directed, and the use of alternative assessment strategies including performance-based assessments, peer reviews, and student reflections are typical. Forty-one respondents indicated they were at this level. That is 30.15% of all respondents.

CIP Intensity Level 5: At Level 5, the teacher’s instructional practices tend to lean more toward a learner-based approach. The important content in the standards emerges based on the students’ personal needs to know and understand as they attempt to research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching methods used in the learning environment are diversified and driven by students and their questions. Both students and teachers are involved in devising appropriate assessment instruments (e.g. rubrics, performance-based assessments, journals, peer reviews, reflections) by which the students’ performance will be assessed. However, the use of teacher-directed activities (e.g. lectures, presentations, teacher-directed projects) may emerge based on the content being studied and at the desired level of student understanding. Thirty-eight of those surveyed indicated they were at this level. That represents 27.94% of the total.
CIP Intensity Level 6: Similar to a CIP Level 7, the teachers at a CIP Level 6 support instructional practices that are learner based, but not at the same intensity or commitment as at Level 7. The essential content embedded in the standards emerges based on students’ needs to know and understand as they attempt to research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching strategies used in the learning environment are varied and driven by students’ questions. Students, teacher facilitators, and occasionally parents, are all involved in developing appropriate assessment instruments (e.g., e-portfolios, web pages, performance-based journals, peer reviews, self-reflections) by which student performance will be assessed. Seventeen respondents indicated they were at level 6 CIP. This represents 12.50% of the total respondents.

CIP Intensity Level 7: At the highest level, CIP Level 7, the teacher’s current instructional practices align exclusively and widely with a learner-based method to teaching and learning. The essential content embedded in the standards emerges based on students’ needs to know and understand as they research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching methods used in the learning environment are diversified and driven primarily by student questions. Students, teachers, and occasionally parents are all involved in devising appropriate assessment instruments (e.g., e-portfolios, web pages, performance-based, journals, peer reviews, self-reflections) by which student performance will be assessed to a very deep degree. Two respondents representing 1.47% of all who took the on-line survey district wide report they were at this level.
District Wide Results

When it came to the frequency that educators used computers, 96.32% of the respondents reported that they use technology daily. This was not surprising to me knowing the extent that respondents are required to use e-mail, productivity databases, attendance programs, the state student information system, and grading programs. Based on the low mean LoTI score of Level 3, this was not indicative of use and integration of educational technologies in students’ educational situations. A total of 68.38% of the participants were clustered in the lowest levels of the LoTI framework (Level 3 or below) and tended to focus technology use on their own productivity rather than high-level instructional strategies with students. Only 17 respondents were at, or above, the target technology LoTI Level of 4b – Routine Integration. This represents 12.50% of the total respondents. This indicates the use of district technologies for teacher productivity and district-required technology-based initiatives. The low LoTI level of 3, but high PCU level of 5, indicates that there has been little crossover from teacher knowledge of how to use technology to teachers’ integration of it in the classroom.

A majority of respondents (55.88%) indicated that they have had less than ten hours of technology-related training in the past five years. An additional 25.74% of the respondents indicated that they have received eleven to twenty hours of technology related training in the last five years. In total, a full 81.62% of respondents have indicated twenty or fewer hours of training in the last five years. This closely parallels the number of respondents at a LoTI level of 4a or below (87.50%). Given the number of certified technology specialists (9) and certified technology support teachers (6) the district has out in the 19 campuses it encompasses, it was surprising to see the low
number of staff training hours over the last 5 years and the high number of educators below the LoTI Level 4b. Certified technology support teacher (TST) and technology specialist (TS) job descriptions indicate their role as being one of modeling and training how to integrate educational technologies. However, 81.62% of respondents indicate that technology training is actually happening at best on average four hours per year. This includes teacher productivity trainings as well as any educational technology integration trainings.

There were a number of obstacles that were cited by respondents as impediments to technology integration. Fifty-eight percent of respondents reported that the greatest obstacle to further the use of technology in their instructional practices was time to learn, practice and plan. An additional 22% of the respondents indicated a lack of access to technology for groups of their students, such as little access to labs and few working computers in the classroom, lack of software, and the like, even though 100% of respondents indicated they had access to these technologies earlier in the survey! Another 8% of the respondents specifically cited a lack of professional development opportunities. In short, time, group access to technologies, and professional development opportunities led the list of barriers to successful educational technology integration.

Research Questions

It has been a basic assumption in many districts that the millions of dollars spent on educational technology each year is being used in the classroom to enhance and further the educational process. This case study has been designed to investigate how
and to what extent teachers are integrating technology into their instructional practices in the Buckeye City Schools District.

**Research Question One**

Research question 1 stated: How is educational technology presently being implemented in the classroom in the general teaching environment? To answer this question, data were gathered through the on-line LoTI survey and sample lesson plans. Through this analysis of teacher reported quantitative and qualitative data a picture of instructional practices was discerned.

The mean LoTI score was a three, which is the Infusion level. This indicates that technology-based tools including databases, spreadsheets, desktop publishing, and the Internet are used to complement certain instructional events focused at the analysis, synthesis, and assessment levels. A variety of critical thinking skill strategies are also employed. This score represents a basic level of implementation and a minimal integration of educational technologies. A full 68.38% of respondents are at, or below, a LoTI score of Level 3. A LoTI target goal of a mean of Level 4b for districts is suggested, based on the National Technology Standards (NETS) and the Technology Standards for School Administrators (TSSA) (International Society for Technology in Education, 2008). The respondents in this study indicated that 87.50% of them are at or below the 4a level. One of the clear themes reported by the teachers was the lack of time to learn, practice the basics, and train. Many respondents conveyed a lack of professional development, learning opportunities, and time to plan to integrate as barriers to successful integration and implementation of educational technologies. Selected comments that
illustrate the majority of the respondents’ concerns regarding lack of time, professional development, and training included:

- **Respondent 4:** As Lib. Med. Specialist, I am concerned that I am not getting training in the latest technology and its use by our students. Media literally is their world in so many ways, and I’m concerned we’re not addressing it or keeping up.

- **Respondent 5:** I want to include more, but in order to be up to date I would like to see more district workshops with a hands on approach to trying out new technology.

- **Respondent 6:** I am often frustrated when using technology because I am not as good troubleshooting Apple products as I am in the PC world. I also run into a lot of restricted sites at school which I understand, but am still frustrated by.

- **Respondent 8:** I do not use tech. Because I only have 1 outdated computer in my room. Poor training, lack of understanding.

- **Respondent 9:** I believe we have a tremendous amount of technological resources in this district, but I wish we had more time to learn how to use and apply them in our classrooms.

- **Respondent 13:** I feel like I only have efficient skills in e-mail and word processing. I’d like some basic training on how to be more effective and savvy.

Not all responses were this glum when it came to the minimal use of educational technologies being integrated into the classroom. Twelve and a half percent of the
respondents were at or above the target LoTI goal of Level 4b as defined by the National Technology Standards (NETS) and the Technology Standards for School Administrators (TSSA) (International Society for Technology in Education, 2008). Although they are by far the minority, their use of educational technologies is readily apparent and integrated into their educational environment. Selected comments that illustrate how some of the respondents at or above the target LoTI level of 4b are using educational technologies included:

- Respondent 2: This website is an excellent source and I use it daily with my students for enrichment, retention and remediation.


- Respondent 15: The Dynavox is the only way one of our students uses for communication. She can express needs like drink of water, bathroom break as well as choosing a free time activity like a “movie” or “songs.” Classroom teachers need more assistance and training to adopt programs.

Intellatools is also a computer software program we use on our student computers for them to use where they can be successful since they only have to touch a picture in order for a song to play - ex: “wheels on the bus” this allows for student to independently entertain themselves. This is a super technological tool for very low functioning students. Smartboard is another method for student interaction and instant gratification for students - they touch a picture with a “pen” and the screen interacts with them.
Given that the district LoTI score was in the lower half of the scale, I expected the PCU score to also be in the lower range. Surprisingly, the mean PCU score was a Level 5, and the scores were skewed to the higher levels of the scale as a whole. This level indicates a fairly high skill level in using computers and technology for personal use. Participants at this level are able to create web pages, multimedia projects, and effortlessly use common productivity applications. They are also confident in their abilities to troubleshoot most hardware, software, and peripheral problems without assistance from technology support staff or other teachers and students.

Additionally, the mean CIP score was a level 4. This means participants may feel comfortable supporting or implementing either a subject matter or learning–based approach to instruction. These approaches tend to be sequential, uniform for all students, use lectures or teacher directed presentations as the norm, and tend to be traditional in their evaluation strategies. Again, as is indicated by the LoTI score, this is a very basic level of inclusion of technology into the common practices of the teacher’s instructional practices.

Based on the statistical observations above, it seems that although teachers have a fairly high competency with technology as a whole as evidenced by the high PCU score, it is not being integrated into the classroom to any great degree, as evidenced by the low LoTI score. When the LoTI and PCU are correlated the Spearman correlation computes to a .507. Though not an overly strong positive correlation, it may indicate that those who are integrating technology do have the skill level to do it. There are pockets of those who integrate technologies into their teaching environment, but they are by far in the minority. There seems to be little crossover from the high personal computing skill level,
as evidenced by the high PCU, to classroom integration, as evidenced by the low LoTI level. In short, technology is being used by teachers to help with teacher’s productivity (technology tools including teacher databases, student information systems like the Data Assessment for Student Learning (DASL) student information system, attendance, and grading) and to supplement some educational experiences by incorporating simple spreadsheets, desktop publishing, and the Internet at a basic level using traditional methods, analysis, synthesis, and assessments.

*Lesson Plan Analysis*

In addition to the online survey, teachers were asked to turn in sample best practices lesson plans that showed technology being used and integrated into the classroom. They submitted forty-three complete and valid lessons. Lesson plans were evaluated by two research assistants who had no knowledge of the district’s technology infrastructure or policies. Each spent approximately one hour with me reviewing the rubric as well as the NETS*ISTE standards (See Appendix B & D). Neither evaluator knew the other and neither was associated with the district in any way. I met with each inter-rate individually to discuss and practice using the rubric they would use as they evaluated teacher’s lessons. A rubric based on the 2008 ISTE National Educational Technology Standards (NETS*S) and Performance Indicators for Students was used. (Appendix B) The ISTE National Educational Technology Standards (NETS*S) and Performance Indicators for Students is a research based set of national standards developed to help further the educational process and to get students ready for the 21st
century skills they will need in a digital world. There are six student indicators of which five were chosen for the rubric.

Based on the rubric, which also closely paralleled the survey instrument’s indicators, each lesson obtained a score between zero and 6 based on the strength of that standard in the lesson. (Appendix D) To make grading easier, the rubric was broken up into three color-coded sections: red for low (0-1), yellow for moderate (2-4), and green for a high (5-6) indication of those standards on the rubric in each of the 5 areas. Knowing that not all standards may be present in every lesson, a score of n/a was given if that indicator did not fit the lesson plan and was not counted in the score. Only if all indicators were not present was a score of zero was recorded for the lesson.

Once I had practiced with the raters individually and was confident that both raters were competent in assessing the plans, they were given time to rate them on the rubric. Inter-rater reliability was correlated over the entire 43 lessons and a positive Spearman correlational value of .82 was obtained. The raters disagreed on two of the lessons. When those two scores were removed, an inter-rater Spearman correlation of .92 was obtained on the remaining 41 lessons. These strong positive correlations indicated to me that the inter-rater reliability was quite high and thus the lesson plan scores obtained using this rubric are reliable.
Table 2
Comparison of Total Survey Mean Scores and Sub-Sample Mean Scores

<table>
<thead>
<tr>
<th></th>
<th>n=136</th>
<th>n=43</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoTI</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>PCU</td>
<td>5</td>
<td>5.14</td>
</tr>
<tr>
<td>CIP</td>
<td>4</td>
<td>4.42</td>
</tr>
</tbody>
</table>

Additionally, I compared the survey scores of the entire sample of 136 with the survey scores of the 43 sub-sample scores of those that also turned in the lesson plans. (Table 2) This was done to see if the results on the survey sub-sample were similar to the sample as a whole. This would help indicate whether the sub-sample scores were indicative of the sample of the whole or not. The scores were surprising close. In fact, the scores were almost identical, indicating that the sub-sample is indeed representative of the whole sample.

The lesson plan mean was a 1.25 on a 7-point scale that goes from 0 through 6. Based on the LoTI result of a 3 on an 8-point scale, it was expected that the lesson plans would have scored higher. Adjusting for the differences in the two scales, the lesson plans mean was a 1.43 on the LoTI 8-point scale. This means that the lesson plans were rated in the lower LoTI range between a Level 1 (Awareness) and a Level 2 (Exploration). These low levels indicate that teachers believe that technology is either something done outside the classroom teacher’s realm or that technology simply augments a teacher’s present instructional practices. This is far below the target of a Level 4b (Routine Integration) where educational technology tools are integrated routinely and provides a broad context for students' understanding of the concepts, themes, and processes they are studying at the time.
Research Question Two

Research question 2 stated: What policies and professional development are in place to use these new technologies?

Easy access to educational technologies had been the norm in this district since 1993. Teachers had easy access to computer labs, computers in the classroom for teachers and students, the Internet, and a variety of peripheral devices, and e-mail for over 15 years. At the beginning of the implementation of the technologies in the schools in 1993, technology support teachers were put in place to provide the technical and professional development support the integration of these technologies. Research has indicated that the support function is critical to the success of the implementation of technologies in the classroom (Ertmer, 1999). A qualitative analysis of interviews with key individuals in technology leadership positions as well as the Technology Support Teachers’ job descriptions, helped provide a clear picture of the professional development opportunities these individuals are providing. The 16 district Technology Support Teachers’ (TST) and Technology Specialists’ (TS) job description included, among other responsibilities, the modeling and integrating of technology best practices into everyday teaching and lesson planning, and collecting evidence of successful technology integration. TSTs and TSs were there to help teachers use and become competent in the use of educational technologies (Technology Support Teacher Job Description, 2007, Appendix E).

One hundred and thirty-six respondents, representing 100% percent of those that filled out the survey, indicated they have access to computers and educational technologies for instructional purposes. However, 19.85% of the respondents indicated a
lack of access to technology for their students, such as access to labs, few working computers in the classroom, lack of software, and the like. This seeming disparity in access to technologies was not unexpected. With a full 68.38% of respondents at or below a LoTI score of Level 3, it was to be expected that those educators would be doing whole class projects, whole class technology instruction, or having all students using the Internet at the same time. If they were unable to get enough seats in a lab. It would not be surprising that the lesson would not include technology. Educators were not trained on how to properly integrate the few computers they had in their classrooms as evidenced by the low LoTI scores, and the low number of technology training hours. The LoTI score of Level 3 indicates that integration was not being achieved to a high degree. In fact, a Level 3 score represents a very basic level of implementation and minimal integration.

Selected comments that illustrate the majority of the respondents’ concerns regarding lack of access, time and training included

- Respondent 3: Having moved from middle school to elementary, I feel I have taken a giant step back in time. The access isn’t the same, people are intimidated by technology and have little time to pursue it on their own.
- Respondent 4: We need training and support.
- Respondent 12: Teachers NEED training on Mac software available to them.

As one teacher commented to me, “There is so much that I don’t understand, that I don’t know what questions or training to even ask for!” (Personal communication with teacher).
I interviewed key central office administrators to gain an administrative perspective on the results. As a whole, they were not surprised by the results. The central office administrators that were interviewed did not comment on the role of the TSTs and TSs too much other than to indicate that the TST and TS responsibilities were related to the job descriptions and were to model and integrate the use of educational technology best practices into everyday teaching and lesson planning. They were there to support teachers and to help them use and become competent in the use of educational technologies, and break/fix duties were secondary. However, one central office administrator did acknowledge that many of the 16 TSTs and TSs were doing a lot more break/fix than they would like to see. Each TST and TS reported to their own principal in a building. Each principal could have had a different way in which they used their TST or TS. This would explain why central office personnel did not comment on what was going on in the field other than pointing out the job description, as each school may have been utilizing TSTs and TSs in a different way. A centralized, coordinated set of objectives for the use of technology in the classroom did not exist other than the job descriptions.

Although educational technology and the training for its integration was a focus in the distant past, government mandates and other obstacles had blocked full realization of technology’s potential. All administrative interviewees indicated that great advances were made during the large influx of monies into technology 15 years before, but recently other initiatives and government mandates had taken precedence, such as No Child Left Behind (NCLB), the new district math program, Adequate Yearly Progress (AYP), data
management, and others, and educational technology classroom integration had faded into the background. Selected comments that illustrate the change in focus included:

- **Respondent A:** For a long time we were out there on the leading edge, we were the first ones to get large infusions of dollars to buy networks, build networks, to get computers. We even funded staff development through a series of grants and initiatives in the late 90s. We were the leader and many school districts took a look at what we were doing… Today, I wouldn’t necessarily consider us to being on the booming edge on anything. We are actually to the point where I think we are barely holding on. We had some leaner years on funding, we’ve had to make some significant cutbacks. I think access is still maintained at a pretty good level in that process but one of the things that has suffered is our staffing. We’ve consistently had reduction in staff over the last four years in the area of technology and our technology professional development; it’s on and off to darn nearly non-existent today.

- **Respondent C:** We’ve spent over the past 7-8 years a great deal of emphasis because of No Child Left Behind, and the new mandates being put on educators (Adequate Yearly Progress (AYP), Progress Monitoring (PM), inclusion, Individual Education Plans (IEPs)). I think it’s taken away some of the things that previously were more of a focus…. There are only so many hours in a day, there is only so much energy that they can exert on trying to get things done for their classrooms. … Clearly there is conversation about what are the key components that we need to train on;
we’ve got continual competing interests. When technology first came on, there were relatively few competing interests versus where we are today…. There is clearly less time for technology and there is less time as a whole in that we continue to restructure how professional development is done.

Central office administrators conveyed that they believed there was change coming and firmly believed that TSTs and TSs should have been actively modeling and integrating educational technology into the classrooms in their respective schools.

Selected comments that illustrate the majority of the administrative staff perspective on the role and performance of the TSs and TSTs included:

- Respondent A: In our bi-weekly technology department meetings, [a curriculum person] will be there to represent elementary [technology] interests and [a different curriculum person] will be there to represent secondary [technology] interests in educational integration. Again, we still are not getting that single point person, but at least we are getting more people at the table to talk about the directions we need to go.

- Respondent B: There is theory and then there is practice too…. They really wanted the instructional technology teachers to be instructional support staff and try to stay away from the break/fix part of it. They really wanted the classified technicians to really handle the break/fix so that the TSTs could focus on the instructional support, making technology integrated with the academic content standards; that was the theory behind it all. We did write the job description primarily based on that. When it
comes right down to practice the teachers experiencing a technical difficulty, they want it fixed now. There is a technology support teacher in the building, they are going to go to that person because that is what their job used to be, as you know, they are going to help, if they can fix it, they are going to fix it. So in practice, I don’t think that that is 100% doable…. You need a person who knows education, who knows teaching, who knows kids, who also knows the technical side of it too. I think if we can get a good balance there, I think the models will work, but I think it will take a couple of years to get that balance.

- Respondent C: It is an ongoing assessment an ongoing planning piece with the players. That is going to be crucial as we go forward. We sit down with the players and say, okay, what are the big snags here? What is right and what is wrong? Were we fixed? But also it can’t be that we change the game every year. We’ve got to get some longevity into what we are doing.

One of the more enlightening points to come out in an interview was the fact that all of the TSTs and TSs report only to their principal. For some elementary TSTs that travel between buildings, that can mean that they are reporting to up to three different principals, and that does not include any central office person. As respondent A put it:

… at the middle school level, our technology support specialists all report to their building principals, they do not report to anybody at central office, and the high school staff do not report to anybody except their principals. Again, there is no coordinated effort helping these people figure out what the best use of their time
is or what the needs of their staff are. We often thought that every two years when we got the Biennial Educational Technology Assessment (BETA) survey results from e-Tech, that we would be able to sit down with these people and analyze the results from their particular buildings and sit back with the principals and design professional development to help improve those situations, but that is not the way it occurred. We can’t even get people to sit down and look at the BETA scores.

Respondent A was clear that a coordinated effort was needed to get a clear and consistent form of professional development out to teachers, and that there needed to be one person coordinating the effort. “There has to be ‘a buck stops here’ person at the top. Someone in the curriculum department who has technology as a major component of their job, not just another duty as assigned.” Having principals decide what was the best use of their technology staff and delivering professional development was not working. This is clearly evident by the low LoTI scores as well as the low lesson plan scores.

Respondent B: This past year there was a single contact person for the TSTs K-12. It is different though, at each level. The elementary is spread very thin, we have one TST to three buildings so there was one supervisor and evaluator. Rather than reporting to three different building principals they reported directly to the supervisor and collaborated with the principals. At the middle school and high school level there is a one to one correspondent so it made more sense for the those technology support teachers to report directly to the building principals. So the building principals took the lead on all of their work. The supervisor actually just met with the middle school people a few times, high school staff pretty
infrequently, they were mostly given direction by their building principals as to specific needs to their building. Clearly there is a disconnect between the integration expectations of the district as expressed through job descriptions and what is truly happening in the classroom.

Research Question Three

Research question 3 stated: Do the responses that educators give on educational technology surveys match the actual lessons they are teaching in the classroom? Are teachers integrating educational technology in the classroom? Are students using educational technology in the classroom?

One hundred and thirty six educators filled out the on-line survey in its entirety. Of those 136 educators, 43 also completed and turned in lesson plans that had an educational technology component. I made it clear that they were looking for exemplary uses of technology integration in the classroom; “best practices” lesson plans showing technology integration. As such, I expected the lesson plans to score higher than the district mean of a LoTI Level 3. Quite unexpectedly, the mean of these lesson plans came in at an equivalent LoTI score of a 1.43. At this level, half way between the Awareness Level and the Exploration Level, teachers tend to view technology integration as something done outside the classroom or at best as a way to augment current lessons. This was far below the low district mean of a LoTI Level 3 and represents only the most rudimentary use of technology integration.

Observing a district PCU mean of Level 5 on the on-line survey, I expected the lesson plans to have scored much higher. A Level 5 indicates a fairly high degree of
knowledge and use of technology for personal use. I would have expected that these skills would have been more prevalent in the lessons teachers turned in to me as best practices than the teachers’ mean LoTI equivalent score of a 1.43 indicates. The lack of crossover from personal use to classroom integration again may indicate that teachers are unsure of what integration looks like, and how to integrate technology into the classroom. The articulated barriers to educational technology’s use by teachers included the lack of time, training, and professional development would seemingly account for this disparity. Teachers who were not properly trained in educational technology’s integration would not know what it looked like and would formulate their own opinions on what constituted ‘good’ integration, which may or may not be based on accepted technology standards and practices.

Table 3

<table>
<thead>
<tr>
<th></th>
<th>LoTI</th>
<th>PCU</th>
<th>CIP</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoTI</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCU</td>
<td>0.507</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIP</td>
<td>0.611</td>
<td>0.558</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>0.086</td>
<td>0.004</td>
<td>0.069</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Spearman correlations were calculated comparing the components of the on-line survey and the lesson plan ratings to assess any relationships among them. None of the resulting correlations was particularly strong (Table 2). The two relationships that had the strongest correlations were the correlation between the CIP and the LoTI (.611), and the correlation between CIP and the PCU (.558). Neither of these correlations was strong. It might be expected that the strongest correlation would be between the CIP and
LoTI. The higher a teacher would score on the CIP, the more students would have control over how they learn, including the demonstration of what they have learned using educational technologies. This modest positive correlation of .611 indicates a relationship, but not a very strong one in this district.

The same can be said of the correlational relationship between the CIP and the PCU. A .558 correlational value is not strong at all. However, as the PCU score goes up, it makes sense that teachers would incorporate their own new knowledge and skills into their teaching and learning practices, making available to their students all tools at their disposal, including educational technologies. Although there is a modest correlation in this district, teachers did not seem to be integrating their personal computing knowledge into their classes. Teachers rated themselves fairly high on the PCU and yet that did not correlate very strongly with the CIP indicating minimal crossover from knowledge on how to use technologies and using it in the classroom.

The most surprising correlations were the lesson plans rating correlated to the LoTI (.086), the PCU (.004), and the CIP (.069) (Table 2). There was no relationship among them at all. This was quite surprising as I had expected there to be at least a mild correlation between the lesson plans and at least one or two of the areas that the on-line survey assessed. However, the lack of relationship is consistent with Cuban’s findings that indicated that access to even the best technologies does not necessarily mean that teachers are integrating it or know how to (Cuban, et al., 2001).

Another surprising correlational result was the correlation between PCU and the LoTI. This is where I thought I would get the strongest relationship. The correlation value of .507 between the PCU and the LoTI indicates that there is some level of
relationship between personal computing knowledge and technology integration into the curriculum, although, again, it was a modest correlation. I had expected that those that knew how to use the technology for personal reasons would be integrating it into their respective classrooms. However, much like the literature suggests, without ongoing and timely professional development, modeling the way, etc., integration into the curriculum just doesn’t happen (Becker, 2000a; Ertmer, 1999; Hadley & Sheingold, 1993).

Unanticipated Outcomes

An unanticipated outcome was the reluctance and resistance to the on-line survey and lesson plan request by the 16 district Technology Support Teachers (TST) and Technology Specialists (TS). Their job description included, among other responsibilities, the modeling and integrating of technology best practices into everyday teaching and lesson planning, and collecting evidence of successful technology integration. They could have turned in any lesson that they worked on by themselves, with a classroom teacher, or one they collected from a teacher to show evidence of technology integration, yet not one lesson plan was turned in, even after repeated requests.

Additionally, only one Technology Specialist completed the on-line survey. In e-mails and conversations with several TS and TSTs it was expressed that the on-line survey and lesson plan “… seems to not really apply to me,” even though they taught a class and had direct contact with students (Personal e-mail with a TST). Another claimed, “I tried last week and it would not allow me to open it up,” and “I couldn't get on so I finally gave up,” even though the website log showed that it was never down, or
had any issues (Personal e-mail with a TST). Both the job descriptions and my conversations with several TSTs articulated the same idea of supporting teachers. However, their reluctance to take the on-line survey and failure to be able to produce one lesson plan they created with a teacher or on their own, as well as the disparity between the LoTI score and the PCU score indicates that the area of TST involvement in the classroom probably needs to be investigated more in depth. This is especially true since 94.12% of the respondents indicated that they believe technology is relevant in their instructional setting. I could only speculate from the conversations I had with the TSs and TSTs that most of their time is spent doing other technology related functions than assisting in the integration of educational technologies in the classroom.

**Summary**

Approximately 68.38% of respondents were in the lower portion of the LoTI scale and a full 87.50% of respondents were below the target LoTI level of 4b. This indicates a huge disparity between the articulated position by many TSTs I have spoken with in the district and actual integration in the classroom. Clearly, access was not an issue as one-hundred percent of all respondents indicated that access was adequate, although not always available for whole class projects, when they wished it.

Though the articulated function of the TSTs in both the job descriptions and through conversations with them was to model and integrate educational technologies into the classroom environment, the assumption that it was happening is inconsistent with the data. In fact, job descriptions were even written to take into account the need for professional development by eliminating break/fix duties and hiring certificated teaching
staff to fill TST and TS positions. This is borne out in the high PCU scores that indicate that respondents were able to troubleshoot most issues themselves. Indeed, the data clearly show that integration of technology into the educational setting had not been achieved to any significant degree. After 15 years since the large infusion of money, access and training for educational technology, only 12.50% of the respondents were at any significant amount of technology integration.

The high PCU levels and low LoTI levels seems to support the idea of a lack of professional development for technology integration into the classroom. Additionally, if self reported PCU was accurate, why do the TSTs and TSs constantly indicate that there is a huge need for break/fix and troubleshooting? When discussing job duties one TST actually lowered his head and shook it saying, “[I]t seems that [troubleshooting] is all I do.” In conversations with central office administrators, TSTs and TSs, two possible reasons for this came to light. First, the TSTs and TSs are on the front line so their easy access to teachers and past history of fix and repair make it easy and natural for teacher to go to them when there is an issue. When interviewing Respondent C from central office regarding the break/fix duties of the TSTs and TSs similar feeling were expressed:

I think [TSTs and TSs] are out often with people and when things break there is a relationship they are in with these buildings. Many of them are full time and at the same buildings all the time. I think there are just so many relationships built there and they know the personalities. So if Sally has something going on and I know Sally’s level maybe is not so comfortable with getting on, I jump in and do it…. I think it is that we have a relatively new model and we just have good people and they just want to try and help anyway and time that they can.
The second reason could be the hierarchical structure the TSTs and TSs actually work in. In all three high schools, both middle schools and up until the year of this research, all TSTs and TSs reported to their respective school principal. The principal had final say as to what these people did. The central office personnel gave hints and tips to try to keep everyone on the same page, but the TSTs and TSs ultimately reported to their principals and did what they said to do. In the elementary case, this means that if they were in two or three different schools, they TST could easily be doing things 3 different ways; duplicating efforts, as well as implementing things differently than how the central office may wish or had intended.
CHAPTER V

Summary

Introduction

This chapter will report the conclusions from this research study of teachers who responded to the educational technology survey instrument as well as conclusions from interviews with central office personnel. A discussion of the results of the study, interpretation of the results, relationship of the current study to previous research, implications for further research, and conclusions and recommendations will be presented.

Discussion of Results

Clearly, one of the overall themes to bear out in both the qualitative and quantitative data is the lack of high-quality professional development that teachers are asking for and is for proper integration of technology into the classroom (Hubbard, & Nave, 2004). Although the job descriptions for the Technology Support Teachers (TSTs) and Technology Specialists (TSs) indicate that professional development should be occurring and is the largest part of the job description, the low LoTI scores, the even lower lesson plan scores, and the qualitative responses gathered indicate that it is not consistently happening. Other factors out of the TST and TS’s control play into this issue. Included among these issues are how the TSTs and TSs are being spread too thinly among buildings, having multiple administrators for them to please or report to, the fact that there is no one central office person whose job it is to solely work with educational
technology integration into the curriculum, and a lack of a central focus from the district office leaving each building to their own agendas. This has left buildings deciphering on their own what they need to do with the personnel they have and how, or even if, educational technology integration professional development will be done.

Based on the low LoTI and lesson plan data compared to the PCU data, it was also clear that there was very little crossover from the relatively high personal computer use (PCU) score and the integration of those skills into instruction. If integration of technology was not happening in the classroom, what was going on in the schools? Earlier I mentioned that when I was discussing job duties with one TST, he actually lowered his head and shook it saying, “[I]t seems that [troubleshooting] is all I do,” even though it was not part of the general job description other than “Other duties as assigned” (Appendix E). Teachers were not required by anyone to integrate technology into the classroom instruction. Instead teachers were required to use e-mail and an on-line grade book. Some schools additionally required teachers to input data into school wide databases. However the vast majority of these database systems were school specific making it difficult for teachers that were in more than one building to find the same data in differently built databases. In short, there was no clear direction coming down from the central office as there was no one person whose job it was to solely direct educational technology. Buildings were left on their own to develop and deliver proper and timely professional development and to monitor it.

To help ease this issue for the TSTs and TSs, so they can develop proper and time professional development, I suggest eliminating break/fix duties from the job description, including from the “Other duties as assigned,” and making it solely under the break/fix
department already at our central office. This would free up these talented, certified
teachers and give them time to develop high quality professional development, plan
lessons with teachers, and model the integration skills in the classroom with the teachers.
This, in turn, would boost the integration of technology in the classroom as well as
achievement scores.

However, if Buckeye were to leave break/fix duties as a major part of the daily
routine of the TSs and TSTs, whether explicit or implied, then they would continue to
waste a significant amount of time and district money per year. If you consider that these
Buckeye School District teachers are certified staff that make almost three times the
amount as a Buckeye School District classified person that can do the same break/fix job,
then you could save two-thirds of the pay with no decrease in services to teachers by
replacing certificated educators with the classified staff (Respondent A). Additionally,
when you add in the fact that the classified personnel in the technology department are
trained in break/fix whereas the certified teachers are trained in education, it makes sense
to eliminate the break/fix duties from the TSTs and TSs’ duties to free them up for other
professional development duties. These duties are already spelled out in the job
descriptions of the TSs and TSTs so you would be clarifying their assignments not
detracting from them.

Additionally, if Buckeye would like to continue the practice of having people on-
site for break/fix issues on the school level, it would make more sense to replace them
with classified employees that make two-thirds less in salary and benefits and are also
better trained in the break/fix realm; it is their expertise. In this scenario, based on the
replacement of 16 TSTs and TSs with classified staff, there would be an annual savings
of approximately $1,000,000 per year. This doesn’t include the increased service to the
teachers since the TSTs and TSs would be replaced with higher qualified and better-
trained staff in the break/fix realm.

*Interpretation of Results*

In a staff meeting that I happened to be at in early 2008, the subject of technology
standards for teachers and students came up as well as the integration of technology into
the classroom. The TST leading the meeting stated the “We (Buckeye Middle School)
incorporate all the technology standards into one class – Technology Education – so
teachers don’t need to be concerned with them.” They went on to say that, “It is up to the
teachers to hit all the technology standards (if they want to) without professional
development, and next year technology will stay just the way it is now.” This statement
was indicative of how set in their ways some TSTs and TSs were in their approach to
technology education. Their autonomy and reporting only to their principal indicated
that no unified coordinated effort is being made in the area of technology integration.
TSTs and TSs were getting caught up in the minutia of everyday break/fix and focus of
the administrator of the building at which they work. These competing interests made it
difficult to be on the same page with regards to technology integration since the central
office can only suggest what is going on in each building.

Change is difficult. It took this district years to get to where it is now: little to no
educational technology professional development, TSs and TSTs reporting to several
different principals who may have different ideas and foci for the same technology
integrator, and having no point person for the curricular side of educational technology.
As evidenced by survey answers and qualitative responses, teachers would like to have TSs, TSTs and principals change their present focus on fix and repair, and provide more educational technology professional development and modeling the behavior they want the classroom teacher to use in the classroom. As one teacher put it succinctly to me and it bears repeating, “There is so much that I don’t understand, that I don’t know what questions or training to even ask for!” (Personal communication with teacher). Certified teachers were highered for these jobs years ago “because they could give good, professional development to the teachers. They know their staffs” (Respondent A). If professional development is no longer happening in the classrooms by these staff members, then it makes sense to absorb them back into the classrooms and replace them with classified employees at an annual savings of approximately $1,000,000 annually. Teachers clearly want and need technology professional development, but the data clearly shows that those wants and needs are not being filled.

Educational technologies can make a teacher more productive and give students multiple avenues to learn and show proficiencies (Eisenberg, & Johnson, 1996; Goldman, & Knudsen, n.d). Earlier research has shown that technologies, when properly utilized, can further the educational process (Hubbard, & Nave, 2004). However, as Cuban (1998) has shown in his research, access to the technologies does not mean that the educators will integrate it into the classroom. Many factors as to why there was no crossover from being proficient at using technology to integrating it come into play. This district had shown a fairly high level of personal computer use with a PCU of Level 5, and virtually universal access to new technologies. However, the very low LoTI score of 3 and the even lower lesson plan scores indicate that there was a disconnect between
personal computer knowledge and how to integrate it into the classroom. This disconnect could be heard in the responses on the lesson plans. As a group, respondents articulated the need and desire for more professional training. Since the PCU was so high, this indicates that they wanted to see professional development focus on classroom integration.

Relationship of Current Study to Previous Research

This case study moves forward the research in integrating educational technology in the classroom. The findings in this study confirm similar findings in previous studies, which indicate that technology is not being used to its fullest extent (Becker, 1994, 2000a; Cuban, et al., 2001; Means & Olson, 1995). Although access to the newest technologies in Buckeye School District were adequate with plenty of lab computers and several computers per classroom, it identified many of the same first- and second-order barriers hindering full integration of educational technologies for a variety of reasons (Ertmer, 1999). First-order barriers (barriers outside the control of the teacher) I found included insufficient planning and collaboration time, and lack of support and meaningful professional development.

Few second-order barriers (barriers the teacher has control over because they are internal and personal in nature) were found. These second-order barriers include teachers’ personal pedagogical belief systems, feelings about educational technologies and their usefulness, and teachers’ resistance to change. Although these are harder to address, as they are specific to the individual, most respondents indicated that they felt that they needed and wanted more professional development, time, and support – all
which are first order barriers. How the technology integration leader chooses to address these first- and second–order barriers is crucial in the process and eventual success of technology’s integration. As such, the lack of accounting for the first-order barriers resulted in the lack of success of educational technologies integration in this district, similar to many districts that fail in integrating technology (Becker, 1994, 2000a; Ertmer, 1999, 2005; Judson, 2006; Kadijevich, 2006; Sarason, 1971).

This study was unique in that it found that the lack of a central point person in technology, as well as the number of people TSs and TSTs must report to, lack of meaningful professional development, limited time to tryout and plan technology-rich lessons, clearly hindered technology integration advancement in the district.

**Implications for further research**

This study needs to be replicated with a larger sample of respondents and in a different school setting. Though the use of an on-line survey gives anonymity to the subjects, it has been my experience that subjects typically rate themselves higher than they actually may be. In addition, the best practices lesson samples help illustrate how the educator is actually implementing the technologies with their students.

**Conclusions and Recommendations**

The current structure and job duties, whether those job duties are expressed or implied, have set the TST and TSs up for failure instead of success. The district seems oblivious to the positive gains in both achievement and test scores that comes with the proper integration of technology, not to mention that every child is exposed to technology
at an earlier age all the time. According to Moore’s Law computer processing power, or
the number of transistors on a CPU, doubles every 18 months (Reiser & Dempsey, 2007).
This district staying locked in the past and not preparing teachers for the future does not
seem a likely place for a district that prides itself as being an educational leader. It sees
nothing wrong with the status quo; access is plentiful, and the staff is in place.
Undoubtedly, the expressed and implied roles and duties of the TST and TSs needs to be
reexamined for there to be any meaningful change in this arena. Simply stated, one
cannot serve more than one master and change is difficult. Technology is an ever-
changing field. Based on the data obtained, the bureaucratic structure must be
streamlined by appointing one, go-to person on the curricular side. Additionally, TSTs
and TSs need to shed the old roles of fix/repair of the past and focus on the educators’
professional development of the use and integration of educational technologies. They
need to learn from best practices and get into the classroom to model the behavior and
technologies we want to see integrated in the classroom.

In light of this research study, several different approaches could be used to help
teachers learn to integrate technologies in their lessons.

1. Bring back the technology academy. Popular when the first influx of
technologies came into the district, it was fairly cheap and easy to run. Certified
teachers ran the academy and modeled the very behavior they wished to see in the
classroom integrating technology into the lessons. University credit was available
and many teachers that enrolled took back these skills and knowledge to their
classrooms.
2. A single point person on the curriculum side for technology integration at central office is needed. Although the position was an “other duties as assigned” position, educational technology is vast and large enough to warrant its own director. The TSTs and TSs should report to this person so there is one, unified direction that everyone understands and can convey. When demonstrating different skill sets, TSTs and TSs can be sent out to different buildings based on need rather than on “I’ve always been here at this building.”

3. All TSTs and TSs should have reported to and been evaluated by the same person. This could be done by grade levels. This would avoid some TSTs and TSs being evaluated more harshly than others and the central office person would be able to make sure that the same message is getting out to everyone.

4. There should have been an articulated focus throughout the district as to the job duties of the TSTs and TSs. It needs to be made clear that the focus of the TSTs and TSs is not break/fix, but professional development. If this is articulated from the director position, it would be clear to all that the days of break/fix from a certified teacher is over. This would not preclude them in performing a 10 minute diagnostic, where if they can not fix it in 10 minutes a trouble ticket is turned in.

5. All break/fix should have been done by classified staff. The cost of a classified person is far below that of a certified person. If job duties were to be primarily break/fix then the idea of a certified teacher in the position of TST or TS did not make financial sense. If, however, the primary focus of the TST and TS positions was to be professional development, then a certified teacher should have remained
in that position and break/fix duties assigned from the point person at Central Office to the appropriate classified staff. 

With the exception of the addition of a central office employee, the cost to implement these ideas would be minimal, with one recommendation saving $1,000,000 a year. They do, however, necessitate a shift in the way that teachers and administrators think about the TST and TS positions. The district needs to evolve from having mere access as a focus to having integration of those educational technologies as its focus. The hardware fix and repair no longer would need to be the responsibility solely of the TST and TS. Indeed, instead of the endless hours doing break/fix, it could have been made clear that they would spend no more than 10 minutes on an issue, unless it was deemed mission critical, and after that the teacher could have put it in the break/fix database themselves, thus taking it off of the TST and TS’s plate and freeing them up to provide technology integration modeling and support.

In conclusion, it would seem that Buckeye School District needs to clarify the role of educational technology in instructional settings. If it is deemed to play a minor support role, relegated to e-mail and data, then the role of the certificated TSTs and TSs comes into question; they are not needed. Support for break/fix can be obtained through classified personnel at an annual savings of approximately $1,000,000 per year. If, however, technology’s role is to provide broad instructional support, a realignment of the TSTs and TSs job duties is in order.
References


APPENDIX A

LESSON PLAN TEMPLATE
NAME: ___________________ GRADE LEVEL: _____ SCHOOL: ______

| CHECK HERE IF YOU DO NOT USE TECHNOLOGY IN THE CLASSROOM: ______ |

OTHERS INVOLVED (if any): _______________________________________

SUBJECT: _______________ LESSON TITLE: ___________________________

MATERIALS NEEDED:

STANDARD(s) THIS LESSON RELATES TO:

APPROXIMATE DATE THIS LESSON WAS LAST DELIVERED:

LESSON DESCRIPTION WITH SPECIFICS ON HOW TECHNOLOGY WAS USED AND WHY
Feel free to attach supporting materials or examples and use additional paper if needed:

FREE RESPONSE.

I would be interested in any comments that you may have regarding educational technology.
APPENDIX B

ISTE NETS* STANDARDS FOR STUDENTS
The ISTE
National Educational Technology Standards (NETS-S)
and Performance Indicators for Students

1. Creativity and Innovation
   Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:
   a. apply existing knowledge to generate new ideas, products, or processes.
   b. create original works as a means of personal or group expression.
   c. use models and simulations to explore complex systems and issues.
   d. identify trends and forecast possibilities.

2. Communication and Collaboration
   Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:
   a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
   b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
   c. develop cultural understanding and global awareness by engaging with learners of other cultures.
   d. contribute to project teams to produce original works or solve problems.

3. Research and Information Fluency
   Students apply digital tools to gather, evaluate, and use information. Students:
   a. plan strategies to guide inquiry.
   b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
   c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
   d. process data and report results.

4. Critical Thinking, Problem Solving, and Decision Making
   Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:
   a. identify and define authentic problems and significant questions for investigation.
   b. plan and manage activities to develop a solution or complete a project.
   c. collect and analyze data to identify solutions and/or make informed decisions.
   d. use multiple processes and diverse perspectives to explore alternative solutions.

5. Digital Citizenship
   Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:
   a. advocate and practice safe, legal, and responsible use of information and technology.
   b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
   c. demonstrate personal responsibility for lifelong learning.
   d. exhibit leadership for digital citizenship.

6. Technology Operations and Concepts
   Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:
   a. understand and use technology systems.
   b. select and use applications effectively and productively.
   c. troubleshoot systems and applications.
   d. transfer current knowledge to learning of new technologies.
APPENDIX C

SURVEY INSTRUMENT, LETTER OF INTRODUCTION, AND STEP SHEET PACKET
Welcome markritzenthaler!

Ritzenthaler Dissertation: Inservice Teachers

Page 1 of 6

Introduction

Ritzenthaler Study: Demographic Questions

Do you have an internet connection in your classroom?

☐ Yes ☐ No

Do you have a personal computer at home?

☐ Yes ☐ No

Approximately how often do students use computers in your instructional setting?

(Select one) ☀

Do you feel like technology is relevant to your instructional setting?

☐ Yes ☐ No

How many computers do you have for instructional use in your classroom?

(Select one) ☀

How many national, regional, or local technology conferences have you attended over the past five years?

(Select one) ☀

Approximately how often do you use computers to do your job as an educator?

(Select one) ☀

How many hours of technology-related training have you received over the past five years?

(Select one) ☀

Do you have an internet connection at home?

☐ Yes ☐ No

Which statement best describes the content of your technology-related training?

(Select one) ☀
Which category best describes your primary grade level?

[ - select one - ]

Which category best describes your primary subject/specialty?

[ - select one - ]

How many years of experience do you have in education?

[ - select one - ]

What do you perceive as your greatest obstacle to further using technology in your instructional setting?

[ - select one - ]

From which individual(s) do you mostly seek primary guidance, information, inspiration, and/or direction relating to the integration of performance-based practices in your instructional setting?

[ - select one - ]

Do you participate in formal or informal technology sharing sessions, such as faculty meetings, inservice training, lunchtime discussions, before or after school meetings, or common preparation time within your instructional setting?

☐ Yes ☐ No

From which individual(s) do you mostly seek primary guidance, information, inspiration, and/or direction relating to the integration of technology in your instructional setting?

[ - select one - ]
Welcome markritzenthaler!
Ritzenhaler Dissertation: Inservice Teachers

Page 2 of 6
Save and Exit

LotTi Dissertations - Inservice Teacher Questions

Read each response and assign a score based on the following scale:

0  1  2  3  4  5  6  7
N/A  Not true of me now  Somewhat true of me now  Very true of me now

Question #1
I frequently engage students in learning activities that require them to analyze information, think creatively, make predictions, and/or draw conclusions using the classroom technology resources.

0  1  2  3  4  5  6  7
N/A  Not true of me now  Somewhat true of me now  Very true of me now

Question #2
I frequently present information to students using multimedia presentations or electronic “slideshows” to reinforce the content standards that I am teaching and better prepare students for standardized testing.

0  1  2  3  4  5  6  7
N/A  Not true of me now  Somewhat true of me now  Very true of me now

Question #3
I have trouble managing a student-centered classroom using the available technology resources and would welcome the help of a peer coach or mentor.

0  1  2  3  4  5  6  7
N/A  Not true of me now  Somewhat true of me now  Very true of me now

Question #4
Students in my classroom design either web-based or multimedia presentations to showcase their research (e.g., information gathering) on topics that I assign in class.

0  1  2  3  4  5  6  7
N/A  Not true of me now  Somewhat true of me now  Very true of me now

Question #5

http://oldmary. lickedhome.com/cgi-bin/WebObjects/lotiSurvey.woa/3/we/ub5WdML1HEdY0cZKeAwYM/3.8.7
I frequently assign web-based projects to my students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards.

Question #6
My students collaborate with me in setting both group and individual academic goals that provide opportunities for them to direct their own learning aligned to the content standards.

Question #7
Using the most current and complete technology infrastructure available, I have maximized the use of the learning technologies in my classroom and at my school.

Question #8
Problem-based learning is common in my classroom because it allows students to use the classroom technology resources as a tool for higher-order thinking and personal inquiry.

Question #9
I use the classroom technology resources exclusively to take attendance, record grades, present content to students, and/or communicate with parents via email.

Question #10
My students identify important school/community issues or problems, then use multiple technology resources as well as human resources beyond the school building (e.g., partnerships with business professionals, community groups) to solve them.
LoTi Questionnaire

Welcome markritenthaler!
Ritzenthaler Dissertation: Inservice Teachers

Page 3 of 6

Loti Dissertations: Inservice Teacher Questions

Read each response and assign a score based on the following scale:

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question #11
My students use the classroom technology resources most frequently to improve their basic math and literacy skills via practice testing software, integrated learning systems (ILS), or tutorial programs.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question #12
Constant technical problems prevent me and/or my students from using the classroom technology resources during the instructional day.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question #13
I am proficient with basic software applications such as word processing tools, internet browsers, spreadsheet programs, and multimedia presentations.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question #14
My students frequently discover innovative ways to use our school's advanced learning technologies to make a real difference in their lives, in their school, and in their community.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Not true of me now</td>
<td>Somewhat true of me now</td>
<td>Very true of me now</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question #15
I can solve most technical problems with our classroom's technology resources during the instructional day without calling for technical assistance.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

http://oldmary.lqhome.com/cgi-bin/WebObjects/lotiSurvey.wuo/3/wo/sb5WtM1L1HEa5jyZKcAWz3M/4.8.7
Locating quality software programs, websites, or CD's to supplement my curriculum and reinforce specific content standards is a priority of mine at this time.

Question #17

Though I may use technology for teacher preparation, I am not comfortable using my classroom technology resources as part of my instructional day.

Question #18

I am comfortable training others in using basic software applications, browsing/searching the Internet, and using specialized technologies unique to my grade level or content area.

Question #19

Computers and related technology resources in my classroom are not used during the Instructional day, nor are there any plans to include them at this time.

Question #20

I consistently provide alternative assessment opportunities that encourage students to "showcase" their understanding of the content standards in nontraditional ways.
Welcome markritzenthaler!
Ritzenthaler Dissertation: Inservice Teachers

LoTi Questionnaire

Page 4 of 8

LoTi Dissertations: Inservice Teacher Questions

Read each response and assign a score based on the following scale:

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #21
My students use the Internet for (1) collaboration with others, (2) publishing, (3) communication, and (4) research to solve issues and problems of personal interest that address specific content standards.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #22
My students participate in online collaborative projects (not including email exchanges) with other students, government agencies, or business professionals to solve their self-selected problems or issues.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #23
Given my current curriculum demands and class size, it is much easier and more practical for my students to learn about and use computers and related technology resources outside of my classroom (e.g., computer lab, resource center).

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #24
I use the classroom technology resources most frequently to locate lesson plans I can use in class that are appropriate to my grade level and are aligned with our content standards.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now
Question #25
My current instructional program is effective without the use of technology; therefore, I have no current plans to change it to include any technology resources.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #26
I use our technology resources daily to access the Internet, send email, and/or plan classroom activities.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #27
Due to time constraints and/or lack of experience, I seek assistance from my colleagues to ensure that my instructional units merge complex thinking skills and student technology use with "real world" projects.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #28
My students' creative thinking and authentic problem-solving opportunities are supported by the most advanced and complete technology infrastructure available.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #29
My personal professional development involves investigating and implementing the newest innovations in instructional design and learning technologies that take full advantage of my school's most current and complete technology infrastructure.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #30
I can locate and implement instructional units that emphasize students using the classroom technology resources to solve "real-world" problems or issues, but I don't usually create them myself.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now
Welcome markritzenthaler!

Ritzenthaler Dissertation: Inservice Teachers

LoTi Questionnaire

LoTi Dissertations: Inservice Teacher Questions

Read each response and assign a score based on the following scale:

0 1 2 3 4 5 6 7

N/A Not true of me now Somewhat true of me now Very true of me now

Question #31

I have an immediate need for some outside help with designing student-centered performance assessments using the available technology that involve students applying what they have learned to make a difference in their school/community.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #32

Students' use of information and inquiry skills to solve problems of personal relevance guides the types of instructional materials used in and out of my classroom.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #33

My instructional use of our classroom technology resources is frequently altered according to the latest innovations and research in the areas of instructional technology, teaching strategies, and/or learning theory.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #34

I regularly implement a student-centered approach to teaching that takes advantage of our classroom technology resources to engage students in their own learning.

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
N/A Not true of me now Somewhat true of me now Very true of me now
Question #35
I frequently consider (1) my students' interests, experiences, and desire to solve relevant problems and (2) the available human resources outside of the school when planning student-centered learning activities that include technology.

N/A Not true of me now Somewhat true of me now Very true of me now

Question #36
Students taking meaningful action at school or in the community relating to the content standards learned in class is an essential part of my approach to using the classroom technology resources.

N/A Not true of me now Somewhat true of me now Very true of me now

Question #37
I have an immediate need for professional development opportunities that place greater emphasis on using my classroom technology resources with challenging and differentiated learning experiences rather than using specific software applications to support my current lesson plans.

N/A Not true of me now Somewhat true of me now Very true of me now

Question #38
My students create their own web pages or multimedia presentations to showcase what they have learned in class rather than preparing traditional reports.

N/A Not true of me now Somewhat true of me now Very true of me now

Question #39
The types of professional development offered through our school system does not satisfy my need for more engaging and relevant experiences for my students that take full advantage of both my "technology" expertise and personal interest in developing learner-based curriculum units.

N/A Not true of me now Somewhat true of me now Very true of me now

Question #40
My students frequently use the classroom technology resources for research purposes that require them to investigate an issue/problem, think creatively, take a position, make decisions, and/or seek out a solution.

N/A Not true of me now Somewhat true of me now Very true of me now

http://oldmary.iqhome.com/cgi-bin/WebObjects/lotiSurvey.woa/3/wo/ubSWtML161EajVCZcMzW2M/6.8.7
Welcome markritzenthaler!
Ritzenthaler Dissertation: Inservice Teachers

Question #41
Having students apply what they have learned in my classroom to the world they live in is a cornerstone to my approach to instruction and assessment.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #42
Curriculum demands, scheduling, and/or budget constraints at our school have prevented me from using any of the available technology resources during the instructional day.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #43
I am skilled in merging the classroom technology resources with relevant and challenging, student-directed learning experiences that address the content standards.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #44
Though I currently use a student-centered approach when creating instructional units, it is still difficult for me to design these units on my own to take full advantage of our classroom technology resources.

0 1 2 3 4 5 6 7
N/A Not true of me now Somewhat true of me now Very true of me now

Question #45
My immediate professional development need is to learn how my students can use our classroom technology resources to achieve specific outcomes aligned to the content standards.

0 1 2 3 4 5 6 7
<table>
<thead>
<tr>
<th>Question #46</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is easy for me to identify and implement software applications, peripherals, and web-based resources that support student's complex thinking skills and promote self-directed problem solving.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question #47</th>
</tr>
</thead>
<tbody>
<tr>
<td>My students have immediate access to all forms of the most advanced and complete technology infrastructure available that they use to pursue problem-solving opportunities surrounding issues of personal and/or social importance.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question #48</th>
</tr>
</thead>
<tbody>
<tr>
<td>I need access to more resources and/or training to begin using the available technology resources as part of my instructional day.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question #49</th>
</tr>
</thead>
<tbody>
<tr>
<td>I regularly use different technology resources for personal or professional communication and planning.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question #50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students' questions and previous experiences heavily influence the content that I teach as well as how I design learning activities for my students.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>
Hello Fellow Teachers,

For those of you that don’t know me, my name is Mark Ritzenthaler and I am a Language Arts teacher at [School Name]. I am presently working on my dissertation to finish my doctorate that revolves around the use of technology in the classroom, and I need everyone’s help. A few weeks ago, I met with Mr. [Name] about the possibility of conducting a study of the teachers in the district regarding this very topic. Upon his approval, I have moved forward and wanted to let you know that I will be implementing my survey instrument soon.

Today I am discussing an opportunity that will benefit [School Name] Schools, yourself, and me as well. I would like to get every teacher in the district to fill out a quick on-line technology survey and turn in a sample technology lesson plan. ALL information is COMPLETELY confidential. The step sheets are attached, and will be available in the office. I realize that your time is limited which is why I have come up with an incentive that I think you will be excited about. For each completed survey/lesson plan I receive, I will enter that teacher’s name into a raffle for gift cards. There are prizes for each level (elementary, middle school, and high school) so your odds of winning are pretty good (MUCH better odds than winning the Ohio lottery).

The survey will benefit you by anonymously analyzing your current instructional practices with technology and by giving you tips and hints on how to improve technologies’ use in the classroom. Your sample lessons will give additional support to those results. Additionally, this information helps the district by analyzing how and where technology is being used in our district and where additional support may be needed, as well as helping fulfill the requirements in the [Strategic Plan section numbers]. Finally, it benefits me, because I get to finally get to finish my dissertation and graduate.

There are two components to a completed feedback form. 1) The online survey and 2) A completed lesson plan sheet.

Participation is voluntary and ALL information is kept confidential and no one except my dissertation committee and myself will ever see your survey or lesson plan. ALL surveys and personal information will be shredded after the mandatory waiting period.

If you have any questions, please don’t hesitate to e-mailing me at: ritzenthaler_mark@[School Email Address]

Thank you for your help in this,

Mark Ritzenthaler
Hi All,

The target date to have the district technology survey completed is May the 30th. You can find the survey here: www.lotilounge.com/ ("Click" on "Sign me up.").

The ‘Group ID’ and ‘Group Password’ is the same for everyone:

Group ID:  **ritzenthalersudy**  (No spaces between words)
Group Password:  **ritzenthalersudy**  (No spaces between words)

All teachers, including Related Arts teachers (Art, music, foreign language, Phys. Ed., etc), support teachers, TSTs, Technology Specialists, Special Education teachers, and any other teacher that has contact with students are encouraged to participate in this voluntary survey, even if you typically do NOT use technology in your classroom.

Preliminary results are coming in and we thank those teachers that have already filled out their surveys. This information will be vital as the district looks forward to the future of educational technology in **[BLANK]**. Your input will have a direct impact on how that will look. And be developed.

Don’t forget that there will be a raffle for gift cards ($100 Visa gift card, $50 Barnes & Noble, $25 Staples) at each level for those that have finished the entire survey.

This is your chance to make sure you have your voice heard.

Thank you for your participation.

Mark Ritzenthaler
Welcome to LoTi Survey!

The following directions go with the screen shot on the next page

3. Follow the registration instructions on the screen. You will first be prompted to enter your Group ID and Password.

   **Group ID:** ritzenthalerstudy
   **Password:** ritzenthalerstudy

4. Next, you will be prompted to enter your User Information including a User ID and Password of your choosing (NOT the Group ID and Password given above).

   This User ID and password should be something you will remember as it is what you will use to login to LoTi Lounge in the future. **(Note: If you wish to go through the process of taking the questionnaire without receiving a score or so that you can instruct others, simply use the User ID [test_yourname], the password [test], and the email address [yourname@test.com]. Please substitute your actual name for 'yourname' in the previous sentence when creating a test User ID so that the User ID and Password are recognized as unique by the LoTi Lounge system. These records are deleted from the questionnaire database each night.)**

   When you take the actual survey it is strongly recommended that you WRITE DOWN your selected User ID and User Password information as many school districts take the questionnaire more than once and it is necessary to re-access the LoTi Lounge system.

5. Next, you will be prompted to enter your Email address. Entering a valid email address is necessary to have full access to LoTi Lounge.

6. Finally, you will be prompted to select your organization from a structural list that has already been entered into the computer based on the Group ID you were given. **Choose your organization and click 'Continue' to complete the registration process.**
Welcome to LoTi Survey!

Provided below is all the information that you will need to register in the LoTi Lounge and get started with a TEST LoTi Questionnaire.

A User ID, Password, and valid Email address will be required to have full access to LoTi Lounge, but since this is a TEST of the LoTi Lounge you will not need to put in your real e-mail yet or print out your results unless you want to.

LoTi Lounge Instructions for New Users

1. Access the LoTi Lounge at: http://www.lotilounge.com/

2. Click on the link that says 'Sign Me Up!' (in the 'I'm a New User' section of the LoTi Lounge login block) to complete a ONE TIME registration sequence that will both identify you as part of the Ritzenthaler study and as an individual user.
Welcome to LoTi Survey!

User Registration

Register as a new user

Group Information:
Enter the group ID and password given to you by your group representative.

Group ID: r3zhbiskbudy
Group Password: ********

Group Member Information:
Enter a personal User ID and Password. Choose something you will remember, you will need this User ID and Password to access this system again.

User ID: markroentgen
(examples: fred_hill, bobby60, 1794)
Password: 1234
Password (optional) Type again to confirm: 1234
Name: First: Mark Last: Blenzbauer
Grade Level: Intermediate Grades (Grades 6-8, Grades 7-8, Grades 8-12)
Subject Area: Humanities (e.g., Language Arts, Fine Arts, Theatrical Arts, Social Studies)

Email Address:
If you forget your password, we'll send it to the email address you provide now, so make sure it is correct.

Note: A valid email address is required in order to use the LoTi Course Planner and register for Courses.

Current Email Address: drenthaler.mark@.*
Note: Email cannot exceed 50 characters.
Welcome to LoTi Survey!

7. Click on 'Take the LoTi Questionnaire' to begin...

Where would you like to start?

- Enter the LoTi Lounge
- Take the LoTi Questionnaire

8. Finally, Choose your version (Teacher, Building Admin, etc) and click 'Start' to begin the survey.
APPENDIX D

RUBRIC FOR LESSON PLANS
### Rubric

**Lesson Plan Rubric**

| Date: 10-01 | Average: 7-9 | N/A | 5-6 | 4-3 | 2-1 | 0-1 |

**The NSTEMI Educational Technology Standards (NETS-S) for Performance Indicators for Students**

1. **Creative and Innovative Thinking**
   - c. Apply existing knowledge to generate new ideas, products, or processes
   - d. Identify trends or forecast possibilities

2. **Communication and Collaboration**
   - a. Create original works as a means of personal or group expression
   - b. Enhance the flow of information to express ideas and issues

3. **Research and Information Fluency**
   - a. Plan strategies to gather information
   - b. Locate, organize, analyze, evaluate, synthesize, or otherwise use information from a variety of sources or media

4. **Technology Planning and Decision Making**
   - a. Plan strategies to solve problems
   - b. Visualize, analyze, or synthesize objects, ideas, or information using a variety of media and formats

**Evaluator's Signature:**

**Evaluator's Notes:**

- Students apply digital tools to gather information, and use information, Students:
- Students use digital tools to gather information, Students:
- Students apply digital tools to solve problems, and use information, Students:
<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>6-5</td>
<td>Average = ( \frac{\text{Total AVE PG} \times 2}{\text{Total AVE PG} + \text{AVE}} )</td>
</tr>
</tbody>
</table>

Students demonstrate a broad understanding of technology concepts, systems and operations. Students:

<table>
<thead>
<tr>
<th>Technology Operations and Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. Use multiple process and divergent perspectives to explore alternative solutions.</td>
</tr>
<tr>
<td>e. Collect and analyze data to identify solutions and make informed decisions.</td>
</tr>
<tr>
<td>f. Plan and manage activities to develop a solution to complete a project.</td>
</tr>
<tr>
<td>g. Identify and define authentic problems and significant questions for investigation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Thinking Problem Solving and Decision Making</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Use alternative thinking skills to plan and consider resources, manage projects, solve problems, and make decisions.</td>
</tr>
</tbody>
</table>
CERTIFIED JOB DESCRIPTION OF TECHNOLOGY SUPPORT TEACHER

QUALIFICATIONS:

1. Valid Ohio Teaching Certificate/License.

2. Minimum of 3-5 years teaching experience or other professional development or training experience.

REPORTS TO:

Building Principal/Director of Curriculum

PERFORMANCE RESPONSIBILITIES:

1. Models classroom instruction that integrates the Technology GCOS/Best Practices into everyday teaching and lesson planning.

2. Supports District, State and National technology initiatives embedded in the Strategic Plan, State/National Standards and GCOS adoptions.

3. Assists administrators and teaching staff in the acquisition and presentation of data related to student performance.

4. Promotes the use of appropriate technology instructional tools in all academic areas.

5. Serves as a resource for building Professional Development Teams to design/develop technology opportunities consistent with the district's direction and philosophy.

6. Communicates the use and needs of instructional technology with staff and administration.

7. Collects evidence of successful technology integration.

8. Provides preliminary staff instruction in the use of mission critical technology systems.

9. Serves as an instructional technology advocate.
10. Consults with special education staff and other assistive technology professionals when necessary to identify potential need for assistive technology.

11. Provides recommendations, assists in selection, modification, and implementation of low, mid, and high technology solutions and devices.

12. Provides instructional training and support in the use and identification of assistive hardware and software in consultation with the district Assistive Technology Team.

13. Other duties as assigned by the Superintendent or his/her designee.

CONDUCT:

Each staff member shall remain free of any alcohol or nonprescribed controlled substance and abuse of any prescribed controlled substance in the workplace throughout his/her employment in the District.

Each staff member shall serve as a role model for students in how to conduct themselves as citizens and as responsible, intelligent human beings. Each staff member has a legal responsibility to help instill in students the belief in and practice of ethical principles and democratic values.

TERM OF EMPLOYMENT: Days and Salary as per Negotiated Agreement

The School District is an Equal Opportunity Employer and as such does not discriminate on the basis of race, color, sex, age, religion, national origin, ancestry, disability, veteran status, marital status, or any other status protected by law.

06/15/07
APPENDIX F

INTERVIEW QUESTIONS
Basic Interview Questions
Semi-Structured Interview

1. Background Information
   a. Name
   b. Position
   c. Who they report to
   d. General Responsibilities

2. Technology Responsibilities
   a. Who reports to you (technology and otherwise)
   b. What influences do you have over technology policy?
   c. What is the bureaucratic hierarchy in technology?
      i. Who do the TSTs report to?
      ii. Does Central Office make school level decisions or suggest what should be done?
      iii. How do you get everyone on the same page?

3. Reaction to survey results
   a. What stood out in the data?
   b. Did it surprise you? Why or why not?
   c. Where do we go from here? What changes (if any) do you see in the future for Buckeye?

4. Anything else?
   a. Free response.
APPENDIX G

PERMISSION TO USE SURVEY INSTRUMENT AND REFERENCES
March 28, 2008

To: Ashland University  
    Dissertation Review Boards

Please accept this letter as notification that Dr. Christopher Moersch informed me that Mark Ritzenthaler will be using the LoTi Questionnaire to collect data for his doctoral dissertation study. Mr. Ritzenthaler has the permission of Dr. Moersch and the NBEA to use the LoTi Questionnaire and the LoTi Framework for purposes of the study only. Mr. Ritzenthaler also has permission to review all available results on the individuals taking place in his study and reprint selected survey questions in the Appendix of the study. Mark Ritzenthaler will be the only person with access to group results for this study. These individual results are to remain confidential for the purpose of this study and are not to be distributed in any way.

For your reference, the LoTi Framework is posted at the LoTi Connection website at:

http://www.loticonnection.com/lotilevels.html

Congratulations Mark!

Sincerely,

[Signature]

Dennee Saunders  
Assistant Director
APPENDIX H

PERMISSION TO USE ISTE NET*S STANDARDS
From: permissions@iste.org
To: ritzie1234@aol.com
Subject: Re: Permissions and Reprints Request from Mark Ritzenthaler
Date: Tue, 31 Mar 2009 7:08 pm

From: permissions@iste.org
Subject: Request for permission received

Dear requestor,

Thank you for contacting ISTE regarding permission. Please allow 10 - 15 business days for processing of this request. Permissions requests are answered in the order that they are received.

If you have a special case, please inform us of your timeline (in the subject line of your email). We will do our best to meet your needs.

If you are a non-member seeking educational course pack permission, please contact Copyright Clearance Center for permission:

CCC, 222 Rosewood Drive, Danvers, MA 01923, fax: 508.750.4744, www.copyright.com

To access ISTE’s Permission Request Form, please visit:

www.iste.org/permissions

For more information about ISTE Permissions, visit:

http://www.iste.org/Content/NavigationMenu/Publications/Permission_and_Reprints/Permissions_and_Reprints.htm

Thank you for your interest in ISTE-published materials.

Permissions Editor
International Society of Technology in Education
175 W. Broadway, Suite 300
Syracuse, NY 13201
Fax: 314.362.3380
permissions@iste.org
www.iste.org

-------- Original Message --------

> 
> > A request to reprint ISTE material came in from Mark Ritzenthaler.
> >
> > Company/Organization: [REDACTED]
> > Member Number or Affiliate Name: [REDACTED]
> > Title/Teacher/Doctoral Student
> > Street Address: [REDACTED]
> > City: Westerville
> > State: OH
> > ZIP/Postal: 43082
> > Country: USA
> > e-mail: ritzie1234@aol.com
> > Phone: [REDACTED]
> > Fax:
> >
> > Requested ISTE Material:
> > Title/Description: ISTE National Education Technology Standards (NETS)
> > Author(s)/Editor(s): ISTE
> > Page/figure/Table Number(s):
> > About the Project:
> > The ISTE material will appear in a(n) : Dissertation
> > URL: Password:
> > Other:
> > Title of project: Educational Technology Use IN The Classroom (working title)
> > Author(s)/Editor(s) of project: Mark Ritzenthaler
> > Publisher: Self

http://webmail.aol.com/42559/aol/en-us/mail/PrintMessage.aspx
Dear Mark Ritzenthaler,

Thank you for your request for a change in your permission to use ISTE’s National Educational Technology Standards. According to our records, on 3/31/09 you were granted permission to use the NETS for Students in your dissertation.

As long as your usage is noncommercial, not for profit, and for educational purposes only, you have our permission to expand the use of the NETS.S for an online version of your dissertation. The rights granted herein are non-exclusive, non-transferable, electronic and print rights only.

For Web viewing, you are free to link to the NETS. We prefer that you link to this material rather than posting:

NETS.S:


If linking does not meet your needs, you have our permission to post the NETS on your website as long as the NETS are posted in full and are properly credited.

Please let us know if we can be of additional assistance. Congratulations on the successful delivery of your dissertation, Dr. Ritzenthaler.

Best regards,

Tina Wells

Book Production Editor
Rights & Permissions
International Society for Technology in Education
541.434.8925
twells@iste.org

On Dec 18, 2009, at 7:14 AM, ritzie1234@aol.com wrote:

> Hi All,
> > Many, many months ago, I ask ISTE for, and received permission to, > use your materials in my dissertation. I put that permission in my > appendix section where it needs to go, and all was well. The > university that I went through is posting the university’s > dissertations online through OhioLINK and the question has come up > as to where that ‘permission for use in my dissertation’ also > includes permission to publish to this site. We just want to be > sure that may university may, in fact, upload my dissertation to > OhioLINK for publication and that it is OK with ISTE. Neither the > university nor I will be making any money from this upload or usage.
> > A reply to this e-mail should suffice. You may call me at the > number below if you have any questions.
> > Thank you for all your help in this matter!
> > Dr. Mark Ritzenthaler
> >