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The digital disconnect: uncovering barriers that sustain the phenomena of unplugged teachers in a technological era

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THE DIGITAL DISCONNECT: UNCOVERING BARRIERS THAT SUSTAIN THE PHENOMENA OF UNPLUGGED TEACHERS IN A TECHNOLOGICAL ERA

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DEDICATION

This dissertation is dedicated to the following people:

Daddy, this degree is a result of your faith. You always believed I could and I would. I think of you and Hebrews 12:1. Keep cheering because I am going to keep running.

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ABSTRACT

This study investigated the barriers to technology integration of teachers that are technology proficient and work in school settings where Type I barriers, such as lack of access, insufficient time to plan, and lack of support, have been systematically removed. The results of this case study are intended to provide practical recommendations for practitioners such as technology coordinators, principals and teachers, and recommend future areas of study.

The participants in this qualitative study consisted of eight teachers, three principals and one technology supervisor. Six of the eight teachers were interviewed, and all eight were observed teaching a lesson that utilized technology. The observations were rated using the Technology Integration Matrix.

The findings from this study implicate that time for professional development is the barrier that needs to be overcome, and that the professional development should be designed to match the current level of technology integration and the current beliefs of the teachers concerning professional development.

Further study into the digital disconnect should focus on how to connect what teachers know about curriculum, students, and teaching to what they know about technology.

CHAPTER 1: INTRODUCTION

Classroom teachers across the United States of America have the privilege and burden of being a part of the Technological Era. They have the privilege of teaching in this new millennium which has ushered in the reality of the future. Fifty years ago space centers, wireless communication, automation, and unlimited access to computers could only be found in fantasy. The year 2000 arrived with all of the hope and anticipation of the technological age. American society has evolved from the excitement of a man landing on the moon to classes exploring with Google Earth.

American society has simultaneously evolved in its educational ranking which is also a burden to the American teacher. The country that was first to mass produce through the technology of the assembly line and first to put a man on the moon now lags behind other countries in math and science scores (Kerachsky, 2008). In these categories, American fourth and eighth graders are ranked behind their peers of other nations. In each grade level and subject the top four performers were all from Asian countries (Kerachsky, 2008). The United States of America now faces a crisis of moving from a producing nation to a consumer nation which can potentially lead to a loss of wealth. In addressing the many crises that face America, President Barack Obama stated that, "Our children will compete for jobs in a global economy that too many of our schools do not prepare them for (Obama, 2009). P. Rogers (2000) cites research that states that, "educational computing is now being considered a necessary basic skill to be competitive in a global community" (p.455). This global community is one more reality of the Technological Era, and teachers are now needed to help prepare students for a global economy by teaching them to be competent and competitive with technology.

The word "teach" is defined by the *Merriam Webster Dictionary* as "to cause to know

something or to guide the studies of" (2009). That is the role of the teacher, the instructional leader in the classroom. How this role is carried out today is heavily influenced by federal, state, and district guidelines with goals of closing achievement gaps (U.S. Department of Education, 2002). With these goals in mind, many areas in education have been targeted for improvement including students' technology literacy (U.S. Department of Education, 2002). The responsibility of ensuring that students are technologically literate, able to function in the Technological Era and competitive in the global economy has been placed upon the shoulders of the classroom teachers who work every day to guide the studies of their students.

Teachers not only have to ensure that students have a working knowledge of the curriculum content, but they must also make sure that students have a working knowledge of current technology. Dockstader (1999) offers the concept of integrating technology, using the technology in teaching and learning the content, as a way to bring the curriculum and technology together. The caution given is that the curriculum should always be the driving force.

According to Li (2007) and Martin and Shulman (2006) the major influence on technology integration is the classroom teacher. The teachers' beliefs concerning teaching and learning, pedagogy, and the role of technology along with the teachers' access to technology resources, and technology professional development are all key factors in technology integration. It is important to keep this in mind when considering the significance that school districts have placed on acquiring hardware, software, and internet access for classrooms. Dr. Yasemin Gülbahar (2008) states that "regardless of the quantity of technology placed in classrooms, the key to how those tools are used is the instructor" (p. 32).

Teachers and Technology Training

In light of the findings of researchers such as Gülbahar (2008), Li (2007) and Martin and

Shulman (2006), schools have responded with opportunities for technology professional development. Whitehead, Jensen, and Boshchee (2003), for example, encourage school administrators to make professional development a priority and to institute "appropriate professional development" for their faculty (p. 67). Dede, Ketelhut, Whitehouse, Breit, and McCloskey (2009) describe the response as "a plethora of professional development programs" (p. 8).

In support of the decision to provide technology professional development, school districts have spent money on the professional development, equipment, and infrastructure to create a technology rich atmosphere in their schools. Within a district's technology budget, Whitehead, Jensen, and Boshchee (2003) advise that "20 to 25%" of the money should be earmarked for professional development. In the 1990's the average amount spent on professional development was about $200 per pupil a year (Dede et al., 2009). In 2003, school districts in the United States spent between $218,000 and $233 million on technology hardware and software (Fickes, 2004), and by 2005," 95% of all U.S. public schools had computers with Internet access in the classroom" (Cook, 2008). Although a priority has been given to professional development, and money is being spent on the trainings, not much evidence in the research shows that there has been a change in the integration of technology (Belland 2009; Shi & Bichelmeyer, 2007).

Statement of the Problem

A digital disconnect now exists between teachers' technology knowledge and their students' technology knowledge. Students are more proficient than most teachers in the general use of technology such as surfing the Internet, but could use it more effectively to enhance their education if the teacher is prepared to facilitate those learning opportunities. Therefore, research

has shown teachers need learning opportunities in the form of effective professional development (Yamagata-Lynch, 2003).

Even though there are different models of professional development (Sparks & Loucks-Horsley, 1989) many technology workshops have been offered as "one size fits all" workshops where the focus is learning techniques for using hardware or software (Hinson, Laprairie, & Cundiff, 2005) or "Spray and pray" one hour workshops without any follow up (Barnett, 2001, p. 2). This type of professional development has been referred to by Larry Cuban as the "over-sold, under-used" phenomenon (2001).

Research supports the fact that computer technology is now available at almost all schools across the nation, but is not used by the majority of teachers (Li, 2007). Ertmer, in her research, discussed barriers to change and classifies barriers into two types. Type I barriers deal with extrinsic or external barriers such as lack of access, insufficient planning time, and lack of support. Type II barriers deal with intrinsic or internal barriers such as teachers' beliefs and established classroom practices (Ertmer, Lane, & Woods, 2000). Teachers that have participated in professional development, but are still not implementing what they have learned are dealing with some type of barrier to integration.

The overall picture is that if teachers are not using the technology, they are not plugged into the Technological Era. Without teachers facilitating and modeling the integration of technology in the classrooms the majority of students across the nation will not be prepared to become technologically literate and succeed in this Technological Era.

Purpose of the Study

This study is designed to investigate the barriers to technology integration of teachers that have participated in technology professional development and are in school settings where Type

I barriers, such as lack of access, insufficient time to plan, and lack of support, have been systematically removed. These teachers have learned things about technology and have technology tools available to them. The researcher wants to find the barriers that still impede the progress of their technology integration.

Significance of the Study

Education has always been the first step in obtaining a "good job" and moving toward financial success. In a global economy where jobs are shrinking, every individual is looking for an advantage. Being able to successfully use technology in many fields is not an advantage, but a job requirement. Students are looking toward the future, and they need to have the assurance that their education will once again give them the advantage.

Based on the findings from this study, district leaders will have the potential to prepare teachers to confidently give their students the advantage with technology. This research will be giving technology leaders information on technology integration barriers and suggesting concrete ways to encourage technology integration in classrooms. Finding ways to work through the barriers will then enable teachers to become more technology proficient through effective professional development.

Research Questions

These are the research questions that will be explored in this study.

1. What causes technology proficient teachers not to integrate technology consistently into their teaching practices?

2. What are the identifiable barriers that can be changed through professional development?

Limitations

This study was qualitative with self reported data. Therefore, it is possible that the participants did not fully disclose all the relevant information. Also the researcher's assumption that teachers are willing to learn about technology and have a view that technology is useful in the classroom setting can be limiting as all participants may not share the same view.

Definitions of Terms

Technological Era: The year 2000 to the present

Digital Divide: the gap between people that benefit from digital technology and those that do not.

Digital Disconnect: the separation between technologically savvy students and their technologically inept teachers.

Digital Natives: students born after 1980 and are immersed in and comfortable with digital technology.

Digital Immigrants: Any user of digital technology that was born before 1980. They are not native to the digital world because it did not exist when they were born.

Digital Settlers: Older users of digital technology that helped created the digital world.

Folk Pedagogy: A person's beliefs about teaching which was acquired as a result of that person's experiences as a student.

Habitus: a set of dispositions of a person that is shaped by entire life experiences, background, and culture.

Technology Proficiency: the ability to have and use a working knowledge of technology including but not limited to computer hardware and software; computer literate.

Type I Barriers: barriers that are external to a person.

Type II Barriers: barriers that are internal.

NETS-T: National Education Technology Standards for Teachers

Consistent Technology Integration: Teachers utilizing technology in the classroom to enhance student learning three to five times per week.

CHAPTER 2: LITERATURE REVIEW

Educational Technology through the Years

Educational Technology has been present throughout the ages. Education began when mankind shared or passed down information to one another. Conversations, observations, and instructions were part of apprenticeships and mother-daughter lessons. Patricia and Paul Baker (2004) use Socrates as an example of the dawn of a new technology in the field of education. The technology in question was the book, and it was rejected by Socrates in the play *Phaedrus* as "inferior to conversation" (p. 149).

Throughout the years, many other technologies have been introduced to the art of teaching and learning. For years, students had been using personalized slates to work out assignments and receive instruction. In 1801, a major change was introduced to American education when a teacher at West Point began to use the blackboard. The blackboard was not introduced to improve student learning, but to make teaching a larger class easier for the teacher (Baker & Baker, 2004). Since that time blackboard, chalkboards, and more recently, whiteboards have been seen as a staple in the American classroom. Intercom speakers, educational television, radio, automatic bells, copy machines, and overhead projectors have woven themselves into the fabric of schools across the nation. And in each technological era, there have been hopes and dreams and proclamations of how that technology would transform education.

In the 1800's, research showed that children could recite their lessons, but were not taught higher order thinking skills (Cambre & Hawkes, 2004). The critics of education in the United States "focused on the failure of schools to make learning 'concrete'" (Cambre & Hawkes, 2004, p. 4). In order to correct this problem, new technologies were introduced to the

classroom. They included pictures, maps, and models (Cambre & Hawkes, 2004).

In 1922, Thomas Edison was convinced that his latest invention, the motion picture, would totally change teaching and learning since it added motion to the still pictures (Lee & Reigeluth, 2009), and in 1997, The National Academy of Sciences and the National Academy of Engineering asserted that

> Technology deployed in education can help remove inequities between the schools of the inner city and the suburbs, between cities and rural districts.... Technology can become the force that equalizes the educational opportunities of all children regardless of location and social and economic circumstance. (p. 18)

Whether it is the chalkboard, the radio, the television, or the computer, technology has always fostered excitement and resistance. There have always been teachers who were eager to try new things, and teachers who were satisfied with how things had been going. Lee and Reigeluth (2009) sum up the history of educational technology as teaching us all "that technological potentials do not easily transfer into direct educational benefits" (p.169).

Today, technologies are digital and more technical than technologies of the past such as the book, blackboard, or maps. Personal computers, Promethean boards, document projectors handhelds and laptops along with online researching, and electronic everything from mail to learning to leadership are available to teachers to transform low performing students to advanced learners. Many in the field of education hold to the same beliefs as Richard Clark who stated that "media (or technology) are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition…" (Simonson, Smaldino, Albright, & Zvacek, 2003, p. 10), and Jerry Willis who stated that "technology is like an oven -what emerges depends on how it was used" (J. Willis, public

presentation, October, 2004). With these realizations the role of the teacher is extremely important.

Throughout history new technologies have fostered fears such as fear of replacement and fear of the technology. In the factories, machines have displaced skill workers, and some fear that computer technologies like online learning will displace the classroom teacher. As the computers moves through its third decade of integration into classrooms it has become apparent that the technology by itself does not lead to more effective teaching and learning; therefore teachers will still be needed to use technology and create ways for teaching and learning to be more effective. The rapid creation and evolution of technology continues to sustain a fear of technology, and some teachers are techno-phobic. While they believe the technology is important, they deal with issues of confidence, anxiety, and understanding dealing with the computer (Gülbahar, 2008; Li, 2007).

A simple formula can be used to determine how effective technology integration will be in any given classroom. It is "if and how." If teachers use it and how they use it are major determiners in the success of the technology (Gülbahar, 2008, Li, 2007; Martin & Shulman, 2006). In addition to the teacher's use, if and how the students respond is also a factor into the overall success. Teachers that feel proficient using technology and perceive a benefit for their students will find ways to use technology in the classroom and enhance the learning environment (Shattuck, 2007) while teachers that feel anxious, afraid, and unsure about using technology may choose not utilize the technologies that are available to them (Buckenmeyer, 2008).

Students of the Digital Age

Students of the Digital Age, which has been defined as 1980 to the present (Bennett, Maton, & Kervin, 2008; Palfrey & Gasser, 2008; Prensky, 2001) are the focus of present

educational concern because they are the students in the classrooms. They have been classified as the D-Generation or Net Generation (Tapscott, 1999), but the term that has emerged as the better descriptive is "Digital Native" (Prensky, 2001; Palfrey & Gasser, 2008) due to that fact that only one billion of the six billion people in the world have digital access. Palfrey and Gasser (2008) noted that because of the digital divide the vast majority of Digital Natives are children of wealthy nations and therefore do not represent an entire generation.

Digital Natives are described as students that have grown up immersed in a digital life. Tapscott (1999) refers to them as "bathed in bits" (p.6) and compared their ease with digital technologies to an average American's ease with the technology of a toaster. They are defined by their iPods, laptops, email addresses, cell phones, and user ID's. They are native speakers of the digital language. This language is changing English grammar by adding new verbs and nouns. Some of the new verbs of the digital language that have been introduced to the world include texting, ("texting", 2009) emailing ("email", 2009), podcast, ("podcast", 2009) and Photoshop ("photoshop", 2009). An elementary English grammar lesson defines a noun as a person, place, or thing. A Digital Native's example of nouns might include virtual places such as YouTube, Facebook, and Second Life. The language of these Digital Natives also make a strong case for the need for education with their "new" spellings that fill their posts, texts, and emails such as "ur" for you are, and "thnx" for thanks (Bennett, Maton, & Kervin, 2008; Palfrey & Gasser, 2008; Prensky, 2001).

The rest of the people that operate in the digital world are categorized as either a Digital Settler or a Digital Immigrant. Palfrey and Gasser (2008) describe Digital Settlers as the people who grew up in an analog only world, but were instrumental in shaping the digital world. These people are sophisticated users of digital technology, but still use traditional analog forms of

interaction such as mailing bills rather than paying them on-line. Digital Immigrants are the people that have learned how to email, use social networks, text, and download mp3's later in life because the technologies did not exist when they were school children (Palfrey & Gasser, 2008; Prensky, 2001; Bennett, Maton, & Kervin, 2008).

Prensky (2001) asserts that because teachers that are defined as Digital Immigrants speak digital as a second language, they have an accent that works as a barrier between them and their Digital Native students. Palfrey and Gasser (2008) concur with Prensky by stating that although teachers are on the front lines of students' lives, they often cut themselves off from their Digital Native students because of language and cultural barriers. Their evidence is the teachers' noted concerns that they are out of sync with the students they are teaching and that the pedagogy of the educational system is not capable of keeping up with the changes brought by the digital age (Palfrey and Gasser, 2008). Tapscott (1999) goes so far as to credit digital technology for shifts in thinking about teaching and learning and suggest ways teachers can change in order to better educate Digital Natives. These changes include shifting the way teachers think about teaching and learning to move to a more interactive learning environment such as moving from lessons that are only linear to hypermedia learning that is not necessarily sequential, from teacher instruction to student construction and discovery, and from receiving the material to learn to learning how to learn and navigate through information (Tapscott, 1999).

Rather than focus on the barriers between Digital Immigrant teachers and Digital Native students, Bennett, Maton, and Kervin (2008) highlight that research supports the fact that, "education has a vitally important role in fostering information literacies that will support learning"(p. 781). Palfrey and Gasser (2008) view this digital age as storing tremendous educational opportunities and encourage teachers that, "old fashioned solutions that have solved

similar problems in the past will work in the digital age…Those solutions are engaged parenting, a good education, and common sense" (p. 10).

Teachers and the Digital Age

Bramble and Mason, as cited in Shi and Bichelmeyer (2007) predicted phases of technology integration in the United States. In the first phase the integration of technology was predicted to move through experimentation from 1960-1976. The next phase was called popularization, and this was to occur in the late seventies and mid-eighties. The third phase in the integration of technology was called transition, and this was to occur from the mid-eighties to the year 2000. During that phase teaching techniques and curriculum changes as a result of computers were to happen. The last phase, infusion, was predicted to begin in 2001, and continue into the future where computer technology would be an essential part of the curriculum. The popularization period has been experienced which is evidenced by the number of computers in classrooms today (Cook 2008), but the transition period has been prolonged. Researchers, such as Shi and Bichelmeyer, have investigated to find out why in order to better inform for the future (Shi & Bichelmeyer, 2007).

Shi and Bichelmeyer (2007) conducted a comparative study of two ethnographic case studies conducted thirteen years apart in order to answer the question, "How have teacher's experiences with computers changed?" (p.182). This cross-case comparison analyzed the findings of two separate case studies. They were both prolonged observations and included document analysis and teacher interviews. The first study was conducted in 1991, and the second was conducted in 2004. Using the constant comparative method, six themes emerged from both studies. There were accessibility, need for technical support, teacher perceptions

about computer usefulness, appropriate programs, factors facilitating computer use, and factors inhibiting computer use.

This research found that after 13 years teachers still typically used computers the same way, which was mainly for administrative purposes. The 2004 study showed more use by teachers mainly because there was greater access, and there were also administrative mandates for administrative tasks such as email for communication and a software package that must be used for attendance and grades (Shi &Bichelmeyer, 2007).

Issues that were important for the teachers in the 1991 study were still important for the teachers in the 2004 study. Shi and Bichelmeyer (2007) found that barriers such as the need for training and a lack of collegiality were mentioned by both groups. There was little improvement in the professional development experiences in thirteen years. The conclusion of the research was that educational technologist and teachers need to collaborate to identify the real problems and authentic needs so that together they can integrate (Shi &Bichelmeyer, 2007).

Cuban, Kirkpatrick, and Peck (2001) and Chen (2008) are other examples of researchers that are looking for evidence of computer integration and solutions for why it has not occurred. Cuban et al. spent seven months in two high schools that had the reputation of being highly technical looking for why did it appear that schools now had high access but low use of digital technologies.

The Cuban and his associates interviewed 21 teachers and 26 students from the two schools, and also conducted faculty and student surveys. They shadowed teachers and students and examined documents such as reports, proposals, and newspaper articles about the schools.

Their findings did not reveal resistance to technology or technophobia. Instead over 60% of the teachers participating (13 out of 21) stated that they had changed their behavior as a result

of using digital technology. This change would support the transition phase of Bramble and Mason's predictions, but after observing the teaching practices, the researchers noted that only four of those thirteen had modified their classrooms in a major way to have a changed pedagogy and a more student -centered classroom. There was little evidence that any of the other teachers had a more student- centered class.

As an answer to why they had high access and low use the teachers responded that their main reasons were that they did not have time to find and evaluate software to use with their students, and that professional development was seldom offered at convenient times. While they did note that there were plenty of opportunities for generic trainings there were not a lot of offerings that were curriculum specific (Cuban et al., 2001).

The conclusion of the research was that it was policy makers that believed having high access to digital technologies would substantially improve teaching and learning, but "complex, deeply embedded factors" (Cuban et al. 2001, p. 829) such as time allocation for classes, school organization, and teacher preparation would hold back widespread technology integration and "substantial changes in teaching practices" (p. 830).

Cuban et al.'s (2001) research revealed that having more access to digital technologies does not translate into a transformed learning environment. This corresponded with Shi and Bichelmeyer's (2007) findings that although there was more technology present after thirteen years, there were few changed learning environments.

Chen's (2008) research begins with teacher's positive beliefs about a changed learning environment. In the study the teachers professed a belief in constructivism which would be equivalent to the changed learning environments that Cuban et al. were seeking to accompany the added technology access.

Chen's study is set in a Taiwanese high school that had a reputation for technology integration. Twelve teachers were interviewed and observed for two months. Chen also collected documents such as syllabi, lesson plans, student products and PowerPoint handouts. The researcher also kept a reflection journal and field notes. All of this data were collected to explore the reasons for inconsistencies between teacher beliefs and teacher practices.

The teachers gave external reasons such as a lack of access, lack of time to plan, and not enough technology support as reason why they did not integrate technology even though they believed it was beneficial. Chen (2008) noted that although the teachers believed in constructivism and student- centered classes, they taught as behaviorist with a teacher- centered classroom. From the research Chen drew conclusions on this phenomenon. The first was that contextual factors work as barriers to technology integration and they include school policy, school culture, and school assessment. While the district may encourage technology integration, the inflexible school assessment and school organization discourages or is a barrier to teachers by hindering them from conducting creative activities which are also time consuming. These contextual factors can also affect the process in which teachers' beliefs change. For example a mandatory paper and pencil test reinforces the belief that knowledge transmission is valued more than knowledge construction. Chen (2008) also noted that the teachers may also be operating on a limited or misinformed understanding of constructivist beliefs.

Buckenmeyer (2008) acknowledges the fact that technology has not been fully integrated into classrooms and asserts that this will only occur with "relevant, continuous, timely professional development" (p.8). The main ingredient in Buckenmeyer's theory of full technology integration is time because the teachers need time to learn and integrate.

Buckenmeyer's assertions are backed in the literature by Fullan's (2001) research on

change and Rogers (2003) theory of diffusion of an innovation. Changing a person's beliefs and habits is Fullan's definition of reculturing. Technology integration gives teachers the opportunity to challenge and change their pedagogical beliefs and classroom practices. The adoption of technology into the curriculum falls into Roger's (2003) definition of diffusion of an innovation. Diffusion is the process where an innovation, in this case technology integration, is spread and saturated over time through a social system by members of that social system. An important factor to how fast a new innovation is adopted is how compatible it is with the values, beliefs and past experiences of the members of the social system.

In order to integrate technology many teachers' belief structures will have to be altered. The new innovation of technology integration does not connect with any past experiences of teaching and learning in the lives of veteran teachers defined as Digital Immigrants because it did not exist in their time of experience; therefore, integration will take a lot of time and a large amount of professional development (Shattuck, 2007). Brinkerhoff (2008) asserts that three to five years is the amount of time that is needed for teachers to change and make the transition into technology integration. One reason for that is that teachers need to have a good understanding of the benefits of the any new innovation before they will totally embrace it (Shattuck, 2007). Fullan (2001) states that teachers do not "resist change as much as they don't know how to cope with it" (p. xii), but "if change is to occur in the classrooms, it must begin with the teacher, not the technology" (Buckenmeyer, 2008, p. 8).

Barriers and Technology Integration

Barriers to technology integration are divided in to external and internal categories. Researchers may refer to them with different names, but the categories consistently emerge as barriers that are external to the teacher and barriers that are internal. Type I barriers which have

been labeled extrinsic, external, socio- cultural, exogenous or non- manipulative (Drent & Meelissen, 2007; Ertmer, Addison, Lane, Ross, & Woods, 1999; P. Rogers, 2000,) include lack of access to computers and software, insufficient planning and learning time, and inadequate technical and administrative support. Type II barriers which have been labeled intrinsic, internal, personological, endogenous or manipulative include beliefs about teaching, beliefs about computers, established classroom practices and a level of willingness to change (Drent & Meelissen, 2007; Ertmer et al., 1999; P. Rogers, 2000).

Research has shown that there is combination of Type I and Type II barriers that retard the integration of technology into classroom practices (Ertmer et al. 1999; P. Rogers 2000) and all must be managed. In order to study barriers to adopting technology P. Rogers, (2000) surveyed 1000 art teachers to find out their current level of technology integration and to identify barriers they face as they move to adoption. P. Rogers was not concerned about specifically using art teachers because research had shown that teachers had similar issues, concerns, and barriers despite individual teaching disciplines.

To set up the framework for the research, P. Rogers used the five-step model of technology adoption credited to Rieber and Welliver (1989) and Hooper and Rieber (1995). This was used because P. Rogers (2000) asserted that in order to obtain a good understanding of the barriers that teachers face, it was important to first know the teachers' level of adoption of technology integration. The steps begin with familiarization which is simply exposure and can be gained through a workshop. The next hierarchical step is utilization. In this state the teachers will try integrating technology, but if any type of problem arises they abandon the effort. The third step is integration. This is the beginning of appropriate use of technology in the classroom. Reorientation is the next step. Here changes are made in the classroom to promote and sustain a

classroom that has the learner as its emphasis. The final step is evolution where changes can take places whenever it is advantageous to the learner.

P. Rogers' (2000) research found that the major barriers to integrating technology were attitudes and perceptions about integrating technology and the quality and materials of professional development. It was also found that teachers with less experience integrating technology were more likely to report barriers, and the more comfortable a teacher was with the technology the less the teacher focused on barriers. With the Type I barriers that were reported there was an interaction and interdependence between them. These barriers included "Availability and Accessibility, Technical and Institutional Support, and Stakeholder Development" (p. 465). P. Rogers' (2000) noted that previous studies had suggested connections between these barriers, but few have explored the correlation between them. It was also teachers at the beginning stages of adoption that were more likely to be affected by external barriers while teachers at the highest level of technology integration found advanced technological support and in-depth professional development to be the largest barriers (P. Rogers, 2000).

P. Rogers then used E. Rogers' (2003) types of adopters of an innovation to chart Type II barriers and levels of adoption. Three percent of innovators, fourteen percent of early adopters, thirty-four percent of early majority, thirty-four percent of late majority, and fourteen percent of laggards deal with internal barriers. A source of difference between innovators and early adopters is internal barriers which include attitudes and beliefs about integration technology (P. Rogers, 2000).

The recommendations from P. Rogers' research to address the problem of barriers are to determine the goals of teaching and learning with technology, assess the level of technology adoption, assess attitudes, and consider the barriers simultaneously (2000). Insight

into how barriers are constructed and what can be done can be researched by listening to teachers in various stages of adoption. External barriers such as availability and support can more easily be addressed than attitudes and beliefs. Some beliefs are created as a response of fear and anxiety after not having enough training and tools to integrate effectively. Those beliefs will not be overcome until the fears are eradicated and the teachers see the benefit of the technology. In order to accomplish that, P. Rogers (2000) recommends lots of time in professional development so that the teachers know what to do and have the time to create appropriate strategies from what they have learned.

Drent and Meelissen (2008) researched barriers to technology integration by analyzing large scale data in educational technology integration in the Netherlands. Instead of highlighting the barriers, their results highlight the positive factors. By working towards the positive factors, barriers can be overcome. From their analysis, four factors emerged as being a positive influence on the innovative use of technology in the classroom. They were student oriented pedagogical approach, positive attitude, computer experience, and personal entrepreneurship of the teacher (p. 195). What was interesting in the findings was that teacher proficiency was found to have a very small indirect effect on innovative use of educational technology. It is necessary for the use, but to integrate innovatively where there are higher order thinking skills involved other factors are more important. The factor with the largest impact was personal entrepreneurship which the researchers defined as "the amount of contacts an educator keeps (both inside and outside the school) for his own professional development in the use of information and communication technologies" (p. 195).

Drent and Meelissen (2008) describe the teachers that are most likely to integrate technology innovatively in their teaching. These are the teachers that are "willing to keep

extensive contacts with colleagues and experts in the area of information and communication technology (ICT) for the sake of his own professional development" (p. 197); teachers that see the advantages of integrating technology; teachers that have a student centered pedagogical approach; and teachers that are competent in the student centered pedagogical approach as well as with technology. In order to create an environment for this type of teacher to emerge, Drent and Meelissen (2008) recommend developing cooperative communities of teachers, encouraging reflection from the teachers about their teaching practices, and "freeing-up" time to create and experiment with innovations (p. 198).

Ertmer et al. (1999) examined the relationship of Type I and Type II barriers and teachers beliefs about integrating technology. They surveyed, interviewed, and observed teachers to gather data to examine teacher use of technology and their perceptions about technology. They found that Type I or first order barriers hinder the teacher from manifesting concrete evidence of their positive beliefs about integrating technology. The teachers in the study had many reasons for using technology. They included motivating students, preparing them to use technology in the future, having more interesting lessons, reaching students with learning problems, and enjoying the technology. The reasons for using technology did not mean that the teachers actually integrated. Barriers were reported, but the significance of the barriers was based on the teacher's belief about technology's role in education. For example, teachers who used technology as a supplement had more Type II barriers which are internal, had concerns about technology's relevance, and could not find ways to use technology. These teachers which viewed technology as an add on to the curriculum were also concerned with lack of time, a Type I barrier, while teachers that believed technology supported and enriched the curriculum found ways to overcome external barriers.

"Teacher beliefs interact with first-order barriers to facilitate or limit teachers' technology use" (Ertmer et al., 1999, p. 67). Therefore, teachers have to perceive that technology tools are valuable and believe that they are easy to use before they embrace them and work toward change. "Belief systems are very resistant to change" (p. 68), so even when first order barriers are removed second order barriers may still exist. Ertmer et al. recommends addressing the different types of barriers simultaneously while being aware of the teacher's level of use. Professional development must also match the level of use and the current belief of the teacher. For example, teachers using technology as an add on would need professional development that would continue to mentor them and demonstrate ways to integrate the technology into the curriculum content, but teachers that are using technology in their daily routines would need professional development that would continue to expose them to technology integration where students explore topics.

The next study into barriers to teacher's technology integration was conducted by Ertmer, Lehman, Park, Cramer, and Grove (2003). This study also differentiated between Type I and Type II barriers. The research was conducted in conjunction with a project to integrate laptops and problem-centered inquiry based pedagogy. The project was designed to address the barriers in professional development before and during the implementation. Teachers were involved in intensive professional development that included realistic modeling with teachers and students and work teams that created units to actually be used in the classroom. They had a choice of a two-week summer institute or a semester professional development course. To address the Type I barriers, skills training were embedded in the professional development courses, and to deal with Type II barriers four strategies were implemented. They were

> creating a vision of learner centered pedagogy through the use of selected texts, identifying instructional opportunities of implementation of that vision by having teachers create online courses and WebQuests, making…resources available by offering the professional development courses on site, and supporting teachers' use of authentic assessment measures… (Ertmer et al., 2003, p. 3).

The conclusions that were made were that meaningful technology use is better aligned with constructivist pedagogy, and that teacher knowing and learning is best when it is "developed across a variety of situations" (Ertmer et al., 2003, p. 2). Professional development will not likely have a continuing effect unless it is able to connect what the teachers learn and what they are teaching in the classroom, so a good focus for professional development is to build technology skills in the context of designing learner centered activities (Ertmer et al., 2003).

Park and Ertmer (2008) examined barriers in technology enhanced classrooms. Their study included eight teachers, two school administrators, one project manager, two technical support staff members, and two university faculty members. These participants were interviewed, surveyed, and observed.

The results highlighted two major barriers, uncertainty of the vision and lack of feedback (Park & Ertmer, 2008). The uncertainty about the vision for the new implementation of technology led to confusion with the teachers about what they should be accomplishing. The research revealed that teachers needed "regular corrective feedback" (p. 641). When implementing new things into their teaching. Park and Ertmer assert that, "it is important for teachers to possess a deep understanding of the purpose of the innovation before being required to make more substantial changes in their practices" (p. 642). When administrators are acquiring new technology it is important to balance the focus between the new acquisitions and sharing the vision of how the new technology will enhance teaching and learning.

In a similar study Park, Lee, Blackman, Ertmer, Simons, and Belland (2005) looked into

internal and external barriers and interventions for those barriers. Data were collected from observations, surveys, and interviews. The researchers described first order or Type I barriers as more easily recognized and fixed while second order or Type II require extensive changes in beliefs and teaching methods.

Their results found that lack of feedback, motivation, knowledge, skills, expectation, and lack of vision sharing were all barriers to the teachers' integration efforts (Park et al., 2005). The recommended solutions included mentoring, coaching, more administrative involvement, team preparation time for technology integrated lessons, a video library of superb units, setting clearer goals, and acknowledging the teachers monthly or quarterly for lessons that integrated technology well (Park et al., 2005)

Becker (2008) questioned whether or not technology integration would work when key barriers were removed. In order to answer the question Becker investigated a state technology program whose purpose was to "integrate the use of technology as a tool into curriculum and instruction to prepare students to meet state academic standards" (p. 3). The program systematically identified and addressed barriers that were sustained by research. The barriers included Type I and Type II and were "computer availability, curriculum materials availability, teacher beliefs, demographic characteristics of teachers, teacher's proficiency, and support from administration, technicians, and peers" (p. 4).

The results indicated that the students in the program outperformed the students in the control group, that the teachers had more positive attitudes about technology integration, and more confidence than the control teachers. There were more "intensive and meaningful student use of technology in student-centered environments" (Becker, 2008, p. 23). The teachers were also given time to change. Each school had participated at least two years before being

evaluated for this study. Becker's recommendation is that even with the barriers removed there needs to continue to be professional development that focuses on the "effective use of technology as a learning tool."

With the research of Becker supporting the effectiveness of technology integration once the barriers are removed, Belland (2009) offers a new theoretical framework in which to encourage technology integration. His review of the literature reiterates the fact that technology integration has not been achieved to the levels that were predicted in the past. He proposes the theory of habitus as the final barrier to technology integration and proposes ways to overcome this barrier.

Habitus is defined as a "set of dispositions to appreciate or do certain things" (p. 356). While each person would have an individualized habitus, people that "share common life experiences" (p. 356) or have similar backgrounds would have a similar habitus. In the life of a teacher, her habitus would be formed throughout her entire life. Belland (2009) compares habitus to Bruner's term "folk pedagogies" (p. 355). Folk pedagogies are what people know about teaching based on their experiences as a child, a student, or a parent, and Belland asserted that many teachers based their teaching practices on their folk pedagogies rather than their professed pedagogy.

One argument Belland (2009) makes for the influence of habitus on the teaching profession is that every person is expected to spend forty hours a week for the majority of the year for almost two decades as a student in a school. Lawyers and doctors do not spend that kind of time in courtrooms or hospitals, but every teacher spent that time as a K-12 student. Therefore, their professional habitus is more influenced by their time as a student than the pedagogy they embrace. Although teacher education programs may teach technology

integration and student centered learning, a teacher's personal habitus may not have those experiences, and as a result the teacher may be resistant to things that attempt to change or enlighten his or her habitus.

With that understanding, Belland encourages technology professional development with habitus rather than barriers in mind. This will take in to account that although a teacher may profess a belief in technology integration, there may still be resistance to integration because it is a change to a personal habitus. The problem that arises from this theory is that it is difficult to measure a person's set of dispositions. A teacher's tendencies "can only be inferred through assessment of their behavior" (p. 362).

Summary of the Current Research

Current research supports the integration of technology while recognizing that it has yet to reach its predicted potential (Becker 2008, Belland 2009). One main factor in the slow rate of technology integration is the classroom teacher because she or he is the one that is on the front lines of education creating and facilitating the learning environment (Gülbahar, 2008, Li, 2007; Martin & Shulman, 2006). Internal and external barriers that the classroom teacher faces are relevant to the conversation about technology integration (Ertmer et al., 1999, Park & Ertmer 2008). External barriers are easier to identify and overcome than internal barriers such as attitudes and beliefs (Becker, 2008). Research has shown that even though a teacher may have a positive attitude about integrating technology and may profess to believe that it is worthwhile and helpful to students, it does not mean that the teacher will actually integrate technology in a meaningful and innovative way (Chen, 2008; Dent& Meelissen, 2008).

Several conclusions about the disconnect between teachers' professed beliefs and actual practices have been drawn. One is that perhaps teachers do not possess a full understanding of

the pedagogy in which they profess belief. Other conclusions are that contextual factors reiterate the value of the actual practice and not the new innovative beliefs, and a person's habitus or folk pedagogies, not professed beliefs, are what generates practice (Chen, 2008; Belland 2009).

Regardless of the barriers or the reasons for the barriers, researchers consistently recommend meaningful, in-depth, continuous professional development to facilitate the change necessary for technology integration in the curriculum (Becker, 2008; Belland, 2009; Chen, 2008; Parks et al., 2005; P. Rogers, 2000). The technology specialists, trainers, and supervisors that plan and implement professional development should be aware of the teachers' level of technology integration, professed beliefs, actual practices, understanding of technology integration and habitus in order to successfully overcome barriers (Becker, 2008; Belland, 2009; Chen, 2008; Parks et al., 2005; P. Rogers, 2000).

CHAPTER 3: METHODOLOGY

Research Design

Although labeled technology proficient, many teachers are not successful in integrating technology on a consistent basis. This qualitative study investigated barriers that prevent technology proficient teachers from consistently integrating technology into their teaching. This study examined the experiences of eight teachers in a school district that has systematically worked to eliminate various types of barriers such as access, professional development, external support and time to coordinate, plan, and implement. Since the teacher is ultimately responsible for the planning and integration of technology, this study sought the voice of the teacher in defining and resolving the problems that hinder technology integration.

Research Questions

These are the research questions that were explored in this study:

1. What causes technology proficient teachers not to integrate technology consistently into their teaching practices?

2. What are the identifiable barriers that can be changed through professional development?

Setting

This study took place in a suburban school district in the southern region of the United States. The district serves approximately 3,600 students and employs 314 teachers. The technology vision of the district as stated in the Parish Technology Plan (2006) is to have a "technology-rich learning environment" (p. 6) for the students and teachers. The district's technology plan focused on four areas: 1. Strengthen Leadership; 2. Improve Teacher Training; 3. Support E-Learning and Virtual Schools; and 4. Encourage Improved access and Technology

Usage (Technology Plan, 2006). Each of the ten schools now has internet access and Promethean Boards, and each teacher has at least one computer in the classroom. The district has also established and continues to fund the Professional Development Center which provides technology training based upon state curriculum standards as evidence of the district's commitment to technology integration (Corona, 2008).

Participants

In order to hear the voice of the teachers, this study focused on classroom teachers that are able to integrate technology and have the necessary equipment to be successful. The voices of their administration, including principals and the technology supervisor, were also desired in order to see if the school district is operating with a shared vision of technology integration.

The participants were eight teachers from four elementary schools within one school district along with their principals and Supervisor of Technology. These teachers all have access to the same professional development and similar equipment. Having more than one teacher from a school gave a broader overview of the district. These teachers had all scored proficient on the Louisiana Teacher Technology Self-Assessment which is state's technology proficiency instrument. This quantitative instrument was created by the Southwest Development Laboratory (SEDL) for the Louisiana Center for Educational Technology. This is a division of the Louisiana Department of Education. The survey is based on the International Society for Technology in Education's (ISTE) National Educational Technology Standards for Teachers (NETS-T) (Broussard, 2006). Their proficient score qualified them as able to integrate technology, and is also equivalent to being computer literate. The teachers had also been observed by the district technology office during the 2008-2009 school year to determine the level of technology integration. The selected participants were taken from the list of teachers who integrate

technology into their teaching practice less than three times a week based on the district technology office observations. The teachers' experiences and grade levels varied.

Table 1

Participant Demographics

Teacher	*Years experience*	*Grade Level*
1	6	1st
2	8	Kindergarten
3	19	4th
4	11	5th
5	24	5th
6	23	6th
*7		2nd
*8		3rd

*****These teachers were not interviewed, but were observed.

Data Collection

Participants in the study were invited to participate in the research through an email with an introduction of the researcher from the district Supervisor of Technology. A total of nine teachers were invited. One declined to participate, and two participated in the observations, but declined to be interviewed. The four principals from the schools where the teachers worked were invited to participate in interviews. One declined.

Data were collected through individual interviews using standardized open-ended questions (Appendix A). The researcher created the interview protocol that was used with all of

the participants and distributed to them before the face- to- face meeting. The teachers, their principals, and the district technology supervisor were interviewed once. The teachers were interviewed to identify their personal barriers to technology integration. The principals of the schools were interviewed to find out their views on the importance of consistent technology integration. The district technology supervisor was interviewed to find out the district's views on technology integration and to compare them to those of the teachers and principals.

The teachers were also observed in their classroom while teaching a technology integrated lesson. Data also were collected using field notes and reflections and the University of Florida's College of Education's Technology Integration Matrix (See Appendix B).

Data Analysis

The data collected from the interviews and observations were analyzed using the constant comparative method (Glaser, 1967). With this method, the data were analyzed by looking for common themes to code. Themes that emerged from the teacher data were technology beliefs, barriers to integration, personal uses, and recommendations for administration.

The barriers that emerged where also categorized into Type I (external) or Type II (internal) barriers.

Themes were also categorized to highlight patterns at particular schools and patterns across the school district. Next the administrative data were analyzed for reoccurring themes and then compared to the teacher data.

The observation field notes and the Technology Integration Matrix (2007) added a rich context to the voice of the teachers from the interviews. The Technology Integration Matrix (TIM) is an observation tool created by the Florida Center for Instructional Technology at the University of Florida's College of Education (2007) that can be compared to the Blake and

Mouton managerial grid where a leader that scores high on both axes is an exemplary leader. This matrix uses levels of technology integration into the curriculum and characteristics of the learning environments as the two axes.

The TIM's levels of technology integration include entry, adoption, adaptation, infusion, and transformation. At the entry level the teacher uses technology to simply deliver content to the students. At the level of adoption the teacher directs the student in using software. When the teacher reaches adaptation she is allowing students to choose the technology tool and modify to complete the task. At the level of infusion the teacher has created a learning environment that uses technology tools throughout the day and across subjects. The final level is transformation, and here the teacher creates a learning environment where the regular activities that students are engaged in would not have been possible without technology.

The TIM's characteristics of the learning environment include active learning, collaborative learning, constructive learning, authentic learning, and goal directed learning. Active learning is where students are encouraged to use the technology rather than to receive information from the technology. At the level of collaborative learning, the students collaborate using the technology tools rather than always working individually. At the constructive level, the students use technology tools to build or construct understanding rather than receive information. Authentic learning is the level where students use technology to solve real world problems rather than work on "artificial" assignments. The highest level of learning environment is goal directed where students use technology to monitor progress, set goals, plan activities and evaluate results.

The Technology Integration Matrix gives a description of each intersection. For example if the lesson is at the level of adaption in technology and the level of constructive in the learning

environment then the "students have opportunities to select and modify technology tools to assist them in the construction of understanding" (Technology Integration Matrix, 2007).

The researcher ranked each level of adoption from one to five with one being the lowest level of technology integration. Then each characteristic of learning was ranked from one to five with one being the learning environment requiring the lowest amount of critical thinking based on Bloom's taxonomy and five being the learning environment requiring the highest amount of critical thinking. Each teacher's lesson was scored on the Technology Integration Matrix using these numbers as rankings with a 5.5 being the highest level of technology integration combined with the learning environment requiring the most critical thinking and 1.1 being the lowest level of technology integration combined with the learning environment requiring the least critical thinking.

The following is an explanation of the ranking system used in the analysis of the data. The ranking 1.1 is the intersection of an active learning environment and an entry level of technology integration. Ranking 2.1 is the intersection of a collaborative learning environment and an entry level of technology integration. Ranking 3.1 is the intersection of a constructive learning environment and an entry level of technology integration. Ranking 4.1 is the intersection of an authentic learning environment and an entry level of technology integration, and ranking 5.1 is the intersection of a goal directed learning environment and an entry level of technology integration.

For example, the Technology Integration Matrix describes students at level 1.1 as using technology for drill and practice while level 5.5 describes students as engaging in metacognative activities at a level unattainable without the technology tools. These rankings from the Technology Integration Matrix were used in the analysis of the teacher beliefs and barriers to

technology integration in order to assess the level of integration and compare the practices to the beliefs as recommended in the literature. If there was evidence of a particular learning environment even though the student utilization of the technology was not there, the lesson was given the rating of the learning environment with the appropriate level of technology integration, because zero, for no integration, was not an option. Therefore, in the analysis, levels of different learning environments without student use of technology are noted with a learning environment ranking and an entry level of technology integration such as 4.1. Teachers also received multiple scores from the TIM if their lesson used more than one type of learning environment. If the lesson was constructive and authentic, or active and collaborative it was noted by having the TMI score reflect the learning environment.

Table 2

Teachers' Beliefs, Barriers, and TMI Scores

Teacher	Yrs. Exp	Grade	Beliefs (Type II)	Barriers(Type I)	TMI Score
1	6	1	Technology is an asset	Self confidence issues; afraid to break the equipment	3.1 4.1
2	8	K	Technology is good in a way	Not being comfortable with it; not knowing how much to bring in	1.1 4.1
3	19	4	I'm not resistant, but I'm not knowledgeable enough to do much	Time to learn it	3.1 5.1
4	11	5	Love it. Tech is the new age. Must stay abreast of what's evolving in the world	Need more in-service training	3.1 4.1 5.1
5	24	5	Tech should be used to enhance lessons NOT be the entire lesson	Trouble shooting; not knowing how to solve problems	3.1 4.1 5.1
6	23	6	Probably excellent, but should not replace the real thing-classroom instruction and reading on your own	Figuring out the time frame; Limited resources at the school	3.1 5.1

CHAPTER 4: FINDINGS

Setting the Stage for the Findings

This study was conducted to investigate technology proficient teachers in order to find the barriers that still impede the progress of their technology integration. These teachers have participated in professional development, are in school settings where Type I barriers such as lack of access, insufficient time to plan, and lack of support have been systematically removed, have learned things about technology, and have technology tools available to them.

The teachers for this study were all selected from schools within the Riverside School District because this district has worked to systematically remove Type I barriers. This school system services a small but vibrant community that is located only minutes away from a major urban community. The Riverside school district is a public system which has deep roots in its community. Many of the workers in the central office, including the district's Technology Supervisor, grew up as members of the community, were educated in the school system, worked as teachers in the classrooms of the district's schools and now serve in a capacity of administration.

Teachers are known by name in the administration office, and supervisors can described the teaching practices of their teachers and know the names of the principals at all of the schools. Children attend the schools their parents and even grandparents attended. There is a strong loyalty and a desire to succeed within the district.

The schools within the district do not have simple elementary or middle school configurations. Elementary grades can be found in schools labeled elementary and middle. The elementary schools that were observed do not house all elementary grades. Applewood Elementary facilitates grades PK-2, Drake Elementary has grades 2-4, Bellwood Elementary has

grades 3-5, and Curry Middle School has grades 4-8. There were two other elementary schools that were not used in the study. One has grades PK-1 and the other has PK-3. There were two other middle schools that were not used. One has grades 5-8 and the other is a traditional middle school with grades 6-8.

Each of the classrooms that were observed had similar technology hardware. Every classroom had a multi-media projector mounted from the ceiling. They were also equipped with Promethean Board brand interactive white boards. Each class had at least one computer, but no more than two, a printer, a DVD player or a VCR that was projected either on a television or through the multimedia projector. Several classes were also equipped with document projectors that can project pages from a book or a worksheet onto the board.

Participants

All of the participants in the study were given pseudonyms in order to protect their identities. All participants were are also proficient or computer literate based upon the state's technology proficiency instrument.

Teacher 1, Mattie Black, and Teacher 2, Kristen Jones both teach at Applewood Elementary School. This school has lower elementary students in grades pre-kindergarten to second. The school has a different feeling because the biggest students are seven to eight years old. It is a very inviting school and the sounds of learning can be heard when you enter the building. There is the feeling that what is going on is a controlled and intentional chaos where children learn while they play.

Mattie Black is a first grade teacher with six years of experience. All six of those years have been at Applewood Elementary School. Ms. Black is the only participant whose age qualifies her as a Digital Native. She believes that technology integration is, "any means

possible to include technology into daily lessons to promote learning either using the Promethean Board, Elmo [document projector], computer, internet, or TV."

Kristen Jones is a kindergarten teacher with eight years of experience. This school year is her sixth year teaching at Applewood Elementary School. She would be categorized as a Digital Immigrant according to the literature, but it would impossible for her to remember life without digital technology because she was so young. She believes that technology integration is, "bringing technology into an area it wasn't before."

Teacher 4, Lori Brown, and teacher 5, Rita Smith, both teach at Bellwood Elementary school. It is an upper elementary school with students in grades 3-5. The school is warm and inviting. The sounds that seep under the doors into the hall ways at Bellwood are the sounds of students being children while interacting with their learning environment. The feel of controlled chaos and the joy of elementary school is present once again. There is work and response, discipline and fun.

This school has received the following awards from the State Department of Education for its academic work: 2006 School of Recognized Academic Growth, 2007 School of Exemplary Academic Growth, and 2008-School of Exemplary Academic Growth.

Lori Brown is a fifth grade teacher with fourteen years of experience. Eleven of those years have been at Bellwood Elementary. She is a Digital Immigrant, and she believes that technology integration is, "bringing technology into the integral part of teaching."

Rita Smith is also a fifth grade teacher. She has twenty-four years of experience which is the most of all of the participating teachers. She has spent nineteen of those years at Bellwood Elementary. Rita is a Digital Immigrant who does not have a definition for technology integration.

Teacher 3, Dana Smart, and Teacher 6, Sue Reid, both teach at Curry Middle School. There is a different feel at this school because of the middle school structure. There are really big kids at this school, and even though the school is divided with grades grouped on halls the presence of the more mature can be felt. The fourth graders even change classes like the big kids. There are not tables and grouped desks and centers at this school. It is a more grown up place. The campus is warm and the classrooms are decorated so that they feel bright and vibrant.

Dana Smart teaches fourth grade at Curry Middle School. She has nineteen years of teaching experience, and ten of those years have been at this school. The fourth grade is departmentalized, and Ms. Smart teaches language arts which includes reading, spelling, and grammar. Ms. Smart is a Digital Immigrant, and did not share her definition of technology integration.

Sue Reid is a sixth grade reading teacher. She has twenty-three years of teaching experience and has been at Curry Middle School nine years. Ms. Reid is a Digital Immigrant and her definition of technology integration is, "using the internet to enhance the reading experience."

The last two participants, Amy Green and Angie Wilson, teach at Drake Elementary School. This school has grades two through four. The feel of this school is a mix between the lower elementary school with its controlled chaos and the mature feel of the middle school. The feeling that persists in the hallway is that this school is a place for children and learning, but in a more structured environment that did not foster the chaotic noise and exuberance of the lower school. The hallways are covered with student work and encouragements to read, read, read. The classrooms are inviting and the classes were divided into groups that encouraged collaboration and assisted in management. Ms. Green and Ms. Wilson participated in the

classroom observation part of the research, but were unwilling to participate in the interviews. Their principal however was interviewed, and her philosophies and previous experiences shed light on the school atmosphere.

In addition to the teachers, the principals of the schools were also invited to participant in an interview. Of the four principals, three found time to participate in the interview.

Principal Anders of Applewood Elementary School did not participate in the study, but was gracious and hospitable as she opened up her school for observations and teacher interviews.

Principal Beck of Bellwood Elementary School was an elementary school teacher and an assistant principal prior to becoming principal of Bellwood. She has three years of administrative experiences, and two of those years, although not consecutive, have been at Bellwood. Principal Becks experience as an elementary teacher is evident in the atmosphere of her school. It is one of those places where little children voices laughing and learning are seeping from underneath the doors. Her definition of technology integration is, "the infusion of technology into core content area instruction to enhance student knowledge and skills."

Principal Cramer of Curry Middle School has spent twenty-three years there serving the children of the community as a teacher, assistant principal, and now as the principal. He taught fifth grade and has been in administration for eleven years. Principal Cramer's teaching experience was with upper elementary students, and the students on his campus, including the elementary students, seem to be more grown up than the students of the same grade at Bellwood. Perhaps it is the school structure where they change classes or the presence of older kids that creates a more mature atmosphere. Principal Curry's definition of technology integration is, "total use of technology in instruction. Not just occasional or as an add on."

Principal Dyer of Drake Elementary School spent fifteen years teaching middle school

English, three years as an assistant principal of a high school, and is currently in her first year as a principal and her first year at Drake elementary. Her experiences in middle and high school have made the transition to elementary school quite interesting. She personally is not a proponent of controlled chaos and believes that her philosophy tempers the atmosphere of the school. She understands the different mission of an elementary school, but feels it can be accomplished without the controlled chaos factor. Her definition of technology integration is, "not just have technology, but using it for instructional purposes and having the students use it." The last participant is the district technology supervisor. Tech Supervisor has worked in this school district for sixteen years. She began as a middle school teacher, worked as the Middle School Curriculum Facilitator, and now is the Supervisor of Information Systems and Educational Technology. She defines technology integration as, "the use of hardware and software in the regular and special education curriculum." As the supervisor her beliefs are a factor to what drives the acquisition of hardware and software and the emphasis on technology professional development. She believes in using technology as a tool and does not believe in "technology for technology's sake. There should be a purpose for its use… Technology should be like the textbook, a tool to help get the point across to the student."

Observations

This section describes the results of the classroom observations made of each teacher in the study. Each observation was scheduled with the teachers in order to have an opportunity to observe a lesson that integrated technology. Most of the teachers scheduled their observation for a time in the morning because of the elementary classroom schedule which teaches core content such as reading and math in the morning. They were also aware that the researcher's primary focus was technology integration.

- Teacher 1- Mattie Black 1st grade

There were nineteen students present. Although there is only one computer there are enough tools to create an interactive student centered learning environment. The technology tools observed in the room were the Promethean Board, document projector, TV/VCR DVD, and computer.

The classroom was very inviting. The bright paint, the curtains over the windows, the letter wall, the reading board and all the words and the maps created a wonderful atmosphere. The lesson observed was during the reading portion of the class. The students received instruction with words from the Promethean Board. The words they practiced were projected while in groups and they work in their books. The multimedia projector allowed the teacher to move around while teaching from the book. The teacher was very interactive with the students. The multimedia projector and the document projector allowed the student's work to be shared visually with the whole class. After completing the assignment, Ms. Black displayed student work as an example of what was right. Next, a video of *Between the Lions*, which a PBS television series for children that focuses on reading, was watched on the TV to reinforce the skills that were used when the class was reading.

On the Technology Integration Matrix the lesson scored 3.1- technology is used to deliver information to students and 4.1- Students use technology to complete assigned activities that are generally unrelated to real-world problems. Although the students did not put their hands on the technology, an entry level authentic learning environment was observed. While the lesson created a learning environment that had medium to high critical thinking level, the technology integration was entry level.

- Teacher 2- Kristen Jones

There were eleven kindergarten students present along with one teaching assistant. The classroom environment was bright colorful and decorated with numbers, letters and vibrant colors. The students sat on a rug for group instruction time, but there were tables and chairs for other work times. There were learning centers located all around the room, and the technology tools observed included a TV/VCR/DVD player, two computers, a document projector, the Promethean Board and a multimedia projector.

The lesson observed was a reading, writing, and spelling lesson, and the kindergarten students used the Promethean Board to make words based on the letters the teacher had provided. All the letters they had learned previously, including the letter names and sounds, were written across the top of the Promethean Board. Each child was given an opportunity to use the Promethean Board pen. Using the letters they knew they were to write words. Each child was excited to have a turn at the "board". The Promethean Board was used like a traditional chalk board, but at the end of the activity Ms. Jones printed the work that had been displayed on the Promethean Board. The lesson then included a *Between the Lions* Video that reiterated the letter sounds the students had been working with. As the students transitioned from the lesson they sang with a CD the song, "Rise and Shine and Welcome to School Today." They also performed the motions and sang another song, "Freeze it," which encouraged listening skills and following directions.

On the Technology Integration Matrix Ms. Jones scored 1.1- students use technology for drill and practice and computer based training and 4.1 students use technology to complete assigned activities that are generally unrelated to real-world problems. The technology integration level for this lesson was entry.

- Teacher 3- Dana Smart

This fourth grade reading/language arts classroom was bright and animated. Ms. Smart was very engaging with the twenty students that were present for the class. The technology tools that were observed included the Promethean Board, multimedia projector, document projector and one computer. The technology was used to facilitate a two- minute editing assignment at the beginning of class. The Students could see the assignment projected on the Promethean Board and they each had a copy on their desks to correct. Correct answers were reviewed as a class and the teacher used the Promethean pen to correct the errors on the board. The technology was not used after that in the class.

On the Technology Information Matrix Ms. Smart scored a 3.1-technology is used to deliver information to students and a 5.1- students receive directions guidance and feedback from technology rather than using technology tools to set goals, plan activities, monitor progress or self-evaluate. Ms. Smart's technology integration level is at entry level.

- Teacher 4- Lori Brown

Ms. Brown's fifth grade classroom was clean, well organized and set up for collaboration. Engaging decorations with student work displayed were all around the room. The technology tools present in the classroom were a multimedia projector, a Promethean Board, one computer, and a television. The classroom was also equipped with a traditional white board which is situated so that the white board and Promethean Board which can be viewed by all.

The technology was used for a writing lesson, and the topic was writing compositions using graphic organizers. There were twenty students present and the technology that was used was PowerPoint slides for instruction and a video. The PowerPoint presentation was used to give lecture note instructions on writing using graphic organizers. Ms. Brown drew a graphic

organizer/sequence chart on the whiteboard and projected her PowerPoint notes onto the Promethean board. Ms. Brown never put the PowerPoint slides in presentation mode but projected the working view. The teacher's examples of graphic organizers were also on Power Point Slides. Ms. Brown did use the Promethean Board to advance the slides and was able to be interactive with students instead of just sitting behind a computer. The students interacted with the information on the Promethean Board verbally, but they did not touch the technology.

There was a smooth transition into the next phase of the lesson which was a *Write on Dudes* video segment that came with the curriculum materials. A student knew to turn off the light signaling that these videos were a part of a classroom routine. The video title was "All about sequence writing." The teacher did not maximize the screen to project a full screen to the students. Eighteen of the twenty students were engaged the entire time with the video. The other two students were whispering to each other. At the conclusion of the video the class discussed what had taken place in the video.

On the Technology Integration Matrix Ms. Brown scored 3.1-technology is used to deliver information to students, 4.1-students use technology to complete assigned activities that are generally unrelated to real-world problems, and 5.1- students receive directions, guidance and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress or self-evaluate. While the lesson created a learning environment that had medium to high critical thinking level, the technology integration was entry level.

- Teacher 5- Rita Smith

Ms. Smith's class was fifth grade inclusion and the lesson was writing a sequence paragraph. Ms. Smith used PowerPoint slides to facilitate her instruction about sequence paragraphs. Because she used her Promethean Board she was not stuck behind a desk advancing

slides. She moved around freely and kept order. Ms. Smith appeared to be very comfortable with the Promethean Board. An editing activity and editing discussion were guided with the PowerPoint slides. There were fifteen students and two teaching assistants present. The technology tools present in the classroom were the Promethean Board, one computer, and TV/VCR. Ms. Smith also had a whiteboard. All of the instructions were on PowerPoint slides which used a lot of text. The teacher's example paragraph had errors, but she used her errors as a teaching opportunity.

Ms. Smith experienced some frustration about not being able to get back to a slide using the Promethean Board. Her statement was, "I could go back to it if it was a flipchart." She was referring to a Promethean Board flip chart she had just learned about, but had not implemented.

On the Technology Integration Matrix Ms. Smith scored 3.1 - Technology is used to deliver information to students, 4.1- students use technology to complete assigned activities that are generally unrelated to real-world problems, and 5.1- students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate. The technology integration was entry level.

- Teacher 6 – Sue Reid

The class observed was a sixth grade reading class with twenty seven students, and the technology tools present in the classroom included a Promethean Board, two computers, a multimedia projector and a TV/VCR. The classroom was set up in facing rows.

Ms. Reid used a PowerPoint to facilitate the bell ringer which is an activity to begin class that the students complete as soon as the bell rings. The students had to respond to a journal topic as their bell ringer. Ms. Reid had a relaxed manner with her students. The classroom was bright and inviting. The projector was turned off after the opening bell ringer/journal. For the

remainder of the fifty minute class the students finish reading the story "Dragon, Dragon," reviewed the story as a group, and finished worksheets that had been previously assigned. After the story, the teacher led a discussion about the story looking for real life advice from the story and told the students they could use the rest of the time, about ten minutes, to finish a previous assignment.

Ms. Reid's score on the Technology Integration Matrix was 3.1 -Technology is used to deliver information to students and 5.1- students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate. The technology integration was entry level.

- Teacher 7- Amy Green

Ms. Green did not want to be interviewed, but allowed a classroom observation. The class observed was a second grade reading and math lesson. The technology tools present in the classroom included a Promethean Board, TV/VCR/DVD player, document projector, and one computer. At 8:40 am all technology was off. Technology was scheduled for later during the math lesson. During the reading lesson the students were involved in partner reading. The partners took turns reading a page in the story. Ten students were present during reading. Ms. Green was very involved and engaging with her students. There was also an assistant present, but the assistant was not helping with the reading lesson. The class was decorated with warm colors and student work. Collaboration for discussion was used. The Math lesson began with calendar math. Fifteen students were present for the math lesson. After the class calendar math lesson, the children returned to their seats and began workbook work. The book page was projected with the document projector. Greater than/less than review was done on the Promethean Board. The students had the opportunity to drag the alligator clip art to represent

the greater than/less than sign. Not all children had a chance to use the pen and drag and drop the alligator. The next part of the lesson was greatest to least using the Promethean Board activity to drag and drop numbers in the right order. With all the activities each child had a chance to use the technology. After the math review on the Promethean Board one student said, "Yeah, that was a fun game." Work then moved to instruction on the board.

Ms. Green's Technology Integration Matrix score was 1.1- students use technology for drill and practice and computer based training, 2.1- students primarily work alone when using technology, and 5.1 students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate. The technology integration was entry level.

- Teacher 8- Angie Wilson

Ms. Wilson did not want to be interviewed, but allowed a classroom observation.

The class that was observed was a third grade reading lesson. The technology tools observed were a Promethean Board, document projector, two computers, and a TV/VCR. Ms. Wilson used the document projector to show and give instructions. She introduced story map and modeled how to fill it out by using the document projector. There were twelve students present during the lesson. The classroom was set up in collaborative groups, and a traditional white board and Promethean Board were used. The classroom was bright and engaging. As a reading teaching strategy, partner reading was used, and the Internet cool timer was used to time the activity but it was not projected. The timer was set for 10 minutes of discussion between partners. The lesson also included a PowerPoint presentation for vocabulary. Ms. Wilson appeared very comfortable with the use of the technology tools available.

Ms. Wilson's Technology Integration Matrix score was 3.1- Technology is used to

deliver information to students, 4.1- students use technology to complete assigned activities that are generally unrelated to real world problems, and 5.1- students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate. While the lesson created a learning environment that had medium to high critical thinking level, the technology integration was entry level.

Interview Results

Six of the eight participating teachers were interviewed using the teacher interview protocol (Appendix A). Several themes emerged from the interview data. They included hesitant beliefs, personal use of technology, classroom use of technology, barriers, and recommendations for administration.

Hesitant Beliefs

One theme that emerged was a slightly hesitant belief in the integration of technology. None of the participants voiced a negative belief in the integration of technology, but only two participants indicated that they were enthusiastically committed to the cause of technology integration. Mattie Black said, "I think it is an asset to teaching that students can relate to" while Kristen Jones replied that she believed technology integrations was, "good in a way", and Sue Reid said that it is "probably excellent, but should not replace the real thing- classroom instruction." Dana Smart said that, "I'm not resistant to technology, but I'm not knowledgeable enough to do much with it, and Rita Smith said, "technology should be used to enhance lessons NOT be the entire lesson."

Four of the six responses expressed hesitant beliefs without being blatantly negative. Their positive belief responses had qualifiers such as "in a way" and "probably" or expressed

what they did not want or could not do rather than what they believed about technology integration as a whole.

Personal Uses of Technology

All of the participants use technology in their personal lives. The most frequent reason for personally using technology was to email (6/6) with internet research (4/6) as the second, and blogs or social networking sites (2/6) at a distant third. It is interesting to note that of the two participants that use social sites one is the study's Digital Native.

Table 3

Personal Use Categories and Frequency Noted by Participants

Reasons for personal use	Email	Research or school work	Blogs or social sites
Frequency	6	4	2

Classroom Use of Technology

The teachers were asked, "What technologies are most beneficial to your teaching, how do you use them, and how often do you use them?" Five of the six teachers said the Promethean Board or a technology used in conjunction with the Promethean Board such as the Internet or document projector was most beneficial. Also, it was stated or implied by the teacher's classroom practices that technology was used daily.

Mattie Black said, "This is the first year I have had a Promethean Board. I absolutely love it. I use it pretty much every day and all day. I can do anything from the board…" Lori Brown said that she uses, "the Promethean Board and computer daily with PowerPoints and

video," and Rita Smith uses, "the Promethean Board daily for interactive lessons… in all subjects."

Barriers

The study participants were each asked about their personal barriers to integrating technology more than they do now. They were specifically asked, "What would you define as your personal barriers to integrating technology more than you do now?" Every respondent answered with a Type I barrier. Type I barriers are external to the person, like access to equipment, professional development, inadequate administrative or technical support or insufficient time to plan or learn more about technology integration. No one gave a Type II barrier such as beliefs and perceptions as a person barrier.

For example Mattie Black's response that she has "self-confidence issues and …is afraid to break the equipment." Kristen Jones stated that her largest barrier was, "not being comfortable with it," and Rita Smith echoed the sentiment of the others in her response that she does "not know how to solve [technical] problems." Not having knowledge or the confidence that comes from that knowledge is a barrier that is associated with time spent in trainings to obtain the knowledge.

Recommendations for Administration

The last theme that emerged from the teacher interviews was their thoughts on what the administration needed to do in order for them to integrate technology more than they do now. Four of the six respondents gave professional development as their answer. Specifically Kristen Jones recommended that the administration, "offer enough classes to teach about the new equipment in our rooms. If you offer just one class and not all can fit in it, then there are those that are left in the dark. So offer more of the same class if there is a need for it." While Lori

Brown recommended "offering technology training on our in-service days." Dana Smart said, "I feel that younger teachers have more exposure to technology in college classes, and I need many more trainings." Rita Smith's response was simply, "more training."

Technology Integration Matrix (TIM) Results

Table 4

Technology Integration Matrix Rating Frequencies

TIM rating	*1.1*	*3.1*	*4.1*	*5.1*
Frequency	1	5	4	4

Each teacher's lesson was rated with the Technology Integration Matrix, and every lesson received at least two rating scores. Two lessons received three rating scores. The lessons were rated based on the activities of the lesson. The rating 3.1 had the highest level of frequency which was observed in five of the eight lessons observed.

This rating (3.1) is the intersection of a constructive learning environment and an entry level of technology integration. Although elements of a constructive learning environment were observed, it was not a constructive learning environment created with technology tools because the students were not using the technology. The Technology Integration Matrix (2007) assumes that the students are using the technology even though it defines Entry level as "the teacher uses technology to deliver curriculum content to students." Entry level is then rated as 1, and in this study, entry level continues to mean that the teacher uses the technology even though the learning environment ratings assume student use. This study wanted to make note of the changes in learning environment even though the level of technology adoption did not change.

Ratings 4.1 and 5.1 had an equal number of frequencies with four each. 4.1 is the

intersection of an authentic learning environment and an entry level technology integration, and 5.1 is the intersection of a goal directed learning environment and an entry level technology integration. The only other rating was 1.1 with a frequency of 1, and it is the intersection of an active learning environment and an entry level of technology integration.

Administrative Interview Results

Three of the four principals of the schools observed in this study were interviewed along with the technology supervisor. These participants are referred to as administration in this study. From the interview data, the following themes emerged: beliefs about technology integration, benefits of technology integration, beneficial technologies, barriers to technology integration, personal use, and ways to remove barriers.

Beliefs about Technology Integration

- Principals

The principals interviewed for this study all voiced a belief in the necessity of technology integration. Principal Beck believed that technology integration is, "completely necessary," and Principal Dyer stated that it needs to go deeper than being a "glorified overhead." Principal Cramer said that technology integration is "the future and should be."

- Technology Supervisor

The Technology Supervisor also believed in the integration of technology and said, "Technology should not be for technology's sake. There should be a purpose for its use and one that will be assisting the teacher. Technology should be like the textbook, a tool to help get the point across to the students."

Benefits of Technology Integration

- Principals

Another theme that emerged from the administrative interviews was the benefit of technology integration. Student engagement was the unanimous benefit voiced by all that were interviewed. Principal Cramer summed up the sentiment with the statement that when integrating technology "engagement, which I consider practically the 'magic bullet' of instruction, is tremendously increased in both quantity and quality."

- Technology Supervisor

The Technology Supervisor views about the benefits of technology integration were in line with the views of the principals. She said,

> Technology is a benefit in terms of what the students are used to seeing. We are teaching the Nintendo generation. These kids have been bombarded with technology for their entire lives and expect to see it on a daily basis. Technology allows teachers to tap into this aspect of their students. It therefore makes the student's learning more meaningful to them.

Most Beneficial Technologies

- Principals

Interactive hardware and software was the technology that the administrators voiced as most beneficial to their teachers' teaching. Each person interviewed specifically named the interactive Promethean Board. Principal Beck said, "software programs that allow students to play interactive games and Promethean boards which students can interact with during lessons" are the most beneficial.

- Technology Supervisor

The Technology Supervisor stated several types of technology including the computer and digital cameras. She said, "I feel that the interactive whiteboard is the one technology that

makes the most difference in the classroom." Other technologies that are used to "supplement the curriculum" and "that [they] find very beneficial… are flip cameras, gps units, digital microscopes, and 'Elmo'-type cameras" which are the document projectors.

Barriers to Technology Integration

- Principals

Knowledge or lack of confidence due to a lack of knowledge was the barrier that emerged from the administrative data. Three participants voiced this Type I barrier. The only other response was also Type I and it dealt with technical problems. Principal Beck said a barrier to her teachers' technology integration was, "teacher knowledge and level of comfort with technology use." Principal Cramer's response to barriers to his teacher's integration was, "knowledge of what is available."

- Technology Supervisor

The Technology Supervisor stated that, "Confidence is the key issue. Most teachers do not want to stand in front of these classes and possibly not know how to do something. It takes time to gain confidence."

Personal Use

All of the administrators use technology in their personal lives. The most frequent response was email with all four participants saying that they used it. The category with the next amount of frequency was social sites. Three of the four administrators interviewed said they use the social site Facebook.

Ways to Remove Barriers

- Principals

When asked "what do you think needs to be done in order for your teachers to integrate

technology more than they do now?" the response of two of the three principals interviewed was continued training. Principal Dyer's concern was that teachers have the opportunity to also have opportunities for "continued training in lesson design, not just how to use the Promethean board", and Principal Beck said her teachers need "continued training to increase their comfort and knowledge level and encouragement to integrate into their daily lessons on my part.

- Technology Supervisor

The Technology Supervisor said that teachers, "need time to gain the confidence that is necessary for technology to be seamlessly integrated. They need to build their own confidence levels and they need to find some success in their integration."

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

This study was designed to address two research questions, and have the voices of the classroom teacher answer. This chapter will give a summary of this study, discuss the finding of the study, and make recommendations for future study.

Summary of the Study

This investigation into the digital disconnect began as research into why students do more with technology than their teachers, and why teachers were not doing more with technology in their classrooms. It was apparent that barriers were present hindering the progress of teaching and learning with technology.

The research of many including Ertmer et al. (1999) and P. Rogers (2000) provided evidence that there were barriers to the integration of technology and also categorized them as first order or second order barriers to change. There were many different names given to these barriers and this research referred to the first order barriers that when removed change teaching practices as Type I and second order barriers that when removed change beliefs and attitudes as Type II.

In the midst of interviews and observations another disconnect that was not sought was uncovered. Teachers know their curriculum. They know their students. They know how to manage a classroom, and they know how to use technology. They do not know how to put it all together.

The voices of administrators were also heard in this study. They informed this research because their beliefs and practices shape the schools where these teachers are. All of the administrators hold beliefs that technology integration is necessary. All of the administrators voiced that their perceived benefit of integrating technology is student engagement, and they

want their students to interact with the technology. The views of the technology supervisor revealed an understanding of the technology development of the teachers in the district. Many of her views echoed their views, and she believes that with time these teachers will "seamlessly" integrate technology.

Findings of the Study

The voices of the teachers clearly answered the questions of this research.

1. What causes technology proficient teachers not to integrate technology consistently into their teaching practices?

2. What are the identifiable barriers that can be changed through professional development?

In addressing the first research question the findings of this study show that teachers do use technology consistently into their teaching practices. Every teacher in the study used some form of technology in her teaching, and stated or implied it through classroom routine that she used technology every day. This is credited to newly installed hardware and software such as the Promethean Boards and multi-media projectors that are in every classroom. Access to hardware and software was a Type I, external barrier that the school district addressed before the classroom observations for this study were made. An issue that arose echoes the concerns of Belland (2009) that there is a "lack of the common definition of the term" (p. 354) technology integration.

In the schools observed, technology is consistently used every day, based on the observations and the interviews of the teachers and the principals, but it is only used at an entry level of integration. The teachers are using the technology, but the students were not observed using technology to problem solve or make new products. The research also observed that these

are good teachers. This claim is supported by the fact that based on the Technology Integration Matrix they created a classroom atmosphere that fosters higher order thinking. When the teaching and learning moved into more critical thinking activities, the teachers were not using the technology.

This information led to an evolution of the first research question. The question grew from "why do teachers not use technology more?" to "why do teachers not use technology at deeper levels of critical thinking and at higher levels of adoption?"

The second research question, "what are the identifiable barriers that can be changed through professional development?" and the newly emerged question "why do teachers not use technology at deeper levels of critical thinking and at higher levels of adoption?" were both addressed in the interview data. The interview questions probed teachers for answers to what barriers keep them from doing more, and what can be done to encourage them to do more.

What emerged was that the disconnect is that teachers do not know how to use what they know about technology appropriately in their learning environments. While they are using technology as a part of their lessons and not just for technology's sake, they do not know ways to integrate it into the critical thinking activities. "Not Knowing" emerged as a barrier. It is categorized at Type I or external because it is not knowing because of a lack of training. Professional development opportunities to gain the knowledge to integrate at higher levels of integration and deeper levels of critical thinking exist in the Riverside School District such as the online classes that connect technology to specific grade-level curriculum standards, and trainings on WebQuests and geocaching in the classroom. What then emerges is that time for professional development is the barrier that needs to be overcome.

Another barrier that emerged from the interview data was the slightly hesitant beliefs the

teachers have about technology integration. The data showed that no one expressed a negative belief, but those that were fully persuaded about the importance and benefits of technology integration were in the minority.

It is important to remember that "teacher beliefs interact with first-order barriers to facilitate or limit teachers' technology use" (Ertmer et al., 1999, p. 67). Hesitant beliefs that say, "I'm not really sure I'm into all of this technology integration" can be a factor in why these teachers do not attend the professional development opportunities to gain the knowledge they need to do more. The Type II barrier, hesitant beliefs, combined with the Type I barrier, time for professional development is an example of the combination of Type I and Type II barriers that the literature shows retards the integration of technology into classroom practices (Ertmer et al., 1999; P. Rogers, (2000).

Although it was not overtly stated the following statement emerged from the data as the identifiable barrier. "Because I am not really into technology integration, I do not really perceive its benefits for my students, I do not make the time to know more about it. In order for me to do more, the trainings must be convenient to me." The theme of personal use also supports this statement. All of the teachers in the study use technology in their personal lives depending upon the benefit it is to them. Also, having only one or two computers in the classroom may be a barrier to continued integration with higher order thinking for teachers with hesitant beliefs.

Recommendations for Practice

"Belief systems are very resistant to change" (Ertmer et al., 1999, p. 67). With that in mind the following recommendations are made to address the Type II barrier, hesitant beliefs. Professional development that matches the level of use and the current beliefs should be used to give teachers a better understanding of technology integration, what it means, and what it looks

like in their classroom. With a better understanding exemplary teachers such as the ones in this study would be able to see more benefits. Technology proficient teachers understand the basics. They know how to use the Promethean Board, but they may not know how to create a lesson that involves a WebQuest in a one computer classroom. This also takes Belland's (2009) theory of habitus into account when planning professional development. These teachers do not have the experience of being taught with technology, and they may not have the experience of a more student- centered classroom that would foster the use of technology into more critical thinking activities. Professional development may reveal some resistance to the change of their personal habitus; therefore they must be continued over time.

One practical recommendation is to share benefits and examples of technology integration through email messages that highlight practical and applicable points from current research. While many classroom teachers may not have time to read and analyze the current research, their highlights can foster a better understanding. Another recommendation is to have video of technology integration in action to share with the teachers. The Technology Integration Matrix Web site has examples with videos of teachers using technology at different level of integration and learning environment.

In this study a lack of knowledge emerged as a barrier. Teachers with a lack of knowledge about using the technology tools they have in more critical thinking activities, and in ways that the students can use them, and teachers with hesitant beliefs do not only need to know how to use a Promethean Board; they need to know why it is beneficial to use a Promethean Board. In a school district with an administration with a shared vision of technology integration some issues, such as benefits to integrating technology, may appear evident to the administration, but not to the teachers. Professional development that once again focuses on the why of

technology integration and the fact that it can be beneficial in critical thinking activities is another strategy to attack the barrier of resistance and make changes in the teacher's personal habitus.

Recommendations for Future Research

Further study into the digital disconnect should focus on how to connect what teachers know about curriculum and students and teaching to what they know about technology. As time goes on, there will be fewer and fewer computer illiterate teachers. Professional development continues to address teacher technology proficiency. Research should continue to look into teacher proficiency with higher levels of technology integration and critical thinking.

Another recommended area for future research is looking into how teachers that are integrating at higher levels of technology integration and learning environments overcame their barriers. Their insight could be informative to technology leaders and teachers to help other teachers overcome their barriers.

If teachers are digital immigrants facilitating the education of students that are digital natives it is important that they understand what they are saying and why they are expressing it in a digital language. If they never attempt to speak, there will never be anything digital spoken in the classroom, but if the teachers attempt, even if they speak with an accent, the digital native will hear and help, and teaching and learning will continue.

REFERENCES

Baker, Patricia, & Baker, Paul (2004). Teacher adjustment to technology: Overcoming cultural mindsets. *Journal of Educational Technology Systems*. *33*, 147-156.

Barnett, H. (2001). *Successful k-12 technology planning: ten essential elements.* Syracuse, NY: ERIC Digest.

Becker, H. (2001). How are teachers using computers in instruction? Paper presented at the 2001 Meeting of the American Educational Research Association, Seattle W.A. Retrieved October 14, 2009, from http://crito.uci.edu/papers/TLC/findings/special3/How_Are_Teachers_Using.pdf

Becker, H. (2008) Does technology integration "work" when key barriers are removed?. Retrieved October 12, 2009, from http://tactl.unt.edu/pdf/AERA08_TACTLPaperAward_Lowther.pdf.

Belland, B. (2009). Using the theory of habitus to move beyond the study of barriers to technology integration. *Computers & Education*, 52, 353-364.

Bennett, S, Maton, K, & Kervin, L. (2008). The 'digital natives' debate: a critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.

Brinkerhoff, J. (2006). Effects of a long-duration, professional development academy of technology skills, computer self efficacy, and technology integration beliefs and practices. *Journal of Research on Technology in Education*, 39 (1), 22-43.

Broussard, J. (2006). *Site-based technology facilitators: Catalysts for achieving teacher technology proficiency in k-12 classrooms.* Unpublished doctor dissertation, Louisiana State University, Baton Rouge.

Buckenmeyer, J. (2008). Revisiting teacher adoption of technology: Research implications and recommendations for successful full technology integration. *College Teaching Methods & Styles Journal*, 4 (6), 7-10.

Cambre, M. & Hawkes, M. (2004). *Toys, tools, and teachers: The challenges of technology*. Lanham, MD: Rowman & Littlefield Education.

Chen, C. (2008). Why do teachers not practice what they believe regarding technology integration?. *Journal of Educational Research*, 102(1), 65-75.

Cook, K. (2008) Computers in the Classroom. *EBSCO Research Starters.* EBSCO Publishing.

Corona, D. (2008). A message from our superintendent. Retrieved March 18, 2009, from West Baton Rouge Parish Schools Web site: http://www.wbrschools.net/super.htm

Cuban, L. Kirkpatrick, H., & Peck C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. American Educational Research Journal, 38(4), 813-834.

Dede, C, Ketelhut, D, Whitehouse, B, Breit, L, & McCloskey, E. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education*, 60(1), 8-19.

Deslatte, M. (2009, January 20). Bringing La. teacher pay to Southern average would cost taxpayers $112 million. Retrieved March 18, 2009, from The Thibodaux Daily Comet Web site: http://www.dailycomet.com/article/20090120HURBLOG/901209859/1223?Title=Bringing_La_teacher_pay_to_Southern_average_would_cost_taxpayers__112_million

Dockstader, J. (1999, January). Teachers of the 21st century know the what, why, and how of technology integration. *T H E Journal*, *26*(6), 73. Retrieved June 3, 2008, from Academic Search Complete database.

Drent, M, & Meelissen, M. (2008). Which factors obstruct or stimulate teacher educators to use ICT innovatively?. *Computers & Education*, 51, 187-199.

email. (2009). In *Merriam-Webster Online Dictionary*. Retrieved October 19, 2009, from http://www.merriam-webster.com/dictionary/email

Ertmer, P, Addison, P, Lane, M, Ross, E, & Woods, D. (1999). Examining teachers' beliefs about the role of technology in the elementary classroom. *Journal of Research on Computing in Education*, 32(1), 54-71.

Ertmer, P., Lehman, J., Park, S., Cramer, J. & Grove, K. (2003). Adoption and use of technology-supported learner-centered pedagogies: Barriers to teachers' implementation. In D. Lassner & C. McNaught (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003* (pp. 1955-1958). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/14133.

Fickes, M. (2004). How much does technology really cost?. *School Planning and Management*, 43(5), 16-24.

Fullan, M. (2001). *The new meaning of educational change* (3rd ed.). New York: Teachers College Press.

Gülbahar, Y. (2008). ICT usage in higher education: *The Turkish Online Journal of Educational Technology*, *7*, Retrieved May 8, 2008, from http://www.tojet.net/volumes/v7i1.pdf

Hinson, J, Laprairie, K, & Cundiff, J. (2005). One size does not fit all. *THE Journal*, 32(11), 26-30.

Kerachsky, S. (2008, December 9). Commissioner's Remarks-NCES Statement on TIMSS 2007. Retrieved March 13, 2009, from National Center for Education Statistics Web site: http://nces.ed.gov/whatsnew/commissioner/remarks2008/12_9_2008.asp

Lee, J., & Reigeluth, C. M. (2009). Heuristic task analysis on e-learning course development: a formative research study. *Asia Pacific Education Review*. *10*, 169-181.

Li, Q. (2007).Student and teacher views about technology: A tale of two cities?. *Journal of Research on Technology in Education*. *39*, 377-397.

Louisiana State Department of Education. (2006). *Louisiana teacher technology proficiency self assessment.* Austin, TX: Southwest Regional Educational Laboratory.

Martin, W. & Shulman, S. (2006). *Intel teach essentials instructional practices and classroom use of technology survey report*. New York, NY: Center for Children and Technology.

National Academy of Sciences & National Academy of Engineering. (1995). *Reinventing schools: The technology is now!* [Online]. Available: http://www.nap.edu/readingroom/books/techgap/welcome.html

Obama, B. (2009, February 24). Remarks of President Barack Obama -- Address to Joint Session of Congress. Retrieved March 13, 2009, from The White House Web site: http://www.whitehouse.gov/the_press_office/remarks-of-president-barack-obama-address-to-joint-session-of-congress/

Palfrey, J, & Gasser, U. (2008). *Born Digital Understanding the First Generation of Digital Natives*. New York: Basic Books.

Park, S, & Ertmer, P. (2008). Examining barriers in technology-enhanced problem-based learning: Using a performance support systems approach. *British Journal of Educational Technology*, 39(4), 631-643.

Park, S., Lee, E., Blackman, J., Ertmer, P., Simons, K. & Belland, B. (2005). Examining the barriers encountered when planning and implementing technology-enhanced PBL in the middle school classroom. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference* 2005 (pp. 2039-2043). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/19362.

podcast. (2009). In *Merriam-Webster Online Dictionary*. Retrieved October 19, 2009, from http://www.merriam-webster.com/dictionary/podcast.

photoshop. (2009). In *Merriam-Webster Online Dictionary*. Retrieved October 19, 2009, from http://www.merriam-webster.com/dictionary/photoshop.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6.

Rogers, P. (2000). Barriers to adopting emerging technologies in education. *Educational Computing Research*, 22(4), 455-472.

Rogers, E. M. (2003) *Diffusion of innovations* (5th ed.). New York: Free Press.

Shattuck, G. (2007) *The Historical Development of Instructional Technology Integration in K-12 Education*. Retrieved October 13, 2009, from http://www.nowhereroad.com/technology_integration/readings/shattuck.pdf

Shi, M. & Bichelmeyer, B.A. (2007). Teacher's experiences with computers: A comparative study. *Educational Technology & Society* 10(2), 180-190.

Simonson, M, Smaldino, S, Albright, M, & Zvacek, S. (2003). *Teaching and learning at a distance foundations of distance education*. Upper Saddle River, New Jersey: Merrill Prentice Hall.

Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development. *Journal of Staff Development, 10* (4). Retrieved August 20, 2003 from http://www.nsdc.org/library/jsd/sparks104.html

Tapscott, D. (1999). Educating the net generation. *Educational Leadership*, 56(5), 6-11.

teach. (2009). In *Merriam-Webster Online Dictionary*. Retrieved April 4, 2009, from http://www.merriam-webster.com/dictionary/teach.

texting. (2009). In *Merriam-Webster Online Dictionary*. Retrieved October 19, 2009, from http://www.merriam-webster.com/dictionary/texting.

The Technology integration matrix. (2007). College of Education, University of South Florida, Tampa, Florida. Retrieved from http://fcit.usf.edu/matrix/download/indicators.pdf

U.S. Department of Education, (2002). *No Child Left Behind Act* (Public Law 107-110). Washington, DC: Retrieved from http://www.ed.gov/policy/elsec/leg/esea02/107-110.pdf

U.S. Department of Education Office of Educational Technology. (2004). *Toward a new golden Age in American education: How the Internet, the law and today's students are revolutionizing expectations.* Washington, D.C.

Whitehead, B, Jensen, D, & Boshchee, F. (2003). *Planning for Technology A Guide for School Administrators, Technology Coordinators, and Curriculum Leaders*. Thousand Oaks, CA: Corwin Press, Inc.

Yamagata-Lynch, L. (2003).How a technology professional development program fits into teachers' work life. *Teaching and Teacher Education*. *19*, 591-607.

APPENDIX A

INTERVIEW PROTOCOL
FOR
TEACHERS, PRINCIPALS, AND TECHNOLOGY SUPERVISOR

Interview Protocol

Teachers

1. Tell me about yourself
    a. What you teach, how long have you taught, how long have you been at this school?
    b. The best part about your job
    c. The worst part about your job
2. Define Technology Integration.
3. What are your beliefs about technology integration?
4. What technologies are most beneficial to your teaching, how do you use them, and how often do you use them?
5. What would you define as your personal barriers to integrating technology more than you do now?
6. In what ways is technology a benefit to teaching and learning in your classroom?
7. In what ways is technology a hindrance to teaching and learning in your classroom?
8. How do you use technology in your personal life?
9. How does technology fit into your established classroom practices (schedule or routine you've created over the years)?
10. What do you think the school and district need to do in order for you to integrate technology more than you do now?

Principals

1. Tell me about yourself
    a. What did you do prior to becoming a principal?
    b. How long have you been in administration?
    c. How long have you been at this school?
2. Define Technology Integration.
3. What are your beliefs about technology integration?
4. What technologies do you believe are most beneficial in your teachers' teaching?
5. What would you define as barriers to your teachers' integrating technology more than they do now?
6. In what ways is technology a benefit to teaching and learning in the classrooms at your school?
7. In what ways is technology a hindrance to teaching and learning in the classrooms at your school?
8. How do you use technology in your personal life?
9. How does technology fit into the established classroom practices (schedule or routine you've created over the years) of your teachers?
10. What do you think needs to be done in order for your teachers to integrate technology more than they do now?

Technology Supervisor

1. Tell me about yourself
    a. What did you do prior to becoming the technology supervisor?
    b. How long have you been in administration?
    c. How long have you been in this district?
2. Define Technology Integration.
3. What are your beliefs about technology integration?
4. What technologies do you believe are most beneficial in your teachers' teaching?
5. What would you define as barriers to your teachers' integrating technology more than they do now?
6. In what ways is technology a benefit to teaching and learning in the classrooms at your schools?
7. In what ways is technology a hindrance to teaching and learning in the classrooms at your schools?
8. How do you use technology in your personal life?
9. How does technology fit into the established classroom practices (schedule or routine you've created over the years) of your teachers?
10. What do you think needs to be done in order for your teachers to integrate technology more than they do now?

APPENDIX B

TECHNOLOGY INTEGRATION MATRIX

Technology Integration Matrix		Levels of Technology Integration into the Curriculum				
		Entry: The teacher uses technology to deliver curriculum content to students.	**Adoption:** The teacher directs students in the conventional use of tool-based software. If such software is available, this level is the recommended entry point.	**Adaptation:** The teacher encourages adaptation of tool-based software by allowing students to select a tool and modify its use to accomplish the task at hand.	**Infusion:** The teacher creates a learning environment that infuses the power of technology tools throughout the day and across subject areas.	**Transformation:** The teacher creates a rich learning environment in which students regularly engage in activities that would have been impossible to achieve without technology.
Characteristics of the Learning Environment	**Active:** Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	Students use technology for drill and practice and computer based training.	Students begin to utilize technology tools to create products, for example using a word processor to create a report.	Students have opportunities to select and modify technology tools to accomplish specific purposes, for example using colored cells on a spreadsheet to plan a garden.	Throughout the school day, students are empowered to select appropriate technology tools and actively apply them to the tasks at hand.	Given ongoing access to online resources, students actively select and pursue topics beyond the limitations of even the best school library.
	Collaborative: Students use technology tools to collaborate with others rather than working individually at all times.	Students primarily work alone when using technology.	Students have opportunities to utilize collaborative tools, such as email, in conventional ways.	Students have opportunities to select and modify technology tools to facilitate collaborative work.	Throughout the day and across subject areas, students utilize technology tools to facilitate collaborative learning.	Technology enables students to collaborate with peers and experts irrespective of time zone or physical distances.
	Constructive: Students use technology tools to build understanding rather than simply receive information.	Technology is used to deliver information to students.	Students begin to utilize constructive tools such as graphic organizers to build upon prior knowledge and construct meaning.	Students have opportunities to select and modify technology tools to assist them in the construction of understanding.	Students utilize technology to make connections and construct understanding across disciplines and throughout the day.	Students use technology to construct, share, and publish knowledge to a worldwide audience.
	Authentic: Students use technology tools to solve real-world problems meaningful to them rather than working on artificial assignments.	Students use technology to complete assigned activities that are generally unrelated to real-world problems.	Students have opportunities to apply technology tools to some content-specific activities that are based on real-world problems.	Students have opportunities to select and modify technology tools to solve problems based on real-world issues.	Students select appropriate technology tools to complete authentic tasks across disciplines.	By means of technology tools, students participate in outside of-school projects and problem-solving activities that have meaning for the students and the community.
	Goal Directed: Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	Students receive directions, guidance, and feedback from technology, rather than using technology tools to set goals, plan activities, monitor progress, or self-evaluate.	From time to time, students have the opportunity to use technology to either plan, monitor, or evaluate an activity.	Students have opportunities to select and modify the use of technology tools to facilitate goal-setting, planning, monitoring, and evaluating specific activities.	Students use technology tools to set goals, plan activities, monitor progress, and evaluate results throughout the curriculum.	Students engage in ongoing metacognative activities at a level that would be unattainable without the support of technology tools.

Adapted from the Florida Center for Instructional Technology, College of Education, University of South Florida. http://fcit.usf.edu/matrix/

APPENDIX C
LETTER TO PARTICIPANTS

DOCTORAL STUDY CONSENT FORM FOR INTERVIEWEES

Researcher: Deidra B. Johnson
Djohn43@tigers.lsu.edu
3038 Yorktown Drive
Baton Rouge, Louisiana 70808
225-921-9526

Dear Study Participant,

Thank you for agreeing to participate in my research study, The Digital Disconnect: Uncovering Barriers that Sustain the Phenomena of Unplugged Teachers in a Technological Era. The purpose of this research project is to hear the voice of teachers concerning technology integration in their classroom and to fulfill the requirements for the degree of Doctor of Philosophy at LSU. Teachers from your school district along with principals and the Technology Supervisor will be interviewed in order to search for answers to my research questions.

Data for this study will be collected in two phases for the teachers. The first is an interview. The second phase is classroom observation of a lesson that incorporates technology. The principals and supervisor will only be interviewed. All interviews and observations will be private and your identity will not be revealed. Your real name, school location, and school district will be given pseudonyms that will be used in everything written about this study.

You may contact me with any questions or suggestions about this study by phone or email. Because your participation is voluntary you have the right to withdraw from the study at any time without penalty or consequence.

Thank you for your cooperation in this research.

Deidra B. Johnson
Researcher

This study has been discussed with me and all of my questions have been answered. I understand that I can contact Robert C. Matthews, LSU Institutional Review Board at 225-578-8692 or irb@lsu.edu with questions about my rights any concerns about this study. I agree to participate in this study and acknowledge my right to receive a copy of this signed consent form.

Study Participant Signature:_____ Date:_____

APPENDIX D

INSTITUTIONAL REVIEW BOARD CONSENT FORM

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

Institutional Review Board
Dr. Robert Mathews, Chair
203 B-1 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu | lsu.edu/irb

- Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://www.lsu.edu/irb/screeningmembers.shtml
- A Complete Application Includes All of the Following:
  (A) Two copies of this completed form and two copies of parts B thru E.
  (B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1 & 2)
  (C) Copies of all instruments to be used.
  - If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.

  (D) The consent form that you will use in the study (see part 3 for more information.)
  (E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB.
  Training link: (http://phrp.nihtraining.com/users/login.php.)

1) Principal Investigator: Deidra Johnson **Rank:** _____ **Student*? Y/N** Y

Dept.: Ed Theory Policy... **Ph:** 225-921-9526 **E-mail:** djohn43@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each
* If student, please identify and name supervising professor in this space
Dr. Janice Hinson
Dr. Earl Cheek

3) Project Title: The Digital Disconnect: Uncovering Barriers that Sustain the Phenomena of Unplugged Teachers in a Technological Era

4) LSU Proposal?(yes or no) no **If Yes, LSU Proposal Number** _____

Also, if YES, either ○ **This application completely matches the scope of work in the grant**
OR
○ **More IRB Applications will be filed later**

5) Subject pool (e.g. Psychology Students) K-12 Teachers

- Circle any **"vulnerable populations" to be used**: (children <18; the mentally impaired, pregnant women, the aged, other) Projects with incarcerated persons cannot be exempted.

6) PI Signature Deidra B. Johnson **** Date** 6/23/09 (no per signatures)

****I certify my responses are accurate and complete.** If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Study Exempted By:
Dr. Robert C. Mathews, Chairman
Institutional Review Board
Louisiana State University
203 B-1 David Boyd Hall
225-578-8692 | www.lsu.edu/irb
Exemption Expires: 7-10-2012

IRB-E16-X LSU Proposal# ____
X Completed Application
X Human Subjects Training

Screening Committee Action: Exempted X Not Exempted ____ Category/Paragraph 1
Reviewer: Mathews **Signature:** Robert C. Mathews **Date:** 7/7/09

VITA

Deidra LaNice Brown Johnson was born April 1973, in Opelousas, Louisiana. She is the daughter of Rev. JD and Mrs. Bernice Fontenot Brown. Deidra graduated from Christian Life Academy in 1991, and earned a Bachelor of Arts in English from Louisiana State University in 1994. She then completed her graduate course work to earn a Master of Education in 1996. For six years Deidra taught in the East Baton Rouge Parish School district teaching English at Capitol High School.

In 2003, Deidra returned to Louisiana State University as a full-time doctoral student pursing a Doctor of Philosophy degree in educational leadership with a specialty in educational technology. While a doctoral student Deidra has taught introductory technology integration classes at the University. She also began consulting with school districts to design and present professional development workshops.

Deidra currently resides in Baton Rouge, and is married to W. Eric Johnson, Jr. They have two daughters, Kyla LaNice and Kari Machelle Johnson.