TECHNOLOGY IN EDUCATION: TECHNOLOGY INTEGRATION INTO THE SCHOOL'S CURRICULUM

A Dissertation

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DEDICATION

I would like to dedicate this Dissertation to my wife, Mrs. Evon Culver, who has been a constant source of support and encouragement during the challenges of life, my career, and Graduate school. I am truly thankful for having you in my life. My work is also dedicated to my parents, Mr. Bobby Culver, Sr. and Mrs. Roberta W. Culver, who have always loved me unconditionally, provided support for me any time when needed, and taught me to be strong and work hard for the things that I aspire to achieve.

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ABSTRACT

Integrating technology into the school's curriculum is a very contentious issue. However, it is an important issue that schools need to consider and assess. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. This research study is significant as it informed teachers and education leadership more of teachers' perceptions about technology integration. This is a quantitative study to identify the problems that teachers are having about integrating technology into their school's curriculum (Inan & Lowther, 2010). The quantitative method focused on collecting data from teachers at several schools in South Georgia. The study analyzed numerical data from a survey of at least 125 participants to ascertain if technology integration relates to the constructs (teachers' proficiency of technology equipment, experience with technology, and technology training) using multiple regressions. To confirm if teachers' proficiency of technology equipment, experience with technology, and technology training impacts technology integration, this research study examined the relationships of these constructs. One hundred twenty-five school teachers (K – 5th grade) out of a population of two hundred and fifty teachers participated to provide data for the study. The researcher conducted the study by traveling to each educational institution and provided copies of the survey to be completed by the teachers. This process is furthered explained in the Methodology section.

The study examined Christensen's Disruptive Innovation Theory as applied to technology integration which is used to integrate technology to improve teaching and learning. Educators must be proactive in learning and teaching with technology to help lessen the technology gap that exists in and out of school for our students (Brown et al., 2001). The Christensen's (2008) Disruptive Innovation Theory supports this study. Christensen's (2008) disruptive innovation theory remains a viable theoretical foundation for examining the barriers to technology integration encountered by the school in its efforts to use technology to improve teaching and learning practices. The disruptive innovation theory explains why some organizations struggle with specific innovations while outlining strategies for predictable organizational success (Christensen, 2008).

Previous research has investigated several schools but the results were inconclusive or contradictory. Thus, many researchers have concluded that more research is needed. Teachers integration of technology has been investigated for a long time. Research has shown, however, there has not been much progress in teachers' integration of computers in their lessons over the last 20 years (Culp, Honey, & Mandinach, 2003).

This study provided new insight and a starting point for more quantitative investigations into teachers integrating technology into the school's curriculum. It is the educator who is the determining factor in whether technology is successfully integrated into the classrooms and schools (Brown et al., 2001).

This study also provided a clear understanding of teachers' perceptions related to the integration of technology into the school's curriculum. The study had limitations mainly because of the study population. This study was limited to the state of Georgia and to the teachers in grades K-5. The implication of the study was to prepare teachers for technology integration into

the school's curriculum, so that they can have a better understanding about educational technology and help to increase their student's knowledge in using educational technology for learning. The study helped to determine if teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training have a significant impact on the integration of technology into the school curriculum.

Statistical tests supported all hypothesis. The research findings concluded that teachers' proficiency of technology equipment, experience with technology in education, and technology training significantly impacts the integration of technology into the school's curriculum. Demographic and covariables of age, gender, grade level, and education level does not significantly impact the integration of technology into the school's curriculum.

CHAPTER I: INTRODUCTION

Introduction

Technology has become a powerful tool for enhancing educational settings (Sandholz, Ringstaff, & Dwyer, 1997). Educators promote the use of technology in education in a variety of ways, but some educators (teachers) are still having problems with integrating technology into the school's curriculum. Technology should be viewed as one means of solving some of the problems which teachers face in their teaching and which learners face in their learning (Williams, 2000). According to Pisapia, integrating technology with teaching means the use of learning technologies to introduce, reinforce, supplement, and extend skills (1994). This study provided up-to-date data in regards to teachers' proficiency of technology equipment, experience with technology in education, and teachers' technology training in regards to the integration of technology into the school's curriculum.

Teaching with technology isn't just about staying current on the latest tools, it's about knowing how to successfully incorporate technology into teaching. According to Brand's research, it states that if teachers are going to effectively incorporate technology then they must possess confidence, understanding, and skills that come from adequate training and development (1997). Teachers need technology training to be proficient with technology equipment. By having the sufficient technology training, it gives teachers more confidence and certainty about integrating technology into the school curriculum. Within the technology-rich environment in a Middle Eastern university, Schoepp found that faculty were unsure about how to use technology in the classroom properly, and this uncertainty is attributed to insufficient training (2004).

This proposed study is significant as it informs teachers and education leadership of the influences that teachers' proficiency, experience, and technology training can have during the

planning and implementation of integrating technology into the school's curriculum. To best meet the requirements of educational institutions and enhance future teachers and student's experiences, this proposed study examined the relationships of these constructs.

Problem Statement

Several schools in South Georgia have currently experienced a process of educational changes resulting from technology integration into the school curriculum. These schools cannot expect to obtain student achievement gains from technology if teachers do not implement it in an effective manner (Mills, 1999). Technology should be well mastered by classroom teachers to have a positive outcome in the teaching and learning process (Al-Batainah, 2008).

The problem in this study is that many classroom teachers are still uncomfortable in integrating technology in their classroom curriculum. Some of the reasons for not integrating technology in their classroom curriculum are because teachers lack proficiency of technology equipment, experience with technology in education, and technology training. A lot of teachers are still unprepared or unable to understand new technologies.

Technology can be an invaluable tool for teachers to engage students and to enhance the learning process. There are significant challenges preventing effective integration of technology in the classroom. Key among all challenges is the lack of adequate, ongoing professional development for teachers who are required to integrate new technologies into their classrooms. There are several research questions below that were created to guide this study about the integration of technology into the school curriculum.

Study Purpose

The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. This study is an important addition to research on the integration of technology. Effective training involves activities which demonstrate ways to use technology as a tool for teaching and reinforcing curriculum standards (Baylor & Ritchie, 2002). Many states have technology requirements for the preparation of teachers. States and school districts that want to ensure that students reach technology goals should mandate educational technology courses prior to teacher certification (Rosenfeld & Martinez-Pons, 2005).

Technology integration depends on the teacher principles, available technologies, and the expectations. The Christensen's (2008) Disruptive Innovation Theory and the Distribution Cognition theory (Hollan, Hutchins, and Kirsh, 2000) supported this study. Christensen's (2008) disruptive innovation theory remained a viable theoretical foundation for examining the barriers to technology integration encountered by the schools in its efforts to use technology to improve teaching and learning practices. The disruptive innovation theory explained why some organizations struggle with specific innovations while outlining strategies for predictable organizational success (Christensen, 2008). It also served as the platform for examining the challenges and barriers that must be identified and addressed within an organization.

According to Simonson (2010), organizations can rely on the principles of disruptive innovation to provide the beliefs for explaining why certain innovations, including technology, have the potential to redefine a specific industry of practice while others simply sustain existing practices.

Distribution Cognition theory (Hollan, Hutchins, and Kirsh, 2000) is also similar to Disruptive innovation theory. It emphasized that the accumulation of knowledge is not relied on the individual's effort, but depends on other people, learning environment, and tools. In the field of educational technology, this theory had been widely applied in distance education, computer-assisted collaborative learning, and the development of computer-assisted-learning tools. These theories have a very large impact on technology and integration of technology into the schools to improve teaching and learning practices for the students.

Data was collected from a survey distributed to participating educational institution's teachers and analyzed with the Statistical Package for the Social Sciences (SPSS).

Research Questions

This proposed study was guided by the following research questions:

1. Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?
2. Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?
3. Does teachers' technology training have an impact on the integration of technology into the school's curriculum?
4. Does teachers' proficiency of technology equipment, teachers experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

CHAPTER II: LITERATURE REVIEW

Definition of Key Terms

Education technology. In this study, educational technology was used frequently to emphasize that educational technology is needed in the classroom curriculum, and teachers needed to integrate this technology in the schools (K – 5th grade) to assist in the process of teaching and learning. (examples of educational technology: computers, iPads, smartboards, and mobile devices)

Technology Integration. In this study, technology integration means that this process is used by teachers in schools or educational institutions to integrate technology into the school's curriculum to allow students to apply computer and technology skills to learning and problem-solving. Teachers are having difficulties in integrating technology. If teachers are provided with the necessary resources to be proficient with technology equipment, had more experience with educational technology, and provided more technology training, they would be able to integrate technology in the classroom effectively.

Teachers' Proficiency. In this study, teachers' proficiency means that teachers are not well advanced in educational technology and do not have proficient knowledge of technology equipment to integrate technology into their school's curriculum. If teachers are proficient with technology, they would be able to integrate technology in the classroom effectively.

Teachers Training. In this study, teachers' training means that teachers are not receiving the necessary training to become knowledgeable, skilled, and prepared to effectively perform the process of integrating technology into their school's curriculum. By providing teachers with technology training, they would be able to integrate technology in the classroom effectively.

Introduction

The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. This study specifically researched the integration of technology in the school's curriculum.

This chapter provided an analysis of research literature that focuses on integration of technology in the school's curriculum. Students require technical engagement in the classroom to prepare for a world of technology. Teachers are responsible for connecting the gap between what happens in the classroom and what students will be expected to achieve. This generation of children have the right to become prepared for the work force and Miller and Van-Fossen (2008) stressed that the need for more technology integration opportunities for teachers is substantial.

Historical Relationship between Technological Integration and Education

To discuss the integration of technology into the classroom, the historical relationship between technological innovation and education needed to be reviewed. A meaningful integration of technology in the classroom can be traced back to the early part of the 20th century when visual aids such as films, pictures, and lantern slides were commonly used in public schools (Reiser & Dempsey, 2007). Then came motion picture projectors, sound motion pictures, the radio, the television, Video Cassette Recorders (VCRs), computers and the Internet in chronological order. How did they change our learning and teaching? Here are some historical stories which can give us some ideas. In 1913, Thomas Edison announced, "Books will soon be obsolete in the schools. It is possible to teach every branch of human knowledge with the motion

picture (Reiser & Dempsey, 2007)." "A medium that gained a great deal of attention during this period (1920s and 1930s) was radio. By the early 1930s, many audiovisual enthusiasts were hailing radio as the medium that would revolutionize education. However, contrary to these sorts of predictions, over the next 20 years' radio had very little impact on instructional practices (Reiser & Dempsey, 2007)." "Perhaps the most important factor to affect the audiovisual movement in the 1950s was the increased interest in television as a medium for delivering instruction. By the mid-1960s, much of the interest in using television for instructional purposes abated (Reiser & Dempsey, 2007)." "For example, in 1984, Papert indicated that the computer was going to be catalyst of very deep and radical change in the educational system and that by 1990 one computer per child would be very common state of affairs in schools in the United States (Reiser & Dempsey, 2007)." With the exception of computers and the Internet, Reiser and Dempsey argues, "As a new medium enters the educational scene, there is a great deal of initial interest and much enthusiasm about the effects it is likely to have on instructional practices. However, enthusiasm and interest eventually fade, and an examination reveals that the medium has had a minimal impact on such practices (2007)." During the last decade, the use of the Internet and personal computer in the classrooms at all levels has become very common as the speed of the Internet increased and the processing power of the PC has tremendously improved.

Per President Reagan's request, the National Commission on Excellence in education was created August 26, 1981. The purpose of the commission was to analyze the state of the U.S. education system, as it was believed the nation has lost focus of the things that made it a top nation and that other countries such as Japan and South Korea were making gains that will challenge the global economic position of the U.S. The analysis completed by the commission resulted in a report known as A Nation at Risk: The Imperative for Educational Reform, now

considered a landmark in education. The report spoke to the welfare of the American people and the disfranchising from society if individuals are not fully prepared to enter the Information Age. The report also yielded several recommendations for addressing the issues presented therein. One key recommendation affecting this doctoral research study is that the report advised adding computer science coursework as a high school graduation requirement (Gardner, 1983). Adding the graduation requirement triggered the dissemination of computers throughout U.S. public schools. Since A Nation at Risk, public schools invested billions of dollars in technology (Dickard, 2003). An initial evaluation of education technology was initiated in 1986 by Congress, which charged the Office of Technology Assessment (OTA) to determine technology usage by American schools. The reports (OTA, 1988, 1989, 1995) by OTA suggest that technology integration is at the discretion of the classroom teacher. The OTA (1995) study found that teachers have been overlooked in the process of integrating technology into education. The focus was on the dissemination of technology. The results of the report advised that teachers need time to discover what technologies can do, time to learn how to operate technology, and time to master applying technology in their classroom.

Literature on the Use of Technology in Schools

It was the research literature on the use of technology in schools, most notably, the Apple Classrooms of Tomorrow (ACOT) longitudinal study (Ringstaff, Sandholtz, & Dwyer, 1991; Ringstaff, Yocam, & Marsh, 1996; Sandholtz, Ringstaff, & Dwyer, 1994; Sandholtz et al., 1997) which began in 1985 and continued for over a decade that marked a key effort towards improving student outcomes. The focus became broader than student learning outcomes as the researchers attended to student learning activities, teacher behaviors, competencies and

characteristics as well as teacher preparation and training. The framework and results of the ACOT studies are important to an understanding of technology in schools.

ACOT was a research and development collaboration among public schools, universities, research agencies, and Apple Computer, Inc. At the beginning, the study consisted of seven classrooms that represented a cross-section of America's elementary and secondary schools. Over the years, the overall project goal remained to study how the routine use of technology by teachers and students might change teaching and learning (Sandholtz et al., 1997). Mainly, it secured the concept of technology-infused classrooms and broadly influenced much of the following research/literature on the subject. In fall of 1986, each of the ACOT sites began with one classroom per school with additional classrooms, staff, and students joining in subsequent years. "The operating principle in ACOT classrooms was to use the media that best supported the learning goal" (Sandholtz et al., 1997). The 1986 vision of technology in education of the study was more far reaching than simply putting computers in schools as teaching machines, "Technology was viewed as a tool to support learning across the curriculum" (Sandholtz et al, 1997).

The ACOT vision was to transform traditional knowledge instruction classrooms into knowledge construction classrooms. ACOT researchers viewed technology as a necessary and catalytic part of such a transformation. A knowledge construction classroom would emphasize problem solving, conceptual development, and critical thinking. It is significant to review this era in history to understand that the primary lesson learned as a result of ACOT is that technology alone cannot improve teaching and learning. Furthermore, technology must be "grounded firmly in curriculum goals, incorporated in sound instructional processes, and deeply integrated with subject-matter content" (Baker, Herman, & Gearhart, 1996).

Apple Classrooms of Tomorrow (ACOT) was the first large-scale initiative to provide one-to-one computer access to students and teachers. The program operated in 13 schools from 1985 to 1998. Evaluations of ACOT concluded that participating students developed collaborative, problem-solving, and communication skills, became more independent learners, and had increased levels of self-confidence (Marshall, 2002; Cooley, 2001; Apple Computer, 1995).

Merging Technology with Education

Merging technology with education can enhance the quality of instruction and can provide continuous assessment of students' progress. Furthermore, the effective integration of technology into the classroom should happen across the curriculum. The people who create the curriculum should be more involved in the implementation of technology in the classroom (Woodward & Cuban, 2001). This would ensure that the teachers have more understanding of the technology and how to use it in the classroom.

Integrating technology in education can play an important role in productivity and effectiveness. The teachers who learn to integrate technology into existing curricula teach differently than teachers who did not have such training or support from the institution (Christensen, 2002). Although many educational systems have rapidly embraced digital technologies, the effective inclusion of these technologies into teaching practice has encountered, and continues to encounter, practical and pedagogical barriers (Wood, Specht, Willoughby, & Mueller, 2008). The need for effective use of technology in the classroom is the most important factor in students' success.

Computers and other technology have been circulated throughout U.S. public schools. Researchers found that approximately 18 million computers exist in schools (Farby & Higgs,

1997). Other researchers found that 100% of U.S. public schools have an Internet connection and computers somewhere in their building (Plomp, Anderson, & Law, 2009). With all the school districts investing in technology, over time the computer-to-student ratio has increased; in evidence of this, Belland (2009) found that there was one computer for every four students.

Impact of Technology Integration

Stratham and Torell (1999) reviewed 200 studies on the effects of technology on student learning. They concluded that, when integrated appropriately, the introduction of technology into classrooms led to increased teacher-student interaction and encouraged cooperative learning, collaboration, problem solving, and inquiry. In addition, students in computer classrooms were found to have fewer absences and lower dropout rates.

Waddoups (2004) analyzed 34 research studies that examined the impact of technology integration on student outcomes. He concluded that the use of technology in the classroom was tied to increased student motivation, more positive attitudes, and higher levels of self-esteem.

The Northwest Regional Educational Laboratory's (2001) review of research on technology use with young children concluded that computers contributed to their cognitive and social development, increased motivation, and improved self-concept and attitudes toward learning.

A study conducted on a one-to-one computing initiative at 150 middle schools in British Columbia concluded that the integration of laptops into the curriculum had a positive impact on students' attitudes, motivation, and work habits. Students were reported to be better organized, feel more responsible for their own learning, and have more confidence in their abilities (eSchool News, 2004).

East Rock Elementary School in Connecticut provided all third and fourth grade students with their own laptops and fifth grade students with access to laptops in libraries. Teachers reported that students' motivation increased and that the computers encouraged student sharing, peer help, and peer communications. Students said computers made learning more interesting and fun and that they felt more responsible for their own learning (Delisio, 2005).

An evaluation of programs that introduced interactive video applications into Ohio and South Dakota schools concluded that students had fewer absences following technology integration. Students were reported to be more engaged in their learning and to demonstrate higher levels of self-esteem and increased responsibility for their own learning (Hawkes & Cambre, 2001).

An evaluation of the Technology Immersion Pilot (TIP) program in Texas high-need middle schools concluded that the program had a positive impact on students' attitudes and behavior. A comparison of students at 22 TIP schools and 22 control schools found that TIP students reported higher levels of school satisfaction and were more engaged in their classwork. TIP students had fewer disciplinary referrals and fewer suspension rates than control students. The program did not appear to have an impact, however, on students' attendance rates (Texas Center for Educational Research, 2006).

Morgan and Ritter (2002) compared students taking algebra with a traditional curriculum versus those taking algebra with Cognitive Tutor (CT) software in five Oklahoma middle schools. They found that students in CT courses felt more confident about their math abilities and were more likely to rate math skills as useful.

Teachers' Proficiency of Technology Equipment

Teachers need specific knowledge and skills that utilize technology for education. Integrating technology into teaching means considering the needs of the students, the curriculum, and available technology, as well as the lesson planning and media design issues, and somehow combining them into a practice that will enhance student learning (Hennessy, Ruthven, & Brindley, 2005).

Ability and usage are similar constructs. It was not obvious to the researchers in the early days that it was necessary to separate ability and usage when examining teachers' proficiency of technology integration. Frequency of usage was often employed as the indicator of teachers' capability to integrate computers. In a large-scale survey by Becker (1999), teachers' frequency of computer or Internet use was the key indicator for their measure of technology integration proficiency. Teachers were asked to specify frequency in terms of "do not use," "occasionally," "weekly," and "more often" on technology use items such as using information from Internet in lessons, using electronic mail to communicate with teachers in other schools, and posting information to the Internet. With this framework, teachers who are not using technology are usually assumed to lack competency or proficiency. Usage, therefore, has been a proxy for teachers' ability.

The Maine Learning Technology Initiative (MLTI) provided all seventh and eighth grade students and their teachers statewide with laptop computers. An evaluation of the program concluded that students believed laptops had facilitated their learning and improved the quality of their work. Teachers reported that students became more engaged in their learning and produced more and greater quality work (Silvernail & Gritter, 2007).

The Mitchell Institute (2004) published findings from surveys of students and faculty at Maine's Piscataquis Community High School, following three academic years of Maine Learning Technology Initiative (MLTI) implementation. Survey results indicated that the laptop program was perceived to increase student motivation, peer collaboration, and interest in school and to improve interactions between students and staff. Teachers and students believed the program had improved the quality of student work and expanded opportunities for personalized learning. The daily student attendance rate improved from 91 percent to over 98 percent. The greatest improvements were seen for at-risk and low-achieving students.

The Tech-Know-Build Laptop Project provided laptops and wireless Internet access to middle school students and teachers in two Indiana cities. A four-year study concluded that following the introduction of the initiative, students were more engaged in their schoolwork, developed better organizational skills, and had fewer absences and disciplinary referrals (Rockman, 2004).

Multiple evaluations have been conducted of Microsoft Corporation's Anytime Anywhere Learning Project, a program that provided students and teachers at 800 schools with laptops for use at school and at home. Evaluations consistently reported that, following implementation of the initiative, students were more involved in their school work, collaborated more with their peers, directed their own learning, and relied more heavily on active learning strategies (Donovan, Hartley, & Strudler, 2007; Gulek & Demirtas, 2005; Microsoft, 2000).

Classrooms for the Future provided laptops and software to high school classrooms in Pennsylvania. The program began in 2006-07 and calls for implementation in all Pennsylvania public high schools by 2009. An evaluation of the program's first year found no increase in the percent of students engaged in their class work. However, among students already rated as

engaged, their levels of engagement were reported to increase, and they appeared to spend significantly less time off-task (Jobe & Peck, 2008).

Grable and Curto (2001) reviewed the literature from 1990 to 1999, examining the use of computer-related technologies in middle school mathematics and science settings. Their investigation began with the structure of the middle school as the environment for technologies, the benefits of varying technologies, student issues surrounding the technologies, and the professional development issues surrounding teachers' implementation of technology in the classroom. They found several types of technology used in science and math classrooms: 13 CD-ROMs for computer-aided instruction, hypermedia-assisted instruction as exemplified by the Web, microcomputer-based laboratories, and calculator-based laboratories. These technologies can be combined with principles of best practice to support a learning environment that integrates active learner involvement, critical thinking, and inquiry.

They further reported that these technologies can serve the needs of many types of learners and can be an asset for the teacher willing to approach students as a facilitator. The use of technology tools can promote inquiry-based activities by allowing collection of large numbers of data points, short time intervals, and quick graphing. Teachers' adoption of the technology tools may depend on issues with professional development, technical support, administrative support, subject matter preparations, student behavior, and management (Grable & Curto, 2001).

Teachers' Experience with Technology in the Schools

Teachers' personal experiences with technology, as well as previous successful instruction with technology, are important factors in determining technology usage (Hughes, 2005). Additionally, technology is more likely to be used when it allows teachers or students to be more efficient and effective in completing a task (Ruthven et al., 2004). Technology is also

more likely to be used when teachers understand how the specific technology enhances instruction and provides individualized support for struggling students (Ruthven et al., 2004). When each of these factors are met, technology implementation is more likely to be successful for teacher instruction and student learning (Hughes, 2005). Teaching experience may indeed lead to better or more effective uses of technology during instruction, independent of teachers' experiences with a specific technology (Hughes, 2005; Ruthven, Hennessy, & Brindley, 2004).

Bebell (2005) conducted an evaluation of the Technology Promoting Student Excellence one-to-one computing initiative in six New Hampshire middle schools. Results indicated that teachers believed participation in the program increased student motivation and engagement and improved students' ability to work both in groups and independently. The program was believed to have the greatest impact on at risk and low-achieving students, as evidenced by their increased classroom engagement and their improved ability to retain content material and work collaboratively with peers.

In Virginia, Henrico County Public Schools implemented the Teaching and Learning Initiative that provided laptops to all middle and high school students, teachers, and administrators. An evaluation of the program found that teachers believed the use of laptops increased students' motivation and self-directed learning and students felt the use of laptops increased their organizational abilities (Zucker et al., 2005).

An important factor for effective integration of technology is the teachers' ability to integrate instructional technology activities to meet students' needs. A study was designed to explore how teachers were currently using and integrating technology for teaching and learning in the classroom. Teachers were compared in their integration of technology based on gender, age, number of years in the teaching field, grade level taught, content area, and education level.

Findings suggest that teachers who use technology regularly are more likely to integrate technology in the classroom. Major conclusions were that significant differences existed for technology use and integration based on grade level while there were no differences based on gender, age, teaching experience, grade level, and educational level (Gorder, 2008). There is little difference in perceptions of integration based on personal or demographic characteristics. The only significant difference in technology integration and uses is based on grade level. Teachers in Grades 9-12 tend to integrate and use technology more than teachers in Grades K-5 or Grades 6-8 (Gorder, 2008).

Technology Training for Teachers

Swan and Hofer (2011) found that teachers with their limited training and relatively superficial curricula, most likely find the implementation of technology quite challenging. In other words, specialized technology tools and resources require substantially more content knowledge than universal tools to use in the classroom. There are many states that have student technology standards, and the No Child Left Behind legislation also mandates the use of technology to enhance the curriculum and engage students in learning (United States Department of Education, 2002), and many states have technology requirements for the preparation of teachers. States and school districts that want to ensure that students reach technology goals should mandate an educational technology course prior to teacher certification (Rosenfeld, & Martinez-Pons, 2005).

Technology training is a major factor that can help teachers develop positive attitudes toward technology and integrating technology into the curriculum (U.S. Department of Education, 2005). For technology to be infused effectively and frequently in the classroom, technology training must go beyond basic technology skill development and involve activities

which demonstrate ways in which teachers can use technology as a tool for teaching and reinforcing curriculum standards (Baylor & Ritchie, 2002).

Elementary teachers have technology training opportunities available to them and many states, including Georgia, have mandated a technology course as part of recertification requirements. However, despite training mandates and opportunities, elementary educators do not frequently integrate technology within the curriculum in classrooms.

Technology training for teachers and providing educational technology in the classrooms (science and mathematics) can play a vital role in making education real, dynamic, and engaging for students. The Apple education research (Apple Computer, Inc., 1995) on middle school science and mathematics reports computer tools in science help students understand and master high-level science concepts, working through a progression of conceptual levels.

Relationships Between the Predictors, Outcomes, and Covariates

Technology use in the classroom can vary significantly from school to school. Some teachers still are unwilling to use technology mostly because of a lack of time, a lack of resources, technology proficiency, or a lack of confidence in their ability to use the available technology. Perhaps more teachers would embrace technology if they knew they would be rewarded for using it other than being punished for not using it. Those who lead our classrooms must be proficient users of digital and educational technologies. In relation to age, there is a lack of research that correlates age specifically with technology proficiency. Gender has little or no influence on technology proficiency. There was no significant difference in the grade level according to other studies. Technology proficiency was higher for teachers that have a higher education level.

Employing teachers that have experience with technology in education is very important as it relates to technology integration. Research regarding experienced teachers has shown that experienced teachers generally know more about the content they teach. Recent research determined that teaching experience has no effect on technology integration at all. Blackburn and Robinson (2008) suggested that experienced teachers' mastery experiences should allow them to perfect their preferred learning styles. In relation to age, as adults begin to age, the number of experiences they have expand. Experiences, along with active participation, relevancy, and determination create new understanding. Gender has little or no influence on teachers' experience with technology. There was no significant difference in the grade level according to other studies. Teachers with a higher education level had more technology experience.

Adequate training in technology use has been a concern of teachers since the introduction of computers into schools. Training provides teachers with the experience needed to feel comfortable with computers. It is the opinion of administrators and teachers that computer training for teachers is a very important factor in being able to teach with computers (Yaghi, 1996). Without training, teachers feel inadequate and frustrated by their limited knowledge. Since teachers interact with students regularly, they need to be comfortable with using computer technology. The perception by teachers is that training is important if they are to incorporate the technology into their curriculum (Guha, 2001). In relation to age, it has not been shown to be a significant factor affecting computer use and training. However, several teachers expressed the belief that age was a factor in technology use because the older teachers were afraid to use the technology. Some suggest that gender has little or no influence on teachers training. Teachers with a higher education level had received more technology training. Some also suggested that

about education level, teachers with a higher education level had received more technology training and was better prepared.

Knowledge Gaps

The knowledge gaps of previous studies were the gaps in teaching and learning of educational technology for the teachers about technology integration. The teachers do not have the necessary resources needed and were having a difficult time using and integrating educational technology to teach their students. Many of the teachers were very hesitant about using educational technology in their classrooms because of their lack of knowledge. The significance of the study was to provide information for educational institutions about the necessary resources needed for teachers to be successful in integrating technology into the school's curriculum. By teachers being well prepared and skilled in integrating educational technology in the classroom, they have the opportunity to produce students that have a better grasp of educational technology. The implication of the study was to prepare teachers for technology integration into the school's curriculum, so that they can have a better understanding about educational technology and help to increase their student's knowledge in using educational technology for learning.

Theories

This research consisted of literature relevant to technology integration in the school's curriculum. The main theory that supported the hypotheses is based on Christensen's (2008) Disruptive Innovation Theory which examined the barriers to technology integration met by schools in efforts to use technology to improve teaching and learning practices. It explained why some organizations struggle with specific innovations. It also served as the platform for

examining the challenges and barriers that must be identified and addressed within an organization.

According to Simonson (2010), organizations can rely on the principles of disruptive innovation to provide the beliefs for explaining why certain innovations, including technology, have the potential to redefine a specific industry of practice while others simply sustain existing practices.

Distribution Cognition Theory (Hollan, Hutchins, and Kirsh, 2000) is also similar to Disruptive Innovation Theory. It emphasized that the accumulation of knowledge is not relied on the individual's effort, but depended on other people, learning environment, and tools. In the field of educational technology, this theory has been widely applied in distance education, computer-assisted collaborative learning, and the development of computer-assisted-learning tools. These Theories have a very large impact on technology and integration of technology into the schools to improve teaching and learning practices for the students. These theories also have been used in several different studies about technology integration: Disruptive Change (Bower, 2002); Disruptive Technology Reconsidered: A Critique and Research Agenda (Danneels, 2004); High Technology and Barriers to Innovation: From Globalization to Localization (Zeleny, 2009).

The first section presents a review of relevant literature, and includes a discussion of research and support of technology integration for the study. The second section is a presentation of Christensen's Disruptive Innovation Theory and Distribution Cognition Theory in education and technology. Scholarly books, seminal journal articles, and research documents are examined for this literature review through the Trident University library. Additional databases searched included EBSCOhost and ProQuest. The online databases of Google Scholar also provided information for the search of the pertinent literature. Bibliographic and reference listings was

accessed from appropriate titles discovered within the review process. Many current scholarly articles pertaining to business, technology, integration, educational institutions, colleges, and teachers were reviewed. This study is an important addition to the research on the integration of technology.

Conceptual Framework

The foundation for the conceptual framework supports two theories: Christensen's (2008) Disruptive Theory and Distribution Cognition Theory (Hollan, Hutchins, and Kirsh, 2000). Christensen's (2008) Disruptive Innovation Theory examined the barriers to technology integration met by schools in efforts to use technology to improve teaching and learning practices. It explained why some organizations struggle with specific innovations. It also served as the platform for examining the challenges and barriers that must be identified and addressed within an organization.

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There was a considerable amount of evidence which indicates that technology integration positively affects student achievement and academic performance (Roblyer & Doering, 2010). Technology opened many doors for students at all academic levels to do real work as they study a particular subject. Integrating a curriculum with technology involved making technology

into a tool to enhance learning in a content area or multidisciplinary setting. Technology should become an essential part of how the classroom functions, as accessible as all other classroom tools.

Research indicated that the integration of technology into instruction occurs over time and follows a pattern (Sandholz, Ringstaff, & Dwyer, 1997). Initially, teachers incorporate new technologies into existing practices. Once they observe changes in their students, such as improvements in engagement, behavior, and learning, teachers gradually begin to experiment with using technology to teach in new ways.

Technology itself has been identified as a potential barrier to technology integration (Zhao & Frank, 2003). Research on the use and integration of technology also suggests that technology by itself is not likely to bring about improvements in schools, but can be a powerful tool for educators if it is made part of a comprehensive and systemic effort to change education. Technology is most likely to be widely integrated by teachers and schools if it supports already existing practices and helped to solve problems or address challenges; it is part of a systemic, organization-wide initiative; and teachers have access to sufficient professional development and ongoing support.

The typical use of technology in classroom includes basic computers and network functionalities such as word processing, spreadsheets, presentation software, the Web, and audio/video projectors.

These are some examples of classroom technology:

- Interactive Whiteboard: An Interactive Whiteboard, other than being a projected computer screen, provides interface between the computer and the instructor via touching the screen. It typically has touch sensors on the screen, which translate the user's writing

on the board, and the software package that projects the writing to the screen. One can think of it as a huge tablet PC that the whole class can look at. It is often referred as a "SMART board", which is a commercial product of this technology. Although some teachers just use it as a whiteboard or flipchart replacement, it enables the user to capture or record his or her board writings, which later can be posted on the Web or transferred via other digital media such as a memory stick or thumb drive for sharing or review.

- Classroom Management Software: The Classroom Management Software projects the student's computer screen onto the classroom via typically a wireless network and enables the student to share what is happening on his or her desktop. This helps instructor to illustrate the examples of desirable or undesirable work as well as the class material. It also helps instructor to control the Internet access and desktop management of the class.
- Student Response System: A Student Response Systems (SRS), sometimes called "clickers", consists of remote-controller type wireless transmitters, unit receiver connected to the classroom computer, and a software package that manages the system. The students can 'click' their votes or choose answers via wireless computer network. It is favored by the instructors of a large class because of its functionality to assess student learning from a large group of students. The newer generation of SRS is being developed to support software deployment of the system via Personal Digital Assistants (PDA), laptop computers, or cell phones.
- Weblog (Blog): Richardson defines Blog as a "an easily created, easily updateable, Website that allows an author (or authors) to publish instantly to the Internet from any Internet connection." (Richardson, 2006). Because of this easiness of posting new information in multimedia or text format, it can be a very powerful collaboration tool for

class assignments or projects. Some examples of the educational use of Blog are class portals, online filling cabinets for student work, e-portfolios, collaborative space, knowledge management, and school Websites.

Table 1: Technologies Teachers Consider Part of Technology Integration

Subject	Hardware Technology	Software technology
Technology Common to all Subjects	Computers Laptops Interactive Whiteboard Overhead Projector	Internet E-mail Microsoft PowerPoint
English	Television VCR/ DVD IPOD Laptops	Microsoft Word PowerPoint Publisher
Reading	Television VCR/ DVD IPOD Laptops Video conferencing	Microsoft Word PowerPoint Publisher
Science	Digital camera Class Performance System Microscopes Electrometric device Gel electrophoresis apparatus	Microsoft Excel
Math	Rulers Protractors Calculators	Geometer's Sketchpad Microsoft Publisher
Social Studies	TV/VCR DVD player IPod	Microsoft Publisher

The literature review for this study identified the research problem, purpose, and theories. The literature review began by examining the important events related to technology integration in the classroom. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. Also, the literature provided background knowledge of the historical events that led to the problems stated in this doctoral research study. Several studies that justified the validity of the research problem were introduced.

Conceptual Diagram

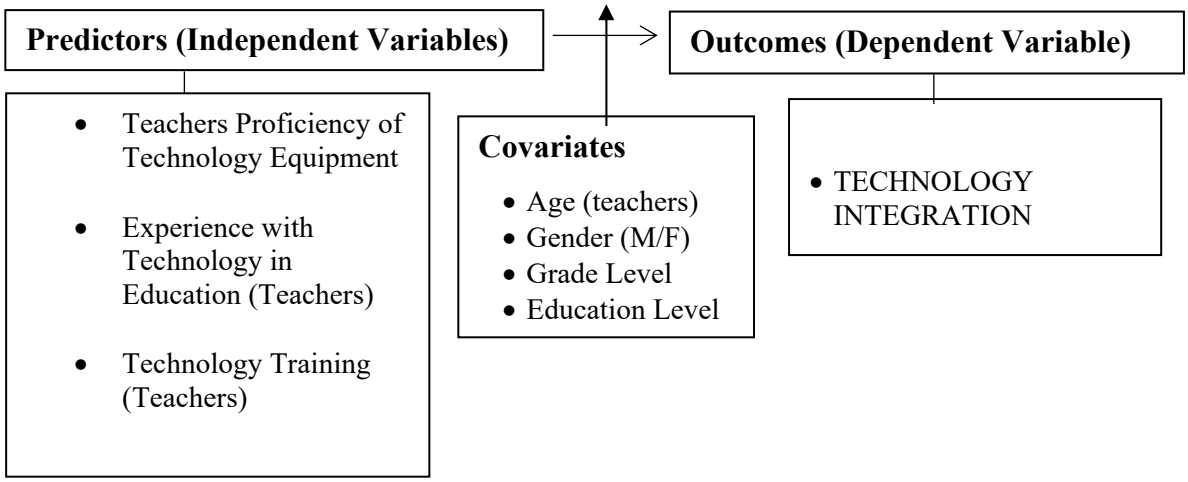


Figure 1: Conceptual Diagram

Hypotheses

The following null and alternative hypotheses guided this study:

RQ_1: Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?

H_1: Teachers' proficiency of technology equipment significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' proficiency of technology equipment does not significantly impact the integration of technology into the school's curriculum.

RQ_2: Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?

H_2: Teachers' experience with technology in education significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' experience with technology in education does not significantly impact the integration of technology into the school's curriculum.

RQ_3: Does teachers' technology training have an impact on the integration of technology into the school's curriculum?

H_3: Teachers' technology training significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' technology training does not significantly impact the integration of technology into the school's curriculum.

RQ_4: Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

H_4: Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined does not significantly impact the integration of technology into the school's curriculum.

CHAPTER III: RESEARCH METHODOLOGY

Introduction

The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. The significance of these relationships was to inform higher education leadership of their teachers' perceptions of integrating technology into the school's curriculum. Data was collected from surveys distributed to participating teachers at several institutions and analyzed with the Statistical Package for the Social Sciences (SPSS).

Research Design

To develop the study, the researcher reflected methods demonstrated in previous studies on technology integration (see Abbitt, 2011; Inan & Lowther, 2010). By doing so, the researcher contributed to the overall reliability of this study and conclusions drawn from data analysis. The study was quantitative in design. A quantitative research design is typically used when a researcher wants to explain a trend or a phenomenon and may be beneficial when a researcher's goal is to measure a school's need of technology integration. In conducting this quantitative research study which is descriptive, the approach or goal was to determine the relationship between the independent variables and the dependent variable within the population. The subjects were measured once, and the intention was to establish associations between the variables. Faculty teachers' responses were statistically tested using Pearson's (r) correlation coefficient and multiple regression statistical procedures were performed to analyze the study's research questions. ANOVA was employed to determine if faculty teachers' age, gender, grade

level, and education level (CV's) have a statistically significant effect on technology integration (DV). The study included a sample population of teachers to ensure that a valid estimate of a generalized relationship between the variables had been obtained.

An existing survey was in place which included paper surveys for the sample population (Appendix 1). The Superintendents verbally agreed to allow circulation of the survey. The survey measured the variables presented in this research study. The survey coding was in Likert-type scale format. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. A quantitative study design was appropriate.

Study Population

The study examined the relationships between the independent variables and the dependent variable. Each independent variable's relationship was significant and has a very important role to predict the outcome of the dependent variable. The predictors were teachers' proficiency of technology equipment, experience with technology, and technology training. Teachers need certain skills to effectively integrate technology. Important relationship factors were teachers' age, gender, grade level, and education level. The study population for the quantitative research study was 125 teachers. The proposed quantitative study consisted of a survey administered to faculty members at participating education institutions.

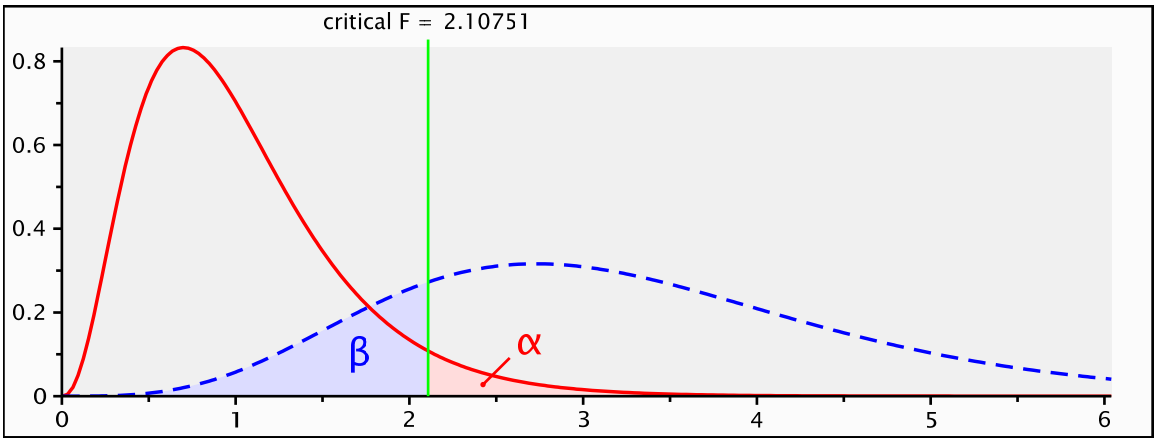
The research sample size consisted of (125) teachers (K – 5th grade) out of a total population of 250 teachers who currently teach and work at schools in South Georgia. The sample size pertained only to the random (125) teachers (males and females). They participated in the quantitative research study and report their responses. The researcher traveled to each

educational institution and provided copies of the survey along with instructions to a staff member of the institutions. The staff member administered the survey to each faculty member, teachers (K – 5th grade), to complete. The institution teachers were given a week to complete the survey for this researcher to reach the target population goal of 125 teachers completing the survey. Afterwards, the same staff member of each institution collected the surveys and contacted the researcher to notify that the surveys were completed and ready for pick up. The researcher traveled to each institution to pick up the completed surveys. Analysis began immediately by using SPSS to compute the data from the surveys collected. The data collected in the study will give educators an understanding of the problems that teachers are experiencing in regards to integrating technology into the school curriculum.

The study population for the quantitative study was 125 teachers. The sample size for the study was sufficient and the sampling methods gave confidence that the sample was representative of the population being studied because the sample size of 103 (required number calculated from G*Power) was calculated by using G*Power Analysis which was used to assure reliability and provide detectable valid findings in this study of 125 (K – 5th grade) teachers. The survey had been tested for validity and reliability.

Participants were selected by use of the random sampling method. Random sampling was best appropriate for this proposed study for this population of 250 teachers which a group of (*N*=125) (teachers) were selected. To recruit these 125 teachers, four out of seven schools were assigned a unique number which were placed in a bowl. This researcher was blind folded and picked four number tags out of the seven number tags from the bowl after the numbers were mixed thoroughly. The numbers picked were the schools selected for the study. From the four schools selected, all (K – 5th grade) teachers were selected for the study. By completing a

random sampling, insight into the faculty's perception was more likely to be achieved. Institutions that were selected and agreed to participate received a survey to disseminate among its teacher faculty. After successful proposal defense, the researcher obtained formal permission from the Superintendents of four educational institutions to participate in the study. Data from each of these organizations was aggregated to satisfy the required sample size identified by a priori analysis. This study has seven predictors and was a medium effect size. A recommended sample size of approximately 103 with a 5% error rate using G* power (Faul, Buchner, Erdfelder, Faul, & Lang, 2009) sample as calculated below:



F tests - Linear multiple regression: Fixed model, R^2 deviation from zero
Analysis: A priori: Compute required sample size

Input Parameters:	Effect size $f^2(V)$	=	0.15
	α err prob	=	0.05
	Power (1-β err prob)	=	0.80
	Number of predictors	=	7 (3 IVs & 4 CVs)
	Response variables	=	1 (DV)
Output Parameters:	Noncentrality parameter λ	=	15.450000
	Critical F	=	2.107506
	Numerator df	=	7
	Denominator df	=	95
	Total sample size	=	103
	Actual power	=	0.800422

Data Collection

Data was collected from 125 (K – 5th grade) teachers after they completed the survey. The researcher entered data into SPSS to facilitate standardization of arithmetic calculations. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. Teachers also completed the consent forms.

Instrumentation

The instrument that was used to collect data in this study was the Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a). This Survey measured the IVs and the DV. This Survey was used to assure reliability and provided valid findings in my study. The author of the survey is Moersch, and the survey was accessed from loticonnection.com. This survey has been tested for validity and reliability. It has been used in several studies and produced stable and consistent results. In other studies, it continued to actually measure what it was intended to measure which shows that this Survey is very reliable and valid for my study. The Level of Teaching Innovation Digital-Age Survey was a viable tool to measure technology integration data provided by the teachers. The Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a) (Appendix 1), with a reliability coefficient of $\alpha = 0.89$, measured faculty perceptions.

Moersch (2011a) developed the original survey in 1994, and since then the instrument has undergone several revisions. The newest Survey was part of a comprehensive conceptual framework that measured teachers' levels of teaching innovation. The instrument was a multidimensional model consisting of two sections. The first section consists of 17 items

measuring the Levels of teaching innovation and included: Digital Landscape, Teacher Perceptions, School Climate, Use of Resources, and Standards-Based Learning. (this section measures the (3) IVs – teachers' proficiency of technology equipment, teachers' experience with technology, and teachers' technology training). The second section included: Teacher Statements (this section measures the DV – technology integration) has 37 Likert-type items.

Since its inception, the Level of Teaching Innovation Digital-Age Survey has been extensively validated and has been demonstrated to have content, construct, and criterion validity (Moersch, 2011a). The appropriateness of the Level of Teaching Innovation Digital-Age Survey for capturing the level of teaching innovation for K-12 practitioners accurately and reliably was confirmed in a study of large numbers of educators from diverse school districts (Stoltzfus, 2009). For the Level of personal computer use, the Cronbach alpha reliability coefficient was .81; for the Level of current instructional practices, it was .73; and for the Level of Teaching Innovation Survey it was .74 (Moersch et al., 1999; Rakes et al., 2006). The content validity of the Level of Teaching Innovation Digital-Age Survey was established through a representative item sampling of the different content domains or subscales of the survey (Moersch, 2011a). Results of an exploratory factor analysis (Stoltzfus, 2009) confirmed the external validity of the Survey.

Independent Variables

The Independent variables for this study are teachers' proficiency of technology equipment, technology experience, and technology training. The Survey questions that measure these variables are:

- Appendix 1, (Demographics); Section 1: (Use of Resources) of the survey measures Teachers' proficiency of technology equipment.

- Appendix 1, (Demographics); Section 1: (Digital Landscape) (School Climate) of the survey measures Technology experience.
- Appendix 1, (Demographics); Section 1: (Teacher Perceptions) of the survey measures Technology training.

Dependent Variables

The dependent variable is technology integration. The tool to measure technology integration was the Level of Teaching Innovation Digital-Age Survey at Appendix 1, Section 2: (Teacher Statements).

Although many instruments that assess the technology use practices of teachers (Moersch, 2002), the Level of Teaching Innovation Digital-Age Survey was selected because it provided a quantifiable dataset of information about how teachers used technology in the classroom (Moersch, 2011a). Administrators and other district officials can use the findings from the Level of Teaching Innovation Digital-Age Survey to identify educational uses of technology accurately and reliably and to suggest professional development needs aligned with the NETS for Teachers (Moersch, 2011a). The Survey was obtained from the administrators of LoTi Connection Organization. An observer was selected to collect the data.

The survey also provides basic personal information about the teachers. Teachers' gender was also used in this study along with the length of time at their school. The teachers' age and grade level was also a factor of information in this study, as well as level of education. Teachers received the survey and a consent form. The Survey was overseen in person. The directions were on the survey and was explained to the teachers. Permission letters to collect data was received,

and teachers were notified of the dates for the survey. The survey was conducted for content, reliability, and validity.

This study seeks to examine the validity and reliability of the Level of Teaching Innovation Digital-Age Survey. Data was calculated using the computer statistical software SPSS. The support/rejection of the null and alternative hypotheses in this study were addressed. Content validity was used on variables that depended on each other to test for coefficient stability or test-retest reliability on content in this study. Criterion validity, construct validity, and content validity were forms of measurement in this study. The teachers were assured that the study survey was tested for validity as well as reliability. The Data that was collected indicated that the assessments have good reliability and validity. Reliability coefficients on the four subscales (Exploration – thinking about using technology; Experimentation – beginning to use technology; Adoption – using technology regularly; and Advanced Integration – using technology innovatively) (Kotrlik & Redmann, 2002) ranged from .83 to .89. The studies that used the survey were: Infusing Technology: A Study of the Influence of Professional Development on How Teachers Use Technology (Cottle, 2010); Impact of Technology Interventions on Student Achievement in Rural Nigerian Schools (Aderonke, 2014); Digital Literacies and Learning: Designing a Path Forward (Spires and Bartlett, 2012).

Validity

The results of a research study are only useful to the extent that they can be accurately and confidently interpreted. The issue of accurate and confident interpretation of results is at the center of any discussion of validity. Obtaining as much information as possible about the participants in the research study aids in minimizing threats to internal validity. Choosing an appropriate research design which had been chosen can help control most other threats to internal

validity. To minimize threats to external validity, a control group was selected randomly, and all was treated the same in all respects. An observer was selected to collect the data. Criterion validity, construct validity, and content validity were forms of measurement in this study.

Variables

The following research variables guided this study:

(IV) Teachers' Proficiency of Technology Equipment

(IV) Experience with Technology in Education (Teachers)

(IV) Technology Training (Teachers)

(DV) Technology Integration

(CV): Teachers' Age, Gender (Male or Female), Grade Level, and Education Level

This study was an analysis of the integration of technology into the school curriculum by the teachers (125) at the District Level Schools in South Georgia. Appendix A (Level of Teaching Innovation Digital-Age Survey) measured each of the variables listed above.

Table 2: Description of Quantitative Study Variables

Variable	Role	Type/Code
Teachers' Proficiency of Technology Equipment	IV	Ordinal/ Categorical (Strongly Agree = 5, Agree = 4, No Opinion = 3, Disagree = 2, Strongly Disagree = 1)
Experience with Technology in Education (Teachers)	IV	Ordinal/ Categorical (0 – 5 = 1, 6 – 10 = 2, 11 – 15 = 3, 16 – 25 = 4, >25 = 5)
Technology Training (Teachers)	IV	Ordinal/ Categorical (Strongly Agree = 5, Agree = 4, No Opinion = 3, Disagree = 2, Strongly Disagree = 1)
Technology Integration	DV	Interval/ Continuous (7 = Daily, 6 = A few times a week, 5 = At least once a week, 4 = A few times a month, 3 = At least once a month, 2 = At least once a semester, 1 = At least once a year, 0 = Never)
Age	CV	Ordinal/ Categorical (18 – 30 = 1, 31 – 50 = 2, >50 = 3)
Gender	CV	Nominal/ Categorical (Female = 1, Male = 2)
Grade Level	CV	Nominal/ Categorical (Pre-K = 1, Kindergarten = 2, 1st Grade = 3, 2nd Grade = 4, 3rd Grade = 5, 4th Grade = 6, 5th Grade = 7)
Education Level	CV	Nominal/ Categorical (Bachelors = 1, Masters = 2, Specialist = 3, Doctorate = 4)

Statistical Analysis

This proposed study seeks to examine relationships between teachers' proficiency of technology equipment (IV), experience with technology in education (teachers) (IV), and technology training (teachers) (IV); it also examined the dependent variable which is technology integration (DV) which the interval level scale of measurement is desirable because the researcher can use the more powerful statistical procedures available for means and standard deviations and to have this advantage, often ordinal data are treated as though they were interval; for example, subjective ratings scales (7 = Daily, 6 = A few times a week, 5 = At least once a week, 4 = A few times a month, 3 = At least once a month, 2 = At least once a semester, 1 = At least once a year, 0 = Never), while relating or measuring each to faculty (teachers) gender, age, grade level, and education level (CV's). Also, the CVs will not need to be controlled because in past studies there were not much difference in the teachers' gender, age, grade level, and education level. All data was screened prior to statistical analysis to ensure that it meets all assumptions required for each statistic such as skewness, kurtosis, scatterplots, normality, linearity, and homoscedasticity. Psychometric properties of the survey instrument included validity and reliability of the constructs, scales, and factors used in subsequent analyses, in addition to the reliability indices as measured by Cronbach's alpha. Dummy coding will be conducted for categorical CV's.

Descriptive Statistics and Analyses

The Descriptive Statistics were based on (125) teachers (K – 5th Grade) out of a population of 250 teachers who currently teach and work at schools in South Georgia. All the participants are state certified teachers. They teach subjects to include: English, Reading,

Science, Math, and Social Studies. Teachers in this study defined technology integration in terms of their use, or perceptions of expected use, of technology. To this group, technology integration means to incorporate the use of computers and computer-related software and hardware. Integration was specific to their educational practices, directly involving the students they teach.

Table 3: Information Pertaining to the Teachers that are being Surveyed

Grades	**Teachers**	**Location**
K – 5th	One Hundred Twenty-Five	South Georgia
	Men	City Schools
	Women	County Schools
Subjects		
	English	
	Reading	
	Science	
	Math	
	Social Studies	

A request for participation in this study was sent to all perspective education institutions (*N = 4*) for distribution to teacher faculty members (*N =125*). The descriptive characteristics of the proposed study participants included teachers' proficiency of technology equipment (IV), experience with technology in education (teachers) (IV), and technology training (teachers) (IV), age (CV), gender (CV), grade level (CV), education level (CV), and technology integration (DV). Descriptive analysis was performed to measure continuous variables mean (M), standard deviation (SD), population (N), confidence interval (CI), categorical variable's frequency (F) and percent (%). This analysis provided a comprehensive and in-depth view of this population to examine its impact on the criterion variables.

Inferential Statistics and Analyses

This correlational quantitative study was guided by the following research questions:

1. Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?
2. Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?
3. Does teachers' technology training have an impact on the integration of technology into the school's curriculum?
4. Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

Faculty teachers' responses were statistically tested. Multiple regression statistical procedures were performed to analyze the study's research questions. Additional demographic questions were included to determine if faculty teachers' age, gender, grade level, and education level (CV's) had a statistically significant effect on technology integration (DV). Pearson's (r) correlation coefficient assessed if the relationship strength between the IVs and DV was significant. The DV was aggregated by transforming responses into subscale scores in SPSS for statistical testing to obtain a mean score.

Table 4: Statistical Analysis of Variables

Research Questions	IV	DV/CV	Statistical Method
RQ1: Does teachers' proficiency of Technology Equipment have an impact on the integration of technology into the school's curriculum?	Teachers' proficiency of Technology Equipment	DV: Technology Integration CV: Age, Gender, Grade Level, and Education Level	Multiple Regression
RQ2: Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?	Teachers' experience with technology in education	DV: Technology Integration CV: Age, Gender, Grade Level, and Education Level	Multiple Regression
RQ3: Does teachers' technology training have an impact on the integration of technology into the school's curriculum?	Teachers' technology training	DV: Technology Integration CV: Age, Gender, Grade Level, and Education Level	Multiple Regression
RQ4: Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?	Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training	DV: Technology Integration CV: Age, Gender, Grade Level, and Education Level	Multiple Regression

Data Analysis Procedures

Descriptive statistics that represent the demographics of the population used in this study were presented in a table. To test the hypotheses presented in this study, multiple regression was ran to test the independent variables and dependent variable presented in this study. Multiple regression analysis is a statistical technique for estimating relationships among variables. The technique was used to model several variables, with the focus being on a dependent variable and one or more independent variables. Multiple regression showed how the dependent variable changes when any of the independent variables vary. Multiple regression is typically used for predicting and forecasting. Multiple regression is an extension of regression. Instead of comparing one variable's influence over another variable, Multiple regression showed the influence of two or more independent variables on a dependent variable. To have valid results when using Multiple Regression, the following assumptions must be met:

- linearity of the relationship between dependent and independent variables;
- independence of the errors (no serial correlation);
- homoscedasticity (constant variance) of the errors; and
- normality of the error distribution.

Results of the independent variables that were significant for integrating technology in the classroom was presented.

The data collected in this study gives educators an understanding of the problems that teachers are experiencing in regards to integrating technology into the school curriculum. Educators must be proactive in learning and teaching with technology to help lessen the technology gap that exists in and out of school for our students (Brown et al., 2001). It is the

educator who is the determining factor in whether technology is successfully integrated into the classrooms and schools (Brown et al., 2001).

Importance of Integrating Technology into the School Curriculum

Technology is universal, touching almost every part of our lives, our communities, our homes.

- Technology is the environment of our children.
- Technology is in our homes and around our neighborhoods.
- Technology is transparent to children.

Technology lends itself to a new role for the teacher: that of a facilitator and coach. Replacing the traditional model of a teacher as a lecturer, the teacher instead presents students with challenging real-life problems and the technology tools to solve them (Means & Olson, 1994).

What might be new to you is what experts like Jamie McKenzie have discovered over the past decade – the teacher as coach, computer as a tool model is the best methodology for effective integration of technology into the classroom (McKenzie, 2000). Technology brings more exciting, up-to-date, and diverse materials right into the classroom (Hawkins, 1997). Considering current trends in education, a modern classroom would not be complete without computers, software, Internet connections, projectors and a variety of other high-tech devices (Keane, 2002). According to Hasselbring (2000), schools will be equipped with the best hardware and software in the near future, but it is unlikely that teachers and students will use them effectively, if teachers are not trained. The success of technology infusion in schools depends on training both in-service and preservice teachers. In the digital age, public schools will require teachers to have competent technology skills and be able to effectively implement

educational technology in classrooms. Therefore, it is logical to require teachers to incorporate technology into the lessons they prepare to teach as teacher education programs help them to prepare for their future classrooms (Johnson, 2000).

Technology integration has long been an issue in schools (Edyburn & Gardner, 1999). Technology can help facilitate the knowledge-constructed classroom. With the use of computers in the classroom, schools would become more student-centered and that more individualized learning would take place than ever before.

Offering teachers support in their attempts to integrate technology into their curriculum can prove to be effective. Teachers need to see how technology placed in the curriculum can impact their instruction to make a decision about its value. I want teachers to view technology as a tool that could be used to help increase student motivation and engagement, and hopefully their academic achievement. I also want students to view technology as an important tool that needs to be integrated into their school curriculum.

Research suggests that when technology is integrated throughout the curriculum, students will not only learn technology skills but also content knowledge (Silverstein, Frechtling, & Miyaoka, 2000). Integrating computers throughout the curriculum enables students to develop the skills needed to be successful in the workplace, including locating and accessing information, organizing data, and making persuasive arguments (Sandholtz, Ringstaff, & Dwyer, 1997). It is assumed that once the appropriate technological tools are in place in the classroom, students and teachers will support the change toward a technologically based curriculum.

In one study, teachers were surveyed and indicated that they recognized the importance of computer technology in teacher-related functions such as attendance-taking and record-keeping, communication, research and planning, and classroom instruction (Ascione, 2005).

Computers are being used, in part, to enable teachers to improve the curriculum and enhance student learning. The Apple Classrooms of Tomorrow (ACOT) study brought to focus that meaningful use of technology in schools went beyond just putting computers in classrooms. Technology is not a change agent for education. Technology when used as an integrated tool with the curriculum could make a difference in education (Sandholtz, Ringstaff, & Dwyer, 1997).

Many schools are just beginning to explore the exact potential technology offers for teaching and learning. Technology will help students acquire the skills they need to endure in a complex, highly technological knowledge-based economy. Integrating technology into the school curriculum means more than teaching basic computer skills and software programs in a separate computer class. Effective technology integration must happen across the curriculum in ways that research shows development and enhancement in the learning process (Roblyer & Doering, 2010). Effective technology integration is achieved when the use of technology is repetitive and clear and when technology supports curricular goals.

Learning while equipped with technology tools allows students to be intellectually challenged while providing them with a realistic picture of what the contemporary office looks like. Through projects, students acquire and refine their analysis and problem-solving skills as they work individually and in teams to find, process, and synthesize information they've found online (Silverstein, Frechtling, & Miyaoka, 2000). The numerous resources that are online provide each classroom with more interesting, various, and current learning materials. The Online Web connects students to experts in the real world and provides numerous opportunities for expressing understanding through images, sound, and text.

With technology tools, students are more likely to stay engaged and on task which reduces behavioral problems in the classroom. Technology also changes the way teachers teach. It offers educators effective ways to reach different types of learners and assess student understanding through multiple means. It also enhances the relationship between teacher and student. When technology is effectively integrated into different areas of the curriculum, teachers grow into roles of adviser, content expert, and coach. Technology helps make teaching and learning more meaningful and fun.

- Teachers that are proficient with technology equipment and experienced with technology will definitely succeed.
- Training must provide teachers with knowledge of the very basics of computer use.
- Personal use of technology allows teachers to explore and then integrate technology into their curriculum.

The integration of technology not only increase student performance but also prepares teachers and allows teachers to engage students in educational experiences.

Children are really drawn to technology, and they get attached to different technology gadgets very easily. Games and smartphones are just a few of these technology gadgets. Clearly, technology offers great potential to engage students in learning.

Some benefits of technology:

- Tech literacy: Students develop necessary skills for college and career readiness.
- Improved engagement: Technology helps students stay on task and improves attendance.
- Information access: Students have access to timely resources.
- Connections: Access to real-world. Technology devices and apps enhance hands-on learning.

- Communication/Collaboration: Students have communication skills through varied media and engage in collaborative learning.
- Differentiated learning: Students with varied styles of learning find new ways to assimilate information and demonstrate learning.
- Distance learning: Students access outside educational content.
- Flipped classroom: Students watch instructional videos outside of class, using class time to practice new concepts while the instructor is there to help.
- Classroom management: Tools help teachers analyze student learning so they can adjust instruction quickly to address needs, as well as organize homework, assessments and grading.

Willingness to embrace change is also a major requirement for successful technology integration. Technology is continuously, and rapidly, evolving. It is an ongoing process and demands continual learning. When effectively integrated into the curriculum, technology tools can extend learning in powerful ways. Despite the dramatic differences in resources and abilities from classroom to classroom, school to school, and district to district, it's possible to integrate technology into the school curriculum so that it can impact engagement and learning for all students. As educators, we need to move from the traditional methods of teaching to new methods where technology is integrated into the classroom.

More and more studies show that technology integration in the curriculum improves students' learning processes and outcomes (Roblyer & Doering, 2010). Teachers who recognize computers as problem-solving tools change the way they teach. They move from a behavioral approach to a more constructivist approach.

Study Limitations

Although this research was carefully prepared, the researcher is still aware of its limitations and shortcomings. This study was limited to the state of Georgia and to the teachers in grades K-5. The sample size as well as respondents from the population warrants cautious use of the study's findings. The population of the experimental group was small, only 125 teachers, and might not represent the majority of the teachers of the intermediate level in education. The total population averages to 250 teachers, but because G*Power recommends 103 as the total sample size, 125 teachers were a satisfactory amount to study. Several scholars (Suresh & Chandrashekara, 2012; Fowler, 2013; Nakagawa & Schielzeth, 2013) corroborate in acknowledging the significance of a broader sample population needed for any statistical analysis to produce generalizable, valid, and reliable results. The researcher recognizes study participants will not comprehensively represent the characteristics of the entire study population.

The desired results of this study suggested a statistically significant correlation between teachers' proficiency of technology equipment, experience with technology in education (teachers), technology training (teachers), and teachers' perceptions of technology integration in the school's education curriculum. This proposed study seeks to provide guidance for future researchers in their understanding of what is needed for teachers to integrate technology in the school curriculum. In addition, since the assessment was conducted by the author himself, it was unavoidable that in this study, a certain degree of subjectivity can be found.

CHAPTER IV: RESULTS

This chapter reports the quantitative results from data collected on the relationship between K – 5th grade teachers' proficiency of technology equipment, experience with technology in education, and technology training, and how it impacts technology integration. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. The researcher reports descriptive data for all the variables and analysis results pertaining to the four research questions. Additionally, this study was conducted to assist educational institution leaders in preparing teachers for integrating technology into their school curriculum, and to inform these leaders of how significant teachers' proficiency, experience with technology, and technology training are to successfully integrate technology. This Chapter provides a more detailed description of the participants as well as a thorough analysis of each research question.

Study Participants

A survey was distributed to faculty at participating educational institutions to obtain data utilized in this quantitative study. For this study regarding K – 5th grade teachers' proficiency, experience with technology, and technology training pertaining to the integration of technology, 125 teachers participated from four educational institutions.

Data Integrity

The researcher analyzed 125 surveys. The survey instrument used to measure K – 5th grade teachers' proficiency, experience with technology, technology training, and integration of

technology was the Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a). Moersch's (2011a) survey instrument, is a multidimensional model consisting of two sections. The first section consists of 17 items, and the second section consists of 37 items; all on a likert scale. The survey was dispersed to faculty at participating educational institutions. After expiration of the survey period, collected data were imported into SPSS 23 for analysis. Conclusive analyses were performed with use of multiple regression statistical tests.

Reliability Analysis

This survey has been tested for validity and reliability. It has been used in several studies and produced stable and consistent results. In other studies, it continued to measure what it was intended to measure which shows that this Survey is very reliable and valid for this study. The Level of Teaching Innovation Digital-Age Survey was a viable tool to measure technology integration data provided by the teachers. The Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a), with a reliability coefficient of $\alpha = 0.89$, measured faculty perceptions. The appropriateness of the Level of Teaching Innovation Digital-Age Survey for capturing the level of teaching innovation for K-12 practitioners accurately and reliably was confirmed in a study of large numbers of educators from diverse school districts (Stoltzfus, 2009). For the Level of personal computer use, the Cronbach alpha reliability coefficient was .81; for the Level of current instructional practices, it was .73; and for the Level of Teaching Innovation Survey it was .74 (Moersch et al., 1999; Rakes et al., 2006).

Descriptive Analysis

The researcher provided basic data analysis on the research variables used in the study. Descriptive analysis was used to provide an initial assessment of the data. A request for participation and consent was sent to (N = 4) educational institutions that agreed to participate in

this study. Study participants submitted responses. Descriptive analyses were performed to measure continuous variables mean (M), standard deviation (SD), population (N), confidence interval (CI), categorical variable's frequency (F) and percent (%). Demographical characteristics included age, gender, grade level, and education level. This analysis provided a full and detailed assessment of this population.

Following the demographic information, a descriptive analysis section explains the variables of this study. Demographics Participants were asked to respond to demographic questions regarding: age (age of teacher), gender, grade level, and education level. The grade level distribution included 125 (100%) participants at the elementary level. Reliability statistics were conducted by the researcher.

Table 5: Age of Participants (Schools A, B, C, D) Demographic/Covariables

Age	Frequency	Percent (%)
20 – 30	24	19.0
31 – 40	28	22.0
41 – 50	48	38.0
51 – 60	21	17.0
61 +	4	3.0
Total	125	100.0

Table 6: Gender of Participants (Schools A, B, C, D) Demographic/Covariables

Gender	Frequency	Percent (%)
Female	109	87.0
Male	16	13.0
Total	125	100.0

Table 7: Grade Level of Participants (Schools A, B, C, D) Demographic/Covariables

Grade Level	Frequency	Percent (%)
Kindergarten	21	17.0
1st Grade	25	20.0
2nd Grade	22	18.0
3rd Grade	18	14.0
4th Grade	17	13.0
5th Grade	22	18.0
Total	125	100.0

Table 8: Education Level of Participants (Schools A, B, C, D) Demographic/Covariables

Education Level	Frequency	Percent (%)
Bachelors	51	41.0
Masters	48	38.0
Specialist	24	19.0
Doctorate	2	2.0
Total	125	100.0

Descriptive Analysis for Categorical Variables

The teachers (faculty) consisted of 13.0% ($N = 16$) males and 87.0% ($N = 109$) females. In reference to age, 80.0% were between the ages of 20-50 ($N = 100$), whereas 20.0% ($N = 25$) were over the age of 50. For Grade Level, 17.0% ($N = 21$) were Kindergarten, 20.0% ($N = 25$) were 1st Grade, 18.0% ($N = 22$) were 2nd Grade, 14.0% ($N = 18$) were 3rd Grade, 13.0% ($N = 17$) were 4th Grade, and 18.0% ($N = 22$) were 5th Grade. The highest-grade level for teachers were at the 1st Grade Level. Majority of the teachers held a Bachelor's Degree 41.0% ($N = 51$) pertaining to the education level. Addition descriptive statistics are found in Table 9.

Table 9: Descriptive Analysis for Categorical Variables

Schools A,B,C,D		Frequency	Percent (%)
Independent Variable			
Proficiency			
	None	0	0
	Little	13	10.0
	Moderate	75	60.0
	High	37	30.0
Experience			
	0-5	51	41.0
	6-10	25	20.0
	11-15	22	18.0
	16-25	18	14.0
	25 +	9	7.0
Tech. Training			
	Str. Agree	35	28.0
	Agree	62	50.0
	No Opinion	14	11.0
	Disagree	13	10.0
	Str. Disagree	1	1.0
Demographic/Covariables			
Age			
	20-50	100	80.0
	Over 50	25	20.0
Gender			
	Male	16	13.0
	Female	109	87.0
Grade Level			
	Kindergarten	21	17.0
	1st Grade	25	20.0
	2nd Grade	22	18.0
	3rd Grade	18	14.0
	4th Grade	17	13.0
	5th Grade	22	18.0
Education Level			
	Bachelors	51	41.0
	Masters	48	38.0
	Specialist	24	19.0
	Doctorate	2	2.0

Note. N=125

Descriptive Analysis for Continuous Variable

The descriptive statistics presented in Table 10 display values for the continuous variable: technology integration. Aggregated scores for the variables were computed by calculating the mean responses for each item. As a result, most teachers (faculty) participated Daily (M = 5.00, N = 125) in technology integration according to responses from the survey items of the subscale, and very few teachers participated a few times a week (M = 4.50, N = 125) or at least once a week (M = 3.00, N = 125).

Table 10: Descriptive Analysis for Continuous Variable

Schools (A, B, C, D)	M (SD)	N	95% CI [LL, UL]
Dependent Variable			
Technology Integration			
Daily	5.00 (.483)	125	[5.02, 5.15]
A few times a Week	4.50 (1.038)	125	[4.34, 5.06]
At least once a Week	3.00 (.645)	125	[2.56, 2.71]
A few times a Month	3.50 (1.055)	125	[3.37, 3.61]
At least once a Month	0	125	
At least once a Semester	0	125	
At least once a Year	0	125	
Never	0	125	

Descriptive Analysis for Independent Variables

The Independent Variables are proficiency of technology equipment (M =3.18, SD =.983), Experience with Technology Equipment (M =3.04, SD =.599), and Technology Training (M =3.25, SD =.701). Survey items were Likert scaled and ranged from 5= Strongly Agree to 1= Strongly Disagree, and 4= High to 1= None. Scores for the variables were computed by calculating the mean responses for each item. As indicated below, in Table 11, Technology Training 52.0% (N = 65) has the highest rating out of the three independent variables followed

by Proficiency of Technology Equipment 28.0% (*N* = 35) and Experience with Technology Equipment 20.0% (*N* = 25).

Table 11: Descriptive Analysis for Independent Variables

Schools (A, B, C, D)	M (SD)	N	95% CI [LL, UL]
Proficiency	3.18 (.983)	125	[2.88, 3.25]
Experience	3.04 (.599)	125	[2.34, 3.06]
Tech. Training	3.25 (.701)	125	[2.96, 3.38]

Descriptive Analysis for Dependent Variable

The dependent variable, technology integration (*M* = 2.54, *SD* = 1.11) was measured on a Likert scale: 7 = Daily, 6 = A few times a week, 5 = At least once a week, 4 = A few times a month, 3 = At least once a month, 2 = At least once a semester, 1 = At least once a year, 0 = Never. Technology Integration contained 37 questions and 7 measurement criteria's. Table 12 shows teachers' response values from the subscale and measured on a 7-point Likert scale.

Table 12: Descriptive Analysis for Dependent Variable

Schools (A, B, C, D)	M (SD)	N (%)	95% CI [LL, UL]
Technology Integration	2.54 (1.11)	125 (100.0%)	[2.36, 3.00]

Descriptive Analysis for three Independent Variables by Demographic/Covariables

Teachers (faculty) who acknowledged their educational institution about three independent variables: teachers' proficiency of technology equipment, experience with technology equipment, and technology training (*N* = 125) were mostly male (*N* = 16), between the ages of 20 – 50 (*N* = 100), and with 1st Grade (*N* = 25) being the Highest-Grade Level and 4th Grade (*N* = 17) with the lowest Grade Level. Teachers were primarily employed by their

educational institution with a Bachelor's Degree ($N = 51$) education level. The educational institutions descriptive statistics are exhibited below in Table 13.

Table 13: Descriptive Analysis for three Independent Variables by Demographic/Covariables

Schools (A, B, C, D)		Frequency	Percent (%)
Age			
	20-50	100	80.0
	Over 50	25	20.0
Gender			
	Male	16	13.0
	Female	109	87.0
Grade Level			
	Kindergarten	21	17.0
	1st Grade	25	20.0
	2nd Grade	22	18.0
	3rd Grade	18	14.0
	4th Grade	17	13.0
	5th Grade	22	18.0
Education Level			
	Bachelors	51	41.0
	Masters	48	38.0
	Specialist	24	19.0
	Doctorate	2	2.0

Descriptive Analysis for Dependent Variable by Demographic/Covariables

There were 125 teachers, consisting of more female ($N = 109$) than male ($N = 16$) teacher respondents. Female teachers' mean score ($M = 2.69$) measuring teachers' perceptions of technology integration was higher than male faculty ($M = 2.63$). Teachers reported between the ages of 20 - 50 ($N = 100$) and over the age of 50 ($N = 25$). The Highest-Grade Level of teachers that responded were 1st Grade ($N = 25$). The majority of teachers with a Bachelor's Degree ($N = 51$) responded in reference to education level. Additional descriptive statistics are found in Table 14.

Table 14: Descriptive Analysis for Dependent Variable, Technology Integration, by Demographic/Covariables

Schools (A,B,C,D)		N	Mean	SD	95% CI LB	95% CI UB	Min	Max
Age								
	20-50	100	2.69	.928	[2.51, 2.87]		1.00	5.00
	Over 50	25	3.46	.881	[3.10, 3.73]		1.00	5.00
Gender								
	Male	16	2.63	1.302	[2.67, 3.10]		1.00	5.00
	Female	109	2.69	.916	[2.43, 3.03]		1.00	5.00
Grade Level								
	Kindergarten	21	2.93	.870	[2.53, 3.32		1.00	4.00
	1st Grade	25	2.63	.916	[2.47, 2.78]		1.00	5.00
	2nd Grade	22	3.96	.587	[3.73, 4.03]		1.00	5.00
	3rd Grade	18	2.61	.557	[2.33, 2.89]		1.00	5.00
	4th Grade	17	3.75	.447	[3.35, 3.98]		1.00	5.00
	5th Grade	22	3.92	.937	[3.60, 4.23]		1.00	5.00
Education Level								
	Bachelors	51	2.76	.954	[2.50, 3.03]		1.00	5.00
	Masters	48	3.00	.896	[2.66, 3.34]		1.00	5.00
	Specialist	24	3.15	.989	[2.78, 3.23]		1.00	5.00
	Doctorate	2	3.33	.866	[3.05, 3.64]		1.00	5.00

Descriptive Analysis for Dependent Variable by Independent Variables

The research participants (teachers) mostly acknowledged their educational institutions as being productive with (N = 125) technology integration. Teachers' technology training (M = 3.25) has the highest mean score with Experience (M = 3.04) having the lowest mean score in their perceptions of technology integration. Additional descriptive statistics are found in Table 15.

Table 15: Descriptive Analysis for Dependent Variable by Independent Variables

	N	Mean	SD	95% CI LB	95% CI UB	Min	Max
Proficiency	125	3.18	.983	[2.88,	3.25]	1.00	5.00
Experience	125	3.04	.599	[2.34,	3.06]	1.00	5.00
Tech. Training	125	3.25	.701	[2.96,	3.38]	1.00	5.00
Technology Integration	125	2.54	1.11	[2.36,	3.00]	1.50	5.00

Quantitative Analysis of Research Questions

Data was collected and analyzed to examine K – 5th grade teachers' proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom by using the Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a) instrument. Four research questions and associated hypotheses were developed for this investigation:

RQ_1: Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?

H_1: Teachers' proficiency of technology equipment significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' proficiency of technology equipment does not significantly impact the integration of technology into the school's curriculum.

RQ_2: Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?

H_2: Teachers' experience with technology in education significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' experience with technology in education does not significantly impact the integration of technology into the school's curriculum.

RQ_3: Does teachers' technology training have an impact on the integration of technology into the school's curriculum?

H_3: Teachers' technology training significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' technology training does not significantly impact the integration of technology into the school's curriculum.

RQ_4: Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

H_4: Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined significantly impacts the integration of technology into the school's curriculum.

H_0: Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined does not significantly impact the integration of technology into the school's curriculum.

The research questions (1 – 4) were statistically tested using Pearson's (r) correlation coefficient and multiple regression for analyses. Pearson's (r) correlation coefficient was use to assess the relationship strength between the independent variables and the dependent variable to check if they were significant. Multiple regression procedures tested the dependent variable, focusing on the independent variables, while controlling for demographic and covariables. Additionally, linearity, homoscedasticity, and normal distribution were observed. These observations validated the appropriate use of multiple regression for this study.

Analysis for Research Question 1

The Survey questions were sent to the (K – 5th) grade teachers of the participating educational institutions. One hundred and twenty-five responses were received. The researcher conducted bivariate and multivariate statistics to investigate the following research question:

RQ1: Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?

Bivariate Statistics

Bivariate analysis using Pearson correlation was conducted to test the dependent variable, technology integration, with the independent variable, proficiency of technology equipment. Prior to conducting bivariate analysis, data was examined and outliers were removed.

Bivariate Correlation between Dependent Variable and Proficiency of Technology Equipment

Technology Integration (M = 2.54, SD = 1.11) characteristics were significantly correlated to Teachers' Proficiency of Technology Equipment (M= 3.18, SD = .983), r = -.051, p = .031. See Table 16 for results.

Table 16: Bivariate Correlation between Dependent Variable and Teachers' Proficiency of Technology Equipment

		Technology Integration	Teachers' Prof. of Technology Equipment
Technology Integration	Pearson Correlation	1	-.051
	Sig. (2-tailed)		.031
	N	125	125
Teachers' Prof. of Technology Equipment	Pearson Correlation	-.051	1
	Sig. (2-tailed)	.031	
	N	125	125

Tests for Assumptions

To avoid violations when running multiple linear regression, the researcher checked the following assumptions before running the regression analysis: normality, collinearity, and homoscedasticity were conducted and the data was checked for skewness and kurtosis to examine normality and linearity in SPSS prior to inferential statistics. The researcher checked each assumption with listwise deletion for compliance.

Normality

The researcher checked the histogram for a bell-shaped curve and p-plot for a 45-degree angle. Normality was clear by this examination.

Homoscedasticity

Homoscedasticity appeared after examining the scatterplots. The assumptions for hierarchical multiple linear regressions were checked. The Durbin-Watson test indicated a value of 1.800. According to Field (2005), values less than 1 or greater than 3 are cause for concern.

Collinearity

According to Fields, (2005) exists when there is a strong correlation between two or more predictor variables and in the case of the three independent variables; the VIF values of 1.000, 1.003, and 1.025 cause no need for concern (Field, 2005).

Multivariate Statistics

Multiple regression analysis tested the relationship between the proficiency of technology equipment and technology integration. Specifically, the researcher wants to know if the proficiency of technology equipment significantly impacts technology integration. For this

section, the researcher performed multiple regressions on the dependent variable focusing on the independent variable, proficiency of technology equipment.

Results of the regression analysis provided confirmation for the research hypothesis. Beta coefficients for teachers' proficiency was (β = -.151, t = 2.043), p = .032. The regression analysis displayed gender, age, and grade level negatively affected Technology Integration when teachers' proficiency of technology equipment is added to the model. For model 1, the adjusted R^2 was -.015. In model 2, when teachers' proficiency was added, adjusted R^2 increased to .025. Teachers' proficiency of technology equipment was a statistically significant predictor to technology integration, p = .032.

Table 17: Coefficients for Technology Integration with Teachers' Proficiency of Technology Equipment

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.215	.439		7.645	.000
	Gender	-.350	.113	-.279	-2.970	.511
	Age	.087	.183	.085	.022	.979
	Grade Level	-.548	.230	-.226	-2.943	.067
	Education Level	-.084	.261	-.024	-.222	.824
2	(Constant)	3.304	.405		8.148	.000
	Gender	-.360	.152	-.223	-2.364	.520
	Age	-.002	.146	-.001	-.019	.947
	Grade Level	-.540	.202	-.253	-2.179	.238
	Education Level	-.043	.202	-.019	-.217	.834
	Teachers' Proficiency	.138	.075	.151	2.043	.032

a. Dependent Variable: Technology Integration

H_1 stated that teachers' proficiency of technology equipment significantly impacts the integration of technology into the school's curriculum. Gender, age, grade level, and education level were not significant in the integration of technology into the school's curriculum. Teachers'

proficiency of technology equipment was a statistically significant predictor to the integration of technology into the school's curriculum, ($\beta = .151$, $t = 2.043$), $p = .032$. Therefore, the null hypothesis was rejected.

Analysis for Research Question 2

Bivariate statistical test, Pearson's correlation, and multivariate statistical test, multiple regression, was employed on the following research question:

RQ_2: Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?

Bivariate Statistics

Pearson correlations indicated technology integration ($M = 2.54$, $SD = 1.11$) characteristics were significantly correlated to teachers' experience ($M = 3.04$, $SD = .599$), $r = -.208$, $p = .001$.

Table 18: Bivariate Correlation between Dependent Variable and Teachers' Experience with Technology in Education

		Technology Integration	Teachers' Experience
Technology Integration	Pearson Correlation	1	-.208**
	Sig. (2-tailed)		.001
	N	125	125
Teachers' Experience	Pearson Correlation	-.208**	1
	Sig. (2-tailed)	.001	
	N	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

Beta coefficients for teachers' experience was (β = .092, t = 1.674), p = .001. The regression analysis displayed teachers' experience had a significant effect on technology integration when added to the model. The regression further revealed gender and grade level negatively affected Technology Integration when teachers' experience is added to the model. For model 1, the adjusted R^2 was .130. In model 2, when teachers' experience was added, adjusted R^2 increased to .255. Teachers' experience was a statistically significant predictor to technology integration, p = .001.

Table 19: Coefficients for Technology Integration with Teachers' Experience with Technology in Education

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.215	.439		7.645	.000
	Gender	-.350	.113	-.279	-2.970	.511
	Age	.087	.183	.085	.022	.979
	Grade Level	-.548	.230	-.226	-2.943	.067
	Education Level	-.084	.261	-.024	-.222	.824
2	(Constant)	2.817	.934		3.152	.003
	Gender	-.293	.139	-.181	-2.112	.311
	Age	.010	.136	.027	.425	.686
	Grade Level	-.426	.193	-.200	-2.204	.537
	Education Level	.036	.192	.016	.186	.853
	Teachers' Experience	.097	.148	.092	1.674	.001

a. Dependent Variable: Technology Integration

H_2 stated that teachers' experience with technology in education significantly impacts the integration of technology into the school's curriculum. Gender, age, grade level, and education level were not significant in the integration of technology into the school's curriculum. Teachers'

experience was a statistically significant predictor to the integration of technology into the school's curriculum, (β = .092, t = 1.674), p = .001. Therefore, the null hypothesis was rejected.

Analysis for Research Question 3

Bivariate statistical test, Pearson's correlation, and multivariate statistical test, multiple regression, was employed on the following research question:

RQ3: Does teachers' technology training have an impact on the integration of technology into the school's curriculum?

Bivariate Statistics

Technology integration (M = 2.54, SD = 1.11) characteristics were significantly correlated to teachers' technology training (M = 3.25, SD = .701), r = .130, p = .048.

Table 20: Bivariate Correlation between Dependent Variable and Teachers' Technology Training

		Technology Integration	Teachers' Technology Training
Technology Integration	Pearson Correlation	1	.130
	Sig. (2-tailed)		.048
	N	125	125
Teachers' Technology Training	Pearson Correlation	.130	1
	Sig. (2-tailed)	.048	
	N	125	125

Multivariate Statistics

Beta coefficients for teachers' technology training was (β = .273, t = 2.075), p = .043. The regression analysis displayed teachers' technology training had a significant effect on technology integration when added to the model. The regression analysis further displayed

gender, age, grade level, and education level negatively affected Technology Integration when teachers' proficiency of technology equipment is added to the model. For model 1, the adjusted R^2 was .120. In model 2, when teachers' technology training was added, adjusted R^2 increased to .144. Teachers' technology training was a significant predictor to technology integration, p = .043.

Table 21: Coefficients for Technology Integration with Teachers' Technology Training

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.215	.439		7.645	.000
	Gender	-.350	.113	-.279	-2.970	.511
	Age	.087	.183	.085	.022	.979
	Grade Level	-.548	.230	-.226	-2.943	.067
	Education Level	-.084	.261	-.024	-.222	.824
2	(Constant)	2.855	.319		5.707	.000
	Gender	-.246	.353	-.150	-2.727	.074
	Age	-3.896	.193	.460	.120	.360
	Grade Level	-.531	.271	-.247	-2.590	.394
	Education Level	-.027	.208	-.019	-.122	.301
	Teachers' Tech. Training	.529	.172	.273	2.075	.043

a. Dependent Variable: Technology Integration

H_3 stated that teachers' technology training significantly impacts the integration of technology into the school's curriculum. Gender, age, grade level, and education level were not significant in the integration of technology into the school's curriculum. Teachers' technology training was a statistically significant predictor to the integration of technology into the school's curriculum, (β = .273, t = 2.075), p = .043. Therefore, the null hypothesis was rejected.

Analysis for Research Question 4

Bivariate statistical test, Pearson's correlation, and multivariate statistical test, multiple regression, was employed on the following research question:

RQ4: Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

Bivariate Statistics

Technology Integration (M = 2.54, SD = 1.11) characteristics were significantly correlated to teachers' proficiency (M = 3.18, SD = .983), teachers' experience (M = 3.04, SD = .599), and teachers' technology training (M = 3.25, SD = .701).

Table 22: Bivariate Correlation between Dependent Variable and the three Independent Variables: Teachers' Proficiency of Technology Equipment, Experience with Technology in Education, and Technology Training

Bivariate Correlation between three Independent Variables with Technology Integration				
	1	2	3	4
1. Teachers' Proficiency	1	**.597***	**.565****	.105
2. Teachers' Experience		1	**.907****	**.164****
3. Teachers' Tech Training			1	**.211****
4. Technology Integration				1

Bold** = significance p < .01
Bold* = significance p <.05

Multivariate Statistics

Beta coefficients for teachers' proficiency was (β = -.151, t = 2.043), p = .032; Beta coefficients for teachers' experience was (β = .092, t = 1.674), p = .001; and Beta coefficients for

teachers' technology training was (β = .273, t = 2.075), p = .043. Regression analysis revealed teachers' proficiency of technology equipment, teachers' experience with technology, and teachers' technology training had a significant effect on technology integration when added to the model. The regression analysis further displayed gender, p = *.064*; age, p = *.957*; grade level, p = *.087*; and education level, p = *.871* negatively affected technology integration when teachers' proficiency of technology equipment, teachers' experience with technology, and teachers' technology training were added to the model. Generally, researchers don't consider a result significant unless it shows at least a 95% certainty that it's correct (called the .05 level of significance, since there's a 5% chance that it's wrong). Since the percentages of all four covariates calculated higher than the .05 percent level, they were not significant predictors to technology integration. Teachers' proficiency of technology equipment was a statistically significant predictor to technology integration, p = .032. Teachers' experience was a statistically significant predictor to technology integration, p = .001. Teachers' technology training was a statistically significant predictor to technology integration, p = .043. Since the percentages of all three independent variables calculated lower or equal to the .05 percent level, they were significant predictors to technology integration. Also, teachers' perceptions of the importance of technology training were much higher than the other two independent variables displaying as being most important to the teachers. Teachers' proficiency of technology equipment was next followed by experience with technology being the least of importance. However, all independent variables were very important to teachers and for this research study to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom.

Table 23: Coefficients for Technology Integration with a Combination of Teachers' Proficiency of Technology Equipment, Experience with Technology in Education, and Technology Training

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.215	.439		7.645	.000
	Gender	-.350	.113	-.279	-2.970	.511
	Age	.087	.183	.085	.022	.979
	Grade Level	-.548	.230	-.226	-2.943	.067
	Education Level	-.084	.261	-.024	-.222	.824
2	(Constant)	3.125	.336		6.476	.000
	Gender	-.323	.148	-.237	-2.502	.064
	Age	-.012	.136	-.002	-.053	.957
	Grade Level	-.355	.258	-.266	-2.849	.087
	Education Level	-.054	.213	-.073	-.255	.871
	Teachers' Proficiency	.138	.075	.151	2.043	.032
	Teachers' Experience	.097	.148	.092	1.674	.001
	Teachers' Tech Training	.529	.172	.273	2.075	.043

a. Dependent Variable: Technology Integration

H_4 stated that teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined significantly impacts the integration of technology into the school's curriculum. Gender, age, grade level, and education level were not significant in the integration of technology into the school's curriculum. Teachers' proficiency of technology equipment was a significant predictor to the integration of technology into the school's curriculum, ($\beta = .151$, $t = 2.043$), $p = .032$. Teachers' experience was a significant predictor to the integration of technology into the school's curriculum, ($\beta = .092$, $t = 1.674$), $p = .001$. Teachers' technology training was a significant predictor to the integration of technology into the school's curriculum, ($\beta = .273$, $t = 2.075$), $p = .043$. Therefore, the null hypothesis was rejected.

CHAPTER V: DISCUSSION AND CONCLUSIONS

The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. This study aimed to inform educational institution leaders of teachers' perceptions about integrating technology into their school curriculum, and to inform these leaders of how significant teachers' proficiency, experience with technology, and technology training are to successfully integrate technology. Chapter V is the final chapter and presents interpretations of Chapter IV findings, describe solutions to address limitations, the study's implications, and provide recommendations for future research. Research questions addressed in this study were:

RQ1: Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?

RQ2: Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?

RQ3: Does teachers' technology training have an impact on the integration of technology into the school's curriculum?

RQ4: Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

Interpretation of Findings

The research findings concluded that teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training have an

impact on the integration of technology into the school's curriculum. The purpose of this study was to examine the relationship between K – 5th grade teachers' perceptions of proficiency of technology equipment, experience with technology in education, and technology training, and show how it impacts the integration of technology in teaching and learning in the classroom. The Level of Teaching Innovation Digital-Age Survey (Moersch, 2011a) was the instrument the researcher used to measure the independent variables and covariates. This study examined the data of one hundred twenty-five (K – 5th grade) teachers employed at four educational institutions. The researcher dispersed a survey for 125 teachers. All participants took the survey. The study used Christensen's Disruptive Innovation Theory and Distribution Cognition Theory in education and technology. These Theories have a very large impact on technology and integration of technology into the schools to improve teaching and learning practices for the students. There was a gap discussed in the study, but the researcher found conclusive information to close the gap. The data indicated that the teachers were well prepared and skilled in integrating educational technology in their classroom curriculum.

Significant Results Related to Research Questions

Research indicates that the integration of technology into instruction occurs over time and follows a pattern (e.g., Sandholz, Ringstaff, & Dwyer, 1997). Teachers need training and guidance to assure that technology is benefiting student learning. The objective for any effective technology professional development program should be to provide teachers with the opportunity to use the technology and to become accustomed with ways to integrate technology into their classroom's curriculum. Initially, teachers incorporate new technologies into existing practices. Once they observe changes in their students, such as improvements in engagement, behavior, and learning, teachers gradually begin to experiment with using technology to teach in

new ways. It can take four years or more from initial use of technology until changes in student learning can be observed (Williams, 2002). However, teachers may adopt technology at different rates, depending on their beliefs about technology and their individual skills, and different implementation factors interact. For instance, with sufficient technical support, teachers feel more competent and ready to integrate technology. Overall support and positive expectations from the school community and administration also influence teachers' beliefs about and willingness to integrate technology (Inan & Lowther, 2010).

Research Question 1

Does teachers' proficiency of technology equipment have an impact on the integration of technology into the school's curriculum?

H_1: Teachers' proficiency of technology equipment significantly impacts the integration of technology into the school's curriculum.

The researcher did find a connection between teachers' proficiency of technology equipment and the integration of technology into the school's curriculum. Teachers' proficiency of technology equipment has a significant impact on the integration of technology into the school's curriculum. According to the data received, the data indicated that the teachers' proficiency of technology equipment in each of the schools were very good. The teachers had the criteria to be employed in the education system and were very skilled and knowledgeable of the technology equipment that was used in their classrooms. The teachers demonstrated effective use of a computer system and utilized computer software. They were enthusiastic, self-motivated, flexible in their methods to teaching, and very competent. It was also recognized by the teachers that student learning could be helped or delayed by teachers' proficiency, technical knowledge, and integration. As computer and technology continue to change and advance, the teachers

continued to strive for excellence in their classrooms. Research also indicates that the most important factor in determining the success of technology in the classroom is a teacher who is comfortable with and knowledgeable about computers.

Research Question 2

Does teachers' experience with technology in education have an impact on the integration of technology into the school's curriculum?

H_2: Teachers' experience with technology in education significantly impacts the integration of technology into the school's curriculum.

The researcher did find a connection between teachers' experience with technology in education and the integration of technology into the school's curriculum. Teachers' experience with technology in education has a significant impact on the integration of technology into the school's curriculum. According to the data received, the data indicated that teachers' experience with technology was very important to enhance elementary teaching and learning. Teachers felt that their technology experience was positive and transferable, and, as a result, their students were more involved. The teachers had access to instructional and hardware technology support if it was needed. The quantitative data indicated that the teachers felt highly supported and that support impacted their technology integration. This study also found that because of the teachers having great experiences with technology, they were more focused and comfortable working with their students and integrating technology into their classroom curriculum.

Research Question 3

Does teachers' technology training have an impact on the integration of technology into the school's curriculum?

H_3: Teachers' technology training significantly impacts the integration of technology into the school's curriculum.

The researcher did find a connection between teachers' technology training and the integration of technology into the school's curriculum. Teachers' technology training has a significant impact on the integration of technology into the school's curriculum. Training is time consuming. According to the data received, the data indicated that when teachers were shown that technology can be a useful tool in the classroom, how to use this tool effectively, and what the benefits are for the students, the teachers were willing to take the time to learn. The teachers were provided excellent and an excessive amount of training to effectively teach their students and to integrate technology into their school curriculum. Teachers were provided great support from their Principals and Administration. Each school were provided with a technology resource teacher. The data indicated that 100 percent of the teachers received technology training. As the technology worked great for them in the classroom, the teachers integrated technology directly into their curriculum, developed ways to use the technology as a tool, and saw that it positively impacted their different subject areas. Though technology training is one of the most common types of professional development for teachers—with 60 percent of teachers reporting some sort of technology-related professional development in the past year (NEA, 2008)—only 43 percent rate it "useful" or "very useful." Many teachers report that the instruction they receive in technology integration, whether online or face-to-face, is still too focused on learning how to use the software versus integrating it into the teaching and learning process (NEA, 2008).

Research Question 4

Does teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have an impact on the integration of technology into the school's curriculum?

H_4: Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined significantly impacts the integration of technology into the school's curriculum.

The researcher did find a connection between teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined and the integration of technology into the school's curriculum. Teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training combined have a significant impact on the integration of technology into the school's curriculum. According to the data received, the data indicated that all of these independent variables are very important, related, and impacted the integration of technology into the school curriculum. The results from the teachers indicated that all are needed to effectively integrate technology and play a significant role in developing the curriculum. The process of technology integration is one of continuous change, learning, and expectantly with improvement. Developing great teachers that embrace technology is very important to its successful integration.

Research Implications

Study Significance

The significance of the study was to provide information for educational institutions about the necessary resources needed for teachers to be successful in integrating technology into the school's curriculum. By teachers being well prepared and skilled in integrating educational technology in the classroom, they have the opportunity to produce students that have a better grasp of educational technology. This study provided a clear understanding of teachers' perceptions related to the integration of technology into the school's curriculum.

Limitations

The study had limitations mainly because of the study population. This study was limited to the state of Georgia and to the teachers in grades K-5. The sample size as well as respondents from the population warrants cautious use of the study's findings. The population of the experimental group was small, only 125 teachers, and might not represent the majority of the teachers of the intermediate level in education. The total population averages to 250 teachers, but because G*Power recommends 103 as the total sample size, 125 teachers were a satisfactory amount to study. But with this research study, 125 teachers were chosen as the sample population to study. The researcher recognizes study participants will not comprehensively represent the characteristics of the entire study population.

Delimitations

This study was delimited by the scope of participants. Respondent population consisted of (K – 5th grade) teachers from educational institutions. Approval was received from four out of

seven educational institutions. Faculty teachers from the participating four educational institutions were invited to participate in this study.

Theoretical Implications

Christensen's (2008) Disruptive Innovation Theory examined the barriers to technology integration met by schools in efforts to use technology to improve teaching and learning practices. The implication of the study was to prepare teachers for technology integration into the school's curriculum, so that they can have a better understanding about educational technology and help to increase their student's knowledge in using educational technology for learning. The study helped to determine if teachers' proficiency of technology equipment, teachers' experience with technology in education, and teachers' technology training have a significant impact on the integration of technology into the school curriculum. Distribution Cognition Theory (Hollan, Hutchins, and Kirsh, 2000) emphasized that the accumulation of knowledge is not relied on the individual's effort, but depended on other people, learning environment, and tools. These theories are very important because teachers need the tools, resources, and support to effectively and successfully integrate technology into the school curriculum to teach their students. In the field of educational technology, this theory has been widely applied in distance education, computer-assisted collaborative learning, and the development of computer-assisted-learning tools. These Theories have a very large impact on technology and integration of technology into the schools to improve teaching and learning practices for the students.

Recommendations for Future Research

Based on this researcher's study and experience, schools have made significant progress regarding their implementation and integration of technology. This researcher has noticed that

teachers are eager to learn about the new and different technology that's available for them to use to integrate technology into their classroom curriculum and would like more technology training to effectively teach their students. Principals should work closely with their school technology support staff regarding technology training and integration. Principals now have new tools available to them to provide this important technology training to their teachers that could have a successful impact on the students' education.

Many schools are implementing programs in which every student is provided a laptop or tablet, and the students can also bring their personal technology devices to use in class. As students incorporate these technology devices into their daily learning experiences in the years to come, it will be much easier for the teachers to integrate more instructional, educational technology into their school's curriculum. It will also provide the teachers an opportunity to communicate with their students outside of the classroom especially when the students are at home and need additional help with homework or something they did not understand in the classroom.

Literature has suggested that the technology-related professional development and training can improve teacher confidence and competency relating to technology integration (Peterson & Palmer, 2011), which lead to increased student engagement (Sadaf et al., 2012). Future research could be conducted to observe the relations between the amount of training needed to effectively increase the level of technology used in the classroom and its impact on increasing student engagement. This research may provide insight into how much training and time is needed for teachers to impact student engagement through technology. Some of the areas needing further research are as follows:

- Student achievement levels related to technology integration in the classroom,

- The relationship between professional development and teachers' level of technology integration, and
- The relationship between teacher experience or education level and technology integration.

Summary

Technology has the potential to assist teachers and prepare students for today's world of technology. Teachers' experience, proficiency, and training with technology are all very important. Training is needed for teachers and educators to learn about updated technology and its strength in the classroom curriculum. Some educational institutions already have the latest technology but others do not have this luxury. Each educational institution needs to get onboard to effectively integrate technology into their classroom curriculum. Support of the teachers and technology can develop better skilled, experienced, proficient, and trained professional teachers and, as a result, improve students' education and lives. Effective technological integration means overcoming the barricades that delay teachers' integration of technology into the classroom's curriculum.

Regression analysis revealed teachers' proficiency of technology equipment, teachers' experience with technology, and teachers' technology training had a significant effect on technology integration. Also, the regression analysis further displayed gender, $p = .064$; age, $p = .957$; grade level, $p = .087$; and education level, $p = .871$ were not significant predictors to technology integration. Generally, researchers don't consider a result significant unless it shows at least a 95% certainty that it's correct (called the .05 level of significance, since there's a 5% chance that it's wrong). Since the percentages of all four covariates calculated higher than the .05 percent level, they were not significant predictors to technology integration. Teachers'

proficiency of technology equipment, $p = .032$; teachers' experience with technology, $p = .001$; and teachers' technology training, $p = .043$ were significant predictors to technology integration. Since the percentages of all three independent variables calculated lower or equal to the .05 percent level, they were significant predictors to technology integration.

Educators are now leaders and facilitators who assist student learning by having the students construct their knowledge. According to research data, technology tools for educational learning and outside of the classroom learning are very appealing to children now, and most likely, it will be in the future. These technology tools provide for learning settings that allow for social and personal experiences and everyday learning situations. The effectiveness of technology integration in education remains a goal for teachers (educators) in this digital age period.

Technology has always been an important topic for this researcher. This researcher has always been fascinated about anything related to technology because it increases opportunities to evaluate, access, and transfer knowledge. From high school to Graduate school, this researcher has learned so much about technology. And during my Dissertation research process, I've had the opportunity to meet some wonderful and intelligent teachers, superintendents, and principals at several great educational institutions. They appear to be really working very hard to successfully integrate technology into their school's curriculum and have done an amazing job so far in completing this task. The students also appear to be enjoying all of the technology tools that had been provided for them to use in their classrooms.

In the future, this researcher would really like to see educators stay current with new trends and developments in technology. It would be great to see all teachers at these educational institutions onboard with successfully integrating technology into their school's curriculum. By

taking small steps, teachers can finally begin to obtain the benefits that technology can bring to their teaching and student's education. With careful planning and an open mind, teachers can successfully use technology tools to improve their teaching and bring learning to life for their students.

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Appendix 1: Demographics

Demographics

Background Information

School Name: _____

State: _____

1. What is your gender?
   - o *Male*
   - o *Female*

2. Please mark the appropriate range for your age.
   - o *20 - 30*
   - o *31 - 40*
   - o *41 - 50*
   - o *51 - 60*
   - o *61 +*

3. What grade levels do you currently teach? (Check all that apply)
   - o *Pre-K*
   - o *Kindergarten*
   - o *1st grade*
   - o *2nd grade*
   - o *3rd grade*
   - o *4th grade*
   - o *5th grade*

4. Which subject(s) do you teach? (Check all that apply)
   - o *General Elementary (all subjects)*
   - o *Mathematics*
   - o *Science*
   - o *English*
   - o *History/Social Sciences*
   - o *The Arts*
   - o *Foreign Languages*
   - o *PE/Health*
   - o *Special Ed.*

5. I've been provided an acceptable amount of technology training at my Institution.
   - o *Strongly agree*
   - o *Agree*
   - o *No opinion*
   - o *Disagree*
   - o *Strongly Disagree*

6. Proficiency of technology equipment:
   - o *None*
   - o *Little*
   - o *Moderate*
   - o *High*

7. What is your education level (Bachelors, Masters, or Doctorate)?
   - o *Bachelors*
   - o *Masters*
   - o *Specialist*
   - o *Doctorate*

8. Including this school year, how many years have you taught?
   - o *0 - 5*
   - o *6 - 10*
   - o *11 - 15*
   - o *16 – 25*
   - o *25 +*

9. Including this school year, how many years have you taught at your current school?
   - o *0 - 5*
   - o *6 - 10*
   - o *11 - 15*
   - o *16 – 25*
   - o *25 +*

10. How many years of teaching experience (technology) do you have?
    - o *0 - 5*
    - o *6 - 10*
    - o *11 - 15*
    - o *16 - 25*
    - o *25 +*

Appendix 2: Level of Teaching Innovation Digital-Age Survey

Level of Teaching Innovation Digital-Age Survey
(Moersch, 2011a)

Section 1.

LoTi Digital Age Survey: Digital Landscape
Select the response for each question below that best represents the digital landscape in your classroom.

1. How many years of teaching experience do you have in education?
- o *Less than Five Years*
- o *Five to Nine Years*
- o *Ten to Twenty Years*
- o *More than Twenty Years*

2. Which statement best describes your classroom's digital infrastructure?
- o *No access to digital resources*
- o *Teacher workstation only*
- o *Classroom laptop/mobile device station(s)*
- o *Access to laptop/mobile device cart(s)*
- o *One-to-one laptop/mobile devices*
- o *BYOD (Bring Your Own Device)*
- o *Other*

3. Which model best describes your approach to blended or hybrid learning in the classroom? Blended learning models include Flipped Classroom, Rotation, Online Lab, Flex, Self-Blend, Supplemental, Face-to-Face Driver, and Online Driver.
- o *No Blended Learning Model*
- o *Blended Learning using a Flipped Classroom Model*
- o *Blended Learning using a Rotation Model*
- o *Blended Learning using an Online Lab Model*
- o *Blended Learning using a Flex Model*
- o *Blended Learning using a Self-Blend Model*
- o *Blended Learning using a Supplemental Model*
- o *Blended Learning using a Face-to Face Driver Model*
- o *Blended Learning using an Online Driver Model*

4. From which source do you most frequently seek guidance, information, inspiration, and/or direction relating to your classroom use of digital resources in the classroom?
- o *Students*
- o *Building Administrators*
- o *School/District Specialists (e.g. Media/Technology Specialist, Instructional Specialist)*
- o *Classroom Teachers (e.g. Other Colleagues, Mentors, Peer Coaches)*
- o *Specific websites (e.g. Teaching Channel, YouTube, Kahn Academy)*

5. What do you perceive as the greatest obstacle to advancing your use of digital resources in your instructional setting?
- o *None*
- o *Lack of Access to Digital Resources*
- o *Time to Learn, Practice, and Plan*
- o *Required Instructional Priorities (e.g. Statewide Testing, New Textbook Adoptions)*
- o *Lack of Staff Development Opportunities*
- o *Other*

LoTi Digital Age Survey: Teacher Perceptions
Select the response for each statement below that best represents your perceptions about the use of digital resources in your classroom.

6. I believe the use of digital resources in my classroom can positively impact student learning and achievement.
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

7. I have the necessary capabilities and skills to integrate digital resources successfully into my classroom instruction.
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

8. I know where (e.g. Teaching Channel, YouTube, Kahn Academy) or who (e.g., campus technology specialist, academic coach, grade level teacher, curriculum coordinator) to go to when I need support for using digital resources in my classroom.
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

9. I receive useful feedback on the integration of digital resources into my instruction from my administrator(s).
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

10. I am able to maximize student learning best when I complement my whole group approach with learning stations/centers, cooperative grouping, and/or individualized instruction.
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

LoTi Digital Age Survey: School Climate
Select the response for each statement below that best represents your perceptions about the educational climate at your school.

11. I am treated as a respected educational professional on my campus.
- o *Strongly Agree*
- o *Agree*
- o *No opinion*
- o *Disagree*
- o *Strongly Disagree*

12. I engage in a two-way cycle of communication and feedback with my school administrators.
- *Strongly Agree*
- *Agree*
- *No opinion*
- *Disagree*
- *Strongly Disagree*

13. I feel that I am listened to, represented, and feel I have a voice on campus.
- *Strongly Agree*
- *Agree*
- *No opinion*
- *Disagree*
- *Strongly Disagree*

14. I understand and support the shared vision for our school's use of digital resources along with other key stakeholders.
- *Strongly Agree*
- *Agree*
- *No opinion*
- *Disagree*
- *Strongly Disagree*

LoTi Digital Age Survey: Use of Resources

Select the response for each question below that best represents how often digital and/or environmental resources are being used during instruction.

15. How often are your students using digital tools and/or environmental resources during the instructional day?
- *Never*
- *At least once a year*
- *At least once a month*
- *At least once a week*
- *At least once a day*
- *Multiple times each day*

16. How often are you (the teacher) using digital tools and/or environmental resources during the instructional day?
- *Never*
- *At least once a year*
- *At least once a month*
- *At least once a week*
- *At least once a day*
- *Multiple times each day*

LoTi Digital Age Survey: Standards-Based Learning

Select the response that best represents how often standards drive student learning experiences.

17. How often are your students involved in standards-based learning experiences during the instructional day?
- *Never*
- *At least once a year*
- *At least once a month*
- *At least once a week*
- *At least once a day*
- *Multiple times each day*

Section 2.

LoTi Digital Age Survey: Teacher Statements
Select the response that best represents how often the statement mirrors the instructional practices in your learning environment.

0 – Never
1 – At least once a year
2 – At least once a semester
3 – At least once a month
4 – A few times a month
5 – At least once a week
6 – A few times a week
7 – Daily

1. My students work together using digital tools and/or environmental resources that require them to analyze information and ask questions based on a teacher-provided prompt. ___
2. My students work alone or in groups to create traditional reports with web-based or multimedia presentations (e.g. Prezi, PowerPoint, Google Slides) that showcase information on topics that I assign in class. ___
3. I assign my students tasks that emphasize teacher-directed investigations with a known outcome (e.g. science experiments, mathematical problem solving, literary analysis) using the available digital tools and/or environmental resources. ___
4. I provide different formative and summative assessments that encourage students to demonstrate their content understanding in nontraditional ways. ___
5. My students use digital tools and/or environmental resources to participate in teacher-directed activities that require them to transfer their learning to a new situation. ___
6. My students use collaborative digital tools (e.g. Google Docs, social media, wikis) and/or environmental resources beyond the school building (e.g. community action groups, parents, elected officials) to create solutions for real world problems (e.g. bullying, health awareness, election apathy, global warming). ___
7. I promote, monitor, and model the ethical use of digital tools in my classroom (e.g. appropriate citing of resources, respecting copyright permissions). ___
8. I use digital tools to expand my communication opportunities with students, parents, and peers. ___
9. My students find innovative ways to use our school's advanced digital tools (e.g. 1:1 mobile devices, digital media authoring tools, probeware with GPS systems) for inquiry-based learning opportunities that use social media. ___
10. I model and facilitate the effective use of current and emerging digital tools to support teaching and learning in my classroom. ___
11. I use digital tools to support my instruction (e.g. multimedia, online tutorials, online simulations, videos) so that students can better understand the content that I teach. ___
12. I alone use the classroom digital tools during instruction due to the amount of content that I have to cover by the end of each marking period. ___
13. My students use a variety of digital tools that support the evolving nature of my grade level content and promote student academic success. ___
14. My students readily self-select the most appropriate digital tool to aid them in completing any given task. ___
15. I employ learner-centered strategies (e.g. communities of inquiry, learning contracts) to address the diverse needs of my students using developmentally-appropriate digital tools. ___
16. My students use digital tools and/or environmental resources to participate in problem-solving activities with others beyond the classroom. ___
17. My students use digital tools and/or environmental resources for (1) collaboration, (2) publishing, and (3) research to tackle real world questions, themes, and/or challenges within our community. ___
18. I model for my students the safe and legal use of digital tools while I am delivering content and/or confirming student understanding of pertinent concepts. ___

0 – Never
1 – At least once a year
2 – At least once a semester
3 – At least once a month
4 – A few times a month
5 – At least once a week
6 – A few times a week
7 – Daily

19. My students model the "correct and careful" use of digital tools (e.g. ethical usage, proper digital etiquette, protecting their personal information) and are aware of the consequences regarding their misuse. ___
20. I collaborate with others (e.g. students, faculty members, business experts) to explore creative applications of digital tools that improve student learning. ___
21. My students use digital tools and/or environmental resources to define real life problems and then find solutions that are grade level appropriate. ___
22. My students engage in standards-based applied learning projects that emphasize student investigations using digital tools. ___
23. I use student-centered performance assessments that involve students transferring what they have learned to a real world context using the available digital tools and/or environmental resources. ___
24. My students' questions, interests, and readiness levels directly impact how I design learning activities that address the content standards. ___
25. My students use the classroom digital tools and/or environmental resources to engage in relevant, challenging, self-directed learning experiences that address the content standards. ___
26. My students' complete online tasks that emphasize high level cognitive skills (e.g. Bloom-analyzing, evaluating, creating; Webb-strategic and extended thinking). ___
27. My students use digital tools and/or environmental resources to confirm their content understanding or to improve their basic math and literacy skills. ___
28. My students use digital tools and/or environmental resources to explore deeper content connections (e.g. analyzing data from surveys and experiments, making inferences from text passages) that require them to draw conclusions. ___
29. My students collaborate with me in setting both group and individual academic goals that provide opportunities for them to direct their own learning aligned to the content standards. ___
30. I promote global awareness in my classroom by providing students with digital opportunities to collaborate with others beyond the classroom. ___
31. My students apply their classroom content learning to real world situations within the local or global community using the digital tools at our disposal. ___
32. I reinforce specific content standards and confirm student learning using digital tools (e.g. discussion forums, digital student response system, wikis, blogs) and/or environmental resources (e.g. manipulatives, graphic organizers, dioramas). ___
33. My students self-select digital tools and/or environmental resources for higher-order thinking and personal inquiry related to project-based learning (PBL) experiences. ___
34. My students use all forms of the most advanced digital tools to pursue collaborative problem-solving opportunities of personal and/or social importance. ___
35. I use digital tools and resources to differentiate the content, process, and/or product of learning experiences. ___
36. I promote the effective use of digital tools on my campus and within my professional community. ___
37. I consider how my students will apply what they have learned in class to the world they live in when planning group projects. ___

Appendix 3: Letter of Request to Conduct Survey

Board of Education
South GA Schools

RE: Request to Conduct Study/ Research

Dear Superintendent:

As a doctoral candidate in Trident University International's Doctorate of Philosophy program, I am conducting research as a part of the requirements for a Ph. D. in Educational Leadership. My research topic is "Technology in Education: Technology Integration into the School's Curriculum." The study focuses on an evaluation of the teachers in reference to technology integration.

I am writing to request your permission to conduct my dissertation research with participating faculty (teachers) from your institution. I will not use any Personal Identification Information from the teachers. My study is currently undergoing Trident University's IRB approval process and, to advance my application, IRB is seeking approval from the participating institution.

Upon your approval, a survey will be presented to your institution for distribution to the faculty (teachers). The teachers will be presented with informed consent information prior to participating and will be asked to complete a brief research survey. The survey will measure their perceptions in reference to technology integration into the school's curriculum. The faculty (teachers) responses are anonymous, and there is no risk or financial benefit to anyone involved in this study. Participating in this research is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, please reply with a statement on your institutional letterhead indicating your approval and e-mail your response to bobbyl.culverjr@my.trident.edu.

You may also contact me by phone at (912) 536-7764 for any questions regarding this request. You may also contact my Committee Chair: Dr. Pamela A. Wilson at pamela.wilson@trident.edu or by phone at (773) 930-9630. Thank you in advance.

Respectfully,

Bobby L. Culver, Jr.

Bobby L. Culver, Jr., M.S.I.T.M.
Trident University International
Student/ Researcher

Appendix 4: IRB Approval

TRIDENT UNIVERSITY
INTERNATIONAL

Institutional Review Board - IRB
5757 Plaza Dr., Suite 100 Cypress, California 90630 • Tel: (714) 816-0366 • Fax: (714) 226-9844

Date: 11/11/2016

Dear Bobby L. Culver,

Thank you for submitting your application to the Institutional Review Board. We reviewed your application for your proposed study, 'Technology in Education: Technology Integration into the School's Curriculum.' Per federal guidelines, we have determined that your study is exempt from further IRB review for the following reason(s):

• Research involves only the use of survey procedures in an adult population, and the information is not recorded in a manner that human subjects can be identified (45 CFR 46.101(b)(2))

This approval is valid for one year from the date of this notice. The research must be conducted according to the proposal submitted to the Trident IRB. In order to preserve the anonymity of participants, data may not be reported without a minimum of ten subjects in a subgroup. If changes to the approved protocol need to be made, a revised protocol must be submitted both to your Dissertation Chair and IRB for review and approval.

Sincerely,

Yan Ma

Yan Ma, MA
Vice-Chair - Institutional Review Board (IRB)

Appendix 5: Letters of Approval from Participating Institutions

Dublin City Schools
207 Shamrock Dr.
Dublin, GA 31021
(478) 353-8000

Frederick C. Williams, Ed.D.
Superintendent

October 28, 2016

Trident International University
Attn: Dr. Pamela A. Wilson
5757 Plaza Drive, Suite 100
Cypress, CA 90630

Dear Dr. Wilson:

Mr. Bobby L. Culver, Jr. is authorized to conduct a research study in the Dublin City Schools' district with faculty (teachers) measuring their perceptions in reference to technology integration in the school's curriculum.

If you have any questions, please contact me at 478-353-8000.

Sincerely,

Fred Williams, Ed.D.
Superintendent

Jeff Davis County Board of Education

SUPERINTENDENT
Dr. Stan Rentz

P.O. Box 1780
44 Charles Rogers Blvd.
HAZLEHURST, GEORGIA 31539
(912) 375-6700
FAX (912) 375-6703

BOARD MEMBERS
Roger Ogilvie, Chairman
Andy Ramay, V. Chair
Larry Allen
Greg Brantley
B.H. Claxton
Randy Smith
John Girtman

October 24, 2016

To whom it may concern:

Mr. Bobby Culver has permission to conduct his research dissertation with willing teachers from Jeff Davis County Schools. We are looking forward to working with him.

Sincerely,

Stan Rentz, Ed.D
Superintendent, Jeff Davis County Schools

TWIGGS COUNTY
PUBLIC SCHOOLS

Generating Excellence: One Team... One Goal

SUPERINTENDENT
Mr. Elgin L. Dixon

MEMBERS, BOARD OF EDUCATION
Joanie Rainey, Chairperson · Teresa Blackshear, Vice Chairperson · Constance Morse · Isiah Rouse Jr. · Shirley Stokes

Monday, October 31, 2016

Dear Mr. Paulk,

Mr. Bobby Culver has my permission to access Jeffersonville Elementary School for the purpose of conducting doctoral research surveys pertaining to technology.

Professionally,

Elgin Dixon, Ed.S
Superintendent of Schools

Wheeler County Board Of Education

18 McRae Street
Alamo, Georgia 30411
(912) 568-7198 Fax (912)-568-1985
"Graduation....The Only Option"

Mark Davidson, *Superintendent*
Suzanne Coley, *C&I/Fed Programs*
Bonnie Smiley, *Accounts Payable*
Gregory Wilcher, *M&O/Food Service*
Renee Garrett, *Asst. Supt. Student Services*
Helen Nunn, *Finance Officer*
Cynthia Edwards, *Payroll Officer*
Frank Ed Palmer, *Technology Specialist*

October 24, 2016

Mr. Culver,

You are more than welcome to conduct your Doctoral survey in the Wheeler County School System. If you have any questions or concerns, please feel free to contact me at the number above.

Sincerely,

Mark Davidson

Mark Davidson