EFFECTIVENESS OF A WEB-BASED COURSE IN FACILITATING
THE INTEGRATION OF TECHNOLOGY INTO
EARLY CHILDHOOD CURRICULA

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Although technology is available and used in early childhood classrooms, little is known about what early childhood teachers believe about the use of technology and how technology is integrated into early childhood curricula. This study was designed to (a) determine the beliefs of early childhood teachers about technology integration into early childhood curricula and (b) describe the extent to which early childhood teachers integrate technology in their early childhood curricula.

The participants included 39 prekindergarten teachers who volunteered to participate in a technology integration project. The treatment group accessed a Web-based technology integration training program and participated in two classroom observations, along with completing an attitudinal questionnaire pretest and posttest. The Prekindergarten Web-based Technology Integration Training included four modules each expanding the following themes: (a) national and state standards and guidelines for technology; (b) setting up a computer center; (c) integrating technology; (d) using the digital camera. The control group participated in two classroom observations without the benefit of the Web-based technology integration training program and completed the attitudinal questionnaire pretest and posttest.

Results indicate that Prekindergarten teachers believe that technology can enhance a child’s learning, but there was no statistically significant difference between the control and the treatment group.
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CHAPTER 1
INTRODUCTION

Technology, such as computers and digital cameras, is commonplace in schools and homes today (Judson, 2006; Thouvenelle & Bewick, 2003; US Department of Education [USDE], 2000; Yelland, 2007). Today’s students grew-up with digital technologies, integrating computers, the Internet, instant messaging, cell phones, and email into their daily activities (USDE, 2004). The use of technology has become an essential skill that can shape and determine students’ educational, employment, and cultural opportunities (Yelland, 2007). The CEO Forum suggests that the development of 21st century skills of digital age literacy, inventive thinking, effective communication and high productivity abilities are crucial for students to thrive in the future (2001). To empower students to learn, achieve and succeed in this century, K-12 education must integrate 21st century skills (CEO Forum, 2001b). Education becomes more relevant when it reflects the realities and challenges of contemporary life (Partnership for 21st Century Skills, 2004).

Researchers report the steady increase of technology availability and use in schools (Swanson, 2006). Nearly all public school teachers (99 percent) report having computers available in their schools (USDE, 2000). Swanson (2006) and USDE (2006) report the average amount of students per computer as 3.8 to 1 in the United States. In a report that focuses on young children’s access to
computers, USDE reports that 86 percent of kindergarteners have access to computers in school (2005). USDE reports that 65% of American children ages 2–17 now use the Internet from home, school, or some other location, which is a 59% growth rate since 2000, when 41% of children went online from any location (2003). USDE utilized the October 2003 Current Population Survey to collect information regarding 29,075 children enrolled in nursery school through 12th grade. The data reflect information about student use of computers and the Internet and that the majority of students use computers and the Internet. Overall, 91% of students’, nursery school through 12th grade used computers and 59% used the Internet. Young children begin to use technology; 67% of children in nursery schools were computer users and 23% used the Internet. Of the children in Kindergarten, 80% were computer users and 32% accessed the Internet (USDE, 2005). In 2002, the US Department of Commerce commissioned a group of experts to envision the effects that technology will have on education. Hinrichs (2002) suggests that by the year 2020, young children will routinely engage in technological learning environments that facilitate communication and collaboration with others and teachers will create activities to expand problem-solving abilities.

In contrast to the reported increases of student use of technology, while 50% of teachers are proficient in the use of technology, they do not integrate technology into the classroom curriculum on a consistent basis (Bauer & Kenton, 2005). As early as 1988, the Office of Technology Assessment (OTA) reported
that only 50% of teachers reported having ever used computers at all and 50% report non-use of computers. Again, in 1995, the OTA asserts that a substantial number of teachers continued to report little or no use of computers for instruction. In The Condition of Education 2001, USDE reports that teachers do not feel prepared to use technology (2001). A continual disconnect between the availability of computers and teacher utilization of computers for instruction is apparent. The problem is not necessarily lack of funds, but lack of adequate training and lack of understanding of how computers can enrich the learning experience (USDE, 2004). Rod Paige, former US Secretary of Education states, “Education is the only business still debating the usefulness of technology. Schools remain unchanged for the most part, despite numerous reforms and increased investments in computers and networks” (USDE, 2004).

As early as 1999, The CEO Forum stated, “We continue to believe the quality of public education in this country depends upon our collective ability to close the gap between technology presence and its effective use in the pursuit of school improvement” (1999, p. 1). The CEO Forum recognizes the fact that while school technology presence continues to increase, the use of technology depends on knowledgeable and enthusiastic teachers who are skillful and motivated to utilize technology within their classrooms (1999). In order to accomplish the goal of competent teachers integrating technology for the improvement of student achievement, the CEO Forum (1999) recommends that:

- Schools of education should prepare new teachers to integrate
technology effectively into the curriculum.

- Current teachers and administrators should be proficient in integrating technology into the curriculum.
- Education policymakers and school administrators should create systems that reward the integration of technology into the curriculum.
- Corporations and local businesses should collaborate with the education community to help ensure that today’s students will graduate with 21st century workplace skills (p. 2-3).

The success or failure of integrating technology is also dependent upon attitudes and beliefs of teachers (Becker, 2000). Teachers make decisions based on their beliefs about technology, instruction, and learning (Dwyer, Ringstaff, & Sandholtz, 1991; Hanks, 2002; Kadel, 2005; Lumpe & Chambers, 2001; Vannatta and Fordham, 2004; Wang, Ertmer and Newby, 2004). Along with beliefs, USDE asserts teachers’ use of technology has a direct relationship to teacher training, preparation and work environments (2000). Furthermore, teachers who spend more time participating in professional development report feeling better prepared to use technology than their colleagues (2000). Teachers indicate that independent learning is the first source of their preparation, with professional development activities and colleagues also providing support (USDE, 2000). Teachers’ feelings of preparedness and experience with technology relate to children’s opportunities to use technology in their classrooms (USDE, 2000). Ertmer (2005) asserts that teachers think about technology as being just another tool to help facilitate student learning or as one more thing to do during the school day.
The National Association for the Education of Young Children (NAEYC) (1996) issued a position statement that technology will increase in daily life and early childhood teachers must assume the responsibility of being prepared to use technology in early childhood classrooms. However, there is little research investigating the integration of technology in early childhood classrooms. Few studies have focused on early childhood classrooms (for children between the ages of three and five) and the integration of technology. The USDE report describing young children’s access to computers at home and at school suggests that young children’s use of computers varied by school program type (part day vs. full day). The amount of professional development for the teacher, presence of computers in the classroom, and the proportion of time during the day spent in teacher-directed, whole-group instruction effected access to technology (2003).

In a study investigating the comfort and anxiety levels of early childhood teachers during technology training, researchers found that overall the training minimized teacher anxiety that could translate to more effective use of computers in the early childhood classroom (Wood, Specht, Willoughby, Stern-Cavalcante, & Child, 2002). Gimbert and Cristol (2004) found that early childhood teachers could successfully integrate technology into the curriculum by participating in professional development. The early childhood teachers in this study learned to integrate technology into learning activities to enhance the technological competency of young children. Early childhood teachers successfully integrated technology using the theme “100 Days of School” in a developmentally
appropriate fashion in a study by Mouza (2005). The key ingredient for the success of the project was professional development. The teachers gained in their technological skills, acquired a better understanding of the rationale for technology integration, discovered relevant tools and resources available for student learning, and enhanced their classroom management strategies.

Cuban (2001) reports that early childhood teachers have only adopted technology as just another activity for the children to access, not as a tool to transform teaching and learning. The early childhood teachers studied adapted technology use within their traditional philosophy of learning in preschool (Cuban, 2001). The computer becomes just another play area for the children to use in their daily activities. Cuban also concludes that technology use in high schools is infrequent, limited, and integration of computers into classroom curricula and instructional techniques was minimal (2001).

In 1997 in the State of the Union address, President Clinton challenged the United States to bring the power of the Information Age to students by connecting each classroom and library to the Internet before the 21st century (Clinton, 1997). In 2002, President George W. Bush signed into law the No Child Left Behind Act (NCLB). NCLB specifically challenges states to improve student academic achievement through the use of technology and assist students in becoming technologically literate by the 8th grade, and ensure that teachers are able to integrate technology into the curriculum (2002). NCLB also requires the updating and publishing of a national long-range technology plan (2002).
National Educational Technology Plan recommends the following action steps specifically toward improving teacher technology training:

**Improve Teacher Training**
Teachers have more resources available through technology than ever before, but some have not received sufficient training in the effective use of technology to enhance learning. Teachers need access to research, examples and innovations as well as staff development to learn best practices. The US Department of Education is currently funding research studies to evaluate the effective use of technology for teaching and learning.

The National Science Foundation also provides major support for Educational research. Recommendations for states, districts and individual schools include:

- Improve the preparation of new teachers in the use of technology
- Ensure that every teacher has the opportunity to take online learning courses.
- Improve the quality and consistency of teacher education through measurement, accountability and increased technology resources.
- Ensure that every teacher knows how to use data to personalize instruction. This is marked by the ability to interpret data to understand student progress and challenges drive daily decisions and design instructional interventions to customize instruction for every student’s unique needs (p. 40-41).

Along with suggestions for improving teacher training, NCLB provides funding through Educational Technology State Grants. NCLB requires that states spend at least 25 percent of the grant on high-quality professional development in the integration of technology into instruction (USDE, 2004).

The International Society for Technology Education (ISTE) created a national set of standards for teachers and students (2002). ISTE suggests that all teachers should be prepared to meet the following standards and performance indicators:
1. Technology Operations and Concepts
   Teachers demonstrate a sound understanding of technology operations and concepts.

2. Planning and Designing Learning Environments
   Teachers plan and design effective learning environments and experiences supported by technology.

3. Teaching, Learning, and the Curriculum
   Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.

4. Assessment and Evaluation
   Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.

5. Productivity and Professional Practice
   Teachers use technology to enhance their productivity and professional practice.

6. Social, Ethical, Legal and Human Issues
   Teachers understand the social, ethical, legal and human issues surrounding the use of technology in PK-12 schools and apply that understanding in practice (pg. 306).

In order to measure the abilities of teachers to integrate technology into their instruction, the CEO Forum developed the School Technology and Readiness Chart (STaR) (1999). The STaR Chart helps school principals assess how well technology (including computers, digital cameras, digital video and other technologies included in standards for students and teachers) is integrated into their schools. As an online self-assessment tool, the chart provides schools with the information they need to better integrate technology into the educational process (CEO Forum, 1999). Drawing from the research in the Apple Computer’s Classrooms of Tomorrow (ACOT), the CEO Forum adapted the stages of development that teachers typically progress through as they integrated
technology into their instructional programs as the basis for the STaR Chart (Fisher, Dwyer, and Yocam, 1996).

The teacher development stages and characteristics during instructional program technology integration, as described in the CEO Forum Year 4 STaR Chart, are:

<table>
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<tr>
<th>Stages</th>
<th>Characteristics</th>
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<tr>
<td>Entry</td>
<td>Educators struggle to learn the basics of using technology.</td>
</tr>
<tr>
<td>Adoption</td>
<td>Educators move from the initial struggles to successful use of technology on a basic level (e.g., integration of drill and practice software into instruction).</td>
</tr>
<tr>
<td>Adaptation</td>
<td>Educators move from basic use to discovery of its potential for increased productivity (e.g., use of word processors for student writing, and research on the internet).</td>
</tr>
<tr>
<td>Appropriation</td>
<td>Having achieved complete mastery over the technology, educators use it effortlessly as a tool to accomplish a variety of instructional and management goals.</td>
</tr>
<tr>
<td>Invention</td>
<td>Educators are prepared to develop entirely new learning environments that utilize technology as a flexible tool. Learning becomes more collaborative, Interactive and customized. (CEO Forum, 1999,pg.14)</td>
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The State of Texas has adopted the STaR Chart to report the percentages of integration achieved by the teachers of Texas. Massachusetts and Florida have utilized the Texas version of the STaR Chart to examine data about
teachers (Massachusetts Department of Education, 2007 and Florida Department of Education, 2007). The STaR report is an online survey that Texas teachers may complete and use the profile to gauge the progress in integrating technology into schools (Texas Education Agency, 2006-2020).

The levels of progress included in the Texas STaR chart are:

**Teaching and Learning**

<table>
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<tr>
<th>Level of Progress</th>
<th>Description</th>
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<tr>
<td>Early Tech</td>
<td>Instruction is teacher-centered. Students occasionally use software applications for drill and practice. No technology integration occurs in content area standards.</td>
</tr>
<tr>
<td>Developing Tech</td>
<td>Instruction is teacher-directed. Students regularly use technology on an individual basis to access electronic information and create communication and presentation projects. There is minimal use of technology to address content area standards.</td>
</tr>
<tr>
<td>Advanced Tech</td>
<td>Instruction is teacher-facilitated. Students work with peers and experts to evaluate information, analyze data and content in order to problem solve. Technology is integrated into content area standards and activities are subject - grade separated.</td>
</tr>
<tr>
<td>Target Tech</td>
<td>The teacher serves as facilitator, mentor, and co-learner. Students have access to all appropriate technologies to compete integrated activities in all core content areas.</td>
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**Educator Preparation and Development**

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<th>Level of Progress</th>
<th>Description</th>
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<td>Early Tech</td>
<td>Technology skills include multimedia and the internet and there is minimal personal use.</td>
</tr>
<tr>
<td>Developing Tech</td>
<td>Use of technology is for administrative tasks and classroom management. The allocation of six to twenty-four percent of technology budget is used for professional development.</td>
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Advanced Tech  Technology is integrated into teaching and learning. Twenty-five to twenty-nine percent of technology budget is allocated for professional development.

Target Tech  Learner-centered projects are regularly supported using technology. Thirty percent of budget allocated for professional development.

The Texas STaR chart for 2004-05 and 2005-2006 report these findings:

   With 7,422 campuses (out of 7,813 campuses) completing the STaR chart in 2004-05, and within the Teaching and Learning category, 7% of Texas school campuses report their progress towards technology integration at the Early Tech level of progress. Of the participating Texas school campuses, 69% report the level of progress towards technology integration at the Developing Tech level of progress. The Advanced Tech level of progress is reported by 22% of Texas school campuses and 1% report their level of progress at the Target Tech level (Texas Education Agency, 2006).

   In 2005-2006, 7,602 campuses (out of 7,882 campuses) completed the STaR chart, and within the teaching and learning category, 3% of Texas school campuses report their progress towards technology integration at the Early Tech level of progress. Of the participating Texas school campuses, 68% report their level of progress towards technology integration at the Developing Tech level of progress. The Advanced Tech level is reported by 27% of Texas school campuses and 2% report their level of progress at the Target Tech level (Texas Education Agency, 2006).
Statement of the Problem

Even though USDE reports that most teachers (99%) acknowledge that computers are available in their schools and reports that the availability of computers in US schools is at an average of 3.8 students per computer, the teachers are not integrating technology into the curriculum (2000). Overall, 65% of American children use the computer with the youngest students’ (ages 3-5) use identified as the fastest increasing group (USDE, 2005). The integration of technology into the classroom curriculum is not keeping pace with the ever-increasing presence of technology within schools (USDE, 2000). Children whose teachers attended technology workshops and those with technology within the classroom were more likely to use technology on a weekly basis (USDE 2003). Weekly technology use is reported for 70% of children whose teachers attended technology workshops. For those children whose teachers did not attend technology workshops, only 54% utilized technology weekly (USDE 2003).

As demonstrated by the Texas STaR Chart, schools report that teachers are increasingly becoming more able to integrate technology into the curriculum (Texas Education Agency, 2006). However, as a group, early childhood teachers do not integrate technology into the curriculum. Specht, Wood, and Willoughby (1999) found that early childhood educators need more training in basic technology skills. In order for early childhood educators to discuss the pedagogy of technology, they must first have experience using technology. Emphasis of the essential role of the teacher in integrating technology into the curriculum was
missing and the technology could not have a significant impact on children’s learning. Papert (1998), considered the world’s foremost expert on helping children learn to work with computers, wrote that teachers will need help in learning how to use technology effectively with children and integrating technology into their classrooms.

Web-based learning is one option for the professional development of early childhood teachers (Web-Based Education Commission, 2000). With the proliferation of Web-based learning, it only makes sense that preservice and inservice early childhood teachers could utilize technology to learn and collaborate with their peers, plan for technology integration into their curriculum, and include technology integration in their lesson plans. Hence, it is time to find out about the use of a Web-based course to promote the integration of technology into early childhood education programs, if early childhood teachers benefit, and if early childhood classrooms reflect the integration of technology.

**Purpose of the Study**

Today the No Child Left Behind Act and the USDE requires “the improvement of student academic achievement through the use of technology in elementary schools and secondary schools and to assist students to become technologically literate by the 8th grade and ensure that teachers are able to integrate technology into the curriculum to improve student achievement” (2002). The Texas Education Agency (TEA) has adopted Prekindergarten Guidelines for
Technology Applications (1999) which state that prekindergarten children should be able to:

- Start, use, and exit software programs
- Use a variety of input devices, such as mouse, keyboard, voice/sound recorder, or touch screen
- Begin to use technical terminology, such as “mouse,” “keyboard,” “printer,” and “CD-ROM”
- Follow basic oral or pictorial cues for operating programs successfully
- Enjoy listening to and interacting with storybooks and information texts (e.g., multimedia encyclopedia) in electronic forms
- Use a variety of software packages with audio, video, and graphics to enhance learning experiences (e.g., improving vocabulary, increasing phonological awareness) (1999, p.21)

To help children achieve goals in the use of technology, early childhood teachers must be able to integrate technology into the curriculum and other aspects of classroom operation (Haugland & Wright, 1997, Hohmann, 1994, Yelland, 2007). With Web-based learning, teachers are able to access instruction to better help with integration of technology into early childhood classrooms. Online or Web-based learning courses continue to flourish on the Internet. As many as 1 million adult internet users are participating in online courses each day (Pew, 2001). Little is known about the effectiveness of Web-based learning by early childhood teachers and consequently how that learning results in the integration of technology into their classroom practices. Therefore, the primary purpose of the present study is to determine the effectiveness of a Web-based
course on the ability of early childhood education teachers to integrate technology into their classrooms.

Research Questions

1. To what extent is a Web-based course effective in changing teachers’ attitudes concerning the integration of technology into early childhood curricula?

2. To what extent is a Web-based course for early childhood education teachers effective in facilitating the integration of technology (computers and digital cameras) into early childhood curricula?

Definition of Terms

*Integration of technology*—Davis and Shade (1999) described integration of technology in early childhood classrooms as viewing the computer and other technologies, such as the digital camera, as an everyday problem-solving tool used to accomplish practical objectives or goals. Using technology, such as computers and digital cameras, in ways to support children’s learning in a wide variety of curriculum areas is the integrated use of technology (Davis & Shade, 1999; Haugland & Wright 1997; NAEYC, 1996).

*Early childhood classrooms*—The early childhood classrooms participating in this study are classrooms where children ages three through five attend school or day care.

*Web-based learning*—The Web-Based Education Commission (2000) defines online professional development as Web-based instruction for job-related
training. Charalambos, Michalinos and Chamberlain (2004) define Web-based training as the process for teachers to access interactive and self-paced modules for learning through the Internet. This Web-based staff development provides teachers the training, support and communication links necessary for their continued success in the classroom.
CHAPTER 2
REVIEW OF LITERATURE

The primary purpose of this study is to determine the effects of a Web-based training on technology integration into the curriculum of early childhood classrooms. The following review of literature summarizes research relating to the use of technology, technology integration into the curriculum in early childhood classrooms and Web-based training for early childhood teaching professionals.

Use of Technology

As early as 1988, the Office of Technology Assessment (OTA) studied the potential of technology for improving the quality of education and investigated the barriers to implementation of technologies. The OTA report cited that to realize the potential for improving the quality of education through technology and for the investments in technology to be effective, teachers must receive training and support. Despite the presence of computers in most American public schools, the OTA noted that only half of teachers reported having ever used computers at all and 50% reported non-use of computers.

Again, in 1995, the OTA reported that a substantial number of teachers continued to report little or no use of computers for instruction. The report recommends that “teachers need visions of the technologies’ potential,
opportunities to apply them, training and just-in-time support, and time to experiment” (OTA, 1995, p. 1). According to the OTA report, integration of technology into the curriculum is vital if technology is to become an effective resource, yet teachers continue to struggle with technology integration into the curriculum.

In *The Condition of Education 2001*, the USDE reports that teachers do not feel prepared to use technology. The report states:

in 1999, 10 percent of public school teachers reported feeling “very well prepared,” and an additional 23 percent reported feeling "well prepared" to use computers or the Internet for instruction. The majority (53 percent) reported feeling “somewhat prepared,” and 13 percent reported feeling “not at all prepared.” (p. 66)

The USDE report finds that teachers with fewer years teaching experience feel more prepared to use computers or the Internet for instruction than teachers with more years of teaching experience. Teachers who participate in more technology professional development report that they felt more prepared to use computers or the Internet in instruction than teachers who participate in fewer hours of technology professional development (USDE, 2001). Teachers who reported having leadership practices (e.g., mentoring, presenting, and informal and formal professional peer relationships with other teachers) were more likely to use computers for research and collaboration with other teachers (Riel, Schwarz & Hitt, 2002). As research shows us,"technology by itself does not guarantee learning. Rather, it is in how teachers and students use available technologies that determines whether transformative learning happens" (Driscoll, 2002, p. 3).
Technology Integration

Using technology in ways to support children’s learning in a wide variety of curriculum areas demonstrates the integrated use of technology in early childhood classrooms (Davis & Shade, 1999; Haugland & Wright, 1997; NAEYC, 1996). The No Child Left Behind Act (NCLB) (2002) emphasizes the value of technology integration into classroom curriculum. The NCLB calls for the combining of technology systems and resources with teacher training and curriculum development to forward the goal of enhancement of student learning and achievement. The secondary goal of NCLB is ensuring that all students are technology literate by the end of the eighth grade (North Central Regional Laboratory (NCREL), 2002).

The NAEYC (1996) Position Statement emphasizes the significant role of technology in the lives of Americans and the need for incorporating technological changes into early childhood education. Using technology tools appropriately within the early childhood classroom may enhance children’s ability to communicate, develop social skills, develop longer attention spans, and interact with their peers (Haugland, 2000; Hutinger, Robinson & Schneider, 2004; Martin, Forsbach-Rothman & Crawford, 2004, Thouvenelle & Bewick, 2003). Although technology can be found in many early childhood classrooms, a study by Martin, Crawford, and Seevers (2003), reported that only 61% (n=121) of the childcare centers surveyed reported having computers available for children to use. The
study also found that the designated computer centers in the childcare centers were inadequate.

Integrating the use of technology into early childhood curriculum requires time, effort, planning, and reflection upon beliefs of early childhood teachers (Clements, 2002). Researchers have shown that teacher attitudes and beliefs are important variables to consider when investigating influences on student learning (Guskey & Passaro, 1994; Ross, 1994.) The success or failure of integrating technology is also dependent upon attitudes and beliefs of teachers (Becker, 2000; Evans-Andris, 1995; Office of Technology Assessment (OTA), 1995). Pajares (1992) asserts that beliefs play a crucial role in determining behavior and strongly affect behavior. Teachers make decisions based on their beliefs about technology, instruction, and learning (Dwyer, Ringstaff, & Sandholtz, 1991; Hanks, 2002; Kadel, 2005; Lumpe & Chambers, 2001; Vannatta and Fordham, 2004; Wang, Ertmer and Newby, 2004 ). Teachers’ context and self-efficacy beliefs are significant predictors of teachers’ adoption of technology school reform efforts and in addition, beliefs are related to change in teacher behavior (Lumpe & Chambers, 2001). Ivers (2002) suggests that “teaching with technology” is a process and should be more than just generating worksheets or lecturing in front of a PowerPoint presentation. The study concluded that “teaching with technology” is helping students use technology to learn, create, think, research, and express their abilities and knowledge (Ivers, 2002).
Researchers have explored the attitudes of teachers in grades K through 12 and the influence upon the integration of technology within classrooms (Christensen, 2002). Christensen (2002) found that a two day needs-based technology integration training with a follow-up day of training each six weeks had positive effects on teacher attitudes and anxiety. However, there is little research investigating the beliefs of early childhood teachers (defined here as teachers of five years old or less children) and the assumed influence upon the integration of technology in early childhood classrooms. Van Scoter & Boss (2002) state that the challenge of integrating computers and technology for early childhood teachers involves finding ways to integrate technology with children who are pre-readers and pre-writers. Mouza (2005) reported that early childhood teachers successfully integrated technology in developmentally appropriate ways into the early childhood classroom during a thematic unit of study. Two important elements that helped teachers in the integration of technology were professional development and administrative support (Mouza, 2005). The administrative support that enhanced the project was providing blocks of time so that the teachers could share, reflect and discuss their efforts in the planning of the technology integration (Mouza, 2005). Labbo and Ash (2000) suggest that teachers in today’s early childhood classrooms “…have the unique opportunity to break new ground in terms of technology that may create the foundations for creative and effective classroom computer use of the future (p. 194).” Considering the lack of research reporting technology integration in early
childhood classrooms, early childhood teachers have much more to learn about
developmentally appropriate technology integration (Hall and Higgins, 2002;
Labbo and Ash, 2000).

In a study of the Apple Classrooms of Tomorrow (ACOT), researchers
investigated the relationship between both elementary and secondary teachers’
epistemological beliefs, pedagogical beliefs, and their instructional uses of
technology (Dwyer, Ringstaff, & Sandholtz, 1991). The study revealed teachers
go through stages in utilizing technology. The stages are: entry, adoption,
adaptation, and appropriation. The study also suggests that teachers move
through these stages as they reflect on their instructional practices and examine
their actions and motives. “Instructional change can only proceed with a
corresponding change in beliefs about instruction and learning. Teachers beliefs
may be best modified while they are in the thick of change, taking risks and
facing uncertainty” (Dwyer, et al., 1991, p. 51).

Research indicates that teachers’ attitudes positively correlate with
teachers’ experiences (Becker, 2001; Kumar and Kumar, 2003; Loyd and
Gressard, 1986). Results of a study of preservice and inservice teachers
enrolled in a special education course indicate that there is a significant
improvement in attitude toward computers and the teachers’ technology skills
after completing a Web-based project (Kumar and Kumar, 2003). Leh (2000)
reports that a technology course increased teachers’ comfort level, confidence,
and attitude. In a literature review, Dupagne and Krendl (1992) found that overall,
teachers express positive attitudes toward the implementation of computers in the classroom and the curriculum but they remain unable to facilitate the use of the technology because of their lack of knowledge or expertise. Dupagne and Krendl, state that “teacher training is critical” (p. 425). There are significant differences between teachers who use technology to teach and those teachers who do not (Becker, 2001; Becker & Ravitz, 2000). The teachers who have more experiences teaching with technology have more positive attitudes toward technology. Research suggests there is also a relationship between a teacher's uses of technology outside of work and the teacher's use of technology in the classroom (Becker, 2001; USDE, 2000). The more teachers use technology, the more confident and comfortable they become in utilizing technology for teaching (Christensen, 1997). Changing teachers' attitudes is a key factor in fostering computer integration and teachers' use of computers for teaching relates to their belief in their ability to do so (Vannatta and Fordham, 2004). Yildirim (2000) recommends that teachers must be encouraged to use computers in the classroom to increase their level of competency and computer training tailored to specific levels of confidence, anxiety, and competency be provided.

Chiero (1997) surveyed K-12 teachers about their current technology use in the classroom. The survey shows that lack of time is the most significant obstacle to overcome in order to increase the adoption of technology. Other researchers find that time is a consistent barrier to integration of computers into curricula (Becker, 1994; McCannon & Crew, 2000). A shortage of computers, a
lack of release time to learn how to use computers, and a lack of scheduled time for students to use computers in class are also reported as barriers to technology use (USDE, 2001).

In reporting technology integration in classrooms, researchers have relied upon teacher self-reporting and inventory approaches, e.g., counting computers, calculating student to teacher ratios and tallying computer time (Judson, 2006). Direct classroom observation might be the missing element that could better describe the integration of computers and digital cameras into classrooms (Brinkerhoff, 2006; Judson, 2006).

In an ethnographic study using observation and interviews, Evans-Andris (1995) reports that elementary school teachers fell into three categories of computer users, avoidance, integration, and technical specialization. The computing style of avoidance, accounts for sixty percent of the population. Teachers who neither use computers themselves nor give their students opportunities to use computers are characterized as avoiders. The integration style of computer users makes up thirty percent of the population. These teachers integrate computers into their curriculum and include computer activities in their daily routine. The remaining 10% of the teachers adopt a technical specialization style of computer user. The technical specialization style teacher spends most of his/her time teaching about the computer in a separate and distinct curriculum, demonstrating the technical aspects of the computer. Evans-Andris (1995) suggests that the computer styles of teachers have critical
implications for the continuing implementation of computer integration into classrooms.

Results of a study of K-12 teachers indicate that the amount of technology, time spent beyond the contractual workweek, and openness to change best-predicted classroom technology use (Vannatta and Fordham, 2004). Researchers suggest that access to technology is not enough to guarantee the utilization of technology (Hanks, 2002; Bauer & Kenton, 2005). The training provided for teachers has often been inadequate for integration and the focus is on how to use the equipment rather than how to integrate the technology into instruction (McCannon and Crew, 2000).

Researchers report an important scaffold for technology integration as an alignment to curricular goals (Swaminathan, 2000; Staples, Pugach, & Himes, 2005). For technology integration to happen, an understanding of how technology relates to curriculum goals and a time investment by administrators and teachers in acquiring and learning to use technology itself so that technology can support the curriculum is necessary (Hasselbring, Smith, Williams-Glaser, Barron, Risko, Snyder, Rakestraw & Campbell, 2000; Staples et al., 2005). Barnett (2003) characterizes the first step of any effective professional development program as including the belief that curriculum drives the use of technology not “technology for the sake of technology”. Effective teachers will utilize technology in appropriate ways, include technology within their instruction and connect technology to district content standards (Barnett, 2003).
Bransford, Brown, Cocking, Donovan, & Pellegrino (2000) note specific ways technology, broadly defined as computers, digital cameras, tape recorders, portable keyboards, and more, may be used to support learning:

- Providing scaffolding and tools to enhance learning and help children solve problems
- Providing more opportunities for feedback, reflection, and revision
- Building global and local communities (p.207)

Chamberlin (2004) wrote that digital cameras and digital photography are powerful because of the images they preserve, not through the quality of the image or the expertise of the teacher. The immediacy of use is the most important benefit because the images can be shared as soon as they are taken (Chamberlin, 2004). Neumann-Hinds (2007) suggests that digital photography can “encourage children to predict observe, classify, hypothesize, and experiment, and to document, present, and communicate their ideas” (pg. 6).

Web-based Courses

In response to the NCLB requirement for high quality teachers, Web-based learning is ideal for increasing professional development opportunities for educators and reinforcing the preparation of future educators (Kleiman, 2004; Kesner, 2001). As quoted in Forbes (2000), Doug Levin, a senior research analyst at American Institute for Research said, “There is every reason to believe that [online education] is something we should be doing…but you have to
recognize that we are inventing this as we go.” Hawk (2000) reports that Web-based professional training options are increasing and a large number and variety of Web-based professional development is available. Teachers may find training suitable to their needs, abilities, subject interests, and technical requirements. The internet is creating high quality educational opportunities as well as access to teachers in either rural or urban areas that may not have high quality instruction available to them (Web Based Education Commission, 2000). However, Kesner (2001) states that as Web-based learning cannot replicate the face to face and hands on instruction that teaching provides. Kesner (2001) suggests that a blending of Web-based and on-site learning could provide a suitable option with successful results. Based on a limited number of studies, students in Web-based learning courses achieve positive outcomes such as good grades and test scores as compared to students in traditional classroom courses (Web Based Education Commission, 2000). Factors that influence Web-based participation as outlined by Vonderwell and Zachariah are information over load, technology and interface characteristics, content-area experience, and student roles and tasks (2005). One necessary characteristic for Web-based student learners, as described by Hillstock (2005) and Howland and Moore (2002), is that a Web-based student must be a self-directed or a self-reliant learner in order to keep up with the class workload.

The information gained in a study of K-12 teachers proposes that peer collaboration (teachers helping and mentoring each other) and peer models
demonstration teachers), hands-on experiences, and class discussions appear
to be the strongest contributors to teacher learning, while course reflections,
course readings, and electronic peer model also show to a lesser extent as
strong contributors to learning (Ertmer, Conklin, Lewandowski, 2001; Ross,
learning has the potential to enhance teachers’ professional development by
supporting group discussions, accommodating busy schedules, integrating
professional development with classroom practice, reducing isolation, and
increasing teachers’ confidence and knowledge with new technologies (1997).
Yamagata-Lynch (2003) found that a professional development program, which
included a Web-based discussion forum, provided teachers with a way to
communicate with their peers and provided motivation to adjust curriculum so
that it would allow a smooth integration of technology. The program built a
partnership among the participants that encouraged teachers to prioritize the
integration of technology. Researchers also support the notion that professional
development, provided in order to change a teacher’s practice, serves as
collaborative inquiry and relates to grade level differences (Fuller, 2000; Hughes
& Ooms, 2004; Treacy, Kleiman & Peterson, 2002).

Glazer, Hannafin and Song (2005) agree that merely making technology
tools available and providing training is necessary but not sufficient to help
teachers integrate technology. Glazer, et al.(2005) found that in order to aid
teachers with technology integration, sustained and collaborative support is
needed. Teachers collaborate by sharing ideas, model best practices, ask questions and support each other during authentic experiences (Glazer, et al., 2005). As reported by Shamburg (2004), the isolation of early childhood teachers inhibits the integration of technology because of the lack of collaboration and sharing with other early childhood teachers. In a report discussing a Mobile County, Alabama program of Web-based staff development, Bush (2005) suggests that a blend of Web-based training combined with communication through email or the telephone with a technology resource teacher helps keep teachers involved and successful with the integration skills learned.

The National Staff Development Council (2001) depicts Web-based learning as having the positive possibilities of:

1. There is a flexibility of time for learning. Access to the e-learning is twenty-four hours a day.
2. Learning occurs anywhere.
3. Learning occurs worldwide—not just where the training occurs.
4. Customization of the learning experiences is possible (p. 2).

Along with positive possibilities also come cautions as suggested by the National Staff Development Council (2001). The cost of connectivity and hardware may prohibit Web-based learning, the potential isolation of learners, and poorly designed programs are problems that may occur during technology based staff development (National Staff Development Council, 2001).
In describing a Web-based learning community, Lock (2006) suggests that the structure of the online community be one of support and nurturing of teachers so that teachers take ownership of their learning and translate that learning into practice. Charalambos, Michalinos and Chamberlain (2004) assert that Web-based staff development provides teachers with support and communication from colleagues. Web-based staff development also provides teachers with the ability to create links necessary for continued success in the classroom (Charalambos, et al. 2004; Glazer, et al. 2005). However, according to Charalambos, et al. (2004), Web-based communities struggle to become and remain communities where colleagues can interact, access feedback, and learn from each other.

In a policy discussion in 2002, KnowledgeWorks Foundation and the Education Commission of the States support Web-based learning as a powerful means of promoting high-quality professional development for early childhood educators (McMaken, Kauerz, DeCesare & Hale, 2002).

Summary

This review of related literature is organized into three sections. The first section summarized research illustrating the use of computers by teachers. The second section discussed the integration of technology into classroom curriculum and the importance of integration into early childhood classrooms. Finally, the third section addresses Web-based learning as a viable means for training early childhood teachers to integrate technology.
In conclusion, the more recent technology integration literature denotes a growing body of studies that focus on teachers’ need of “just in time training” to transform technology from hardware, software, and digital connections into tools for teaching and learning (CEO Forum, 1999).
CHAPTER 3

METHODOLOGY

The primary purpose of the present study is to determine if the technology integration practices of early childhood teachers can be improved through participation in a Web-based course. Data was analyzed to gain insight into the effectiveness of a Web-based course on the integration of technology into early childhood curricula.

Research Design

The improvement of technology integration through a Web-based course study is a four module experimental pre-observation/post-observation control group design. This study used a combination design of the attitudinal questionnaire, the observational checklist which includes a short interview, and responses to questions at the completion of each training module. Through quantitative analysis, I used the data collected in the questionnaire and the observation checklist to investigate trends and frequencies within the sample. Through qualitative analysis, I used the data collected in the responses within the training modules to investigate trends and characteristics of responses that occurred during the training within the treatment group. Creswell (1994) suggests that the combination of methods will help a researcher to better understand a
concept. The study was designed to determine if a Web-based course would change teachers’ attitudes concerning technology integration and facilitate the improvement of technology integration in early childhood curricula by answering the following research questions:

1. To what extent is a Web-based course effective in changing teachers’ attitudes concerning the integration of technology into early childhood curricula?

2. To what extent is a Web-based course for early childhood education teachers effective in facilitating the integration of technology (computers and digital cameras) into early childhood curricula?

Population

Ninety-two prekindergarten teachers in 29 out of 52 elementary schools in a large urban school district that serves over 62,000 students were the population for this study. Within the school district, there are 52 elementary school campuses including one alternative education campus and one center. Of the 52 elementary schools, 43 have prekindergarten classes.

School district campuses qualify for Title I funding based upon percentages of children or student eligibility for free or reduced priced lunch. Thirty-one campuses in this school district are designated Title I, and 21 campuses are not designated as Title I. Twenty-one Title I schools are
represented within the sample and 8 non-Title I schools are represented within the sample for the study. A letter of permission to conduct the study in the school district was obtained from district administration. The Institutional Review Board application was completed and approved.

Teacher Sample

Identification

The participants of the study included 39 early childhood teachers from a large suburban school district. Of the 39 teachers, 100% were female. The years of experience of the teachers ranged from 1 year to 28 years; 9 taught 1-3 years; 10 taught 4-7 years; 15 taught 8-15 years and 5 taught 16 or more years.

All 92 prekindergarten teachers in the district were informed of the research project and were invited to enter their names into the randomization selection process (see Appendix H for recruitment letter). When the teacher agreed to participate, the generated list of the potential participants was used during randomization. During the next step in the process, names were drawn from the volunteer teachers to form the experimental and control groups.

Randomization Assignment

Research participants in the teacher sample included 39 prekindergarten teachers. I randomly selected 20 teachers from the group to serve as the control group and 19 teachers from the group to serve as the experimental group. Two teachers shared a classroom and co-taught together; therefore, only one teacher was used as part of the experimental group. The one teacher remained
unmatched within the sample. The names of the volunteers were written on slips of paper and the participants in the experimental and control groups were matched in a stratified random sample by first sorting into Title I or non-Title I designation, bilingual and English as a second language (ESL) teachers, and years of teaching. Matched pairs were created. A matched pair of names was then separated and placed in a cup. With the help of an assistant, I drew out one name at a time and the names were alternatively assigned to the control or experimental groups.

The control group of teachers and the experimental group of teachers attended a group meeting to introduce the procedures for the project. The teachers were notified that there was a 50% chance of each teacher being placed in the experimental group or the control group. The teachers signed the informed consent form and completed the Prekindergarten Technology Integration Questionnaire, which included a brief section of personal information. I introduced to the two observers and myself during the meeting.

The Prekindergarten Technology Classroom Observation Checklist served as the basis for the observations. We met before the observations began to discuss the Prekindergarten Technology Classroom Observation Checklist and the procedures used to score it. I created the four module Web-based training course entitled, technology integration in early childhood classrooms. The two observers examined the Web-based training course to understand the content the prekindergarten teachers viewed in the training and discussed the training.
We met to discuss the progression of the observations and to discuss any problems encountered.

*Instrumentation*

Two instruments were developed to collect data for this study. The Prekindergarten Technology Integration Questionnaire was completed by the prekindergarten teachers in the experimental and control group. A classroom observation checklist, The Prekindergarten Technology Classroom Observation checklist was used during classroom observations in the experiment and control teacher groups. The Prekindergarten Technology Integration Questionnaire is included in Appendix A and the Prekindergarten Technology Classroom Observation checklist is included in Appendix B.

*Questionnaire*

A questionnaire was developed to measure the current attitudes of prekindergarten teachers about technology integration into early childhood classrooms. The questionnaire was used as a pre and post assessment. I created and designed the Prekindergarten Technology Integration Questionnaire by investigating suitable questionnaires found in current available questionnaires and literature (Cox, 1996; Creswell, 1994; Knezek, Christensen, Miyashita, and Ropp, 2000; Wilkinson and Birmingham, 2003).

Literature detailing the current best practices of integrating technology into early childhood education was investigated to guide in the development of the questionnaire so that technology integration was relevant to early childhood
Classrooms (Center for Best Practices in Early Childhood, 2007; International Society for Technology in Education, 2002; Morrison, 2007; National Association for the Education of Young Children, 1996; Prairie, 2005; Roblyer, 2003; Thouvenelle and Bewick, 2003; Yelland, 2007; Wright and Shade, 1994).

Part one of the questionnaire consists of items 1 through 11 and part two consists of items 12 through 16 of the questionnaire. The Prekindergarten Technology Integration Questionnaire consisted of 16 Likert Scale items (see Appendix A). The Likert Scale items were designed to determine the attitudes of the participants towards technology integration into early childhood classrooms. Part three of the questionnaire consisted of five items asking for personal and classroom background information. The 16 Likert Items were scored as follows: strongly agree=5 points, slightly agree=4 points, agree=3 points, slightly disagree=2 points, and strongly disagree=1 point. The scores were added together to arrive at a total score for each participant. Part three of the questionnaire was Demographic information that was collected to help me understand the population being studied. The demographic information collected included: years of experience teaching in prekindergarten, years of teaching other grade levels, type of teacher certification, and the approximate time regularly scheduled within the school day for small group time and center time in each early childhood classroom within the sample.
Observation Checklist

Each participant in the experimental group \((n=19)\) and in the control group \((n=20)\) were assessed at the pre- and post- data collection using the Prekindergarten Technology Classroom Observation Checklist (See Appendix B). The Prekindergarten Technology Classroom Observation Checklist was developed by investigating the current research addressing the use of technology by young children, including the best integration practices, and the current district, state and national curriculum technology integration standards for students and teachers (Center for Best Practices in Early Childhood, 2007; International Society for Technology in Education, 2002; Morrison, 2007; National Association for the Education of Young Children, 1996; Prairie, 2005; Roblyer, 2003; Thouvenelle and Bewick, 2003; Yelland, 2007; Wright and Shade, 1994).

The Prekindergarten Technology Classroom Observation Checklist (see Appendix B) is an eight section technology integration classroom observation tool to identify the technology integration in early childhood classrooms. Section 1 of the checklist consisted of questions asking about the adults and children in the classroom. Section 2 of the questionnaire consisted of the type of activity in the classroom during the observation. Section 3 consisted of the type of technology activity in the classroom along with information about how many computers were in the classroom. Section 4 consisted of the other types of technology that might be available and utilized in the classroom or available for access by the teacher. Section 5 consisted of types of technology produced artifacts in the classroom.
Section 6 consisted of the teacher/child activity in the classroom. Section 7 consisted of three interview questions to further clarify any technology integration not observed in the observation. Section 8 consisted of a space for the observer to draw a picture of the layout of the classroom and where the computer center was located.

Each item in Sections 1-6 were designed to be answered with yes or no, along with space for comments by the observer to determine the frequency of and type of technology integration observed in the prekindergarten classrooms. The purpose of the Prekindergarten Technology Classroom Observation Checklist was to compare technology integration before the Prekindergarten teachers participated in the Web-based course and after participation in the course. The possible range for the scores was 16 through 80 points.

A pilot study was performed in four classrooms using the Prekindergarten Technology Classroom Observation Checklist and the Prekindergarten Technology Integration Questionnaire. These four classrooms were not included in the present study. The respondents to the questionnaire reported that they understood the directions, were able to complete the answers within 2 to 10 minutes, found no objections to answering the questions, and agreed that the layout was clear and attractive. Following the pilot study, one question on the questionnaire was expanded to clarify meaning. After use of the Prekindergarten Technology Classroom Observation Checklist in the four classrooms, a format change was made to allow more comment space and the interview questions to
ask for clarification from the teacher about certain items were added. Internal consistency of the Prekindergarten Technology Integration Questionnaire for the sample was calculated at 0.913 using Cronbach’s alpha.

Through quantitative analysis, I investigated the data gathered using the Prekindergarten Technology Integration Questionnaire and the Prekindergarten Technology Classroom Observation Checklist to identify trends and characteristics inherent in the sample studied.

**Intervention**

*Experimental group*

After the pre-observation in classrooms, the experimental group, or treatment group, received access to a set of four series of training modules (see Appendix F). Prekindergarten teachers accessed the Web-based course during a timeframe established by me. During each week in June, 2007, the training modules were to be accessed by the treatment group, one module per week. Although I set up the timeframe of one module each week, the prekindergarten teachers had the option of doing the modules at a faster pace. During the month of June, school was not in session. The prekindergarten teachers could access the training at home or since summer school was in session, the computer labs at the schools were available. The prekindergarten teachers accessed the Web-based modules including reflection questions that appeared at the end of each module (see Appendix E for the training questions). The prekindergarten teachers answered the questions on an (exclusive to the treatment group) email
conference entitled prekindergarten technology. All the treatment group prekindergarten teachers could view all the responses of the group on the email conference and could interact among all the treatment group participants along with myself. I monitored the emails and encouraged comments, suggestions or answered questions asked on the conference.

I created the prekindergarten technology project Webpage. A thorough investigation of the literature depicting best practices in early childhood education technology integration, the current federal, state and district technology integration standards, and guidelines for young children guided the creation of the training modules (Center for Best Practices in Early Childhood, 2007; International Society for Technology in Education, 2002; Morrison, 2007; National Association for the Education of Young Children, 1996; Prairie, 2005; Roblyer, 2003; Texas Education Agency, 1999; Thouvenelle and Bewick, 2003; Yelland, 2007; Wright and Shade, 1994).

The Webpage was created using the school district portals and Webpage template. I was assisted by the school district Director of the Instructional Technology department and a Technology Integration Specialist to create and maintain the prekindergarten technology project Webpage. The Webpage included 4 training modules, each with a separate theme, including:

module 1 - standards and objectives by national and state entities to provide early childhood educators with guidance for student use of technology.
module 2 – computer center setup
module 3 - suggestions for activities that can be used for technology integration using a computer in an early childhood classroom
module 4 - activities that can be accomplished in a prekindergarten classroom using a digital camera

Also included on the Webpage were some actual activities created by me to depict how the technologies could be utilized, presented for parents and students, and actual technology artifacts created in a prekindergarten classroom.

**Control group**

The prekindergarten teachers in the control group did not participate in the Web-based course. The expectation of the school district is that all prekindergarten teachers will have access to the Web-based training after the project is finished. The control group teachers completed the Prekindergarten Technology Integration Questionnaire at the pre-observation (May 10, 2007) and the post-observation (September 11, 2007) meetings. We conducted the pre-observation and the post-observation of the classrooms during May, 2007 and September, 2007 respectively.

**Data Collection Procedures**

Data collection occurred in three phases:

Phase I (Questionnaire and Pre-observation), Phase II (Intervention), and Phase III (Post-observation).
Phase I: Pre-Assessment

I provided prekindergarten teachers with questionnaires. The questionnaires were completed during a meeting (May 10, 2007) where the teachers were asked to sign-in to verify attendance. The prekindergarten teachers were also provided with an overview of the project during the meeting and signed informed consent forms. I created a pre-observation schedule and asked teachers to verify their availability on the date assigned. Difficulties arose when prekindergarten teachers were unable to attend the Pre-observation meeting (16 teachers out of 39 total teachers attended). I therefore visited the teachers unable to attend the meeting, provided an explanation of the project, collected the informed consent forms, facilitated the completion of the Prekindergarten Technology Integration Questionnaire, and confirmed the scheduled observations.

The two observers and I have experience and training to qualify as “highly qualified” to observe in the classroom. I have 18 years of experience teaching prekindergarten with a master’s degree in early childhood and three years of mentoring and observing prekindergarten teachers while working on a state funded grant and one year as a prekindergarten facilitator mentor teacher for the school district. One observer holds a master’s degree in early childhood, has taught prekindergarten and kindergarten 18 years, has taught college level courses including early childhood student teacher supervision, and spent 3 years mentoring and observing teachers on a state funded grant. The other observer
holds a doctorate in family studies, has been the director of a childcare center
and observed in classrooms for collecting grant data on a state funded grant in
Dallas and Grand Prairie, Texas. The process involved using two classroom
observation instruments. She also served in the school district as a facilitator for
a state funded grant that focused on early literacy where she observed in control
classrooms and observed mentors in the classrooms.

We conducted the classroom pre-observations from May 11 through May
23, 2007. The classroom observations lasted approximately 1 hour.

Phase II: Intervention

The teachers accessed the Web page and they answered the questions at
the end of each module on the technology email conference. I designated a
timeframe for access of the Web-based course

module 1--technology integration in early childhood
classrooms - completed June 3-9
module 2 -- classroom computer setup - completed June 10-16
module 3 -- technology integration activities - completed June 17-23
module 4 – using the digital camera - completed June 24-30

The prekindergarten teachers could complete the four training modules at a
faster pace, but were asked to complete the training modules including their
responses to questions at the conclusion of each module by the end of June. I
notified the treatment group teachers of their needed participation in the Web-
based training by email and included the URL to access the training modules.
The prekindergarten teacher participants accessed the Web-based course modules and answered the module questions on the email conference. The questions for each training module are included in Appendix C.

Twelve prekindergarten teachers completed the training and responded by email within the timeframe as established (the month of June, 2007). Six more teachers completed the training by the first week in August, 2007 and one teacher never completed the training because of lack of access to an Internet connected computer.

**Phase III: Post-assessment**

During another meeting of the participants (September 11, 2007), I provided prekindergarten teachers with the same version of the Prekindergarten Technology Integration Questionnaire. The questionnaires were completed and a schedule for Post-observation was created. The prekindergarten teachers were asked to confirm availability on the scheduled observation dates. The teachers were asked to sign-in to verify attendance. Not all of the teachers were able to attend the meeting (17 teachers out of 34 total teachers), therefore, I emailed the questionnaire and a calendar of scheduled observation dates to the teachers unable to attend the meeting. The non-attendance teachers were asked to fill out the Prekindergarten Technology Integration Questionnaire and email it back to me. Some of the teachers also gave the completed questionnaires to the observers.
We conducted the classroom post observations from September 12 through September 20, 2007. For the post-observations, only 34 teachers were available because three participants changed teaching jobs and two participants retired from teaching.

Data Analysis

A pre and post experimental research design was utilized in this study. Quantitative analysis methods in the statistical analysis software were used to analyze the Prekindergarten Technology Integration Questionnaire and the Prekindergarten Technology Classroom Observation Checklist and a qualitative process was used to analyze the teacher email responses to questions included in the Web-based training. Qualitative analysis software was utilized to code information within the emailed responses that were generated during the training. The purpose of combining methods in this study is to examine different aspects of the problem and to add depth to the study, thus using the “complementary strengths” of the methods (Onwuegbuzie and Johnson, 2006).

Scores from the Prekindergarten Technology Integration Questionnaire and the Prekindergarten Technology Classroom Observation Checklist were entered into a spreadsheet software program and were imported into the statistical analysis software. The complete data set was utilized to generate the statistics for this study.

Each teacher’s responses were copied from the school district email program into text files utilizing a word processing program for use as a source of
information for a qualitative analysis software program. The text of the email responses was searched and coded by defined text units. Specific themes emerged from the information.

Summary

This study measured the effectiveness of a Web-based training course for the integration of technology into early childhood classrooms. Data was collected through a questionnaire, classroom observations, and responses to questions after each module of the training. This chapter delineated the methodology used in this study to answer the two research questions.
CHAPTER 4

RESULTS

The focus of the present study was the investigation of the effects of a Web-based training on technology integration into the curriculum of early childhood classrooms. The study was designed to measure the effects of the Web-based training as to whether the attitudes of the participants would change as a result of the training.

The research questions for this study are:

1. To what extent is a Web-based course effective in changing teachers’ attitudes concerning the integration of technology into early childhood curricula?
2. To what extent is a Web-based course for early childhood education teachers effective in facilitating the integration of technology (computers and digital cameras) into early childhood curricula?

Thirty-nine prekindergarten teachers participated in the study. The teachers were matched on years of experience in prekindergarten, Federal funding level of Title I or non-Title I, and language of instruction and randomly assigned to either a control or treatment group. The treatment group participated in a Web-based training providing information about technology integration into early childhood classrooms. Both teacher groups, treatment and control, jointly attended two meetings that included an overview of the study and a schedule for
classroom observations. I met individually with the teachers who were unable to attend the meetings. Both groups completed a pretest and a posttest Prekindergarten Technology Integration Questionnaire and were observed in their classrooms by one of the trained observers using the Prekindergarten Technology Classroom Observation Checklist. The treatment group also responded by email to questions at the end of each of four Web-based training modules.

The results of the present study are provided in four sections. The first section details the demographic data about the treatment and control groups. The second section analyzes the data collected through the Prekindergarten Technology Integration Questionnaire and the Prekindergarten Technology Classroom Observation Checklist. Qualitative data is analyzed in the third section and the fourth section provides a summary of the analyses.

I used statistical software to analyze the quantitative data in the present study and qualitative software to organize and code the qualitative data in the present study.

**Demographic Data**

The demographic data of the study describe the characteristics of the participants. Prekindergarten teachers in a large urban school district participated in the study. The similarities and differences of the schools and classrooms where the participants teach are also described. Participants responded to questions about their teaching experience in prekindergarten and other grade
levels and their certifications. The prekindergarten teachers who participated in the study were all (100%) female. The data in Table 1 shows that approximately 49% of participants have taught prekindergarten between 1 and 7 years and approximately 51% of participants have taught between 8 and 16 or more years. The teaching certificate held by the majority of the participants (90%) was an Early Childhood teaching certificate. (see Figures 1 and 2).

Table 1

Demographics of Participants

<table>
<thead>
<tr>
<th>Teaching Experience in Prekindergarten</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 3 years</td>
<td>9</td>
<td>23.1</td>
</tr>
<tr>
<td>4 to 7 years</td>
<td>10</td>
<td>25.6</td>
</tr>
<tr>
<td>8 to 15 years</td>
<td>15</td>
<td>38.5</td>
</tr>
<tr>
<td>16 or more years</td>
<td>5</td>
<td>12.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching Certifications Held</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood</td>
<td>35</td>
<td>89.7</td>
</tr>
<tr>
<td>Elementary School</td>
<td>21</td>
<td>53.8</td>
</tr>
<tr>
<td>Alternative (either Early Childhood</td>
<td>5</td>
<td>12.8</td>
</tr>
<tr>
<td>or Elementary)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 shows the teaching experience in prekindergarten reported by the participants. The figure represents the treatment and control groups.
combined because this shows the makeup of the entire group and Figure 2 demonstrates the treatment and control groups separated.

![Pie chart showing teaching years distribution]

**Figure 1.** Years of teaching prekindergarten (n=39).

The Federal funding level for the majority of the schools of the participants (79%) was Title I and the language of instruction in most of the classrooms of the participants (77%) was English as a second language (ESL). In an English as a second language (ESL) classroom, the language of instruction is English while some of the students know languages other than English. In an ESL classroom, the students are learning English. In bilingual classrooms, the language of instruction is Spanish, but there is also an ESL component where the children learn English.
Table 2 shows the percentages of Title I and non-Title I schools represented in the sample. School campuses qualify for Title I Federal funding based upon their free or reduced price lunch percentage. Of the classrooms represented in the sample, 79% are designated Title I and 21% of the classrooms are non-Title I.

Table 2 shows the percentage of classrooms represented in the sample that have a language of instruction of Spanish with a segment of the day as ESL for the bilingual classrooms (21%) and English as the language of instruction in the English as a second language (ESL) (77%) classrooms.

Table 2

*Federal Funding Level of the Classrooms Included in the Sample*

<table>
<thead>
<tr>
<th>Federal Funding Level</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Title I</td>
<td>8</td>
<td>20.5</td>
</tr>
<tr>
<td>Title I</td>
<td>31</td>
<td>79.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language of Instruction</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>English as a Second Language</td>
<td>30</td>
<td>76.9</td>
</tr>
<tr>
<td>Bilingual</td>
<td>9</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Table 3 shows the frequencies and percentages of the demographic data for both the treatment and control groups. The table shows treatment and control groups teaching certificates held; teaching experience in prekindergarten;
Federal funding level of the classrooms; and the language of instruction in the classrooms.

Table 3

*Demographic Data for Treatment and Control Groups*

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td><strong>Teaching Certificates Held</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Childhood</td>
<td>18</td>
<td>46.2</td>
</tr>
<tr>
<td>Elementary Education</td>
<td>9</td>
<td>23.1</td>
</tr>
<tr>
<td><strong>Teaching experience in Prekindergarten</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 3 years</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>4 to 7 years</td>
<td>4</td>
<td>21.1</td>
</tr>
<tr>
<td>8 to 15 years</td>
<td>8</td>
<td>42.1</td>
</tr>
<tr>
<td>16 or more years</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>Federal Funding Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Title I</td>
<td>4</td>
<td>21.1</td>
</tr>
<tr>
<td>Title I</td>
<td>15</td>
<td>78.9</td>
</tr>
<tr>
<td><strong>Language of Instruction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESL</td>
<td>15</td>
<td>78.9</td>
</tr>
<tr>
<td>Bilingual</td>
<td>4</td>
<td>21.1</td>
</tr>
</tbody>
</table>
Figure 2 compares the teaching experience in prekindergarten for the treatment and control groups. Figure 3 compares the Federal funding level of the treatment and control groups. Figure 4 compares the language of instruction (ESL or bilingual) in the classrooms of the treatment and control groups.

Figure 2. Years of prekindergarten teaching experience.
Figure 3. Federal funding levels.

Figure 4. Language of instruction.
Participants were matched on the variables years of experience, Federal funding levels, and languages of instruction. Attrition occurred because two participants retired and three participants changed teaching positions. Five participants departed from teaching prekindergarten resulting in 34 participants who completed pretests and posttests.

Testing of the Research Questions

An analysis of covariance (ANCOVA) was completed to compare treatment and control posttest scores on the Prekindergarten Technology Integration Questionnaire. The treatment group means showed a minimal or slight increase from pretest to posttest while the variability decreased. The control group means demonstrated more increase from pretest to posttest and the variability decreased. The ANCOVA controlled initial differences between the two groups by using the pretest scores as a covariate. The univariate tests measured group differences. The test produced an \( F=0.151 \) with \( df=1, 32 \) with \( p=0.700 \). The means and standard deviations are displayed in Table 4. Figure 5 displays the means with a scale from 16 to 80. The possible range of scores is from 16 to 80. Treatment and control groups did not differ significantly.

Table 4 shows an increase from pretest to posttest. A higher score indicates attitudes that are more positive. The higher the score on the questionnaire, the more the participant agreed with the statements referring to technology integration into early childhood curricula. However, the differences were minimal.
Table 4.

*Pretest and Posttest Means and Standard Deviations for Total Scores of Prekindergarten Technology Integration Questionnaire*

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Treatment</td>
<td>63.67</td>
<td>9.50</td>
</tr>
<tr>
<td>Control</td>
<td>65.69</td>
<td>12.61</td>
</tr>
</tbody>
</table>

*Figure 5.* Pretest and posttest means on prekindergarten technology integration questionnaire.
An analysis of covariance (ANCOVA) was completed to compare treatment and control posttest total scores on the Prekindergarten Technology Classroom Observation Checklist. The treatment group means showed a slight decrease from pretest to posttest while the variability decreased. The control group means also demonstrated a slight decrease from pretest to posttest and the variability increased slightly. A higher score on the Prekindergarten Technology Classroom Observation Checklist indicates that more integration is occurring in the classroom. The ANCOVA controlled initial differences between the two groups by using the pretest scores as a covariate. The univariate tests measured group differences. The test produced an $F=0.853$ with $df=1, 32$ with $p=0.363$. The groups were not significantly different. The means and standard deviations are displayed in Table 5. Figure 6 is a graph of the means based on a range of 41 to 81, which are the minimum and maximum scores on the checklist.

Table 5

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>57.32</td>
<td>6.34</td>
</tr>
<tr>
<td>Control</td>
<td>58.40</td>
<td>5.00</td>
</tr>
</tbody>
</table>
Figure 6. Pretest and posttest Prekindergarten Technology Classroom Observation Checklist

The following items from the Prekindergarten Technology Integration Questionnaire were chosen to show the frequencies of specific items on the questionnaire to give some insight into the attitudes of the participants. The means and standard deviations of all items are in Appendix C.

The Prekindergarten Technology Integration Questionnaire included sixteen Likert Scale items. The items were rated on the following scale: 1. strongly disagree, 2. slightly disagree, 3. agree, 4. slightly agree, and 5. strongly agree. The higher the mean indicates that more of the participants agreed with the statements.
2. I use the computer to present information to the children.

The treatment and control group showed the lowest mean scores on this item and the variability for both groups is high.

5. Technology can enhance a child’s learning

The treatment and control groups agree that technology can enhance a child’s learning. Sixteen participants or 88.9% in the treatment group and 15 participants or 93.8% in the control group rated this item as strongly agree.

7. Young children can use a digital camera

The treatment and control groups agree on this item, but at different levels of agreement as illustrated in Table 6.

Table 6

*Individual Responses on Item # 7 on Prekindergarten Technology Integration Questionnaire*

<table>
<thead>
<tr>
<th></th>
<th>slightly disagree</th>
<th>agree</th>
<th>slightly agree</th>
<th>strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Treatment</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Control</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Technology integration is possible in prekindergarten.

The treatment and control groups agree on this item, with 66.7% and 75.0% respectively in both groups responding with strongly agree.

15. Digital camera prints or computer pictures can allow children to revisit
experiences.

The treatment and control groups agree on this item, with very little difference. All 18 participants 100% in the treatment group responded with *strongly agree* and 14 participants 87.5% in the control group responded with *strongly agree* to the item.

The internal consistency of the Prekindergarten Technology Integration Questionnaire was calculated using Cronbach’s Alpha at 0.913.

Table 7

*Treatment and Control Means and Standard Deviations for Items on Prekindergarten Technology Integration Questionnaire*

<table>
<thead>
<tr>
<th>Item</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>2. I use the computer to present information to the children.</td>
<td>3.28</td>
<td>1.49</td>
</tr>
<tr>
<td>5. Technology can enhance a child’s learning</td>
<td>4.83</td>
<td>0.51</td>
</tr>
<tr>
<td>7. Young children can use a digital camera</td>
<td>4.06</td>
<td>0.87</td>
</tr>
<tr>
<td>8. Technology integration is possible in prekindergarten</td>
<td>4.44</td>
<td>0.51</td>
</tr>
<tr>
<td>15. Digital camera prints or computer pictures can allow children to revisit experiences.</td>
<td>5.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

The Prekindergarten Technology Classroom Observation Checklist presents some details into how technology is being integrated into early
childhood classrooms. The Prekindergarten Technology Classroom Observation Checklist was scored with “yes”=2 and “no”=1. The “yes” score indicated that a specific behavior or activity towards technology integration was occurring in the classroom and “no” indicated that those behaviors or activities were not occurring in the classroom. The higher the score on the checklist, the more yes responses and the more technology integration was observed in the classroom.

An interrater reliability was established for the Prekindergarten Technology Classroom Observation Checklist. We conducted classroom observations using the Prekindergarten Classroom Observation Checklist within the same 4 classrooms and the reliability rate was 0.86% based on exact agreement. The interrater reliability was conducted during the first four actual observations of participants in the study.

The following items are on the Prekindergarten Technology Classroom Observation Checklist (see Appendix D for complete list of Means and Standard Deviations for the checklist):

6. Children in the classroom-how many

The number of children in the control group classrooms was more than the number of children in the treatment group classrooms as shown by the treatment and control groups means and standard deviations in Table 8. This appears as a random occurrence.
Table 8

*Treatment and Control Groups Means and Standard Deviations of Number of Children in Classrooms*

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Number of Children in</td>
<td>15.44</td>
<td>3.87</td>
<td>17.50</td>
<td>3.20</td>
</tr>
<tr>
<td>classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Computers are being used in the classroom.

The computers are being used in both the treatment and control groups. It was interesting to note that 22% classrooms were not using the computers in the treatment group and 37.5% classrooms were not using the computers in the control group. This scenario could occur because the students did not use the computers while the observer was in the classroom or that the students are not using the computers at all.

10. Computers are functioning.

For the most part the computers were functioning in the classrooms as shown by the group frequencies and percentages. When looking at the frequencies, 16.7% in the treatment group were not functioning and 25% in the control group were not functioning. This occurs at times because the prekindergarten classes in the district have the older computers available.

15. Digital camera in the classroom

The group frequencies and percentages demonstrate that there are digital cameras in the classrooms, 88.9% in the treatment group and 81.3% in the
control group. The next item is out of order only to compare the availability of the
digital cameras and the use of the digital cameras.

49. Teacher using digital camera.
The group frequencies and percentages demonstrate that some teachers are
using a digital camera, but the frequencies show only 66.7% in the treatment
group and only 62.5% are using a digital camera. The teacher may be using the
camera while the observer is in the classroom or there are artifacts apparent in
the classroom.

34. Presentation station in use
The group frequencies and percentages show that Presentation stations (a
laptop computer, a projector, speakers, and sometimes a document camera
placed on a cart so as to move from classroom to classroom for teachers to use
to present information) are being used in the prekindergarten classrooms.
However, only 16.7% in the treatment group and 12.5% in the control group use
the Presentation station.

34a. Presentation station available.
The group frequencies and percentages show that Presentation stations are
available for use in the prekindergarten classrooms. Presentation stations are
available for 75% of the treatment group and 66.7% of the control group.
However, the prekindergarten classrooms usually share the Presentation stations
with other teachers. The Presentation stations are available for use within the
school building.
Table 9

*Treatment (n=18) and Control (n=16) Frequencies and Percentages for Items on Prekindergarten Technology Classroom Observation Checklist*

<table>
<thead>
<tr>
<th>Item</th>
<th>Treatment</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Computers are being used in the classroom</td>
<td>14</td>
<td>77.8</td>
<td>10</td>
<td>62.5</td>
</tr>
<tr>
<td>10. Computers are functioning</td>
<td>15</td>
<td>83.3</td>
<td>12</td>
<td>75.0</td>
</tr>
<tr>
<td>11. Children have access to computers</td>
<td>15</td>
<td>83.3</td>
<td>10</td>
<td>62.5</td>
</tr>
<tr>
<td>15. Digital camera in the classroom</td>
<td>16</td>
<td>88.9</td>
<td>13</td>
<td>81.3</td>
</tr>
<tr>
<td>34. Presentation Station in use</td>
<td>3</td>
<td>16.7</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>34a. Presentation Station Available</td>
<td>12</td>
<td>66.7</td>
<td>12</td>
<td>75.0</td>
</tr>
<tr>
<td>49. Teacher using digital camera</td>
<td>12</td>
<td>66.7</td>
<td>10</td>
<td>62.5</td>
</tr>
</tbody>
</table>

Qualitative Data

The responses to the questions at the end of the Web-based training modules yielded information about the participants’ reactions to the training. The questions that are within the training modules are found in Appendix D.

The responses to the questions were imported into qualitative analysis software. The sources are the number of text files of the respondents that accounted for the references. The references refer to the number of times that the text was coded within the sources. Some respondents’ text files yielded multiple responses. Each training module has a specific theme, therefore, there
is a general category for each response. The text file responses were reviewed thoroughly. The text was searched with a word frequency query. The first text units used in a search were single words. However, the single words did not give enough information to adequately identify the appropriate category. Paragraphs were used as the text unit to provide enough information to formulate categories. Each set of module responses of the participants were then coded. Specific themes emerged from the information. After categorizing all four modules of each participant, the categories were reviewed to make sure that the paragraphs were coded in the appropriate category. The responses were coded and seven themes emerged with the following reference occurrences:

Table 10

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sources</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentions</td>
<td>34</td>
<td>46</td>
</tr>
<tr>
<td>Time</td>
<td>31</td>
<td>35</td>
</tr>
<tr>
<td>Barriers to Technology Integration</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Activities to Meet Standards</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Why Integrate Technology in Early Childhood</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Comfort Level</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Use of Digital Cameras by Children</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

Intentions indicate that prekindergarten teachers can “talk the talk” about integrating technology, but are not yet able to initiate the actions needed as indicated by the findings in this study. Within the emails, the teachers spoke of
activities that they would like to attempt. The following is a sampling of the comments:

“

“I have gotten a lot of new ideas from viewing the information presented. I plan on using several of the ideas next year.”

“It [the training] has given us new ideas on using the digital camera in the classroom.”

“I think letting the children use the digital camera is a very good idea. I will allow students to use the camera next year.”

“In this coming year, I plan to have my students enter into the School District Technology Fair.”

The teachers are interested in attempting some of the ideas suggested in the Web-based training. Supporting the teachers in the quest for more technology integration in early childhood classrooms involves the teachers, the technology trainers on each campus and the district technology instructional specialists. Making technology training geared toward early childhood classrooms will support the prekindergarten teachers. Along with the support from the technology specialists, the teachers support each other by sharing information and skill in developing activities appropriate for early childhood curricula.

The other categories that emerged within the email responses are possible reasons that the intentions are not fulfilled as yet. The category of barriers to technology integration spans several topics. The prekindergarten
teachers made comments about how their computers froze up and they had printer problems and other barriers to technology integration:

“I also use the programs that I have been trained on. I am limited by the programs that freeze my computer.”

“My team (with K) has only one presentation cart to use between 7 teachers and I have not been able to have it one time in my room even though I went to the training here in my building.”

“Some barriers could be: lack of knowledge, time, space, teachers set in their ways, lack of equipment.”

“Time, time, time. Lack of time is the biggest factor.”

Barriers to technology integration in early childhood classrooms are the same barriers that are reported in K-12 classrooms. Researchers agree that a shortage of time, a shortage of computers, changing teachers’ attitudes and helping teachers become more comfortable utilizing technology are all barriers to integrating technology (Becker, 2001; USDE, 2000; USDE, 2001, McCannon & Crew, 2000; Clements, 2002).

Considerable information was obtained through the noted comments of the observers on the Prekindergarten Technology Classroom Checklist. The prekindergarten teachers shared comments and thoughts about their own classrooms. They also shared intentions such as:

“I am getting a Presentation station, but I'll need some training.”

“I am considering taking my class to the computer lab.”
“I plan to create some class made books.”

As reported by one of the observers on the Prekindergarten Technology Classroom Observation Checklist, one teacher took on the use of digital cameras by the children by writing a grant to be able to buy disposable digital cameras for the children in her class to use to take pictures. However, also during an observation, one teacher explained that she had the computers in the closet until an ordered table was received. She planned to use the computers when the new table for another center was received.

Based on the information reported on the Prekindergarten Technology Classroom Observation Checklist, several teachers had not allowed the children to use the computers yet. Comments were:

“I haven’t had time yet to train the children how to use the computer.”

“The computer is too stimulating for a child with behavior problems.”

The teachers apparently had not allowed the children to use the computers yet because it was the beginning of the school year.

Summary of Findings

In the present study, I asked two main questions. First, to what extent is a Web-based course effective in changing teachers’ attitudes concerning the integration of technology into early childhood curricula? Second, to what extent is a Web-based course for early childhood education teachers effective in facilitating the integration of technology into early childhood curricula?
The answer to the first research question is that there was no statistically significant difference in the pretest and posttest scores on the Prekindergarten Technology Integration Questionnaire concerning the attitudes of the prekindergarten teachers after the Web-based course. The answer to the second research question is that there was not a statistically significant difference in the integration of technology into early childhood curricula. There was no statistically significant difference in the scores in the pretest and posttest of the Prekindergarten Technology Classroom Observation Checklist. However, the intentions voiced by the teachers in the qualitative data give hope to further improvement within the school year. The prekindergarten teachers were interested in learning more about technology integration as indicated by the qualitative data.
CHAPTER 5
DISCUSSION

The focus of the present study was to determine the effects of a Web-based training on technology integration into the curriculum of early childhood classrooms. The primary purpose of the study was to determine if the pretest scores on the Prekindergarten Technology Integration Questionnaire and the pretest scores on the Prekindergarten Technology Classroom Observation Checklist could be improved through the use of a Web-based course demonstrating the best practices and current research on technology integration in early childhood curricula. The research study examined two research questions. The first question asked if there was a difference in the Prekindergarten Technology Integration Questionnaire posttest scores between prekindergarten teachers in the treatment group and prekindergarten teachers in the control group. The second question asked if there was a difference in the Prekindergarten Technology Classroom Observation Checklist posttest scores between prekindergarten teachers in the treatment group and prekindergarten teachers in the control group. In order to address these research questions, I collected pretest and posttest data from 34 prekindergarten teachers. The original sample included 39 prekindergarten teachers, however, attrition accounted for 34 prekindergarten teachers remaining in the sample.
Findings

The purpose of the present study was to determine if the scores on an attitudinal questionnaire and a classroom observation for prekindergarten teachers could be improved through the implementation of a Web-based training. The first research question asked if there were differences in posttest scores between prekindergarten teachers in the treatment group and prekindergarten teachers in the control group. The results of the analysis of variance were not statistically significant, and therefore did not affirm the hypothesis in this research question. Finding no significant differences indicates that the Web-based course is not enough to change the attitudes of prekindergarten teachers. Beliefs play a crucial role in determining behavior and strongly affect behavior (Pajares, 1992). It takes significant time to effectively change the beliefs and daily practice of teachers (Swain, 2006). The time needed to change the teachers’ attitudes was not available within the duration of the current project. Expanding the duration of the project was not possible due to time constraints.

The findings of the present study add to previous research in the area of technology integration in early childhood education. There is a lack of research with regard to technology integration into early childhood education and to the research into the attitudes of early childhood teachers towards technology integration.

The second research question asked if there were differences in posttest scores between prekindergarten teachers in the treatment group and
prekindergarten teachers in the control group with data collected through classroom observations using the Prekindergarten Technology Classroom Observation Checklist. The results of the analysis of variance were not statistically significant, and thus did not affirm the hypothesis in this research question. However, given the intentions gathered through the comments on the Prekindergarten Technology Classroom Observation Checklists of both groups, this leads me to believe that the Web-based training increased the interest of the treatment group and the participants in the control group have expressed interest in accessing the Web-based training. The school district administrators involved also expressed the expectation that all the prekindergarten teachers would be able to access the Web-based training after the completion of the study.

Implications for Web-based Training

The findings for this study provide implications for Web-based training. Finding no statistically significant results leads me to suggest that the Web-based training be part of a program that includes the Web-based training plus on-site training and provide time for prekindergarten teachers to discuss applications of training. Sharing resources with the group would help facilitate more integration. Each teacher would not have to develop activities, but could share what has been developed and peer coaching could help the teachers who would need more help learning the software utilized. With a focus on training that is specific to a particular grade level and “just in time training,” technology integration will likely occur (CEO Forum, 1999). Of course, training requires time, money and
time out of the classroom for such training would not necessarily be supported by school districts.

This study revealed another aspect of the use of technology within the early childhood classrooms. As technology advances, the “old stand-by” technology will not work on more advanced computers. The CD software that was used to install learning games and point and click activities cannot be used in more advanced machines. The Internet will serve as the access to games and online activities for the children. Thus far, few Websites provide the activity level that the CD software entailed. More Websites are developing and there are Websites that evaluate and screen children’s Websites. The classrooms where this study was conducted will only have access to the Internet without the CD software that was appropriate for early childhood. The prekindergarten teachers in this study were already experiencing the change in technology. The school district has started an upgrade in technology and started replacing computers that supported the prekindergarten software with new computers that do not run the software. The search for appropriate Internet Websites has begun. The presentation stations that allow for presenting information to children on a large screen does not replace early childhood practices of “hands-on” materials. The information presented enhances the “hands-on” by bringing information to the classroom that otherwise is not available except in books and pictures. One of the participants emailed to explain how a visit from the fire fighters from a nearby fire station was enhanced by showing the children firefighters in action via the
Internet on the presentation station. The “sharing of ideas” demonstrates how teachers learn from each other.

The upgrading of the computers also brings the need for training of the teachers. Web-based learning is valuable in providing training, but as this study showed, teachers who are comfortable using the technology will continue to utilize the available technology. The Web-based training created a community of teachers who were interested in learning more. The control group of teachers who did not access the Web-based training expressed an interest in the Web-based training and want to learn more after the study is completed.

Limitations of the Present Study

There are several limitations of the present study. The time of the year has a direct bearing on the results. The findings based on the posttest were definitely affected by the observations occurring during the beginning of the year. School began the last week of August and the observations using the Prekindergarten Technology Classroom Observation Checklist were begun in the second week of September. The prekindergarten children had been in school for approximately 11 days. During the early part of the year, the prekindergarten children are learning all the new routines that are established by the teachers within their classrooms. Therefore, the prekindergarten teachers may not have time to create the technology artifacts that will come later in the year. The children will become much more independent and trained in using the technologies as the year
passes. The project was started in May of 2007 because of delays in approval and completion of the dissertation proposal. See Time line in Appendix G.

The timing of this project was not accomplished as was originally planned. The original time extension appeal was designed to complete the dissertation in August 2007. The items that were required to proceed to the next phase of the project did not always happen as quickly as necessary. If I had it to do all over again, the beginning of the year would not be the choice time to do the post observations.

The sample size of the present project was not large enough to generalize results from the sample to all prekindergarten teachers and classrooms. A larger sample size will also allow the use of more powerful statistics. Due to attrition of five teachers from pretest to posttest for reasons of retirement and job changes, affected the sample size.

Another factor in limiting the project is the length of the intervention. The length of the intervention limited the amount of information that the participants received and the feedback between me and the participants was inadequate. Christensen, 2002 found that a two-day needs-based technology integration training with a follow-up day of training each six weeks had positive effects on teachers attitudes. Although this project had only a four-week intervention with no follow-up training, the qualitative data demonstrates that the training helped teachers contemplate utilizing technology in a new way. If the training was
longer, the teachers might not just be talking about doing something new, they would have accomplished a new creative way of integrating technology.

Another form of limitation is the fact that the prekindergarten teachers have the older equipment in the school district. Older equipment results in more problems, such as broken machines, out-dated software, and slower machines with low memory. Although, the older computers are being replaced and the replacing of the out-of-date computers should have a positive effect but the new machines do not run the old software as well as the older machines. New computers utilize computer processors that do not speak the same computer language as the older software. The CD’s or software that we currently use with the children will not be used much longer. The Internet will be the only way that the teachers will have to provide activities for the children on the computer.

Recommendations for Future Research

There are several recommendations for future research based on the results of the present study. The recommendations include a more timely pretest and posttest. The present study pretest was facilitated at the end of the year in May and the posttest was accomplished during the beginning of the new school year. A time of year, when children and teachers are in a comfortable routine and not coping with a new routine would be a more suitable time to conduct the study.

For further research in this present study, there is a need to do a follow up observations into these classrooms to see if the intentions of the prekindergarten
teachers are coming to fruition. A replication of the study with a longer time for training and mentoring by the available technology specialists in the school district would perhaps improve technology integration.

There is a strong need for more information about technology integration in prekindergarten and early childhood. As more and more technology becomes a part of the world of the preschooler, early childhood teachers have much more to learn about developmentally appropriate technology integration (Hall and Higgins, 2002; Labbo and Ash, 2000). The emphasis in the research has been in K-12 education. It is time to look into how teachers of young children are using technology in creative ways and how young children interact with technology.

The continued interest in and change in technology necessitates further research into how technology is integrated into the early childhood classroom and curricula.
APPENDIX A

PREKINDERGARTEN TECHNOLOGY INTEGRATION QUESTIONNAIRE
Part 1
Directions: The following are statements relating to technology integration. Please indicate your degree of agreement with each statement by checking the column that closely matches your opinion.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Slightly Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>
| 1. I use the computer daily to:  
  • Check email  
  • Do administrative tasks (check roll, etc.) |  |  |  |  |  |
| 2. I use the computer to present information to the children. |  |  |  |  |  |
| 3. Some of the children in my classroom use the computer daily for directed activities. |  |  |  |  |  |
| 4. Some of the children in my classroom use the computer daily for independent activities. |  |  |  |  |  |
| 5. Technology can enhance a child’s learning. |  |  |  |  |  |
| 6. Young children can use the Internet. |  |  |  |  |  |
| 7. Young children can use a digital camera. |  |  |  |  |  |
| 8. Technology integration is possible in prekindergarten. |  |  |  |  |  |
| 9. Opportunities for technology usage are present in my classroom. |  |  |  |  |  |
| 10. I model technology usage for the children in my classroom. |  |  |  |  |  |
| 11. Technology integration activities should be included in lesson plans. |  |  |  |  |  |
Part 2

Directions: The following are statements relating to technology integration. Please indicate your degree of agreement with each statement by checking the column that closely matches your opinion.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Slightly Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. United Streaming can be used to find out more about a subject with the children in your class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. The Internet can be used to find out more about a subject with the children in your class. (as during use of a KWL chart)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Kidspiration can be used to document a retelling of a story with the children in your class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Digital camera prints or computer pictures can allow children to revisit experiences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Real objects used for an activity can then be translated for use in a more abstract way with a computer program.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part 3

Please check or fill in the descriptions that describe your situation. This information will be used only to describe the teacher group and to compare group responses.

<table>
<thead>
<tr>
<th>Years of experience in PK:</th>
<th>Years Teaching</th>
<th>Type of teacher Certification:</th>
<th>Approximate Time for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>______ 1-3 yrs.</td>
<td>______ Teaching</td>
<td>______ Early Childhood</td>
<td>Regularly Scheduled</td>
</tr>
<tr>
<td>______ 4-7 yrs.</td>
<td>______ K-3</td>
<td>______ Elementary Education</td>
<td>Small Group Time</td>
</tr>
<tr>
<td>______ 8-15 yrs.</td>
<td>______ 4-6</td>
<td>______ Alternative Certification</td>
<td>AM ________</td>
</tr>
<tr>
<td>______ 16 or more</td>
<td>______ Middle School</td>
<td></td>
<td>PM ________</td>
</tr>
<tr>
<td></td>
<td>______ High School</td>
<td></td>
<td>Regularly Scheduled Center Time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM ________</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PM ________</td>
</tr>
</tbody>
</table>

Thanks very much for your time.
APPENDIX B

PREKINDERGARTEN TECHNOLOGY CLASSROOM

OBSERVATION CHECKLIST
<table>
<thead>
<tr>
<th>Date</th>
<th>School</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Time of observation: | 4. Technology activity in lesson plan |
| Yes | No |

2. Teacher in the classroom | 5. Teaching Assistant in the classroom |
| Yes | No |

3. Volunteer in the classroom | 6. Children in the classroom—how many |
| Yes | No |

### Activity in the Classroom

<table>
<thead>
<tr>
<th>7. Teacher / Assistant Directed Activity</th>
<th>8. Child Directed Centers</th>
<th>Other?________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Group</td>
<td>Large Group</td>
<td>Individual</td>
</tr>
</tbody>
</table>

### Technology Activity

<p>| 9. Computers are being used in the classroom. | Y | N | Comments |
| 10. Computers are functioning. |     |   |          |
| 11. Children have access to computers. |       |   |          |
| 12. Earphones being used. |         |   |          |
| 13. CD’s apparent. |           |   |          |
| 14. Expectations posted in computer center. |             |   |          |
| 15. Digital Camera in the classroom. |               |   |          |
| 16. Adult with children at computers. |                 |   |          |
| 17. Children start the programs. |                 |   |          |
| 18. Children stop the programs. |                 |   |          |
| 19. Children exit the programs. |                 |   |          |
| 20. Children use the mouse. |                 |   |          |
| 21. Children use the keyboard. |                 |   |          |</p>
<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. Printer in the classroom.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children use technical terminology:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Mouse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Keyboard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Printer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. CD-ROM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. How many computers are in the classroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. How many children are at the computers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Other technology in use or available:

<table>
<thead>
<tr>
<th></th>
<th>Y In Use</th>
<th>N In Use</th>
<th>Y Avail</th>
<th>N Avail</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. VCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Tape Recorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Overhead</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. CD/Tape Player</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. Presentation Station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Technology Produced Artifacts

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. Class-made books made using digital pictures.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. Class-made books made using Kidpix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pictures of the Children:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Cubby/locker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Name Cards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Class Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. Small Group Rotation Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. Thinking Maps created with Kidspiration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. Kidpix drawings with child dictation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Other:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. Other:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Teacher/Child Activity

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>N</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>45. Teacher presenting shared reading using Power Point.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. Teacher using other technology. Describe:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. Evidence of prior technology use by teacher. Describe:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49. Teacher using Digital camera.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50. Class goes to computer lab regularly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51. Children using software to reinforce activities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52. What software are the children using?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interview/Comments:

1. Do you have access to other technologies (not present in the classroom, but in the school, e.g. presentation station, etc)? If yes, tell what technology and describe how it is used?

2. Does your class go to the computer lab? If yes, what software do the children use during the lab time and how often do the children visit the lab?

3. Please tell me about any other ways that you use technology that was not apparent in this observation.

Observer
Draw a picture of the layout of the classroom—be sure to include computer center.
APPENDIX C

TREATMENT AND CONTROL GROUPS MEANS AND STANDARD DEVIATIONS FOR THE PREKINDERGARTEN TECHNOLOGY INTEGRATION QUESTIONNAIRE
<table>
<thead>
<tr>
<th>Items</th>
<th>Treatment</th>
<th></th>
<th>Control</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I use the computer daily to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Check email</td>
<td>5.00</td>
<td>0.00</td>
<td>4.88</td>
<td>0.50</td>
</tr>
<tr>
<td>• Do administrative tasks (check roll, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I use the computer to present information to the children.</td>
<td>3.28</td>
<td>1.49</td>
<td>3.44</td>
<td>1.31</td>
</tr>
<tr>
<td>3. Some of the children in my classroom use the computer daily for independent activities.</td>
<td>3.72</td>
<td>1.53</td>
<td>3.44</td>
<td>1.50</td>
</tr>
<tr>
<td>4. Some of the children in my classroom use the computer daily for directed activities.</td>
<td>3.83</td>
<td>1.29</td>
<td>3.88</td>
<td>1.26</td>
</tr>
<tr>
<td>5. Technology can enhance a child's learning.</td>
<td>4.83</td>
<td>0.51</td>
<td>4.81</td>
<td>0.75</td>
</tr>
<tr>
<td>6. Young children can use the Internet.</td>
<td>3.33</td>
<td>1.24</td>
<td>4.13</td>
<td>1.02</td>
</tr>
<tr>
<td>7. Young children can use a digital camera.</td>
<td>4.06</td>
<td>0.87</td>
<td>3.88</td>
<td>0.96</td>
</tr>
<tr>
<td>8. Technology integration is possible in prekindergarten.</td>
<td>4.44</td>
<td>0.86</td>
<td>4.63</td>
<td>0.72</td>
</tr>
<tr>
<td>9. Opportunities for technology usage are present in my classroom.</td>
<td>4.11</td>
<td>0.96</td>
<td>4.38</td>
<td>1.47</td>
</tr>
<tr>
<td>10. I model technology usage for the children in my classroom.</td>
<td>4.17</td>
<td>0.86</td>
<td>4.31</td>
<td>1.14</td>
</tr>
<tr>
<td>11. Technology integration activities should be included in lesson plans.</td>
<td>3.94</td>
<td>1.056</td>
<td>4.19</td>
<td>1.05</td>
</tr>
<tr>
<td>12. United Streaming can be used to find out more about a subject with the children in your class.</td>
<td>3.89</td>
<td>1.02</td>
<td>4.19</td>
<td>1.38</td>
</tr>
<tr>
<td>13. The Internet can be used to find out more about a subject with the children in your class. (as during use of a KWL chart).</td>
<td>4.11</td>
<td>1.02</td>
<td>4.25</td>
<td>1.00</td>
</tr>
<tr>
<td>14. Kidspiration can be used to document a retelling of a story with the children in your class.</td>
<td>4.11</td>
<td>1.08</td>
<td>4.06</td>
<td>1.39</td>
</tr>
<tr>
<td>15. Digital camera prints or computer pictures can allow children to revisit experiences.</td>
<td>5.00</td>
<td>0.00</td>
<td>4.81</td>
<td>0.54</td>
</tr>
<tr>
<td>16. Real objects used for an activity can then be translated for use in a more abstract way with a computer program.</td>
<td>4.83</td>
<td>0.51</td>
<td>4.69</td>
<td>0.60</td>
</tr>
</tbody>
</table>
APPENDIX D

TREATMENT AND CONTROL FREQUENCIES AND PERCENTAGES FOR THE PREKINDERGARTEN TECHNOLOGY CLASSROOM OBSERVATION CHECKLIST
<table>
<thead>
<tr>
<th>Items</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 through 8 were reported as f and %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Computers are being used in the classroom.</td>
<td>14</td>
<td>77.8</td>
</tr>
<tr>
<td>10. Computers are functioning.</td>
<td>15</td>
<td>83.3</td>
</tr>
<tr>
<td>11. Children have access to computers.</td>
<td>15</td>
<td>83.3</td>
</tr>
<tr>
<td>12. Earphones being used.</td>
<td>7</td>
<td>38.9</td>
</tr>
<tr>
<td>13. CD's apparent.</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>14. Expectations posted in computer center.</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>15. Digital Camera in the classroom.</td>
<td>16</td>
<td>88.9</td>
</tr>
<tr>
<td>16. Adult with children at computers.</td>
<td>12</td>
<td>66.7</td>
</tr>
<tr>
<td>17. Children start the programs.</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>18. Children stop the programs.</td>
<td>7</td>
<td>38.9</td>
</tr>
<tr>
<td>19. Children exit the programs.</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>20. Children use the mouse.</td>
<td>13</td>
<td>72.2</td>
</tr>
<tr>
<td>21. Children use the keyboard.</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>22. Printer in the classroom.</td>
<td>8</td>
<td>44.4</td>
</tr>
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Children use technical terminology:

<table>
<thead>
<tr>
<th>Items</th>
<th>Treatment</th>
<th>Control</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>23. Mouse</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>24. Keyboard</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>25. Printer</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>26. CD-ROM</td>
<td>0</td>
<td>100.0</td>
</tr>
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</table>

27 and 28 are not reported as f and %

<table>
<thead>
<tr>
<th>Items</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>29. TV in use</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>29a. TV available</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>30. VCR in use</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>30a. VCR available</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>31. Tape Recorder in use</td>
<td>7</td>
<td>38.9</td>
</tr>
<tr>
<td>31a. Tape Recorder available</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>32. Overhead in use</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>32a. Overhead available</td>
<td>15</td>
<td>83.3</td>
</tr>
<tr>
<td>33. CD/Tape Player in use</td>
<td>16</td>
<td>88.9</td>
</tr>
<tr>
<td>33a. CD/Tape Player available</td>
<td>18</td>
<td>100.0</td>
</tr>
<tr>
<td>34. Presentation Station in use</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>34a. Presentation Station available</td>
<td>12</td>
<td>66.7</td>
</tr>
<tr>
<td>35. Class-made books made using digital pictures</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>36. Class-made books made using Kidpix</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Description</td>
<td>Treatment</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>---</td>
</tr>
<tr>
<td>Pictures of the Children:</td>
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<td></td>
</tr>
<tr>
<td>37. Cubby/locker</td>
<td>7</td>
<td>38.9</td>
</tr>
<tr>
<td>38. Name Cards</td>
<td>9</td>
<td>50.0</td>
</tr>
<tr>
<td>39. Class Schedule</td>
<td>8</td>
<td>44.4</td>
</tr>
<tr>
<td>40. Small Group Rotation Schedule</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>41. Thinking Maps created with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidspiration</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>42. Kidpix drawings with child dictation</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>43. Other:</td>
<td>11</td>
<td>61.1</td>
</tr>
<tr>
<td>44. Other:</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>45. Teacher presenting shared reading using Power Point</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>46. Teacher using other technology Describe:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe:</td>
<td>12</td>
<td>66.7</td>
</tr>
<tr>
<td>47. Evidence of prior technology use by teacher Describe:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe:</td>
<td>10</td>
<td>55.6</td>
</tr>
<tr>
<td>48. Children using Digital camera</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>49. Teacher using Digital camera</td>
<td>12</td>
<td>63.2</td>
</tr>
<tr>
<td>50. Class goes to computer lab regularly</td>
<td>5</td>
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</tr>
<tr>
<td>51. Children using software to reinforce activities</td>
<td>12</td>
<td>66.7</td>
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<tr>
<td>52. What software are the children using? Not reported as f and %</td>
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APPENDIX E

TRAINING MODULE QUESTIONS
Module 1- Technology Integration in Early Childhood Classrooms Questions

1. Given all the standards for students and teachers, describe how you think prekindergarten teachers are integrating technology (e.g., computers and digital cameras) into the prekindergarten curriculum?

2. Consider the ISTE Standards (NETS-S) for Students and the Prekindergarten Technology Guidelines. How are you providing activities so that the children in your classroom are working towards the standards?

Module 2 - Classroom Computer Setup Questions

1. In reflecting on your computer center in your classroom—what questions do you have and do you think your computer center needs to be modified and how can you accomplish the task?

2. Does your computer center help the children accomplish the Prekindergarten Guidelines? (such as:

   a. Starts, uses, and exits software programs

   b. Uses a variety of input devices, such as mouse, keyboard, voice/sound recorder, or touch screen

   c. Begins to use technical terminology, such as “mouse,” “keyboard,” “printer,” “CD-ROM”

   Give an example of something that the children can do in your classroom.

3. What is your opinion about letting the children use the digital
Module 3 – Technology Integration Activities Questions

1. Respond to this quote:

“New technologies are tools that enhance and add to existing ways to explore ideas, create, research, and disseminate new knowledge acquired in the classroom. They provide opportunities to engage students and to draw on their diverse learning styles (Yelland, 2007).”

With the activities presented in this module in mind, what do you think this quote means for prekindergarten teachers and students?

3. What do you feel are barriers to integrating technology into prekindergarten curriculum?

Module 4 – Using the Digital Camera Questions

1. What information do you need to integrate technology into your classroom curriculum?

2. How has this training modified your thinking about technology integration in prekindergarten?

3. Describe your future plans for technology integration into your classroom curriculum?
APPENDIX F

TECHNOLOGY INTEGRATION IN EARLY CHILDHOOD CLASSROOMS

WEBPAGE AND TRAINING MODULES
Welcome to the Prekindergarten Technology Project

This is the Prekindergarten Technology Project to help Prekindergarten teachers integrate technology into the Prekindergarten curriculum. The following modules demonstrate some of the ways that technology (specifically computers and digital cameras) can be utilized to enhance learning for Prekindergarten students.

Lesson Modules

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Lesson Supplements

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</table>
Today’s students grew-up with digital technologies, integrating computers, the Internet, instant messaging, cellphones, and email into their daily activities.

*U.S. Department of Education, 2004*
The following standards and objectives by National and State entities provide early childhood educators with guidance for student use of technology.
Technology Guidelines for Prekindergarten

Young children have much to gain from use of technology. In prekindergarten, they expand their ability to acquire information, solve problems, and communicate with others. Regular access and exposure to computers and related technology can enhance this learning.

Texas Education Agency, 1999
Technology Guidelines for Prekindergarten

Children use engaging, age-appropriate, and challenging software, and technology to extend their knowledge and to enrich their learning of curriculum content and concepts. These technologies serve as important learning tools and are integrated throughout the instructional program.

Texas Education Agency, 1999

Technology Guidelines for Prekindergarten

Children learn the basic functions of the computer and related technologies. They develop techniques for handling and controlling various input devices, and become increasingly confident and independent users of age-appropriate software programs.

Texas Education Agency, 1999
Technology Guidelines for Prekindergarten

The child:
- Starts, uses, and exits software programs
- Uses a variety of input devices, such as mouse, keyboard, voice/sound recorder, or touch screen
- Begins to use technical terminology, such as "mouse," "keyboard," "printer," "CD-ROM"

Texas Education Agency, 1999

Technology Guidelines for Prekindergarten

- Follows basic oral or pictorial cues for operating programs successfully
- Enjoys listening to and interacting with storybooks and information texts (e.g., multimedia encyclopedia) in electronic forms
- Uses a variety of software packages with audio, video, and graphics to enhance learning experiences (e.g., improving vocabulary, increasing phonological awareness).

Texas Education Agency 1999
National Association for the Education of Young Children (NAEYC)
Position Statement
Technology and Young Children – Ages 3-8
1996

Available at:
http://www.naeyc.org/about/positions.asp

NAEYC Position Statement

Technology and Young Children – Ages 3-8

“Technology plays a significant role in all aspects of American life today, and this role will only increase in the future...Early childhood educators must take responsibility to influence events that are transforming the daily lives of children and families.”
NAEYC Position Statement

Technology and Young Children - Ages 3-8

1. NAEYC believes that in any given situation, a professional judgment by the teacher is required to determine if a specific use of technology is age appropriate, individually appropriate, and culturally appropriate.

2. Used appropriately, technology can enhance children's cognitive and social abilities.

3. Appropriate technology is integrated into the regular learning environment and used as one of many options to support children's learning.
NAEYC Position Statement

Technology and Young Children – Ages 3-8

4. Early childhood educators should promote equitable access to technology for all children and their families.

5. The power of technology to influence children’s learning and development requires that attention be paid to eliminating stereotyping of any group and eliminating exposure to violence, especially as a problem-solving strategy.

NAEYC Position Statement

Technology and Young Children – Ages 3-8

6. Teachers, in collaboration with parents, should advocate for more appropriate technology applications for all children.

7. The appropriate use of technology has many implications for early childhood professional development.
Prior to completion of Grade 2, students will:

1. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies.

2. Use a variety of media and technology resources for directed and independent learning activities.

3. Communicate about technology using developmentally appropriate and accurate terminology.
NETS-S

4. Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning.

5. Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom.

6. Demonstrate positive social and ethical behaviors when using technology.

7. Practice responsible use of technology systems and software.

NETS-S

8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners

9. Use technology resources (e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories.

10. Gather information and communicate with others using telecommunications, with support from teachers, family members, or students partners.
Teachers are the Key

- Teachers plan the classroom environment
- Teachers affect whatever occurs in the classroom
- Teachers make decisions about technology to ensure student learning.

*NAEYC, 1996*

Along with standards, objectives and performance indicators for students come standards and objectives for teachers. National and State entities provide the following standards and objectives for teachers.
Standard I. All teachers use technology-related terms, concepts, data input strategies, and ethical practices to make informed decisions about current technologies and their applications.

Standard II. All teachers identify task requirements, apply search strategies, and use current technology to efficiently acquire, analyze, and evaluate a variety of electronic information.

Standard III. All teachers use task-appropriate tools to synthesize knowledge, create and modify solutions, and evaluate results in a way that supports the work of individuals and groups in problem-solving situations.
Standard IV. All teachers communicate information in different formats and for diverse audiences.

Standard V. All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

International Society for Technology in Education

National Educational Technology Standards for Teachers (NETS·T)

2000

Available at:
http://cnets.iste.org/Teachers/t_stands.html
I. Technology Operations and Concepts
Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:
A. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Education Technology Standards for Students)
B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

II. Planning and Designing Learning Environments and Experiences
Teachers plan and design effective learning environments and experiences supported by technology teachers. Teachers:
A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.
B. apply current research on teaching and learning with technology when planning learning environments and experiences.
C. identify and locate technology resources and evaluate them for accuracy and suitability.
D. plan for the management of technology resources within the context of learning activities.
E. plan strategies to manage student learning in a technology-enhanced environment.

III. Teaching, Learning, and the Curriculum
Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers:
A. facilitate technology-enhanced experiences that address content standards and student technology standards.
B. use technology to support learner-centered strategies that address the diverse needs of students.
C. apply technology to develop students’ higher-order skills and creativity.
D. manage student learning activities in a technology-enhanced environment.
IV. Assessment and Evaluation
Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers:

A. apply technology in assessing student learning of subject matter using a variety of assessment techniques.
B. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.
C. apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

V. Productivity and Professional Practice
Teachers use technology to enhance their productivity and professional practice. Teachers:

A. use technology resources to engage in ongoing professional development and lifelong learning.
B. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.
C. apply technology to increase productivity.
D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.
VI. Social, Ethical, Legal, and Human Issues

Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply that understanding in practice. Teachers:

A. model and teach legal and ethical practice related to technology use.
B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.
C. identify and use technology resources that affirm diversity.
D. promote safe and healthy use of technology resources.
E. facilitate equitable access to technology resources for all students.
Elements of a Rationale for Using Technology in Education

1. Motivation
   • Gaining learner attention
   • Engaging the learner through production work
   • Increasing perceptions of control

2. Unique instructional capabilities
   • Linking learners to information and education sources
   • Helping learners visualize problems and solutions
   • Tracking learner progress
   • Linking learners to learning tools

3. Support for new instructional approaches
   • Cooperative learning
   • Shared intelligence
   • Problem solving and higher level skills

4. Increased teacher productivity
   • Freeing time to work with students by helping with production and record-keeping tasks
   • Providing more accurate information more quickly
   • Allowing teachers to produce better looking, more “student-friendly” materials more quickly

5. Required skills for an information age
   • Technology literacy
   • Information literacy
   • Visual literacy

Roblyer, 2003
Why use technology in the Prekindergarten classroom?

You provide not only the instruction and skill children need for using computers and digital cameras as tools but also access to computers and digital cameras that some may not have at home.

Thouvenelle & Bewick, 2003

Strategies for Using Classroom Technology in Prekindergarten

- Choose quality software that helps teachers and children use the computer as a tool for learning.

- Locate computers within the early childhood classroom and set up the center just as you would any other learning area.

Thouvenelle & Bewick, 2003
Strategies for Using Classroom Technology in Prekindergarten

- Link computer and digital camera experiences with other hands-on activities to promote knowledge construction and deepen understanding of concepts.

- Demonstrate the use of computers and digital cameras as tools so young children have opportunities to observe adult role models.

  Thouvenelle & Bewick, 2003

You have completed the 1st module of this training. Please reflect on the following questions and email your response on the PK Technology conference in First Class.

You may highlight the questions using the text tool, copy, and then paste them into a First Class email to post on the conference. This will keep the questions in mind as you answer.
Question

1. Given all the standards for students and teachers, describe how you think Prekindergarten teachers are integrating technology (e.g., computers and digital cameras) into the Prekindergarten curriculum?

2. Consider the ISTE Standards (NETS-S) for Students and the Prekindergarten Technology Guidelines. How are you providing activities so that the children in your classroom are working towards the standards?

Thank you very much for your time and participation.
Technology Integration in Early Childhood Classrooms
Module 2

By Leticia Graham

Classroom Computer Center

Observe your computer center and reflect on the following suggestions for computer center location, introduction of the computer center, computer center rules, and management. The use of a digital camera in the classroom is the last module.
Classroom Computer Center

Classroom Computer Center Location:

- **Safety** - Place the computers against the wall to prevent children from tripping over the cords.

![Image of children using computers]

Equipment Care - Keep paint, water, sand, food, and magnets away from your computers. Magnets can damage the software and the computer screen.

![Image of child holding hands with paint and magnet]
Classroom Computer Center

Classroom Computer Center Location:

- **Lighting** - Place your computers to avoid glare from the sun and or overhead lights. Get down on kid level to check the glare factor.

Classroom Computer Center Location:

- **Traffic Patterns** - The common placement is away from direct traffic; however some teachers integrate the computer center with other learning centers so that passersby can comment on what is happening on the computers.
Classroom Computer Center

Classroom Computer Center Location:

- **Noise Level** - Many activities on the computer require voice support for the children so put the center away from the noisiest centers.

---

Classroom Computer Center

Classroom Computer Center Location:

- **Space** - Plan sufficient space to allow children to work cooperatively.

*(Earphones prohibit social interactions and cooperative learning. Reflect on the computer activity when deciding to use earphones or not.)*
Classroom Computer Center

Classroom Computer Center Location:

- **Furniture** - Make sure that the monitor is at the child’s eye level. Place the monitor so the child’s head is 16 to 24 inches from the screen.

Classroom Computer Center

Classroom Computer Center Location:

- **Printer Location** - Ideally, the printer should be visible and accessible to the children, but that is not always the case. If children cannot watch their pictures printing, they may not realize that they are actually in control of the print function.
Introduction of the Computer Center

To introduce the computer center:

- Find out what your children know about computers.
- Introduce the computer using the same strategies and activities you use with any other new learning experience.

Introduction of the Computer Center

- Introduce the computer by providing a small group training.
  - Using the common name for CD-rom, keyboard, mouse - show the children the objects.
  - Talk about taking care of the computers (no banging the mouse, the screen or any other parts of the computer).
  - Everyone receives a Certificate for participating in the training (you may not use the computer before training).
Introduction of the Computer Center

- Make posters depicting behavior expectations towards the computers.

**Take turns.**

Introduction of the Computer Center

**Be careful with the computer.**
Introduction of the Computer Center

If you have a problem—tell a teacher.

Computer Training Award

Presented To

For Becoming a Computer User

Teacher: ____________________________ Date: ____________________________
Computer Center Rules

As in all centers, there are rules and expectations for behavior in those centers. Children must be told and shown exactly the type of behavior that is acceptable in the computer center.

Suggestions to allow all children access to the computer center:

- Have a sign-up sheet by the computer – the children sign-up for computer use during center time.
Computer Center Management

- Utilize the computer as one of the small group stations (each child will then have computer time during the week of small group rotation-this will encourage cooperation and sharing.)

Computer Center Management

- Use the computer for journal writing with the teacher during literacy groups or small groups. The children can use KidPix to draw their picture, the teacher types the child’s dictation and the picture can be printed to go into their journal or taken home.
Digital Camera Management

To use a digital camera within the classroom:

- First of all—ask your CTM where the cameras are stored and coordinate a time when you can check one out.
- Make sure the camera is charged or have new batteries.

Digital Camera Management

- Show your principal your pictures or projects and ask to check out a camera to keep in your classroom (you must have a locking file cabinet or some sort of secure storage for the camera). Be prepared to share if someone else in your building needs a camera.
Digital Camera Management

- Teach the children how to use the camera
  - Once again there are rules and expectations modeled for the children:
    - Use two clean hands to take pictures.
    - One person at a time takes the picture.
- You will need to designate one person per time period to take pictures—draw a name or a sign-up sheet.
- This is a teacher-facilitated activity especially for the first time or two.
- Solicit conversations about the pictures the children choose to take.
- Print them out so the children can relive the experiences.

This is the completion of Module 2—please respond on the First Class conference to the following questions:

You may highlight the questions using the text tool, copy, and then paste them into a First Class email to post on the conference. This will keep the questions in mind as you answer.
Questions

1. In reflecting on your computer center in your classroom—what questions do you have and do you think your computer center needs to be modified and how can you accomplish the task?

2. Does your computer center help the children accomplish the Prekindergarten Guidelines? (such as:
   - Starts, uses, and exits software programs
   - Uses a variety of input devices, such as mouse, keyboard, voice/sound recorder, or touch screen
   - Begins to use technical terminology, such as "mouse," "keyboard," "printer," "CD-ROM"

Give an example of something that the children can do in your classroom.

3. What is your opinion about letting the children use the digital camera?

Thank you very much for your time and participation.
Now that we have all this expensive technology equipment.....

How do we integrate the technology into the Prekindergarten curricula?
Technology Integration

The unique challenge of integrating technology into Prekindergarten is that the children are pre-readers and pre-writers, but technology can enhance classroom learning for Prekindergarten children.

Integration of technology in early childhood classrooms is described as viewing the computer and other technologies, such as the digital camera, as an everyday problem-solving tool used to accomplish practical objectives or goals. Using technology in ways to support children’s learning in a wide variety of curriculum areas is the integrated use of technology.

### Technology Integration

The software and capabilities of computers available (but not limited to this list) in Prekindergarten classrooms (availability is somewhat site based) are:

<table>
<thead>
<tr>
<th>Software (some are CD-ROM)</th>
<th>Millie’s Math House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumpstart Kindergarten</td>
<td></td>
</tr>
<tr>
<td>Sammy’s Science Place</td>
<td>Bailey’s Book House</td>
</tr>
<tr>
<td>Just Grandma and Me</td>
<td>Graph Club</td>
</tr>
<tr>
<td>The New Kid on the Block</td>
<td>Zoo Zillions</td>
</tr>
<tr>
<td>Arthur’s Teacher Trouble</td>
<td>Kidspiration (OS 10)</td>
</tr>
<tr>
<td>The Tortoise and the Hare</td>
<td>Math Carnival</td>
</tr>
<tr>
<td>Stanley’s Sticker Stories</td>
<td>The Animals!2.0</td>
</tr>
<tr>
<td>Let’s Go Read!1 An Island Adventure</td>
<td>Math Blaster</td>
</tr>
<tr>
<td>Let’s Go Read!2 An Ocean Adventure</td>
<td>KidPix</td>
</tr>
<tr>
<td>Dora the Explorer: Backpack Adventure</td>
<td>Clifford: Thinking Adventure</td>
</tr>
<tr>
<td>Dora the Explorer: Lost City Adventure</td>
<td>Gus Y Su Fiesta Del Pijama</td>
</tr>
<tr>
<td>The First Thousand Words</td>
<td>A to Zap!</td>
</tr>
</tbody>
</table>

### Technology Integration

Word Processing and Presentation Software:

- Microsoft Word
- Microsoft Power Point
- Microsoft Excel
- Microsoft Access
Technology Integration

Technology integration is incorporating technology into the classroom curriculum to enhance, reinforce, and bring together different discipline areas to achieve a total connection for Prekindergarten children.

Center for Best Practices in Early Childhood
www.wiu.edu/thecenter/

Technology Integration

The following examples are suggestions for activities that can be used for technology integration using a computer:
Technology Integration

The children drew pictures using Kidpix that were used as a slide show for Open House. The pictures went along with a Transportation study. They were asked what vehicle they would like to draw. After the drawing was finished, the teacher asked them “Tell me something about your vehicle.” The teacher took dictation, typed it into the picture and then the child recorded their dictation to go along with the picture (Sorry - Kidpix does not have the ability to export the recorded sounds to a format that we can access on this website).

Kidpix

We went to Disney World on the bus.

Elaine
We're going to see another boat.

My monster truck goes faster.
Kidpix

My Dad was driving my Blazer to school.

Technology Integration

Kidpix is a very easy to use, open-ended and interactive program that the children can use to draw and create.

Children interact by: creating images; making decisions about what to do next; reacting to what they've designed; and sharing their creations with others.

There are many opportunities for children to create drawings that demonstrate or apply curriculum-based themes, concepts, and/or skills.
Technology Integration

The Texas Prekindergarten Guidelines covered in this activity were:
Technology:
- Using software
- Using a mouse and voice/sound recorder
- Follows basic oral or pictorial cues for operating programs successfully
Language:
- Uses new vocabulary in everyday communication
- Links new learning experiences and vocabulary to what is already known about a topic
- Uses sentences of increasing length

The Kidpix slide show activity addresses ISTE NETS?S Standards for Students:
1. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies.
2. Use a variety of media and technology resources for directed and independent learning activities.
3. Communicate about technology using developmentally appropriate and accurate terminology.
4. Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning.
5. Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom.
6. Demonstrate positive social and ethical behaviors when using technology.
7. Practice responsible use of technology systems and software.
8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners.
9. Use technology resources (e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories.
The Kidpix slide show activity addresses ISTE NETS?T Standards for Teachers:

**III. Teaching, Learning, and the Curriculum**
Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers:
A. apply technology to develop students’ higher-order skills and creativity.
D. plan strategies to manage student learning in a technology-enhanced environment.

**V. Productivity and Professional Practice**
Teachers use technology to enhance their productivity and professional practice. Teachers:
D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

The activity also addresses SBEC Technology Applications Standards for All Teachers:

**Standard V.** All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.
Technology Integration

Microsoft Power Point is another program that can be used to facilitate shared reading in your classroom.

The following examples are shared reading experiences created because the teacher knew that the children did not have prior knowledge about certain topics.

Thanks go to Liza Huebner at Kookan for the shared books about space and the farm.

What can we see in space?
We can see stars.

We can see rockets.
We can see a space shuttle.

You may view the complete Shared Reading book on the website.

On the Farm

This shared reading combines use of clip art and digital pictures from a field trip along with sound bites. Double click on the sound button to hear the animal.
The cow says....

The pigs say ...
The rooster says ...

You may view the complete Shared Reading book on the website.

Technology Integration

The following is another shared reading book about Alive.

What is Alive?
Technology Integration

An elephant is alive.

Technology Integration

A butterfly is alive.
Technology Integration

An alligator is alive.

Technology Integration

A tree is alive.
Technology Integration

A flower is alive.

Technology Integration

A tortoise is alive.
Technology Integration

People are alive.

Technology Integration

Shared reading is everyone looking at the same print at the same time and reading together. If you have a presentation station, of course you could show the slide show on the screen and read with the children, but if not, put a computer monitor on a table so that a group of children can see and read together. You can print out a book so that everyone can take a book home.
Technology Integration

It is relatively easy to create these shared reading books. The hardest part is finding the pictures and clip art. You can use clip art found on Microsoft Clip Art and can download new clips from [www.microsoft.com](http://www.microsoft.com) (on the page you will see a topic Clip Art-click on it and then use the search tool to find new clip art). Check the clip art that you want and then click on download and it will download to your clip art gallery on your computer. *Ask your Technology Trainers for help if needed.*

Technology Integration

The Texas Prekindergarten Guidelines covered in this activity were:

Language
The child:
- Refines and extends understanding of known words.
- Begins to understand some basic print conventions.
- Begins to recognize the association between spoken and written words by following the print as it is read aloud.

*For the Alive and The Farm book*
- Identifies animals and plants as living things

*For the Space Book*
- Describes observations
Other Examples of Class-Made Books

This poem book was made with Kidpix.
Puff, went the wind!  
Out went the lights!  
Off ran the jack-o’-lanterns  
On Halloween night!

http://www.cobbk12.org/sites/literacy/fetc/
Shared Reading

The following shared reading example is on the Internet. It is available:

http://www.cobbk12.org/sites/literacy/fetc/

WEATHER
By Karen Friedman
It is cloudy.

It is snowy.
It is foggy.

It is rainy.
It is sunny.

It is a rainbow!
Technology Integration

Kidspiration is software that can provide tools to engage children in thinking. The following is a thinking map of the story of *A Pocket for Corduroy*. The teacher made a template using the software before using it with the children.

The story was read numerous times before attempting to get the children to retell the story. The children retell the story through questions by the teacher - the teacher assistant holds the book so the children can see the pictures and the teacher types in what the children dictate. The thinking map was made into a larger poster and the children drew a picture of Corduroy and his new pocket to display with the poster.
This next example of Kidspiration is a story map—obviously children did the writing, but for Prekindergarten, the teacher should type.
Technology Integration

To use the Internet with Prekindergarten children, a list of websites is on the PK Technology web page. Use the website you choose first to check out how it works on the computers the children will be using. Because of Internet security, an adult should help them with the website.

The Internet is a good place to help children find out more about a topic of interest—especially if you are doing a KWL chart. (K-What you know about a topic W-What you want to know about a topic L-What you learned about a topic—this is where the Internet can be of help) You might not always have access to a book about a subject, but there will be something on the Internet.

Some helpful Internet sites are posted on the webpage. There are also websites listed that the children can access to participate in activities.

Technology Integration

United Streaming is another option to find out more about a topic. AISD has a contract with United Streaming which gives teachers access to many videos. The videos can be accessed through the AISD website. You must have an ID and password and your Technology Trainers can help you with access.

The videos can be shown on a Presentation Station or on a computer monitor. Put the computer on a table so that the children can see.

To locate an appropriate video, use the search tools on United Streaming.
United Streaming

This is the login screen for United Streaming.

United Streaming

This is the results of a search “teeth” for K-2. There are many other topics that would help PK children with concept development. The videos are shown on the computer.
Technology Integration

The Software titles that are available in Prekindergarten cover many concepts and subject areas.

Check out one of the titles that your children have not accessed. Play with the software on the computer to find out more about what concepts the software is presenting. If you can't figure something out ask your technology trainers or you can email on the PK Technology conference or the PK conference your question.

This is the completion of Module 3—please respond on the First Class conference to the following questions:

You may highlight the questions using the text tool, copy, and then paste them into a First Class email to post on the conference. This will keep the questions in mind as you answer.
1. Respond to this quote:
   “New technologies are tools that enhance and add to existing ways to explore ideas, create, research, and disseminate new knowledge acquired in the classroom. They provide opportunities to engage students and to draw on their diverse learning styles (Yelland, 2007).”
   With the activities presented in this module in mind, what do you think this quote means for Prekindergarten teachers and students?

2. What do you feel are barriers to integrating technology into Prekindergarten curriculum?

*Thank you very much for your time and participation.*
Technology Integration in Early Childhood Classrooms
Module 4

By Leticia Graham

Technology Integration

This last module will focus on using the digital camera.
Technology Integration

"The primary literacy of the 21st century will be visual: pictures, graphics, images of every kind...it's no longer enough to be able to read and write. Our students must learn to process both words and pictures. They must be able to move gracefully and fluently between text and images, between literal and figurative worlds."

Visual Literacy: Learn to See, See to Learn
By Lynell Burmark

Technology Integration

The following are activities that can be accomplished in a Prekindergarten classroom using a digital camera.
Technology Integration

Take pictures in the first week of school so that you can use the pictures for name cards, cubby or locker pictures, and small group rotation.

Name cards

Ashley
Rotation Chart

Technology Integration

Prekindergarten Guidelines covered:
The Name Cards, Locker Labels, and Small Group Rotation cards will:
In Letter Knowledge—help the children to begin to notice beginning letters in familiar words.
In Personal and Social Development—begin to develop friendships with others. This will help them learn the names of the other children.
Technology Integration

The use of digital pictures to support learning addresses ISTE NETS?T Standards for Teachers:

Teachers:

B. use technology to support learner-centered strategies that address the diverse needs of students.

The activity also addresses SBEC Technology Applications Standards for All Teachers:

Standard V. All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

Technology Integration

The following activity is developing a Thinking Map using digital pictures. The teacher and teacher assistant took pictures during a pumpkin carving in the classroom. The activity also became a favorite class-made book.
Thinking Map for Making a Jack-o-Lantern

For the Thinking Map, the teacher used the pictures and guided the children through the process of sequencing. The teacher planned first how the Thinking Map would look so that the arrows drawn were correctly placed. The pictures were placed with tape first and then glued down.
Making a Jack-o-Lantern

First cut the top.
Making a Jack-o-Lantern

Seeds are inside.

Making a Jack-o-Lantern

You may view the complete book on the web page.

Get the seeds out.
Technology Integration

Another class-made book is The Gingerbread Man. This book and the Jack-o-Lantern book were made using Microsoft Word. We took the pictures, downloaded them to a computer, then copied and pasted them into a word document and used a text box to put in the words. We then printed it out and put it together as a book for the children to enjoy in the classroom library. Children who go to the classroom library each day during small group read these books over and over.

You may choose to print out the pictures to cut and paste into a book. You could add the text typed into Word and cut out to finish your book. Either way, you create a book that the children will love to read and find themselves in the pictures.

Class-Made Book

The Gingerbread Man

By Teacher A’s AM PK Class
We made a Gingerbread Man.

Raisins for eyes, nose, mouth, buttons, arms and legs.
“Don’t open the oven door!”

You may view the complete book on the web page.

Technology Integration

The Prekindergarten Guidelines covered in the making and use of the class-made books and the Thinking Map:

Technology:
- Begins to use technical terminology.

Language:
- Begins to retell the sequence of a story.
- Understands that writing is used to communicate ideas and information.
- Demonstrates an interest in books and reading through body language and facial expressions.

Science:
- Describes observations.

Social Studies:
- Cooperates with others in a joint activity
Technology Integration

The Making a Jack-o-Lantern activity addresses ISTE NETS?T Standards for Teachers:

Teachers:
A. apply technology to develop students’ higher-order skills and creativity.

The activity also addresses SBEC Technology Applications Standards for All Teachers:

Standard V. All teachers know how to plan, organize, deliver, and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

Class-Made Books

There are some good examples of class-made books on the Internet.

http://www.cobbk12.org/sites/literacy/fetc/
Technology Integration

An activity that helps parents learn more about their child’s activities at school is to take digital pictures. Take pictures of the activities that the children participate in during the day. The pictures were downloaded, copied and pasted into Microsoft Powerpoint.

Show the pictures to the parents during the beginning of the year parent meeting. The parents and children wanted to see the pictures more than once. This is a powerful way to let parents know what happens at school.

Slide Show

The children were very excited about their parents seeing the pictures of the activities at school.

The following is an example of a beginning of the year slide show:

The entire slide show is not included here.
Prekindergarten

Anywhere Elementary

177
Slide Show

The slide show activity addresses the following standards:
NETS?T Standards for Teachers:
A. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

Texas State Board for Educator Certification (SBEC) Technology Applications Standards for All Teachers:
Standard IV. All teachers communicate information in different formats and for diverse audiences.

Shared Book and Slide Show

Of course, taking pictures of special events (field trips, field day, performance for parents, etc.) can also help the children relive special experiences.

The following is a shared book (a slide show was also created for parents to see) for a Chinese New Year Parade.
Our Chinese New Year Parade

We had a parade.
We had a dragon.

We had shakers.
We had masks.

You may view the complete book and the slide show on the web page.

Shared Book and Slide Show

The Prekindergarten Guidelines covered in the making and use of the class-made book and the slide show:

Technology:
- Begins to use technical terminology.

Language:
- Enjoys listening to and responding to books
- Understands that writing is used to communicate ideas and information.
- Demonstrates an interest in books and reading through body language and facial expressions.
- Asks questions and makes comments related to the current topic of discussion.

Social Studies:
- Connects past events to current events.
Shared Book and Slide Show

The shared book and slide show activity addresses the following standards:

NETS?T Standards for Teachers:
A. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

Texas State Board for Educator Certification (SBEC)
Technology Applications Standards for All Teachers:
Standard IV. All teachers communicate information in different formats and for diverse audiences.

Technology Integration

Consider this, activities to integrate technology for Prekindergarten children are possible and like the chicken, you just have to cross the road to technology integration.
This is the completion of Module 4—please respond on the First Class conference to the following questions:

You may highlight the questions using the text tool, copy, and then paste them into a First Class email to post on the conference. This will keep the questions in mind as you answer.

Questions

1. What information do you need to integrate technology into your classroom curriculum?
2. How has this training modified your thinking about technology integration in Prekindergarten?
3. Describe your future plans for technology integration into your classroom curriculum.

Thank you very much for your time and participation.
APPENDIX G

TIMELINE OF THE STUDY
The following is a timeline of the events that brought about the ill-timed completion of the project.

- **August 2006**
  - Setbacks caused the need for a time extension appeal for completion of the dissertation
  - Composed Dissertation Proposal

- **December 2006**
  - Time extension was granted
  - Discussed with PK Director the approval from school district

- **January 2007**
  - Met with School District Associate Superintendent who would discuss the approval with Deputy Superintendent
  - Continued to compose and revise Dissertation Proposal, Web-based training and IRB Application

- **February 2007**
  - Approval was granted for the project by Associate Superintendent (notified by email)
  - Met with Instructional Technology Director
• March 2007
  o March 22, 2007 the approval letter was received from the Deputy Superintendent
  o Met with Instructional Specialist who would help post the training on a Website within the school district Web portals
  o Sent recruitment letter to prekindergarten teachers asking for their participation in the project

• April 2007
  o Web-based training and Website completed and ready April 8, 2007
  o IRB Application was turned in and reviewed

• May 2007
  o IRB approval was received on May 1, 2007
  o Dissertation Proposal Seminar May 8, 2007
  o Orientation Meeting with prekindergarten teacher volunteers where informed consent form and questionnaires were completed
  o Teachers who were unable to attend the meeting were contacted by the researcher to sign informed consent form and complete questionnaire (16 teachers out of 39 attended the meeting)
  o Observations began May 11 and were completed May 23, 2007
  o Further time extension for completion of dissertation was submitted
• June 2007
  o Teachers accessed the Web-based training and responded to questions via email
  o Data was organized for entry into statistical software
• July 2007
  o Further time extension was reviewed July 9, 2007
  o Pretest data was entered into statistical software
• August 2007
  o Further time extension was granted August 20, 2007
  o Chapter 3 was revised and Chapter 4 was composed.
  o New School Year began and teachers were notified of September 11, 2007 meeting
• September 2007
  o Meeting with teachers September 11 to complete questionnaires and discuss scheduled observations (17 teachers out of 34 were in attendance)
  o The researcher contacted the teachers who were unable to attend via email
  o Observations began on September 12 and were completed on September 20, 2007
  o Posttest data was organized and entered into statistical software and qualitative data was categorized by qualitative software
• October 2007
  o Chapters 3, 4, and 5 were completed
  o Dissertation Defense was accomplished on October 19, 2007
APPENDIX H

DESCRIPTION OF THE STUDY
Recruitment email for teachers to participate in the study:

Dear Prekindergarten Teachers,

I am writing you to invite you to participate in a research project. The project concerns technology integration into prekindergarten classroom curriculum.

At least 50 teachers are needed to participate. Please consider participating. From the willing volunteers, a group of teachers will be randomly selected to participate in a 4 module Web-based training. Another group will be randomly selected as the control group and will not participate in the Web-based training. Teachers in both groups will be observed in their classroom including a short 10-minute interview one time before the training and then another observation along with a short 10-minute interview will occur after the training. The training will be accessible at school or at home on a Website, and will not take more than 1 hour to complete - one module per week. At the end of each module, there are questions to answer and you will have access to a PK Technology conference on First Class to post your answers and add comments or questions.

We have a rare opportunity to add to the research to support prekindergarten. Our AISD Administrators support the project and are greatly interested in what we are accomplishing in prekindergarten. When the project is completed, I hope to share the experiences and research with all prekindergarten teachers.

If you would consider participating in the project, please reply to sender and tell me that you will participate. We will have a short orientation meeting soon where you will be asked to complete a short survey and will be introduced to the observers.

Sincerely,

Leticia Graham
REFERENCES


Determining what is worthwhile and looking for changes in daily teaching
and learning practices. *Journal of Technology and Teacher Education*,
14(1), 29-59.

25(35), Editorial Projects in Education: Bethesda, MD, 50-58.

Retrieved November 20, 2006 from
http://www.tea.state.tx.us/curriculum/early/prekguide.html

2006 from http://starchart.esc12.net/docs/0405Summary Date.pdf
or http://starchart.esc12.net/docs/20052006StarChartSummary.pdf.

June 6, 2006 from http://starchart.esc12.net/docs/TxTSC.pdf


Treacy, B., Kleiman, G. & Peterson, K. (2002). Successful online professional

*Teacher’s tools for the 21st century: A report on teachers’ use of
technology. (NCES 2000-102)*. Washington, DC.


