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## Teachers' beliefs and technology use in kindergarten and elementary classrooms

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### Abstract

With the increased availability of technology in today's schools, concerns arise over whether teachers are effectively incorporating technology tools into their instruction in order to advance student learning and engagement. This project was designed to examine the types of educational technology practices that kindergarten and elementary teachers in Denver, Colorado, USA, implement in their classrooms and their beliefs concerning the implementation of educational technology in their classrooms.

Teacher participants were interviewed to evaluate the types of technology they utilize in their lessons and their beliefs concerning the implementation of technology. The researcher found that teacher participants integrate a variety of technology into their classrooms. The results also showed that the participants are committed to utilize technology because they strongly believe that it benefits students. However, the results showed that there is a distinct difference concerning how technology is utilized in the classroom among the participants.

Keywords: teachers' beliefs, technology use, kindergarten and elementary students.

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## 1. Introduction

Our society lives in a vital technological age. Although this is technology century, it has been noticed among early childhood educators, parents and teachers that technology use for young children is becoming an issue (Ihmeideh, 2009) and our children are affected by technology tools in different ways. However, developing countries' response to technology utilization and implementation has been steadily on the rise (Abuhmaid, 2008).

According to Lengel and Lengel (2006) it has become a challenge for teachers to keep up with the rapid changes in technology in order to bridge the gap between technologies used at home and those used at school. The distance between schools and society seems to be increasing, since workplaces are moving rapidly towards extensive information, continuous communication, and complex multi-tasking, while some schools are still tied to pencils, paper, books, and tests. Furthermore, Lengel and Lengel (2006) point out that technology becomes attractive to students when it is used creatively and integrated fully into the curriculum.

Technology can improve the overall learning environment of schools and enhance the engagement of students so that they can feel more connected to school. Therefore, it is the intention of this researcher to use the following general questions to guide this project:

1. How are educational technologies being implemented in teaching kindergarten and elementary stages?
2. What are kindergarten and elementary teachers' beliefs concerning the implementation of educational technology in instruction?

### 1.1 Statement of the Problem

In our technologically diverse world, it is becoming increasingly important for teachers to implement technology into their curriculum. Researchers, educators, administrators, policy-makers, and parents are now searching for the best ways to integrate technology into classrooms in order to enhance teaching and learning (Li, 2007; Pedretti, Mayer-Smith & Woodrow, 1998).

Students now encounter a variety of technologies on a daily basis by using Facebook, Twitter, MySpace, fan forums, Wiki, BlogSpot, Podcast, instant messaging, Skype, iPods, email, and cell phones. Outside of school, in their homes and in the community, young people are becoming technologically aware. Students can rapidly become adept at taking advantage of social networking websites, electronic games, and locating information of all kinds (Parris, Fisher & Headley, 2009). Teachers should plan accordingly, to introduce and integrate technology into the curriculum to enhance the overall classroom environment and increase student engagement, motivation, and satisfaction. A technology-enhanced environment may have positive impacts on students' motivation if students work collaboratively without emphasis on social comparison (Hsieh, Cho, Liu & Schallert, 2008). However, it is unclear whether schools and teachers are keeping pace with students by engaging technology in the classrooms. In addition, there is limited research focused on teachers' beliefs concerning the integration of educational technology in instruction and specifically in the area of the kindergarten and elementary setting. This study examines educational technology practices used by kindergarten and elementary teachers and teachers' beliefs towards implementing technology in their classrooms.

## 2. Literature Review

Current research expressed concern about teachers' ineffective use of computer technology for instructional purposes (Heravi, 2009). Such studies suggest that a transformation in the behaviours of traditional teachers is necessary to increase the integration and use of new technology in the curriculum (Heravi, 2009). While governments, school administrations, and school boards continue to

support the provision of educational technologies, it is not clear the extent to which teachers integrate technology in the classroom (Hixon & Buckenmeyer, 2009).

A crucial question raised by Schaffhauser (2009) is, which comes first technology or pedagogy? In his article, titled *Which Came First - The Technology or the Pedagogy?* the author discusses how young teachers come to classrooms with more knowledge about technology and little knowledge about how to teach with it. Experienced teachers are not always technologically aware but have more pedagogical knowledge. The article also discusses "Technological pedagogical content knowledge (TPACK)" which is a term coined to emphasize three aspects that are essential to teaching with technology: content knowledge of the subject, the pedagogy associated with it and the technology used to deliver it.

Thus, this study will help understand the extent of education technology implementation in kindergarten and elementary classrooms and teachers' attitudes and experiences toward the implementation of technology. The literature that follows focused on some related literature concerning teachers' beliefs and perceptions and the practices of kindergarten and elementary teachers concerning the implementation of technology.

### *2.1 Beliefs and Perceptions*

Gorder (2008) explains that the "effective integration of technology is the result of many factors, but the most important factor is the teachers' competence and ability to shape instructional technology activities to meet students' needs" (p. 1). In her study, she discusses teacher perceptions of instructional technology and how they impact technology integration. This study explores how teachers are currently using and integrating technology for teaching and learning in the classroom. The study also examined teacher perceptions of uses and integration based on personal characteristics. This study compared the integration of technology based on gender, grade level taught, number of years teaching experience and other categories. The results of the findings showed that teachers use technology for professional productivity, and to facilitate and deliver instruction but do not integrate it well into teaching and learning. There is a significant difference in technology integration and use by grade level, with teachers in the secondary and high schools using more than those at the elementary and preschool level. Additionally, most educators face a digital divide and those that have learned to use technology are considered digital immigrants. The younger generation of teachers comes to teaching armed with technology but does not always have the knowledge of how to teach with it.

Palak and Walls (2009) conducted a mixed design study in the northern part of West Virginia that focused on examining the attitudes and beliefs of teachers concerning technology. This study was designed to answer these two questions: (1) how do teachers' beliefs relate to their instructional technology practices? (2) How do factors other than beliefs relate to teachers' instructional technology practices? This study consisted of only teachers who were currently using technology in their classrooms and who taught in technology-rich schools. This sampling was chosen to limit the influences of barriers such as lack of equipment, support, and teacher comfort levels with technology. There were 138 Pre K-12 teachers selected for the survey. This study showed that teachers have a positive attitude about educational technology but the level at which teachers use the technology varies. The level of technology use is influenced by teachers' educational practice beliefs. Teachers who were more favorable to teacher-centered learning did not view technology as having as big an impact on student learning as those who had student-centered learning beliefs. Teachers were comfortable with the technology and felt they had support from the administration if they had questions or needed assistance with hardware or software (Palak & Walls, 2009).

Teachers' perspectives of the use of technology seem to vary geographically. Akengin (2008) examined the use of information technologies in the field of social science in Turkey. He interviewed 20 prospective teachers who studied in a social science program. The results show that "prospective

teachers were acquainted with the computers, the Internet and overhead projectors the most, from among the information technologies and think that these technologies were utilized at schools and teacher training programs" (p. 126). The researcher concluded that technology is commonly used as a teaching tool to help enhance student comprehension and also different technologies are used in different situations.

Moreover, teachers in the Turkish study appeared less knowledgeable of and supportive of educational technology compared to the US teachers in Palak and Walls' (2009) study. Some interviewees were unable to provide a definition and use for information technology. The two most common uses of information technologies were computers and the internet. According to the participants, the disadvantages for using technology were "results in laziness in research, decrease in student participation, and it increases teacher prep time for a lesson" (p. 135).

## 2.2 Technology and Children

Researchers showed that technology tools isolate young children from their lives and their social behaviour or peer play (e.g., Barnes & Hill, 1983). Subrahmanyam, Kraut, Greenfield and Gross (2000) ensured that access to computers and its availability increases the amount of time that children spend in front of computer screens, thus exposing them to the risk of obesity. However, the research showed mixed findings regarding the advantages and the disadvantages of technology in general and computer use in particular.

There is different evidence about the effects of technology on children's friendships and family relationships as well as on loneliness and depression. Violent computer games may lead to aggressiveness and hostility (Provenzo, 1991). As a result, young children need to participate in sports and social activities instead of using computers and technology, which is a serious concern with regard to their physical well-being. Several arguments have been put forward about the heavy usage of new media and its negative effects on academic achievement, self-esteem and sociability of children (e.g., Roe & Muji, 1998; Heim et al., 2007; Tapscott, 1998; Drotner, 2001). Research in more depth is required in this area to help increase awareness in parents and childhood educators about the positive and negative effects of home and school technology in children's lives (Subrahmanyam, Kraut, Greenfield & Gross, 2000).

However, research studies have emphasized important benefits of exposing young children to technology and integrating it into pre-school curricula (Castellani & Jeffs, 2001; Haugland, 2000). In fact, integrating technology into the pre-school curriculum may produce positive changes in young children (Hutinger & Johanson, 2000), and enhance their social interaction (Dodge, Colker & Heroman, 2003). It was shown to improve their cognitive development (Nir-Gal & Klein, 2004), increase creativity (O'Hara, 2008), and improve their problem-solving skills (Sarama & Clements, 2001). In addition, technology increases children's self-concept and other learning development situations (Clements & Sarama, 2003), develops children's literacy skills (Lankshear & Knobel, 2003; Morrow, 2009), demonstrates increased levels of spoken communication and cooperation (Kariuki & Burkette, 2007), and may change children's approaches to learning (Downes, 2002).

In summary, the research is not conclusive with regard to technology use and the extent to which teachers implement technology and their attitudes towards the integration of technology in teaching. As the previous literature highlighted, there is a need to further examine the extent to which teachers integrate technology into their teaching. For the purpose of this study, this research focused only on school technology and the importance of implementing it in classrooms. Thus, it is important to find out the extent to which kindergarten and elementary teachers integrate technology in their classroom and their beliefs toward the integration of technology.

While studies such as this are useful for examining how kindergarten and elementary teachers are currently using technology in their classrooms, research still provides only a snapshot of what is

currently taking place in the field and more research on this issue would provide valuable insight (Lipscomb, 2003).

### **3. Methodology**

#### *3.1 The Researcher's Role at Site*

The research sites were comprised of 20 elementary schools and kindergartens in Denver, CO, USA. The researcher does not have any personal connections to these schools. After securing the schools' permission to conduct the study, the researcher contacted the teachers in order to collect the data.

#### *3.2 Research Questions*

This research study was guided by the following questions:

1. What are the types of educational technology practices that kindergarten and elementary teachers in Northern Colorado, USA, implement in their classroom?
2. What are the beliefs of these teachers concerning the implementation of educational technology in their classrooms?

#### *3.3 Sample of Participants and Research Site*

The study sample included kindergarten and elementary teachers. Twenty kindergartens and twenty elementary teachers were randomly selected from one educational district in Denver (n = 40), and were chosen for interview purposes. All teachers were females because all staff working in kindergarten and elementary settings in Denver, CO, were females.

#### *3.4 Data Collection and Analysis Procedures*

Data collection took place in Denver schools. Semi-structured interviews were used (see appendix A). This allowed the researcher to illustrate and describe the types of technology tools and teachers' beliefs toward integration of technology. The interviews were audiotaped and then transcribed. Data collection and content analysis were concurrent with writing memos and reflection on the interviews and developing the questions through collection of data, then transcribing verbatim.

Content analysis was used to identify the important patterns in the transcripts such as types of technology teachers use, and teachers' practices and beliefs in regard to technology. The analysis began with several readings of the interview texts to gain familiarity with the content. After that, phrases and/or statements of the content of each interview were assigned a code. After finding the essential themes, the transcripts, notes, and memos developed through the analysis process were reviewed to confirm that the essential themes had been captured.

#### *3.5 Establishing Credibility*

After the data has been transcribed, the transcripts were shared with the teachers as member checking to validate the accuracy of the information. In addition, peer review was used. Finally the researcher used quotes from participants' interviews to support the findings.

#### 4. Findings

The categories generated from the data analysis were organized by the major subjects of the interview schedule: the nature of using technology in kindergarten classroom and teachers' beliefs and opinions of technology practices. Here, the researcher made comparisons and contrasts between the teachers.

##### 4.1 *The nature of using technology in kindergarten and elementary classrooms*

Kindergarten and elementary teachers in this current study reported a variety of visions of the tools of technology use. They use technology for its efficiency such as creating tests and exams, grading, and PowerPoint presentations. In addition, 30 out of 40 teachers (75%) used computer and technology tools to facilitate their lessons and for presentation of information. Ten out of 40 teachers (25%) used PowerPoint for showing stories and teaching the letters in English language lessons and numbers in Math. Results indicated that 39 out of 40 teachers (99%) use a number of technologies in their classrooms such as the Internet, maps, the smart board, overhead projector, TV, video, web cams, and computers with different software such as, Microsoft Word, Excel spread sheets, and Google, to create the presentations and video clips.

Teachers also mentioned that students can use the computer to do their homework. Furthermore, they mentioned that a smart board is the most commonly used technology tool to lecture or present information, or to help students do their assignments, as evidenced in some teachers' responses:

One teacher said, "Every class will have a process of getting a classroom with a set of notebooks. That means every student has a personal laptop computer that they have in the classroom, and then in addition to that we have smart board technology which means they have [a] smart board hanging in front of class and my laptop is connected to the smart board, and then we use blackboard as well, as a way to hold assignments and things for students to access".

Another teacher said, "the kids have a notebook so every one of my kids basically has lap top and access to the computer every day so I use the smart board. I have click quizzes. I use blackboard so I post all my assignments online. I also do homework discussions online so either when I am not in classroom kids are more able to contact me on their assignments".

Another teacher summed up, "Technology is a great motivated tool for catching children's imagination and their attention."

##### 4.2 *Teachers' beliefs and opinions of technology practices*

Results indicated that half of the teachers (50%) in this study believe that high-level technology use is still surprisingly low. They use technology weekly to open up lessons and produce their work.

One teacher stated, "I don't use the computer every single day, as a routine, but I use them weekly. They do it. It depends on the assignment. They have access all the time and they are assigned a certain computer but they probably use an average weekly not necessary daily".

Additionally, other teachers indicated that training on how to integrate technology effectively was very useful. One of the teachers believes that using technology is important, but not all the time. On the other hand, she indicated that technology has many benefits for the teaching-learning process. It saves class time and minimizes teachers' efforts. As evidence she said:

"Technology is one of those things that can bridge the gaps for learners. You can teach them faster. They can make greater gain in a short period of time".

Thirty-nine out of forty teachers think that technology helps facilitate learning and teaching and builds student-teacher relationships. One teacher said, "I personally feel like there is a lot of student

teacher interaction. It is a positive participation, and these relationships with me are amazing, secure, and healthy. They are in a growth environment". Another added, "That's been very successful because it is a great way to review the lessons; it is a great way to reinforce what they have learned."

One teacher elaborated, "My children become excited about something new when I use technology." Another stated, "if you come to my classroom, you see children are engaged, then I feel like I am being successful because it really has to be student-centered."

However, one teacher continues to teach in traditional ways; using the computer as a tool to facilitate her teaching is still teacher-centered rather than student-centered.

#### 4.3 Summary of Findings

This section summarizes the major findings of this study:

1. All participants integrated computers and technology into their classroom using different tools: the smart board, Internet, maps, overhead projector, TV, video, and web cams.
2. Most participants developed a personal commitment to use computers and technology based on their positive beliefs that students get a benefit from using technology.
3. Three out of forty participants continued to teach in mostly traditional ways using computers and technology as a good tool to facilitate teaching and learning. They supported their comment that the children in kindergarten and first grade could not participate well through computer assignments and their participation is still low.

### 5. Discussion and Conclusions

The results indicated that teachers use a variety of technologies in their classrooms such as computers with different software, the Internet, and maps. These results are supported by Ertmer et al. (1999) who found that teachers' beliefs about the role of technology are related to how technology is used.

It has been found from the previous research and this study that technology is very important in facilitating the teaching process. According to Becker (2000), computers serve as a "valuable and well-functioning instructional tool" (p. 29) in schools and classrooms when the teachers have convenient access, are effectively prepared, have some free time in the curriculum, and hold their personal beliefs towards teaching.

Teacher training helps teachers change their beliefs and integrate technology in their classrooms (Matzen & Edmunds, 2007; Sandholtz, Ringstaff & Dwyer, 1997). Moreover, analysis of the data showed a positive interaction among the teacher, the student, and the technology in classrooms. However, the results indicated that technology usage is still low, which is consistent with the fact that high-level technology use is still surprisingly low (Barron et al., 2003; Newman, 2002; Zhao, 2007).

### 6. Study Limitations and Further Research

There are some important limitations of this study. First, the possibility of a sampling bias within this population, and the possibility that this population is not representative of the bulk of kindergarten and elementary teachers in different school levels. This must be kept in mind when interpreting the findings. More research is needed to explore how teachers in technology-rich schools are using technology on a daily basis. A further and deeper understanding of how kindergarten and elementary teachers are integrating technology into their classrooms will provide the novice teachers with effective models to improve their teaching and learning styles.

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