STUDYING PRACTICING KUWAITI KINDERGARTEN TEACHERS' ATTITUDES, KNOWLEDGE AND REPORTED PRACTICES REGARDING COMPUTER INTEGRATION INTO THE CURRICULUM

by

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Abstract

This study aimed to investigate the attitudes, knowledge and reported practices of Kuwaiti kindergarten teachers regarding computer use in the classroom. The study was completed using a mixed methods research design whereby both quantitative and qualitative data was collected and analyzed in two phases. In the first phase of the study, a sample of 174 practicing kindergarten teachers in Kuwait, obtained from 16 kindergarten schools, completed a questionnaire. In particular, these participants volunteered to complete a questionnaire that measured their attitudes, knowledge and practices regarding the use of computers in their classroom. In the second phase, in-depth semistructured interviews with six kindergarten teachers were conducted to investigate those teachers' in depth perceptions and personal experiences with computers in their classrooms.

Results from the questionnaires in the first phase of this study indicated that the majority of the participating teachers reported relatively positive attitudes and were knowledgeable regarding computer use in the curriculum. Contrary to what was proposed, however, the following independent variables were not statistically significant predictors of either teachers' attitudes or knowledge regarding the use of computers in their classroom: age, number of years of teaching experience, level of education, type of computer training, and ways of using computers. A significant relationship was found between computer attitudes and having access to a home computer. No significant relationship was found between teacher's knowledge and having access to a home computer.

Although the majority had a positive attitude toward and were knowledgeable about the use of computers, interview data analysis in the second phase of this study
showed that kindergarten teachers struggled to integrate computers into the curriculum and that they rarely used them in their lessons even though they perceived computer implementation to be beneficial to both teachers and children. The analysis revealed that teachers need more computer training, with other factors, to best integrate computers into the curriculum. The findings are discussed in terms of recommendations for practical applications and future research.
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Dedication

I dedicate this work to my parents. Without their support and prayers, this work would have been very difficult to achieve.

To my partner, love and the father of my three children, my husband Mohammad: without your help, patience and love I would never have completed and achieved my Doctoral degree.
Chapter 1

INTRODUCTION

1.1. Overview

We live in a world dominated by computer technology, and computers are everywhere: homes, stores, banks, libraries. Computers have begun to appear in schools, even at the preschool level. Since the early 1980s, the rate of implementation of computer technology into Canadian and American schools has grown exponentially (Armstrong & Casement, 1998). Clements and Swaminathan (1995) report that, "in the mid-1980s only 25% of licensed preschools had computers. Today almost every preschool has a computer and the ratio of computer to students has dropped from 1:125 in 1984 to 1:22 in 1990" (p. 275). In 2000, there was one computer for every five public school students (Mouza, 2003). Presently, almost 93% of all elementary schools in the United States have computers in their classrooms (World Almanac and Book of Facts, 2005). In the future, the use of computers in schools by young children is likely to become even more prevalent. Likewise, the implementation of computer applications into education has become an important educational objective in the goals for Kuwaiti public schools (Ministry of Education of Kuwait, 2001). The Minister of Education in Kuwait has recommended that computers be placed in all Kuwaiti kindergarten classrooms for the purpose of integration into the curriculum. "Computers in My Kindergarten" is one of the kindergarten themes that has been implemented into the Kuwaiti kindergarten curriculum since the 2000-2001 academic year.

Even though billions of dollars have been allocated to put computers into public schools in the 21 countries that they studied, the International Association for the Evaluation of Educational Achievement (IAEEA) found that the integration of computers
in education is a universal problem (Tubin & Chen, 2002). In addition, research findings indicate that computers are not fully integrated into early childhood classrooms (Wright & Shade, 1994), and early childhood teachers' knowledge about computers is not at a level that would support optimum computer learning opportunities (Specht, Wood, & Willoughby, 2002).

For some children, their first actual experience with computers begins in the early childhood classroom. Kindergarten teachers are important in this regard because they are the first to have early influences on how children learn in the classroom. Also, because many preschool children may not have extensive experience with computers, the teacher plays a significant role in teaching children how to use this technology. According to the literature, the success of the implementation of computers in schools depends on teachers and how effectively they integrate and use computers in their curriculum (Evan-Andris, 1996). According to Haugland (1995), there are four factors that are crucial for computers to have a significant impact on young children's learning. Three of these factors focus on the important role of the teacher in the computer-learning environment. In particular, these factors point to the importance of teachers' awareness of the potential benefits of computer use in the classroom, teachers' thoughtful placement of computers in the classroom and teachers' training on how to integrate computers into the early childhood curriculum. The fourth factor is the accessibility of computers in the early childhood classroom.

When using computers as a learning tool, research suggests that young students' learning and development strongly depend on their teachers' attitudes, skills and knowledge about computers (Haugland & Wright, 1997). It appears that a teacher's attitudes and knowledge regarding computer use with students may have a significant impact on him or her implementing (practice) such technology effectively into the
curriculum. Attitudes and knowledge teachers have regarding the use of computers in their classroom will also likely have an effect on a child’s first experience with computers. Because the integration of computers into schools may not be successful unless teachers themselves understand the value that computers can bring to instruction, understanding teachers’ attitudes, beliefs and knowledge regarding computers is important. Such understanding may foster the integration of computers into the curriculum (Akyurekoglu, 2002).

Educators regard teachers’ attitudes and knowledge about computer integration into the curriculum as major factors that affect their instruction in general and computer use with students specifically (Christensen, 2002; Specht et al., 2002). Christensen claims that if teachers have positive attitudes about the use of computers in their classrooms, as well as possess knowledge about computers and utilize developmentally appropriate programs, young children can benefit and gain knowledge from using computers. Likewise, understanding teachers’ beliefs is important to improving their teaching practices in using computers in their classrooms because “beliefs teachers hold influence their perceptions and judgment, which, in turn, affect their behavior in the classroom” (Pajares, 1992, p. 307). That is, in an attempt to understand teachers’ classroom actions (practice), researchers have examined teachers’ attitudes, knowledge and beliefs as major factors that influence their actual practices and behaviors in the classroom.

Studies on teachers and their use of computers tend mostly to focus on the factors that may influence teachers’ attitudes toward the use of computers in the classroom. A growing body of research indicates that the early childhood teachers’ academic preparation and experience with computers are important factors in successful computer integration into early childhood classrooms (e.g., Khine, 2001;
Landerholm, 1994; Powell, 1999; Powell & Lord, 1998; Rovai & Childress, 2003; Yildirim, 2000). Other studies find that teachers' beliefs and knowledge regarding computers, in-service computer training, teachers' computer access at home, age, and number of years of teaching experience are all factors that have their effects on teachers' attitudes toward computers, which in turn have their influence on their actual use of such technology in the classroom.

1.2. Purpose of the Study

This study aims to explore and quantify the attitudes, knowledge and reported practices of practicing kindergarten teachers in Kuwait regarding computer use in the classroom. It also examines factors that may have contributed to these attitudes and knowledge, and examine how teachers' attitudes affect their teaching. More precisely, the three goals are:

First, to examine practicing Kuwaiti kindergarten teachers' attitudes, knowledge, and practices regarding teaching children using computers;

Second, to examine any differences among kindergarten teachers' attitudes towards and their awareness of their knowledge of teaching children using computers as related to six selected variables: age, number of years of teaching experience, level of education, type of computer training, computer access at home, and ways of using computers; and

Third, to investigate kindergarten teachers' personal experiences and perceptions related to teaching children using computers and how these may have influenced their attitudes and knowledge.
1.3. Research Questions

This study addresses the following questions:

**Question 1** What attitudes do practicing kindergarten teachers in Kuwait hold regarding computers and teaching children using computers?

**Question 2** What knowledge do kindergarten teachers in Kuwait have about computers and computer use in a teaching setting?

**Question 3** How are computers used in the kindergarten classroom curriculum?

**Question 4** Do teachers with positive attitudes toward computers also have a strong knowledge of computers?

**Question 5** Do practicing kindergarten teachers' attitudes and knowledge regarding the use of computers in their classrooms differ by any of the following six selected independent variables: age, number of years of teaching experience, level of education, type of computer training, computer access at home, and ways of using computers?

**Question 6** What personal experiences and perceptions teachers have regarding teaching children using computers.

1.4. Significance of the Study

A study of practicing kindergarten teachers' attitudes, knowledge, and practices regarding computer use in their classrooms is important for several reasons. First, the scarcity of information on teachers' perceptions of their use of computers in the classroom and the level of skills, comfort or knowledge that early childhood educators have regarding computer technology is regrettable because it is the sort of evidence the Ministry of Education, curriculum developers and policy makers require if they are to determine the degree to which those kindergarten teachers have
successfully integrated computers, and the challenges they have faced in the process of this integration. In other words, the findings of this study will provide rich information and claims for discussion and arguments about how computers are currently used in early childhood classrooms and will point to areas that require modification and improvement.

Second, because of the limited body of research in the area of early childhood education and technology, this study contributes to the knowledge base by exploring the attitudes, knowledge, and practices of kindergarten teachers using computers in their classrooms. This study is a response to several calls for an investigation of early childhood teachers' attitudes, knowledge, and practices regarding the use of computers in their classroom (Derscheid, 2003; Isikoglu, 2002). Derscheid and Isikoglu suggested that more studies are needed to investigate the attitudes and knowledge of early childhood teachers in different early childhood classrooms, with different kinds of curriculum and program characteristics, and with different levels of teacher preparation and background for working with computers in early childhood settings. The knowledge gained from this study will have important implications for early childhood teachers on how to make effective use of computers with young children.

Third, because the integration of computers into Kuwaiti kindergarten schools is in its early stages, the findings of this study could well serve as a useful reference for kindergarten teachers and for the Ministry of Education in Kuwait. In addition, Amal Al-Ahmed (2005), a Kuwaiti Kindergarten Superintendent, indicates that since the application of computers in all kindergarten schools, little effort has been made and no studies have been conducted toward Kuwaiti kindergarten teachers' attitudes and knowledge regarding the use of computers in their classrooms. In addition, based on my literature review, there are no Arabic studies that have examined teachers' attitudes and knowledge regarding computer use in their classroom. Most of the studies are
conducted in Western countries, with the majority of these studies conducted in North America.

Fourth, international researchers would want to get a better sense of the attitudes and knowledge of diverse populations regarding computer integration into the curriculum and would benefit from this study. The findings would inform international researchers about teachers in Kuwait and how they perceive the integration of computers into curriculum. That is, this study hopes to fill the gap in the literature and to contribute to the multicultural responses that are not yet in the literature.

Fifth, some suggestions and recommendations given by teachers with different orientations toward computers and computer use in their classroom may also help to improve the use of computers in the classroom for other teachers. If a majority of kindergarten teachers believe that specific preparations and instruction are needed, then the Ministry of Education might take steps in considering such preparations.

Sixth, previous studies that investigated early childhood teachers' attitudes and knowledge regarding computer use in their classroom report different findings with regard to the factors that affect teachers' attitudes and knowledge. Therefore, this study may provide additional data to be used by others who are interested in enhancing the early childhood classroom with computers.
1.5 Terminology

For the purpose of this study, the following definitions of terms are used.

**Attitudes.** Collins, Downes, Griffiths, and Shaw (1973) describe attitude as: "a personality disposition affecting conduct and belief in relation to some person, institution, situation or other object, revealing itself, for example, in love or hate in degrees of intensity from person to person" (p. 14). This definition of attitudes reveals that attitudes influence the behavior and beliefs of a person toward any situation, issue or object. Attitudes can be positive or negative views of an object, person, or events.

**Knowledge.** The knowledge and skills which teachers can demonstrate while dealing with computer application in the classroom (Seels & Richey, 1994).

**Kuwaiti Kindergarten.** An educational institution separate from the elementary school, offering two levels of education where the first level enrolls 4-year-olds and the second level enrolls 5-year-olds. The kindergarten curriculum is based on the use of themes: "Computers in my kindergarten" is one of these themes.

**Computer Integration.** The use of computers as a tool to facilitate teaching and learning.

**Early Childhood.** Includes kindergarten children generally ages three to five years.

**Ministry of Education.** Established in 1962, the Ministry of Education is one of the largest ministries in Kuwait. The Ministry aims at updating and developing educational and teaching methods to ensure education to all citizens in Kuwait.

**Mixed Methods Study.** A procedure for collecting and analyzing both quantitative and qualitative data in a single study (Creswell, 2003).

**Sequential Explanatory Mixed Methods Design.** It is the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. The priority in this design is given to the quantitative data, and the two methods are integrated during the interpretation phase of the study (Creswell, 2003).
1.6. Organization of the Study

This dissertation consists of six chapters, references, and appendices. Chapter One has provided an introduction and the background needed for the study, the purposes of the study, research questions, a description of the possible significance of the study, and a definition of terms.

The second chapter outlines a review of the existing literature that relates to the study. In the first section of this chapter, a review of kindergarten education in Kuwait is described. The second section examines studies related to the implementation of computers into early childhood curriculum. The purpose of this section is to examine existing research and scholarly work on the integration of computers into early childhood classrooms in order to gain a better understanding of the concerns and possible uses and benefits to young children. An effort will be made to address the following: using computers to support development and learning by young children and using computers as tools in many areas of the early childhood education curriculum such as language arts, mathematics, and science. This is followed by discussing the current state of the integration of computers into early childhood classrooms. After discussing children and computers and the current state of computer use in early childhood classrooms, another important area to understand is early childhood teachers' attitudes and knowledge regarding computer use in the classroom, and factors affecting early childhood teachers' attitudes and knowledge regarding the use of computers in the classroom.

Chapter Three provides rich descriptions of the methodology and methods used for data collection and data analysis. Chapter Four presents the quantitative data collection and analysis. Chapter Five presents qualitative data analysis. The final
chapter discusses the conclusions and suggestions for future research.
Chapter 2

LITERATURE REVIEW

2.1. Overview

Morrison (1997) states that "teaching efficacy stems from teachers' beliefs and attitudes..." (p. 9). Given that teachers' attitudes and beliefs may influence their actions in the teaching/learning environment, the purpose of this chapter is to review the literature and examine practicing early childhood teachers' attitudes, knowledge and practices regarding computer use in their classrooms. I will also examine factors that may have contributed to these attitudes and knowledge, and examine how teachers' attitudes affect their teaching. In addition, the major findings that emerge from the literature on early childhood teachers' computer use in the classroom will be discussed.

More precisely, to clearly review the issue of teachers' attitudes, this chapter has been divided into six sections. To provide the reader with the needed background for the context in which I carried out this research, I begin with a description of kindergarten education in Kuwait. Then, the role of computers in the classroom and their effects on children's learning and development will be described. In the third section, a description of the current state of the practice of using computers in early childhood classrooms is discussed. This is followed by examining practicing early childhood teachers' attitudes and knowledge regarding computer integration into the curriculum to understand whether those variables (attitudes, knowledge) have any effect on teachers' actual integration and application of computers into the curriculum (practice and behavior). The final section is a summary of the review and synthesizes the major topics that emerge from the literature on early childhood teachers' computer use in the classroom.
As noted earlier, there has been no published research that deals with Arabic kindergarten teachers' attitudes regarding the integration of computers into the curriculum. Therefore, my literature review focuses on the North American context and that of some European countries.

2.2. Overview of Education in Kuwait

2.2.1. Demographic information

Kuwait is a small country on the eastern coast of the Persian Gulf, enclosed by Saudi Arabia in the south and Iraq in the north. As of July 2006, Kuwait had a total population of 2,418,393 people which included 1,291,354 non-nationals. Kuwaiti citizens are a minority of those who reside in Kuwait. The official language is Arabic, although English is generally understood. About 85% of Kuwait's population are Muslims. Kuwait also has a significant Christian and Hindu population (Wikipedia, 2006).

In the period prior to the discovery of oil in Kuwait (the beginning of the 20th century), education was limited to the teaching and reciting of the Holy Quran or the three basic Rs: reading, writing and arithmetic. The economic and social conditions at the time did not require more than this. Brisk trading and economic activity, however, changed all this and led to the establishment of the first school in Kuwait in 1911, the Al-Mubarkiya School, followed by the establishment of the Al-Ahmadiya School in 1921. Both schools, however, concentrated merely on arithmetic and correspondence. A more structured education system came into being in 1936, when a Council of Education was set up. In 1956, the government adopted a major education plan that divided formal education into four categories: Kindergarten, with duration of two academic years; Primary with duration of four academic years; Intermediate, with duration of four academic years; and Secondary, with duration of four academic years. All schools and
institutes, public and private, are subject to regulations formulated by the Ministry of Education and the Ministry of Higher Education. The Private Education Department of the Ministry of Education supervises all foreign schools in Kuwait, which must be registered with the Department (Kuwait Education Overview, 2006).

2.2.2. Kindergarten

The Ministry provides free kindergartens for Kuwaiti children between the ages of four and six. There are a large number of expatriate schools for expatriate children, aged between two and four years.

2.2.3. Elementary, intermediate and secondary education

Primary education is a right and is offered free of charge by the State. It is obligatory for all Kuwaitis from the age of six to 14 to attend school - primary school to the intermediate school. Attendance at schools run by the State is limited only to Kuwaiti children. Private schools for Arab expatriate children receive generous government support, land to construct schools, and free textbooks. Some assistance is also provided to non-Arab schools. Private schools for non-Arab children follow the curricula of their respective home country. The school year runs from about mid-September to mid-June. Expatriate schools usually have three days off in October; breaks of a fortnight each, twice a year; and all official holidays. The school week is Saturday through Wednesday. Most schools start at 7:45 am and finish at 2 pm, though timings vary a bit between summer and winter and between schools for different nationalities.
2.2.4. University and adult education

Kuwait University was established in 1966, with the aim of providing academic, professional and technical rehabilitation, and supplying the country with scientifically and practically qualified manpower in different fields. State-funded adult education and vocational training is provided by the Public Authority for Applied Education and Training (PAAET). Additionally, there are several private institutions in the country that offer a variety of full and part-time courses in various subjects such as business studies, secretarial skills, computing and languages.

2.3. Goals of Kuwait’s Kindergarten

The Committee on Kindergarten Curriculum Development, in the Ministry of Education, established ten general goals for the kindergartens of Kuwait. Following the most current objectives, the aims were defined as follows:

1. To help children gain religious beliefs and ideas.
2. To help children acquire a sense of belonging; to their family, society, the Arabian Gulf, the Arab nation, and the Islamic nation.
3. To promote strong self-esteem.
4. To help children acquire the means to be honest and positive in their relationships with adults.
5. To help children learn responsibility and independence.
6. To help children become aware of their physical needs, keeping their bodies safe and healthy. To practice healthy habits in playing, relaxation, sleeping, eating, and dressing. To be assisted in learning the habits of security at home, outside, and within the kindergarten.
7. To help children develop their five senses, develop control and appreciate the use of their bodies, and to develop a positive sense of self.

8. To help children acquire basic living capacities.

9. To help children extend their concern for and conception of their natural surroundings, dealing with it in a positive way.

(Ministry of Education, 2000).

These goals are reflected in the kindergarten curriculum, which is presented in the following section.

2.3.1. Kindergarten curriculum in Kuwait

The kindergarten curriculum is comprised of instruction and play. Children are taught about and through language, literature, arithmetic, natural science, music, art, motor skills, role-play, and creativity (Nashif, 1985).

Since 1976, theme teaching has been used in kindergarten education. Each theme used in Kuwaiti kindergartens runs for two weeks at a time. Throughout the school year the Ministry of Education plans the themes, and provides teachers with a "Teacher's Theme Manual" to help them plan or choose their lessons. The following is a list of themes designed by the Ministry of Education for the year 1999/2000:
Table 2-1  Kindergarten curriculum themes

<table>
<thead>
<tr>
<th>The First Level</th>
<th>The Second Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• My Kindergarten</td>
<td>• Computers in My Kindergarten</td>
</tr>
<tr>
<td>• Who Am I?</td>
<td>• Human Beings and People Work</td>
</tr>
<tr>
<td>• My Family, Relatives, and Neighbors</td>
<td>• My Food</td>
</tr>
<tr>
<td>• My Health and Safety</td>
<td>• Water and Air</td>
</tr>
<tr>
<td>• Water and Air</td>
<td>• Animals and Plants</td>
</tr>
<tr>
<td>• Animals and Plants</td>
<td>• The Four Seasons</td>
</tr>
<tr>
<td>• Sounds, Color, and Shape</td>
<td>• Islam is My Religion</td>
</tr>
<tr>
<td>• Cooperative Society</td>
<td>• Communication and Transportation</td>
</tr>
<tr>
<td>• Communication and Transportation</td>
<td>• Kuwait is My Country</td>
</tr>
<tr>
<td>• My Country Kuwait</td>
<td>• Petroleum</td>
</tr>
<tr>
<td>• The Sea</td>
<td>• The Sea</td>
</tr>
<tr>
<td></td>
<td>• Free Theme (Teacher/Student choice)</td>
</tr>
</tbody>
</table>

2.3.2. Kindergarten teachers in Kuwait

Two female teachers are assigned to each kindergarten classroom. They work together as a source of knowledge and guidance for children. Teachers must have a bachelor's degree from either Kuwait University or the kindergarten division of the Basic Education College, where teachers can major in kindergarten.

2.3.3. Computer use in Kuwait education

Integrating computers into the Kuwaiti educational system started in 1987 when the Ministry of Education started to implement computers in all secondary schools. In 1993, the Ministry decided to implement computers in all Middle schools. The implementation of computers into the Kuwaiti kindergarten schools started in 2001 (for more information of the project, see Appendix A). Thus, computer implementation is a relatively new event for early childhood education compared to other advanced countries. Therefore, addressing kindergarten teachers' attitudes and knowledge regarding the use of computers in their classroom is necessary at this stage.
2.4. Computers and Children in the Classroom

Navin and Mark are playing at the computer in their preschool classroom. Like the rest of their classmates, these four-year-old children fearlessly experiment with the computer as they navigate through the art program they are using. As they draw and paint on the computer screen, Mark and Navin talk about their creation. "Let’s try the stamps" insists Navin as they change the background color from white to green. “Okay, I want butterflies in our picture, and they have some in the stamp part,” Mark says. The two children work to negotiate additional elements of their project as play continues over the next fifteen minutes. Once the picture is complete, they print it out, show it to two interested classmates, and then take off for the block corner to engage in additional play. (Henniger, 2002, p. 478)

The scene described above is becoming more and more common in early childhood classrooms (Haugland, 1997) and the use of computers is growing, such that almost all preschools have computers. Currently, several complex issues influence early childhood education. All of these issues mirror the society we live in and all will affect early childhood teachers and young children’s education positively or negatively. These issues, as described by Krogh and Slentz (2001), are school entry age, inclusion of children with disabilities in regular classrooms, violence in schools, more or less structure in curriculum and instruction, and the integration of computers into early childhood classrooms. That is, one of the current curriculum issues influencing the education of young children is the integration of computers into the early childhood curriculum.

Despite the increased use of computers in early childhood classrooms, there are still arguments against the appropriateness of computer integration into preschool and kindergarten curricula (Alliance for Childhood, 2000; Armstrong & Casement, 1998;
Major concerns are focused on the impact of computers on the children's social and emotional development.

The potential benefits of computer integration into the early childhood curriculum, on the other hand, are supported by research (Haugland, 2000; Haugland & Wright, 1997; NAEYC, 1996; Svenson, 2000; Swaminathan & Wright, 2003). It has been reported that the use of computers by young children facilitates cognitive development by improving creative thinking and problem-solving skills and by improving their social interaction and language skills. For instance, Shade (1996a) concludes that "computer use with young children in early childhood has been shown to have major, positive impact on social, emotional, language, and cognitive development" (p. 43). Such integration involves using computers for supporting classroom themes and activities, increasing children's learning and development, and accomplishing the curricular goals in the classroom.

The National Association of the Education of Young Children (NAEYC), the leading accreditation organization in the early childhood field, supports the integration of computers in early childhood classrooms. In their position statement (1996) regarding the appropriateness of technology use with young children they argue:

The potential benefits of technology for young children's learning and development are well documented...the research indicates that, in practice, computers supplement and do not replace highly valued early childhood activities and materials, such as art, blocks, sand, water, books, explorations with writing materials, and dramatic play. (p.11)

In addition, the NAEYC's position statement emphasized seven important issues:
1. the essential role of the teacher in evaluating appropriate use of technology;
2. the potential benefits of appropriate use of technology in early childhood programs;
3. the integration of technology into the typical learning environment;
4. equitable access of technology, including for children with special needs;
5. stereotyping and violence in software;
6. the roles of teachers and parents as advocates;
7. the implications of technology for professional development. (p.11)

Overall, the use of computers as an integrated part of the early childhood curriculum was and still is supported by research findings as well as by early childhood institutions. Davidson (1989) stated that “the computer is seen as a material with many potential benefits and many potential problems. If it is used wisely, with the principles of early childhood development in mind, it can be a valuable addition to a developmental-based classroom” (p.12).

Using any new tools and materials in an early childhood classroom requires learning how these can be used to promote and facilitate growth in children's development. Computer technology is one of these new tools that have been used in almost every kindergarten classroom, but the use of this technology must meet the developmental needs of young children. That is, the integration of computers into the early childhood curriculum must be appropriate and meaningful for young children and must meet “the development levels, abilities, needs, and interests and the curriculum” (Essa, 1999, p. 208). This means that policy makers, program funding agencies, and teachers should be aware of child developmental principles when deciding how to
integrate computers into the early childhood curriculum. According to Essa (1999), curriculum that does not rely on the interests, needs, and abilities of the children is meaningless.

A large body of research on computer use with young children focuses mainly on the use of computers to enhance social, language, and cognitive development (Seng, 1998). Before implementing any new tool in early childhood classrooms, educators must first understand the potential effects of this tool on young children's development. One necessary ingredient for the success of computers as a new tool in early childhood classrooms is an understanding of the needs and developmental abilities of young children. Through this understanding, educators then make decisions about whether computers should be used with young children and what the purposes for such use may be. The following discussion is organized in terms of research on computer use and its relation to the following areas of young children's development: social-emotional, language, physical and cognitive.

2.4.1. Computers and social-emotional development

It has been claimed that "what is done for young children should be based on an early childhood curriculum that is grounded in a coherent child-development theory" (Hohmann, 1990, p.7). Taking this perspective into account requires that early childhood programs consider the processes children go through to acquire knowledge at different phases of development. One of the main concerns of the early childhood curriculum is children's social and emotional development (Essa, 1999; Hohmann, 1990). Relationships with other children provide the child with a sense of well-being and self-confidence that enable him/her to actively participate in classroom activities. Therefore, young children's social experiences have been the greatest domain for
researchers’ concern.

In spite of early concerns that computers would isolate children and cause them to have less interaction with other children (Alliance for Childhood, 2000; Armstrong & Casement, 1998; Barnes & Hill, 1983; Healy, 1998), research has shown that when working with computers in the classroom, children build higher levels of social interaction (Bergin, Ford, & Hess, 1993; Charles, 1998; Clements, 1994; Clements, Natasi, & Swaminathan, 1993; Davidson, 1989; Fitzpatrick & Hardman, 2000; Rhee & Bhavnagri, 1991; Romeo, Edwards, McNamara, Walker, & Ziguras, 2003; Svenson, 2000). In the classroom environment, “many activities can be done either independently or socially” (Davidson, 1989, p. 3). It is common to see children, for example, play and work alone at the computer, and it is not uncommon to see a child reading a book, drawing, listening to a tape recorder in a listening center, or constructing a block building alone. Contrary to the theory that computers encourage isolation, in Rhee and Bhavnagri (1991) study, they investigated social interactions between 18 four-year-old preschoolers who were playing with a computer with their peers. Children’s interactions while they played with a computer were videotaped for eight 45-minute sessions. The results showed that children have extensive social interaction with their peers when they play with a computer in the natural setting of a preschool.

From my experience working with first-grade students in the school’s computer lab, instead of isolating them, I found that children love to share their computer experiences with their teacher and their peers. As well, they helped each other when working together on a single computer in the classroom. Unlike when reading a book, drawing or sitting in the listening centre, using a computer in the classroom can encourage children to work together cooperatively. Research has shown that, when assigned computer-related tasks, young children engage in a greater amount of
collaboration than when using paper and pencil (Clements & Nastasi, 1993; Crook, 1998). According to Clements et al. (1993), "compared to more traditional activities, such as puzzle assembly or block building, the computer elicits more social interaction and different types of interaction" (p. 60).

In addition to its role in developing children's social interactions, computers promote positive attitudes toward learning and enhance children's motivation (Clements & Nastasi, 1993). Also, computer activities are shown to enhance self-knowledge and expression (Haugland, 1996). Howland, Laffey, and Espinosa (1997) conclude that use of the computer software, KidSim, motivated primary school students and they gained an awareness of themselves as producers and inventors.

Constructivism is a learning theory based on the idea that each individual learner constructs his or her own knowledge (Hein, 1991), and one of the main principles of this theory involves collaborative learning. That is, according to Hein, constructivist theorists claim that learning and development occur when students interact with the environment and people around them. It is possible that computers could encourage more interaction between students, but not necessarily so. Social interaction among the children working with computers in the classroom depends highly on the teacher. For example, some teachers prefer a quiet classroom with individual student work and limited student decision-making which would decrease interaction between the students (Friedman, 1991). Henniger (2002) states that the early childhood teacher is one of the most important factors that influence the development of social skills in young children.
2.4.2. Computers and literacy development

Language enables children to engage in both the cognitive and affective parts of the educational program (i.e., reading, writing, math, science). Through language, children can express their experiences, thoughts and feelings to others. Riding and Tite (1985) conducted an experiment with 60 four-year-old boys and girls whose first language was not English in two nursery schools to evaluate the use of a dynamic picture presentation in its effect to elicit a structured story form from young children. The researchers designed two versions of pictorial materials: static (picture on card contained the images of dogs, grass, sun, bowl and bird in the sky) and dynamic (the same images in the static picture were programmed as computer graphics). The children were asked to tell a story and were randomly assigned to three groups with 10 boys and 10 girls. These were: (a) a control group with no stimulus, (b) a treatment group with the aid of a static picture card, and (c) a treatment group with the aid of the dynamic computer presentation. The results showed that children tend to tell and write more elaborate narratives about computer graphics compared with a static picture or no stimulus.

Agreeing with Riding and Tite (1985), Davidson and Wright (1994) stated that computer play encourages longer, more complex speech and the development of fluency in young children. Kelly and Schorger (2001) investigated the amount of language 25 preschool children used as they interacted at the computer center and during their free play at traditional early childhood learning centers. The result indicated that the use of computers in early childhood settings promoted expressive language development when used as a self-selected learning center among many centers and activities in an early childhood classroom. According to NAEYC (1996), young children's
development is enriched through activities that expose them to a variety of learning opportunities, including those associated with the use of computers in the classroom environment.

Although there are positive research findings on the effects of computers on the children's language development, others such as Armstrong and Casement (1998), strongly argue against the use of computers with young children. They argue that "electronic books will lead to less attention being paid to the story itself and will therefore do less to develop listening and reading skills than the traditional activity of reading aloud" (p. 85). However, the majority of findings indicate that computers have the potential to enhance children's language and it depends on how well computers are used with young children.

2.4.3. Computers and physical development

A very important component of the early childhood program is developing young children's motor skills. Motor skill development involves large or gross motor movements such as running, jumping, climbing, dancing, etc. which occur on the playground or in the classroom and small or fine motor work, for example, that is required for holding a pencil, crayon, or playing with puzzles. It is said that children need to spend much of their classroom days moving and doing (Henniger, 2002). That is, young children learn best through using their bodies to explore the world around them. The use of computers like any other tools in the early childhood classroom can facilitate the physical development of young children.

On the other hand, opponents of using computers with young children expressed great concerns that this technology poses serious health hazards to children such as
obesity, eyestrain, and long-term physical developmental damage (Alliance for Childhood, 2000). When using computers, children must use their hands in a controlled, specific way to type on the keyboard, move the mouse, and use the joystick. Unfortunately, few studies have investigated the influence of computers on children's physical development. Children's enjoyment of computer software along with their desire to control the computer by using the mouse or keyboard, motivate them to use more careful hand motion and encourage them to exercise their small-muscle abilities (Davidson, 1989). In addition, Davidson and Wright (1994) claim that when children work on computers, they improve their fine motor skills and eye-hand coordination. When using a computer, children exercise their small muscles which leads to the development of their fine motor abilities.

When young children use computers, they are rarely using their large/gross muscle movements (jumping, running, dancing). This is a valid concern regarding the use of computers in early childhood classrooms. Not all early childhood activities support all developmental areas. For example, when children read, write, draw, and play with blocks and puzzles, which are key parts of early childhood education, children barely use their large muscle movements. To overcome this concern, early childhood experts suggest that early childhood programs contain a variety of activities that promote both fine and gross motor development (Bredekamp, 1993). That is, early childhood classrooms must not rely entirely on computers as the only activity in which children engage. Children must see their classrooms as offering a variety of activities, in addition to the computer, that they can choose freely.
2.4.4. Computers and cognitive development

The word *cognition* means "to know." That is, "cognitive development is the continuing process of learning about the world and all of its many components" (Henniger, 2002, p. 396). Young children learn about their environment best by constructing their own knowledge through manipulating materials and discovering facts, concepts, and relationships (Davidson, 1989; Henniger, 2000). Early childhood curricula develop children's cognitive skills by focusing on learning by doing, discovery, problem solving and decision-making. One of the major criticisms of the effects of computers on children's cognitive development is that computer use requires a level of abstraction that is not in the repertoire of most preoperational children (Armstrong & Casement, 1998). It is argued that children learn best while playing and physically interacting with materials such as water, sand, blocks and paint. Children will construct new knowledge and concepts and modify old ones while they are engaged in play. This interactionist model is supported by Piaget's (1952) cognitive developmental theory. Piaget's theory, known also as the constructivist perspective, says that learners benefit most from "concrete" experiences or hands-on activities that allow the learner to manipulate his/her environment in order to construct knowledge based on interactions with the world.

Like other concrete materials, children can use computers to construct knowledge. Computers have concrete components that could provide a match for some preschoolers' abilities (Hoot, 1986). Computers, for example, can stimulate children to construct and revise concepts (Davidson, 1989). However, constructivists raise an important concern regarding the development of knowledge and learning new concepts. Learning new knowledge depends on the level of activity. The activities must match the
child's ability (Hoot, 1986). For example, if the activity goes too far beyond a child's abilities, the child will become frustrated. On the contrary, if the activity is not challenging enough, the child will become bored and uninterested. According to constructivist theory, learning occurs if the concrete experiences and activities meet the child's interests and prior understandings.

Do children have the cognitive skills needed to use and understand computer software? One of the issues that is related to technology use with young children, according to the NAEYC position statement (1996), is that if it is used appropriately, computers can enhance children's cognitive and social abilities. "Appropriately" means using software that is both developmentally appropriate and age-appropriate, and which engages young children in creative play, mastery learning, problem-solving, and conversation (Haugland & Wright, 1997).

As long as computers are satisfying children's needs and meeting their cognitive abilities, then using computers will be one of many other appropriate and good activities that teachers might provide in their classrooms as learning tools. A large number of research studies conclude that computers have positive effects on children's cognitive development. Haugland (2000) emphasizes that when computers are integrated into the curriculum "children demonstrate gains in conceptual understanding, develop abstract thinking, increase verbal skills, and have gains in problem solving" (p. 14).

Early childhood curriculum is viewed by most professionals as "integrally tied to a concern for dealing comprehensively with 'the whole child,' the child's physical, social, cognitive, and emotional development" (Essa, 1999, p. 206). As discussed earlier, early childhood curriculum must be directly related to children and their developmental needs, and thus in order to successfully integrate computers into early
childhood curriculum, educators must be knowledgeable about children and familiar with theories of how children learn.

Educator Friedrich Froebel established the first kindergarten in Germany in 1836 (Essa, 1999; Henniger, 2002; Spodek, 1991) and greatly influenced the early American kindergarten movement (Essa; Spodek). Froebelian kindergarten, which means children's garden in German, was intended to follow children's nature and development through self-activity. According to Froebel, children learn through their contact with materials and activities (Spodek). That is, kindergarten programs must focus on the child's developmental needs and how the child can best learn. Froebel's kindergarten was centered on play and his program contained games, art activities, songs, blocks, stories, and finger plays (Essa).

Currently, early childhood curriculum places a strong emphasis on teaching the following cognitive areas: science, math, social studies, language arts (oral language, listening, writing, and reading), art, music, and physical education (Marzollo, 1987). These subject areas are integrated and studied in themes that children enjoy exploring such as the five senses, home and community, food, health, computers in my kindergarten and many more. Early childhood teachers organize activities and materials that support a theme or unit being studied. These activities and materials must support the development of the whole child physically, socially-emotionally, linguistically, and cognitively. Merrill, Hammons, Vincent, Reynolds, Christensen, and Tolman (1992) point out that using computers in the curriculum provides the opportunity to enhance reading, writing, music, science, and other subject areas.

In general, in order to successfully integrate computers into early childhood classrooms, it is essential to examine the impact that computers have on young children's cognitive development in the following curriculum areas: math, science, and
language. Such understanding may encourage all who care about young children to think deeply about computers and how to get the most out of such technology in order to best educate young children. The following discussion will focus on computers and their effect on math, science, and emergent literacy.

2.4.5. Computers and math development

Mathematics is one of the areas included in early childhood curriculum. Clements (2001a) and others believe that mathematics should be introduced to children in preschool. In the early childhood classroom, children develop cognitive understanding of mathematical concepts such as classification, seriation, patterning, number concepts, measurement, geometry, and problem solving which “are essential to future growth in the discipline” (Henniger, 2002, p.400). Unfortunately, many of us remember mathematical experiences as memorizing concepts and facts that lack connection to our real lives. In fact, mathematics is an exciting topic to study when taught from a constructivist standpoint. Grounded in the developmental theories of Jean Piaget and Lev Vygotsky, a constructivist approach to early education promotes the idea that children are active constructors of their own understanding of the world by directly manipulating concrete materials (Henniger, 2002). In the constructivist classroom, you usually see children as active learners. That is, children learn new mathematical concepts best through manipulation and making connections between mathematical facts and real situations in the world in which they live (Henniger).

Research concludes that computer use can raise mathematical skills and knowledge for young children (Clements et al., 1993; Clements, 2001a). With the ability to link pictures, words and numbers, kindergarteners learn about shapes more
effectively from a computer-based program than from a teacher-directed program (Clements, 1991). Through computer use, preschoolers learn about relational concepts such as above/below and over/under more effectively than learning from television (Clements, 1991). Furthermore, studies show that the use of LOGO (Papert, 1993) with young children promotes creativity and facilitates basic number sense. For instance, the use of LOGO computer programming develops a learning relationship between the size of the numbers and the length of a line drawn by a turtle (Clements & Samara, 1997). The development of mathematical knowledge can be also accomplished by using the Building Blocks software package that asks children to build a picture on the computer (Clements, 2001a). Using such software enables a child to perform tasks that could not be made while using the actual physical pattern blocks. Clements mentions that teachers can request the children to make a design using physical blocks, and then copy it onto the computer. In this way, the children connect the physical activity with the computer experience.

Clements (1991) provides guidelines for teachers to follow when considering using computers to teach young children mathematics:

1. Use software that challenges children to solve meaningful problems that can be integrated with children's non-computer mathematical experiences;
2. Combine software use with the use of manipulatives;
3. Use software that does what textbooks and worksheets cannot do. For example, it should help students connect multiple representations and use animation appropriately;
4. Use software that encourages multiple solution strategies;
5. Plan for children's developmental growth through the use of powerful
tools such as Logo (p. 119).

According to Clements' (1991) guidelines, children's learning of mathematical skills depends on several factors. First, children learn different skills depending on the software being used. For example, using drill-and-practice software leads to gains in certain rote skills but has not been appropriate in improving children's development of mathematical ideas (Clements & Nastasi, 1993). However, when using open-ended (LOGO) software that enables children to manipulate objects in the software and encourages solving mathematical problems through exploration, children can develop mathematical ideas and concepts (Clements & Samara, 2002). In addition, to gain the best benefits from computers, teachers must provide additional mathematical learning tools such as blocks, paint, books, stories, and many more.

2.4.6. Computers and science development

Just as mathematics is an important part of the early childhood curriculum, science is also important. The science curriculum in any early elementary classroom aims to provide, within the classroom learning environment, opportunities for exploration and understanding. Science education reform has emphasized the need for integrating computer technology into learning and teaching (Papanastasiou, Zembylas, & Vrasidas, 2003). In the last few decades, and because of its rapid spread into classrooms, special attention has been put on computer technology and its role in teaching our students at different grade levels.

Although this study investigated computer integration into early elementary science curriculum, the scope of the science literature review included the broader range of elementary and secondary education. Shields and Behrman (2000) concluded
that very little research exists on the effectiveness of computer applications for younger students in early elementary school or preschool. Hence, the following section takes a look at one study and explores whether the findings may be applicable to the kindergarten situation.

The potential benefits of technology for students' learning and development in science must not be ignored and are, in fact, well documented. Woolsey and Bellamy (1997) observe a number of relationships between current technologies and approaches to science learning. These include *observation and reporting* through the use of word processing; phenomena and media that can be manipulated using media technologies like digital cameras; analysis and mathematical capabilities supported by computer tools designed for this; and collaboration and networks that exist in web-based environments to connect people to resources. Moreover, there are a number of computer-based technologies that also contribute to science learning environments (Woolsey & Bellamy, 1997). Technology allows for calculation (spreadsheets), simulation (modeling dynamic data), data collection (compose, organize, distribute), imaging (scanners), writing (word processing), information access (CD-ROM), networking (synchronous/asynchronous communication), presentation of materials (projection), and portability (laptops).

Several examples are also given by Woolsey and Bellamy (1997) for how technology and pedagogy can be combined to create new scientific opportunities for students. The Multimedia Bulletin Board, a research project that was designed to explore how technology might facilitate inquiry, allows students to inquire about a topic through imaging and networking. Using the metaphor of a physical bulletin board, students, resources, and scientists are brought together via software and media and are motivated by inquiry-based learning. KidsNetwork allows students to network their
experimental observations with other classrooms and experts in the field. Portable laptops and video cameras enable students to go into the field to record data, input it, examine it, interpret it, and share their interpretations with others via networks. Simulation and imaging are possible, for instance, via Media Fusion that uses digital movies as the basis for conversations with people in other networks. A Visual Almanac provides students with image resources to explore everyday phenomena, and Cocoa helps students build simulations that mimic dynamic systems. Finally, the Science Learning Network creates a virtual learning community that includes teachers, museum educators, scientists and other resources and is able to distribute information resources in a networked environment.

The previous study emphasized the important role that computer technology plays in enhancing upper grade students' science learning. However, when thinking about kindergarteners and the benefits that they might gain in science from using the computer, early childhood researchers must take a serious look at this issue at their grade level. Indeed, more studies are needed on computer use with young children in general, and the effects that they may gain from such use in science specifically.

2.4.7. Computers and language development

Kindergarten curriculum focuses on pre-reading skills such as listening, stories, and language experience. Early childhood teachers can promote early literacy by engaging young children with storytelling, drawing and painting, and pretend play, activities that are critical in the development of both written and oral language (Novick, 1998). Studies have shown that children gain the most in terms of reading and writing as opposed to other subject areas when they are using computers.
The use of computers in the early childhood classroom plays a crucial role in children's literacy development (e.g., Borgh & Dickson, 1992; Cochran-Smith, Kahn, & Paris, 1990; Jones & Pellegrini, 1996; Kelly & Schorger, 2001; Liang & Johnson, 1999). Research shows that primary school children have exhibited improvement in their reading skills, letter recognition, and letter naming through the use of computers (Clements & Nastasi, 1993). Liang and Johnson's (1999) study concluded that computers encourage and facilitate children's literacy development through the use of computer-generated pictures, colors, animations and songs. In addition, the authors found that literacy actions (i.e., writing) were easier for children to accomplish with computers because it is simpler for children to type a word than to write it by hand. Word processors present additional advantages for children who are beginning to write words (Davidson, 1989).

Clements and Nastasi (1993) and Shilling (1997) report that computer word processors can provide critical support, or scaffolding, for young children's writing. In their case study of five-year-old children, Cochran-Smith, Khan, and Paris (1990) found that children's writing was facilitated and improved when they used a word processing program with help received from a coach, or helper. In contrast to paper and pencil, they found that when children write using a computer with a word processing program, they produced three times the length of what they would produce using paper and pencil. Beside the length of their pieces, their texts were more connected. They suggested that young children have a certain level of ability when they use pencil and pen. When working with computers, children's writing is more focused. The researchers were not sure which factor – the word processing program or the use of a coach – had a greater influence on the children's writing development.
According to Cochran-Smith and colleagues (1991) and Jones and Pellegrini (1996), there is a relationship between word processor use and the increase of social interaction among children. They reported that while children engage in social interaction, the writing emerged. That is, the potential effects of using a word processor on young children's written products could be related to the social context in which the writing occurs such as teacher and peer relationships. Accordingly, when researchers want to examine the effect of using a word processor on young children's literacy development, they must manipulate any variable(s) that might have an effect on the writing development.

In my internship experience¹ I reported on field research into first-grade students reading and writing. I focused on two first grade classrooms where the students ranged in age from 6-7 years. The number of students in each class was 18 and they came from different social, linguistic and ethnic backgrounds. Because research in the area of language development in young children focuses on both oral and written language, I focused mainly on literacy and teaching reading and writing with these students. One of the questions that helped to focus my internship experience was: Do students find learning to read and write through computers fun? Do they have difficulties? What is the teacher's role?

In order for these questions to be answered, I included primary source data from multiple sources such as:

¹The information is taken from my internship experience in Franconia Elementary School in Virginia State as a requirement when I was a Masters' student in the spring of 2003 in the United States.
1. Reflective journals of my experiences
2. Observations of teachers and children in the classroom
3. Interviews and questionnaire data with teachers and children
4. Resource and curriculum materials
5. Artifacts of children's work

In the two observed classrooms, computers were one of several learning centers in the classroom. The three computers were placed on one long table. Even though computers were supposed to be integrated into the curriculum, only one of the two observed teachers used the computer with her students. This classroom teacher used technology to have students practice word families, write sentences about specific topics, and draw. The teacher asked her students to write \( n \) words families (words starting with the letter \( n \)) on the computer and she told them to write a sentence for each word if they could. Because first-graders still need to become more skilled and familiar with reading and writing, and also need to become more familiar with how to use the computer, they just wrote the \( n \) words with some spelling mistakes, but could not write sentences.

Thus, I believe that the computers in this learning process did not play a role in developing the writing skills for these students. This particular writing assignment did not seem fit well with these first-graders' learning experience. The role that the teacher played in the learning experience was unenthusiastic. For instance, she did not indulge her students' enthusiasm when they wanted to use the computers to print some words.

During my study, the observed children were not interacting with their peers while working on computers. Children were asked to focus on their own computers and not
interact with others. Collaboration between students in the classroom is very significant, especially for struggling readers and writers. Some of the observed students were struggling with the task at hand and seemed to want to feel more engaged in the learning process when they use the computers to read and write. An active, engaged learning environment for all learners is crucial. The teacher could let two students, a struggling reader with a good reader, work together in using the computer to do their writing assignments. In this way, the learning interaction between these two students could have a positive impact on the student's learning skills, and the good reader may correct any mistakes that might occur in the sentence.

Interviews on using the computer were conducted with four children. The data showed that three children did not know the parts of the computer (keyboard, monitor, and mouse). Overall, they liked using computers in reading and writing activities. When I asked them why they liked using the computer, the following response was typical: “Because it is fun, you can draw pictures, write whatever you want, use the internet, play games.” However, one of the children said that he prefers writing on paper instead of using the computer. He said that he gets confused trying to find the letters because the keys are not in alphabetical order.

In addition, I interviewed the classroom teacher about her ideas on using the computer to teach reading and writing. The teacher said that it is a support tool for teaching reading and writing and it also helps children who do not speak English. For example, there are computer programs that have stories that highlight words and provide contextual definitions. She also added that they use several programs where children can look at the picture and pick up the sounds and the letter that goes with that picture. “So it's definitely a big support and it's also enrichment,” the teacher said.
In general, the children who used computers for reading and writing loved using the computer and they found it fun and enjoyable working with their peers and with their teacher. There are many computer literacy programs that teachers might use in the classroom. In addition, these programs provide children with reading and writing skills. Children could read and listen at the same time, and they could highlight the word and click on an icon that will tell them the word. Children generally love using such programs because they engage them in the activity, and because they have beautiful pictures and sounds. In short, to have a significant impact on children's learning, teachers have an essential role that they must play when integrating computers into the curriculum (See Haugland & Wright, 1997).

To successfully integrate computers into early childhood curriculum areas such as math, science, and language, and to have a significant impact on children's learning, educators must choose educational software that is developmentally appropriate. Developmentally appropriate software, according to Haugland and Ruiz (2002), empowers children to become active participants in their own learning, enables them to control the learning process, and construct concepts and knowledge through exploration, experiment, and collaboration with others. In contrast, “When children use non developmental software computers have no positive impact on learning and appear to cause significant losses in children's creativity” (Haugland, Bailey, & Ruiz, 2002, p. 191).

Those who argue against the appropriateness of computer integration into preschool and kindergarten curricula (Alliance for Childhood, 2000; Armstrong & Casement, 2000; Healy, 1996) focus on the negative impact of computer use on young children. Computer use by young children may have negative impact on them if
computers are used in non-developmentally appropriate ways with young children. The big challenge for teachers is to choose and find developmentally appropriate software and web sites that meet children's interests and needs and to integrate them into the curriculum that supports the way young children learn best.

The following are criteria adopted from Haugland and Ruiz (2000) that teachers can follow when choosing developmentally appropriate software for their young students:

1. Age appropriate,
2. Child in control,
3. Clear instructions,
4. Expanding complexity,
5. Independence,
6. Nonviolence,
7. Process orientation,
8. Real world models,
9. Technical features, and
10. Transformations. (p. 125)

Teachers, thus, play a crucial role in selecting appropriate software for their students that offers learning that depends on exploration and discoveries. To do so, they need training in software evaluation and how to select software that is developmentally appropriate.

This section has provided a brief overview of the use of computers in early childhood programs. The review has focused mainly on the relationship between computers and social-emotional, language, and physical development among children with a direct focus on the relationship between computers and cognitive development in math, science, and language arts. Should computers be used and integrated into early
childhood classrooms? This is a crucial issue that many educators continue to debate. I agree with those who do not see how computers could play a valuable role in the learning of young children when they see computers as a machine that does only word-processing and video game playing. However, computers can become an important tool that encourages young children to explore and discover if they are accompanied by a caring, knowledgeable teacher who chooses developmentally appropriate software, places computers on low tables, places two or three chairs in front of computers, encourages peer interaction, and provides books that support the theme. That is, computers could be one component of a diverse range of program offerings in early childhood education. The question, then, should be modified from whether computers should be integrated into early childhood classrooms or not, to a question that focuses more on how best they can be integrated into early childhood classrooms.

Computer use with young children in early childhood classrooms has been revealed to have potential to support children in all stages of development. That is, computers have a positive impact on social-emotional, language, physical, and cognitive development. Similarly, Haugland (2000) states that computers have many potential gains for kindergarten and primary children on the development of motor skills, enhanced mathematical thinking, and increased creativity. In addition, computers enhance children's self-concept, and children reveal growing levels of spoken communication and cooperation (Haugland & Wright, 1997).

The successful integration of computers in early childhood curriculum depends on the educator's knowledge about how young children learn (learning theories) as well as knowledge about how best to integrate computers into the curriculum to best meet the needs of young children (content and pedagogical knowledge). Indeed, knowing
how children learn, educators can provide developmentally appropriate integration of computers into the early childhood curriculum, and thus computers can become an important learning tool for young children.

When teachers use computers in appropriate ways, the computer does not cause segregation, and does not decrease social interaction and language development. When used appropriately, communication between the child and the teacher will be enhanced and will not change the activities and the environment of the classroom (Davidson, 1989). A large number of research studies focus on the effects of computers on children’s social and language development, however, more research is needed to explore and provide a better understanding of the potentials of computers for enhancing young children’s learning in curriculum areas such as mathematics and science.

I truly appreciate Dewey’s, Piaget’s, and Papert’s perspectives regarding how children learn best by doing, manipulating, and by thinking about what they do. Computers and other tools can be valuable facilitators of teaching young children if they are used with careful consideration of the child’s developmental needs. It is not the computer itself that affects young children’s learning, rather it is the software being used. Using software that encourages manipulation and problem solving is needed. In addition, “In practice, computers supplement and do not replace highly valued early childhood activities and materials...research indicates that computers can be used in developmentally appropriate ways beneficial to children and also can be misused, just as any tool can” (NAEYC, 1996, p.1). Early childhood teachers must be careful to not segregate children from other activities and materials when using the computer. Instead, computers must be one of several free options for children to choose. Teachers must not fully depend on computers in teaching young children nor can they
ignore the potential of computers.

One of the main outcomes of writing this section is enhancement of my own perception of computer use with young children. I am fascinated by the potential of computers for learning and teaching young children. Computers can make learning fun and enjoyable and at the same time they can make children learn through hands-on and concrete experiences. Computer software in early childhood classrooms can become another important tool for exploring, in more depth, the theme being studied. I am not saying that computers should replace other crucial early childhood materials such as blocks, water, art supplies, or other concrete materials. Rather, computers can be another tool that supplements learning and teaching for young children.

2.4.8. Developmentally appropriate practice and the use of computers

Early childhood educators know that curricula for young children should be based on what is known from research about child development and how young children learn (Essa, 2003). Such information enables teachers to plan environments and develop activities that more readily match young children's needs and characteristics. Such an approach is often referred to as developmentally appropriate practice (DAP) (Geist & Baum, 2005).

In 1985, NAEYC stressed the importance of providing children developmentally appropriate learning experiences and computers, like any early childhood resources, should be used in developmentally appropriate ways with children. In DAP environments, computers offer active learning experiences through which young children acquire and construct knowledge (Haugland, 2000).
To ensure that learning experiences when using computers are meaningful and relevant for the participating children, knowledge of the classroom environment and curriculum becomes very important. It is impossible for early childhood teachers to utilize computers successfully if their curriculum model does not welcome such a resource. For instance, in the Kuwaiti context, the kindergarten programs and curriculum are highly structured. As mentioned earlier, the Kuwaiti kindergarten curriculum focuses mainly on structured themes and schedule. That is, teachers are required to use a prepared curriculum consisting primarily of direct instruction in a specific time. In addition, the ways computers are being used in Kuwaiti kindergarten classrooms is limited to pre-selected software programs, independent work activities and game. As such, this may limit the ways in which individual teachers may be able to integrate computers in developmentally appropriate ways.

If teachers, administrators, and policy makers value active learning and DAP, as supported by NAEYC and other educational organizations, they would view computers as valuable resources for teaching and learning in integrated ways throughout the early childhood curriculum. That is, the educational philosophies and goals of the program have an essential role in the computer integration process, and these philosophies and goals shape the ways in which computers get integrated in early childhood classrooms in developmentally appropriate ways. This kind of computer integration would involve using computers in meaningful ways in mathematics, science, art, literacy, as well as in a pre-selected thematic unit.
2.5. The State of Computer Integration into Early Childhood Curriculum

In order to enrich school curriculum and meet the demands of the rapid introduction of information technology into the society, the Ministry of Education in Kuwait has recommended that new materials and perspectives be considered. "Computers in My Kindergarten" is one kindergarten theme that was implemented in the Kuwaiti kindergarten curriculum during the year 2000-2001 (Kuwait Ministry of Education, 2001). According to the Kuwait Ministry of Education, there are several justifications for integrating computers into Kuwaiti kindergarten classrooms:

1. Immense increase of the quantity of data, diversification of knowledge sources and appearance of new data containers depending on the computer, which necessitates that we provide children with necessary skills and knowledge so that they become acquainted, at an early age, to these characteristics of our present world;

2. Creating convenient circumstances encouraging the child to innovate, create and invent, in which the computer plays a major role;

3. Many kindergarten teachers have demonstrated major interest in computers by registering in training sessions concerning computers outside the Ministry, at the Kuwait Teachers Association, Kuwait University, Public Authority for Applied Education and Training and Kuwait Computers Association, as well as private companies in order to acquire and develop their computer skills; and

4. Flexibility of the programs and activities offered to kindergarten children and the formation of the semester, including different fields, which facilitates the possibility of adding computers to the activities in a smooth way without making significant change to the nature of the programs, but enriching them
and assisting their clarification and progress (Kuwait Ministry of Education, 2001).

Even though billions of dollars have been allocated to put computers into public schools, Norris, Sullivan, Poirot and Soloway (2003) state that computer integration into American primary and secondary schools over the past 25 years “has been essentially zero” (p. 15). In addition, research findings indicate that computers are not fully integrated into early childhood classrooms, and early childhood teachers' knowledge about computers are not at a level that would support optimum computer learning opportunities (Specht, Wood, & Willoughby, 2002).

Why are computers not being effectively used with young children? Research results are replete with evidence that early childhood and elementary classes are confronted by: 1) lack of access to computers, 2) high cost of hardware and software, 3) lack of teacher training and long-term support of teachers, 4) little or no use of computers by teachers, and 5) lack of teacher awareness of the potential benefits of computers. These are recognized as major factors that influence the successful integration of computers into the classroom (Haugland, 1995; Norris et al., 2003; Rovai & Childress, 2003; U.S Department of Education, 1996). That is, early childhood teachers may have limited exposure to computers and computer training for an educational setting, which will result in their limited use or avoidance of such technology in their classroom.

Computer integration into early childhood classrooms is reshaping early childhood teachers' lives in the classroom. Such integration brings with it new challenges for early childhood educators. According to the National Association of the Education of Young children (NAEYC, 1996), the leading accreditation organization in
the field of early childhood education, when used appropriately, computers can enrich children's cognitive and social abilities. In addition, the NAEYC adopted guidelines in 1996 for the use of computers with young children ages 3 through 8. These guidelines stated that early childhood teachers must be prepared to use computers; have an obligation to research critically the effects of computers on children; and must use professional judgment in evaluating curriculum materials, such as software and internet based resources. In addition, early childhood teachers are expected to provide students with computer skills and how to use this technology that will make them successful citizens in tomorrow's society (Kuwait Ministry of Education, 2000).

Likewise, the National Educational Technology Standards (NETS) created foundational technology standards for all teachers and students using computers in the classroom (Forcier & Descy, 2002). In its standards, NETS provides teachers and students with fundamental concepts and skills for applying information technology in the classroom. The Foundation Standards in Technology for All Teachers (Forcier & Descy, 2002, pp. 419-420) requires teachers to meet the following standards:

A. Basic Computer/Technology Operations and Concepts.

B. Personal and Professional Use of Technology.

C. Application of Technology in Instruction.

Even though years ago people expected that computers would take over many teacher tasks, now it is widely believed that computers in fact put more demands on the teacher than ever before. Such integration brings with it new challenges for early childhood educators. The problem is that most often computers have been placed into early childhood classrooms without any thought given to how teachers can and should be using this tool to teach the curriculum. The standards and guidelines provided from
the previous mentioned organizations require teachers to use the computer effectively with students and to use professional judgment in evaluating software and so on (Forcier & Descy, 2002; NAEYC, 1996).

Early childhood teachers are challenged to find ways to best use this learning tool to be of most benefit to young children. For example, teachers find it difficult to develop lesson plans that incorporate computers into their teaching. In addition, teachers may find it difficult to learn the mechanics of the software and hardware. These challenges and many others may have an effect on teachers' attitudes toward computer use and these attitudes may affect their actions and practices with computers in the classroom. Researchers regard teachers' attitudes and knowledge as the major factors that affect their instruction in the classroom in general and computer use with students specifically (Christensen, 2002; Specht et al., 1999; Specht et al., 2002).

2.6. Early Childhood Teachers’ Attitudes, Knowledge, and Practices Regarding Computer Use in Their Classrooms

Over the years, the attitudes of groups or individuals have been of interest in many empirical studies. Thomas and Znaniecki, as cited in Shrigley, Koballa, and Simpson (1988), used attitudes as a psychological concept in their work The Polish Peasant in Europe and America, which is considered a landmark for first considering attitude as a concept worthy of study. Bem (1970) defines attitudes as what people like or do not like. Attitude is seen as favorable or unfavorable feelings toward specific societies, persons, and/or objects (Koballa, 1988), and the general term "may be defined as a positive or negative affect toward a particular group, institution, concept, or social object" (Ary, Jacobs, & Razavieh, 1996, p. 239).

Attitudes are learned through experience. For example, according to Koballa
Babies are not born with attitudes toward snakes. They may be learned either actively or vicariously. Because attitudes are learned, they are susceptible to change, but they are not momentarily transient" (p.116).

Shrigley (1983) also sees attitudes as learned, but also involving cognition. Explaining the key elements, he says, "Attitudes predict behavior; the social influence of others affects attitudes; attitudes are a readiness to respond; attitudes are evaluative, therefore emotion is involved" (p. 439). There exists a consistency between an individual's attitude scores and his or her subsequent behavior (Koballa, 1988). The consistent relationship between attitude and behavior becomes obvious when researchers try to measure attitude as a means of predicting human behavior (Shrigley, Koballa, & Simpson, 1988). Because of this relationship, Wareing (1990) defines attitudes as learned predispositions to behave favorably or unfavorably to a given object, in this case to computer use, in a particular way and in particular situations. These predispositions are expected to occur between the stimulus and the response or behavior (Shrigley et al., 1988).

2.6.1. Attitudes and Knowledge

Teachers' attitudes and knowledge about computers are important factors that determine the type of uses that teachers make of computers in their classrooms (Davidson, 1989). Researchers agree that if teachers have positive attitudes about the use of computers in their classrooms, as well as possess knowledge about computers and utilize developmentally appropriate programs, young children can benefit and gain knowledge from using computers (Christensen, 2002).

That is, attitudes and knowledge are basically intertwined, with one affecting the other. For instance, increased knowledge about computers may result in a positive
attitude toward computers. On the other hand, a negative attitude may diminish a quest for increased knowledge by refusing to attend any computer workshops or refusing to listen to any advice or support regarding how best to integrate computers into the curriculum. Therefore, it would appear from this research (Christensen, 2002; Davidson, 1989; Davis & Shade, 1994) that both attitude and knowledge about computers can have an impact on teachers' practices and the use of computers in their classrooms.

2.7. Factors Affecting Early Childhood Teachers' Attitudes Toward Computer Integration into the Curriculum

Attitudes are learned from experience. They may be learned either actively or vicariously. That is, because attitudes are learned and not inherent, there should be external factors that have influences on what teachers have learned and therefore their attitudes toward the use of computers, which in turn affect the actual use of such tools in the classroom (Cummings, 1998; Derscheid, 2003; Ellison, 1993; Landersholm, 1994).

2.7.1. The pre-service experience

Because pre-service teachers are expected to use computers in their classrooms, several studies have been conducted for the purpose of investigating the importance of computer courses to the knowledge and attitudes toward computers of pre-service early childhood teachers. A growing body of research (e.g., Khine, 2001; Landerholm, 1994; Powell, 1999; Powell & Lord, 1998; Rovai & Childress, 2003; Yildirim, 2000) indicates that meaningful learning in computer courses in pre-service teacher education programs will improve teachers' knowledge and understanding of computer use in the classroom, making teachers better able to communicate and share this understanding with their students. In addition, pre-service teachers who are exposed to content and courses about computer use in the classroom can have their
attitudes positively influenced toward the use of computers in their classroom (Powell & Lord, 1998).

Powell and Lord (1998) investigated whether exposure to computer simulation programs affect computer knowledge and attitudes toward computers of undergraduate early childhood teachers who were enrolled in a teaching method course. The authors conducted an experimental study and surveyed 120 early childhood education students. The results showed that pre-service teachers who were exposed to computer simulation had more positive attitudes toward and greater knowledge of computers than those in the control group who were not exposed to such a program. This research suggested that in order for pre-service early childhood teachers to have positive attitudes toward and knowledge about computers, which will lead to the use of computers effectively in their classrooms, more training and more adequate computer programs must be offered to those future teachers in their undergraduate program.

2.7.2. The in-service experience

Unfortunately, computer training amongst practicing teachers has not been widely available for early childhood teachers in recent years. Early childhood teachers who are expected to use computers with their students have had little or no computer background in their academic preparation, and possess limited knowledge in computers. As discussed previously, research findings indicate that computers are not fully integrated into early childhood classrooms and early childhood teachers' knowledge about computers is not at a level that would support optimum computer learning opportunities. Moreover, recent research in early childhood education suggests that the classroom environment and educators' knowledge about computers are not at a level that would support computer learning opportunities (Specht et al., 2002).
Landerholm (1994) agrees with Specht et al point of view. Landerholm surveyed 110 preschool and kindergarten teachers in a 5-county area in and around the city of Chicago, Illinois, for the purpose of examining teachers’ attitudes, knowledge, and practices related to computer use in their classrooms. The results showed that over 92% of the teachers had positive or very positive attitudes toward using computers with their students. However, the majority of the surveyed teachers who were positive toward computers did not use computers in their classroom because they did not have the computer training support, computers in their classrooms, or consultation to help in getting started to use the computer with their students. Most of the teachers who were using computers in their classroom had learned what they knew on their own or by attending classes and workshops on their own.

Although the definition of attitude emphasizes that attitudes directly influence actions, this is not always the case. Even though the teachers did not have any experience with computers, in-service professional development, or computer courses at university, this did not affect their attitudes which were positive toward computer use in their classroom. Just because teachers have positive attitudes toward computer integration into the classroom does not mean that this positive attitude impacts positively the integration of computer into early childhood classrooms. Likewise, just because teachers are knowledgeable about computers does not guarantee that the computers will be used. That said, the research suggests that teachers lacking experience (in-service or pre-service) with computers do not change their attitudes, ideas and views regarding the integration of computers into the classroom.
2.7.3. Computer access at home

Nowadays, most teachers have access to computers at home. In his study on 114 teachers, Yildirim (2000) found that 90% of the teachers reported owning a home computer. Sexton, David, King, and Nina (1999) found that the majority of prospective early childhood teachers had positive attitudes toward computers and computer use in the early childhood classroom. The study showed that there was a significant relationship between the attitudes of the teachers and having access to computers at home.

Similarly, in their study on factors that affect the opinions of teachers toward computers, Tsitouridou and Vryzas (2003) surveyed 107 early childhood teachers enrolled in a two-year in-service program in Greece to examine whether teachers' attitudes toward computer use are differentiated by a series of factors, such as in-service training, years of teaching experience, use of computers at home, and experience with computers. The results showed that the majority of teachers had positive attitudes toward computer use. In addition, there were significant influences of computer use at home, previous experience with computers, and in-service training on teachers' attitudes toward computer use in the classroom.

In general, teachers who use and own computers are more likely to exhibit favorable attitudes toward computer use in the classroom. That is, teachers who have previous computer skills through use of their own computers, tend to show lower levels of anxiety and concern regarding computer use. However, the research suggests that early childhood teachers in general do not know how to use computers in their classroom and do not know what children can do with the technology. Thus, more studies must be conducted to measure early childhood teachers' attitudes toward and knowledge about and practices regarding computer use in the classroom.
2.7.4. Other factors

There are other factors that might contribute to the attitudes of teachers toward computer use in the classroom. In 1988, Davis (as cited in Derscheid, 2003) studied early childhood teachers' attitudes toward computer use in early childhood classrooms. The results of the questionnaire indicated that the majority of the teachers had positive attitudes toward computer use in the classroom. Significant differences were found between the teachers' attitudes and their age, number of years of teaching experience, amount of computer training, amount of computer experience, and prior instructional computer use.

Five years later, Ellison (as cited in Derscheid, 2003) also found that the majority of early childhood teachers had positive attitudes toward computer use in the classroom. This study, however, found that there was no relationship between teachers' attitudes and number of years of teaching experience or level of education. The study also found a relationship between early childhood teachers' attitudes and the type of computer training they had received: "Those who had received training from college or university appeared more positive than those who had received in-service training or those who were self-taught" (p. 8).

Another study surveyed 60 elementary school teachers who taught kindergarten through fifth grade and investigated their knowledge, level of computer usage and instructional preparation (Cummings, 1998). The results indicated that the majority of the teachers stated that they do not like to teach with computers. They attribute time to be the greatest barrier to their successful integration of computers.

Because attitudes are learned, the social influence of others is integral to the process of using computers in the classroom (Shrigely et al., 1988). That is, society, Ministries of Education, superintendents, principals, other teachers, parents and others
may put pressure on early childhood teachers without any concern for their personal beliefs, knowledge or attitudes regarding computer use in the classroom. When pressured, people can respond with resistance which may lead to ineffective integration of computers.

As discussed above, several factors may affect teachers' attitudes toward the use of computers which would result in their actual use of computers in the classroom. Researchers must conduct more research to study the dominant as well as other factors that may influence early childhood teachers' attitudes toward computer integration into the classroom in general and Kuwaiti teachers specifically.

2.8. Summary of Research Findings
My review of the literature suggests that there are five particular areas that merit focused investigation. First, the findings of previous studies point to a need for further investigation of how teachers use computers in the classroom and how teachers' knowledge, beliefs and attitudes regarding computer use might affect their practice.

Second, despite an increased interest in computer use with young children, it is surprising that so little empirical research has actually been conducted on the topic. "At present, little is known about the level of skills, comfort or knowledge that early childhood educators have regarding computer technology" (Specht, Wood, Willoughby, 2002, p. 2). Generally speaking, research related to early childhood education has not grown compared with other areas of educational practice (Saracho, 1993).

Third, early childhood teachers' attitudes toward computers and computer use in their classrooms are generally positive. However, the factors that influence the direction of teachers' attitudes are varied (i.e., pre-and in-service computer training, knowledge, experience with computers, experience of teaching, teachers' age). These findings
indicate that it will be difficult to make any generalizations about the factors that most
influence teachers' attitudes toward computer use in the classroom.

Fourth, the literature review shows an obvious dearth of research utilizing
qualitative methods for examining early childhood teachers' attitudes, knowledge,
beliefs, and perceptions regarding the use of computers. Mostly, the previous studies
used quantitative methods such as questionnaires to investigate the teachers' attitudes
toward computers. According to Seidman (1991), the attitudes of teachers are
influenced by values, beliefs, expectations, and life style that may not be
understandable through the use of questionnaires alone. Therefore, there is a great
need to conduct research using both quantitative methods, such as closed-ended
questionnaires, and qualitative methods, such as interviewing and/or observation when
collecting data in order to explore the issue more in-depth, which has the potential to
enable readers to place more confidence in the findings.

The rationale for using a questionnaire in this study is that the population with
which I conducted the study is a unique one. There are two exceptional things about my
study. First, as mentioned earlier, the majority of the questionnaires that I have come
across have been done with North American and some European populations; no single
study has focused on Arabic teachers and their attitudes and knowledge regarding the
integration of computers into their classrooms. Even international researchers would like
to get a better sense of this other culture and would like to know what Arabic teachers
think and believe about the integration of computers into their classrooms and how they
are responding to computers in their classroom. That is, this study will contribute to the
much needed multicultural responses that as yet are not in the literature. Second, in the
reviewed literature, the surveyed population are often teachers who might use
computers, or could use them or who were thinking of using them in the future but there
seems to be a limited number of teachers who were currently using computers in their classrooms. That is, in this study I used questionnaire and gathered information from a population who actually are using computers in their classroom. In addition, this population is using the same theme “computers in my kindergarten”, a common curriculum to which they can speak.

Fifth, despite the curricular mandate to integrate computers at all levels of Kuwaiti public education, to date, no study has examined the teaching practice of kindergarten teachers and their attitudes toward computer use in the classroom. Therefore, base line investigations of Kuwaiti kindergarten teachers’ attitudes, beliefs, and knowledge regarding the use of computers in the classroom is needed.
Chapter 3

Research Method

3.1. Overview

This chapter outlines the procedures and methodology behind this investigation. This study was undertaken to provide answers to the following research questions:

**Question 1** What attitudes do practicing kindergarten teachers in Kuwait hold regarding computers and teaching children using computers?

**Question 2** What knowledge do kindergarten teachers in Kuwait have about computers and computer use in a teaching setting?

**Question 3** How are computers used in the kindergarten classroom curriculum?

**Question 4** Do teachers with positive attitudes toward computers also have a strong knowledge of computers?

**Question 5** Do practicing kindergarten teachers’ attitudes and knowledge regarding the use of computers in their classrooms differ by any of the following selected independent variables: age, number of years of teaching experience, level of education, type of computer training, computer access at home, and ways of using computers?

**Question 6** What personal experiences and perceptions teachers have regarding teaching children using computers,

This chapter is organized as follows: description of the methodology with justification of the methods that were employed, participants involved, data collection and data analysis procedures.
3.2. Justifications for Integrating Quantitative and Qualitative Methods

To answer the research questions, a sequential explanatory mixed methods research design was employed. Creswell (2003) defines this research design as the collection and analysis of quantitative data followed by the collection and analysis of qualitative data to help explain or elaborate on the quantitative results. The priority in this design is given to the quantitative data, and the two methods are integrated during the interpretation phase of the study. This design is also called a two-phase model (Creswell).

I employed both quantitative and qualitative research methods for this study in order to fully investigate teachers' attitudes, knowledge and experiences regarding computer use in Kuwaiti kindergarten classrooms. As Patton (1990) suggested, the advantages of using a quantitative approach in my work was to measure the reactions of a great many teachers to a limited set of questions and to understand relationships. By contrast, as Patton (1990) mentioned, the use of qualitative methods in my study was to produce a wealth of detailed information about a much smaller number of teachers and cases.

Several researchers applied mixed methods research to answer their research question(s) (Gogolin & Swartz, 1992; Shepard & Smith, 1987). These studies, among others, suggested that the combination of quantitative and qualitative methods is more useful in helping researchers gain powerful information than using each method separately. That is, using both quantitative and qualitative methods in a single study expands an understanding from one method to another, and confirms the findings from multiple data sources (Creswell, 2003). The main goal for me using mixed methods research is to benefit from the strengths of both quantitative and qualitative research, and to minimize the weaknesses of each method (Johnson & Onwuegbuzie, 2004).
Generalizability is a concern for qualitative researchers. According to Johnson and Onwuegbuzie (2004), findings resulting from qualitative research may not be generalizable to other people in different settings. That is, the external validity of the findings is seen by Marshall and Rossman (1999) as a weakness in qualitative research. The use of mixed methods in my study may solve this problem. That is, I can use the strengths of a quantitative design (e.g., generalize data to a larger population) (Harrison, 2001) to overcome the weaknesses in a qualitative design (e.g., findings cannot be generalized to the population) by using both designs in a single study (Johnson & Onwuegbuzie, 2004). Another advantage of using a mixed method in my study was that one data set can add meaning to another data set. For example, in my study the qualitative data such as teachers' words from the interviews can be used to explain and give more meaning to numbers from the questionnaires (Johnson & Onwuegbuzie, 2004).

That is, to fully understand the phenomena or certain topics and certain questions about young children (i.e., computer use with children), early childhood researchers may want to utilize both methods (quantitative and qualitative) to help make sense of the topics or questions being investigated. The use of mixed methods would generate both narrative and numerical data which can yield valuable knowledge to advance understanding of early childhood education.

In summary, the fundamental rationale for me using mixed methods research was to understand the phenomena more fully, and to deepen our understanding of the issues being studied. Thus, the integration of research methods may lead to a greater holistic interpretation of situations, and in the case of the current study, teachers' attitudes, knowledge, and practices regarding computer use in their kindergarten classroom. The methods that I have elected to use for this study are questionnaires,
and an interviewing approach. The questionnaires responses are to be analyzed quantitatively whereas the interview data is to be analyzed qualitatively. With the stance that quantitative and qualitative methods together will provide the clearest picture of an existing condition, the following section details the particulars of the study including participant selection, instrumentation development and data analysis protocols.

3.3. Participants

3.3.1. Questionnaire participants

The study's target population is practicing kindergarten teachers in Kuwait with diverse teaching experiences. According to the latest statistics from the Kuwait Ministry of Education (2006), 2,717 teachers work as kindergarten teachers, of whom 1,717 teach kindergarten second level, in 172 kindergarten schools serving 38,656 Kuwaiti children. A total number of 174 teachers in 16 schools, all of them female, participated in the study.

A purposive convenience sampling strategy was used for this study. According to Patton (1990), "The logic and power of purposeful sampling lies in selecting information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research" (p. 169). In addition, I used a convenience sampling because it was impossible to select teachers from a larger group. In addition, the lack of time and money for a large-scale study was another reason for choosing this type of sampling.

While this type of sample (i.e., convenience) made it easier to conduct my study, there is one important limitation. There is no precise way of generalizing from the sample to any type of population. That is, the generalizability of my findings will be
limited to the characteristics of the teachers who participated. The findings of this study will be valid for teachers similar to those studied. Although I was not able to employ random selection, the characteristics of the participated teachers match those of the population. The inclusion of schools from all six Kuwaiti school districts should ensure a fair representation of the Kuwaiti school population.

The response rate was very high for the current study. Out of 17 schools that were contacted, 16 schools from the six districts returned their questionnaires. A total of 230 questionnaires were distributed across the 16 schools, of which 200 were returned. Among this number, 26 questionnaires were returned as empty questionnaires which were not used. Excluding this number of empty questionnaires, a total number of 174 was obtained. That is, data of 174 teachers (from 16 schools) were deemed acceptably completed.

Table 3-1 displays the sampling plan that I employed for my study. It contains the average number of teachers for both the sample of the study and the Kuwaiti kindergarten population organized by districts.
Table 3-1  Sampling plan for sample's and nation's kindergarten teachers district by district

<table>
<thead>
<tr>
<th>Districts</th>
<th>#Schools Participating</th>
<th>Sample #Teachers participating</th>
<th>Total Population of Teachers in the Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Aasima</td>
<td>3</td>
<td>39</td>
<td>301</td>
</tr>
<tr>
<td>Hawaii</td>
<td>4</td>
<td>47</td>
<td>426</td>
</tr>
<tr>
<td>Al-Farwania</td>
<td>4</td>
<td>40</td>
<td>330</td>
</tr>
<tr>
<td>Al-Ahmadi</td>
<td>2</td>
<td>28</td>
<td>201</td>
</tr>
<tr>
<td>Al-Jahra</td>
<td>2</td>
<td>27</td>
<td>289</td>
</tr>
<tr>
<td>Mobarak Al-Kabeer</td>
<td>1</td>
<td>10</td>
<td>170</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>174</td>
<td>1,717</td>
</tr>
</tbody>
</table>

3.3.1.1. Teachers' demographic information

The demographic information about the participating teachers was obtained through a demographic questionnaire that the teachers completed for the current study. The teachers that participated in this study were kindergarten teachers who teach second level and who use computers as a required theme in their classrooms. The participants of the study graduated either from Kuwait University, or from the College of Basic Education.

3.3.2. Interview participants

The second phase of the study involved interviewing selected teachers. The interview method allows the researcher to collect large amounts of information quickly and uncovers the participant's views about the topic of study (Marshall & Rossman,
Six practicing kindergarten teachers were purposively selected for participation in one hour semi-structured interviews. These interviews were audiotaped and later transcribed.

Teachers were purposively selected (Merriam, 1998) for the face-to-face interviews. According to the numbers of teachers completing the questionnaires who volunteered for follow-up interviews, three schools in one school district were identified. Each school principal and the district kindergarten superintendent were then asked to characterize these particular teachers' attitudes and knowledge toward computers and computer use based on their regular classroom observations. As a result, the pool of volunteers was narrowed to three pairs of teachers. The first pair consisted of teachers who were known as having negative attitudes and low knowledge regarding the use of computers in their classrooms. In addition, those teachers were also known for limited use of computers in their classrooms. The second pair consisted of two teachers who were known as having moderate attitudes and knowledge regarding computer use in their classrooms. Those teachers used computers regularly in their lessons. The third pair consisted of teachers who were known to have the most positive attitudes and high knowledge regarding the use of computers in their classrooms. They use computers everyday. Based on this knowledge, these six practicing kindergarten teachers, who were among the initial sample of 174 questionnaires respondents, were invited to participate in face-to-face follow-up interviews.
3.4. Data Collection Procedure

In order to examine the research questions in this study, two procedures were used for data collection:

1) A questionnaire on early childhood teachers' attitudes toward and knowledge about the use of computers in early childhood classrooms (see Appendix C). For the purpose of this study, questionnaires' questions were adapted from other relevant instruments in the research literature. The study did not duplicate any one questionnaire.

2) Follow-up interviews with six purposely selected teachers.

3.4.1. Questionnaire

Because "a questionnaire is a written document containing statements or questions that are used to obtain perceptions, attitudes, beliefs, values, perspectives, and other traits" (McMillan, 2000, p. 155), the questionnaire for the study includes demographic items such as age, number of years of teaching experience, educational level, use of computers in the classroom, computer training, type of computer training, and computer ownership. As well, additional questionnaire items address teachers' attitudes, knowledge and practices regarding computer use with kindergarten children.

3.4.1.1. Instrument construction

The construction of the instrument went through different stages:

1. Identifying the purpose of the study and the research questions.

2. Reviewing related literature in order to search for relevant instruments that measure early childhood teachers' attitudes and knowledge toward computers and computer integration into the curriculum.

3. After reviewing several related instruments from the literature, I chose the
questions that were suitable to my study.

4. The instrument then was reviewed by conducting a pilot study with five graduate students in the Curriculum Studies Department at the University of British Columbia. Three are Ph.D. colleagues who were expert in the field of Educational Technology; one specialized in Biology; and one was a masters student who also specialized in Educational Technology. The pilot study was conducted to examine the clarity of the items since the questionnaire items were taken from four related instruments. This pilot study led me to add new items, eliminate unnecessary items, and revise weak items. In addition, feedback on the wording and organization were taken into account when revising the questionnaire items.

5. Finally, the questionnaire was translated into Arabic by a Ph.D. native Arabic-speaker.

In the process of developing the questionnaire for this study, I relied on four relevant instruments. Suitable questions were chosen that could answer the research questions for this study.

Likert-type scaled items were created to assess participants' attitudes toward knowledge about and practices regarding computer use in early childhood classrooms. Response categories included Strongly Agree, Agree, Disagree, and Strongly Disagree. It was the intention of the researcher to eliminate the “No Opinion” option from the scale to force respondents to choose one answer from the four options. In this study, I believe that the “No Opinion” option could be used inappropriately. In the Kuwaiti culture, people may answer “No Opinion” to represent a “Disagree” response.
For positively worded statements such as "I would like to learn to use a computer", values ranged from four points for Strongly Agree, indicating highly positive attitudes, to one point for strongly Disagree, indicating an extremely negative attitude. For negatively worded statements, such as "using a computer is time consuming", the values were reversed, with a strongly Disagree response being assigned four points and a Strongly Agree response being assigned one point. Likert choices are scored quantitatively.

The four relevant instruments were found when reviewing the literature on early childhood teachers' attitudes toward and knowledge about computers and computer use in the classroom and were adapted for use with Kuwaiti teachers. One of the study was entitled Early Childhood Teachers' Computer Attitudes, Knowledge, and Practices (Landerholm, 1994). Landerholm had 10 attitude toward computers items and 19 practices items. In the present study, questions 5, 6, and 7 about kindergarten teachers' reported use of computers in their classroom were taken from Landerholm's study. Likert-scale items 1, 2, 3, 4, 5, 6, 7, 8, and 9 that measure attitudes came from Landerholm's (1994) study as well.

Cummings (1998) examined Teacher Attitudes and Effective Computer Integration. The researcher used 60 questions to measure teachers' impressions of their affect, knowledge, level of computer usage in the content areas, instructional preparation, and school setting. No reliability information was found in this study. For the purpose of the proposed study, attitudes Likert-scale items 15, 16, 17, and 18 were chosen from Cummings's (1998) study. In addition, items 1 and 2 that measure knowledge were also taken from Cummings's study.

Another study conducted by Derscheid (2003), entitled Early Childhood Educators' Attitudes toward and Knowledge about Computers in the Classroom used 14
attitudes items, 10 knowledge items, and 6 practice items to examine early childhood educators' attitudes and knowledge about computers. The instrument used had an excellent reliability rating of .90. Likert-scale knowledge items 3, 4, 5, 6, 7, and 8 were adopted from Derscheid's study.

Another instrument that was adapted for this study is the Attitudes Toward Computer Use questionnaire (ATCUS) constructed by Popovich, Hyde, Zakrajsek and Blumer (1987). This instrument was designed to "...assess how people react to using computers and computer-related mechanisms" (Popovich et al., p262). The ATCUS questionnaire covers the following four factors: negative reactions to computers, positive reactions to computers, computers and children or education, and reactions to familiar computer-related mechanisms. The observed instrument reliability was .84. Likert-scale attitudes items 10, 11, 12, 13, and 14 were taken from Popovich et al. study. All of the previous studies used instruments with early childhood teachers who were and were not using computers with the children in their classrooms.

The four questionnaires instruments were examined and items were considered carefully in order to choose those which best fit the present research purposes and questions. For the purpose of this study, some questions from all four were used; however, the present study's questionnaire did not duplicate any one questionnaire (See Appendix D).

3.4.1.2. Questionnaire suctions

The questionnaire for the present study (see Appendix C) consisted of 44 items and was framed into four sections as follows:

1. The first section includes the following demographic information about each teacher: age, number of years of teaching experience, educational level,
computer ownership, type of computer use, computer training and type of computer training. Requesting personal and academic information from the participants provides an understanding of each participant's background and experience, as well as their age and their ways of using computers.

2. The second section serves to determine teachers' reported use of computers in their classroom. This section contains seven questions.

3. The third section contains a scale that addresses teachers' attitudes toward computer and computer use with children. This section uses a Likert scale, with four response choices ranging from "Strongly Agree" to "Strongly Disagree". This section has a total of 19 items.

4. The fourth section serves to determine teachers' knowledge about computers and computer use in their classroom. This section uses a Likert scale that ranges from "Strongly Agree" to "Strongly Disagree" with a total of eight items.

3.4.1.3. Validity of the instrument

The validity of the questionnaire is achieved if the items measure what they intend to measure. I used multiple approaches to establish instrument validity. First, I chose the questionnaire items based on several published questionnaires in the literature. Second, to ensure face and content validity for the instrument, four educators were involved in examining the instrument. I notified those individuals about the research questions, the subjects, and the purpose of the study.

3.4.1.4. Pilot study for instrument construction

I piloted the instrument with 16 Kuwaiti practicing kindergarten teachers. Attached to the instrument was a cover letter explaining the purpose of the
questionnaire. The teachers were given one day to complete the questionnaire. Minor word changes were made to the initial questionnaire before it was presented to the complete sample of research participants a week later.

3.4.1.5. Procedures for gathering research information

The followings procedures were employed in conducting the questionnaire:

1. A native Arabic-speaking educator translated the instrument from English to Arabic. Another Arabic-speaking educator translated the instrument from Arabic to English.

2. Recommendations of three Kuwaiti professors were used.

3. The questionnaire was accompanied by a cover letter (see Appendix B) to help teachers understand the purpose of the research.

4. I obtained permission in writing from the Education Ministry of Kuwait to distribute the questionnaires to teachers in their school setting before carrying out the study.

5. The principals in each selected school were handed the questionnaires by the researcher for them to distribute, which were completed and returned to the principals’ offices.

6. At the end of the questionnaire, space was provided for teachers who were willing to be interviewed by the researcher, in which they can write their names and phone numbers. I contacted six of these teachers for interviews after the questionnaire data had been gathered and analyzed. As indicated earlier, teachers were purposely selected based on school principals’ and kindergarten superintendent’s recommendations upon their attitudes and knowledge toward computers and computer use in their classrooms. Three
pairs of teachers were selected according to their principal's rating of their level of computer use in their classroom and their attitudes and knowledge regarding the use of computers in their classroom. The first pair consisted of two teachers who were known as having negative attitudes and low knowledge regarding the use of computers in their classroom. The second pair consisted of two teachers who were known as having moderate attitudes and knowledge regarding computer use in their classrooms. Those teachers used computers regularly in their lessons. The third pair consisted of two teachers who were identified as having the most positive attitudes and high knowledge regarding the use of computers in their classrooms. They use computers everyday.

7. The principal in each selected school distributed the questionnaire to teachers, who were given three days to complete the questionnaire and return it to the principal.

8. I was able to collect 174 usable questionnaires (i.e., complete answers) of the 200 distributed questionnaires.

10. Then, SPSS software version 11 was used for item analysis, to determine the extent to which each item contributed to the objectives of the questionnaire and to determine the Reliability Coefficient (Cronbach Alpha). This test of reliability was intended to provide a measure of the extent to which all items are positively inter-correlated in each scale as well as in the entire questionnaire. The Reliability Coefficient was .871. (See Appendix C)
3.4.2. Interviews

In phase two of the study, six selected teachers from three different schools were interviewed. Teachers were interviewed one-on-one in places preferred by the teachers at the school sites. For instance, two interviews were conducted in the kindergarten classroom after the children had been dismissed. I assured all participating teachers of full confidentiality. To understand how the teachers perceived and interpreted the world around them, I used a semi-structured interview (see Appendix E). The interview allowed me to explore opinions, attitudes and beliefs of individuals that may not be understandable through the use of questionnaires (Brown & Dowling, 1998). Also, McMillan (2000) states that through the interview, a researcher gets greater depth and richness of information. I wanted to understand more than had been revealed in their questionnaires about teachers' attitudes and knowledge regarding the use of computers in their classroom. In addition, I wanted to understand how they used computers in their classrooms. Thus, I interviewed kindergarten teachers to obtain precise comprehensive information, and thereby to clarify and triangulate the results of the questionnaire. I specifically asked the interviewed teachers to elaborate on their responses from their questionnaire. The interview data added more information and the researcher gained a stronger sense of how to interpret the questionnaire responses.

The use of semi-structured interviews is significant because it brings meaningful insights to the quantitative results, through the details of the teachers' perceptions, thereby adding to the overall richness of this study. According to McMillan (2000), semi-structured questions are most commonly used in educational research because they are "open-ended yet specific in intent, allowing individual responses" (p. 166). Some of the interview questions emerged from analysis of the questionnaire data.
Semi-structured interviews do not have a fixed set of questions. However, a researcher has a theme and a set of guiding questions that direct his/her interview (see Appendix E). In my research, I used teachers' responses during the interview to generate new questions (build on what teachers say). I did not ask exactly the same questions to my participants, given that my questions emerged from the questionnaire responses from the interviewed teachers as well as from the interviewee's responses during the interview. A case study approach for each teacher was used to describe the personal experiences, perceptions, attitudes and knowledge of six kindergarten teachers in Kuwait regarding the use of computers with young children. The six participants will be described more fully later. Data analysis procedures consisted of transcribing, coding, data management, and interpretation of the information.

3.4.2.1. Validity and credibility of the interview data

As the researcher in this study, I was the primary instrument for data collection and analysis of this section of the study. As an interviewer, I had to rely heavily on my own perceptions, which were, of course, results of my position as a researcher. Even though I have quoted the teachers' exact words as much as possible, I am sure that even the selection of the words in the transcripts to include in my analysis chapter comes from my stance as a researcher. That is, to ensure the credibility and validity of this study, I employed the strategies of triangulation, member checks, and peer review.

**Triangulation.** I used multiple data collection methods to confirm emerging findings. That is, I collected data through a combinations of questionnaire and interviews.

**Member checks.** I discussed my notes and impressions with the interviewed teachers on their responses to gain their comments on my interpretation of the data and
to ask them if the findings were plausible. In addition, copies of the transcriptions were sent to the participants by email to correct errors or to change any incorrect interpretations of their responses.

Peer review. My dissertation committee members read and commented on the findings.

3.5. Data Analysis Procedures

3.5.1. Questionnaire data analysis

The data that were collected from the returned questionnaires were analyzed using both descriptive and inferential statistics. These analyses were performed using SPSS (Statistical Package for the Social Sciences) version 11. SPSS is a comprehensive and integrated statistical program for data description and hypothesis testing in the social sciences.

In this study, demographic data were gathered from the participants to generate a general profile of the Kuwaiti sample and to determine if those variables influenced the attitudes and knowledge of the participants regarding the use of computers in their classrooms. Descriptive statistics for each variable included the range, frequency distribution, the mean, and standard deviation. Single-factor analysis of variance (ANOVA) and T-tests at the .05 level of significance were carried out to assess group differences. In addition, this study asked the participants about their current use of the computer in their classroom. The items in this section concerning computer use were analyzed using descriptive frequency statistics.

For research questions one, two and three, frequency counts and percentages for categorical variables and means and standard deviations for continuous variables
were used. Descriptive statistics were utilized to help understand, explore, and estimate the characteristics of kindergarten teachers' attitudes, knowledge and practices regarding computer use in their classroom.

Research question four was designed to examine relationships among the variables of attitudes toward computer integration into curriculum and knowledge about computer and computer integration into curriculum. A Pearson product moment correlation was utilized to measure correlation between this pair of variables.

For research question five, one-way Analysis of variance procedure (ANOVA) and T-test were employed to examine differences between kindergarten teacher's attitudes and knowledge regarding using computers in their classrooms, based on the selected independent variables: three age ranges (20-29, 30-39, 40 or more), four groups of number of years of teaching experience (1-5, 6-10, 11-15, over 16), five levels of highest degree achieved (two-year college, bachelor's, master's, doctorate, other), computer access at home (yes, no), seven ways of using the computer (educational games, using the internet, internet for e-commerce, word processing, spreadsheets, power point, other), computer training (yes, no), and five types of computer training (four-year college or university, in-service training, computer store, self taught, other). That is, ANOVA and t-test were carried out in order to answer research question five.

For research question six, interviews were conducted to examine in depth teachers' experiences and perceptions toward using computers.

3.5.2. Interview data analysis

After gathering and analyzing the data from the questionnaire, follow-up interviews offered the chance to provide teachers an opportunity to elaborate in ways
not available from questionnaires alone (Patton, 1990). For example, if the interviewed teacher said in the questionnaire that she hates computers because they are so difficult, then this teacher was asked to elaborate more on her answer. During the interview process I discovered why this teacher holds these feelings and attitudes toward the use of computers with children.

I employed a purposive sampling procedure to target a group of teachers who are applying computers, to varying degrees, in their teaching. I interviewed a group of six teachers. I began with a case study for each interviewed teacher, and then I employed the process of summarizing and sorting the transcripts.

In order to provide detailed descriptions and make sense of the raw data that I had collected in my interviews on teachers' personal experiences and perceptions regarding teaching children using computers, the analytical procedures described by Creswell (1998) were followed. These procedures comprise of four phases and they are: (1) data management, (2) reading and memoing, (3) classification, and, (4) representing.

1. **Data Management**

The big challenge that I encountered when all my data were transcribed was how I could organize and manage my data in order to make use of the useful information they contained. To meet and overcome this challenge, first I created files for each teacher. Then, the raw data were read and re-read in order to be familiar with them and understand each case interviewed.

2. **Reading and "Memoing"**

I reviewed my data and wrote my memos regularly to reflect any thought and feelings that emerged. In the reading process, I wrote my comments and any common themes that emerged in margins of the pages. I also underlined narratives that I felt
significant for my research questions. After, these comments and themes were grouped and compared across all six data sets. Then, I compared the emergent themes with my research question to test their relevance. As a result of this process, I created initial codes and categories. Under each code and category, I attached data that were relevant to each one. In this way, it was easy for me to report the data under each theme.

3. Classifying and Coding

Classification, as Creswell (1998) suggests, involves taking a text or qualitative information apart, looking for a few “categories, themes, or dimensions” (p.144) that represent the original information. The procedure involved reading the data frequently and carefully to identify and familiarize myself with any patterns that stand out. My entire interview transcripts were color coded by hand based on my initial codes and categories.

4. Representation

In presenting the narratives and discussions of this study, I tried as much as possible to use the participants’ actual words to give a vivid description of the phenomena being studied. My presentation of the data gathered from my six interviews and my structural framework for the final report relied on presenting the participants’ perspectives and their worldviews. The qualitative writing style that I followed was a descriptive style. Denzin (1998) suggests that “in descriptive realism the writer attempts to stay out of the way and to allow the world being described to speak for itself” (Denzin, 1998, p. 327). That is, in following this writing style, I described each case with the information that the participant provided, and my personal interpretations were left for the discussion part of the dissertation.
3.6. Summary

This research was designed to better understand the attitudes, knowledge and practice of Kuwaiti kindergarten teachers regarding the use of computers in their classrooms. To this end, I developed and utilized a research method that best answered my research questions. This chapter on Methodology has presented a brief overview of qualitative and quantitative mixed methods research design and has explained the main reasons and rationale for why this design was best fitted to the purposes and questions of this study. Components of each research design have been explained, including the selection of the participants, data collection methods, and data analysis.
Chapter 4

RESULTS: QUANTITATIVE ANALYSIS

4.1. Overview

This chapter presents the findings of this study based on the analysis of the self-reported data collected from 174 Kuwaiti practicing kindergarten teachers as mentioned in Chapter 3. Two hundred copies of the questionnaire were distributed to these kindergarten schools. Of those distributed copies, 174 usable copies were collected.

This chapter analyzed two kinds of outcomes: first, analyzing the demographic data, such as age, teaching experience, level of education, type of computer training, computer ownership at home, and ways of using computers; and second, analyzing both the descriptive and inferential research questions of this study.

4.2. Reliability Analysis

From 174 usable questionnaires, the calculation of Coefficient Alpha for the first scale, *Attitudes toward computers*, which included 19 items, indicated consistency of this scale. Correspondingly, coefficient Alpha value was moderate: 0.75. The reliability for the second scale, *Knowledge of computers*, which consisted of 8 items, was high: 0.92.

Lastly, a final analysis was performed to check the reliability of all items. The result indicated a high degree of internal consistency among all of the items in the questionnaire, with the Cronbach Alpha being .87. Thus, the Coefficient Alpha suggested that the attitude and knowledge scales were internally consistent and a reliable measure of kindergarten teachers' attitude and knowledge regarding teaching children using computers for this particular sample of 174 practicing kindergarten teachers.
4.3. Demographic Characteristics of Kindergarten Teachers

One hundred-seventy four participants in this study were asked six demographic questions regarding their age, years of teaching experience, highest degree achieved, ownership of computers, and if they took computer training, where did they take it (See Figures 4-1 – 4-7).

Figure 4-1  What is your age range?

Figure 4-2  How many years of teaching experience do you have?
Figure 4-3  What is your highest degree achieved?

Figure 4-4  Do you own a personal computer?

Figure 4-5  If You Own a Personal Computer, How Do You Use It?
Figure 4-6  Have you taken computer training?

- Yes, I have 44%
- No, I haven't 56%

Figure 4-7  Where did you receive your computer training?

- Four-Year college or university 36%
- Inservice training 14%
- Computer store 12%
- I am self-taught 33%
- Other 5%
In closing, I would like to draw the readers' attention to three interesting results that stood out for me. As these graphs indicate, the majority of teachers indicated that they own a personal computer. Second, a large majority of the respondents had between one and five years of teaching experience and only five teachers had taught for more that 16 years. Third, the majority of the respondents hold bachelor's degrees.

4.4. Analysis of Research Questions

4.4.1. Research question 1: Kindergarten teachers' attitudes

Research Question One asked, "What attitudes do practicing kindergarten teachers in Kuwait hold regarding computers and teaching children using computers?" This question was explored using attitudinal questions on the questionnaire which used a four-point Likert scale. Each point is given a numerical value ranging from 4 = "strongly agree" to 1 = "strongly disagree." This portion of the questionnaire contains 19 attitude items.

To analyze practicing Kuwaiti kindergarten teachers' attitudes toward computers and computer use with children, the means and standard deviations for the attitude scale were examined. The frequencies, percentages, means, and standard deviations of kindergarten teachers' responses to each questionnaire item are shown in Appendix J. In essence, the average subject score (n = 174) on the 19 attitudes scale was judged to be positive (3.22) with a standard deviation of .482 which indicates to "agree" based on the scale with different standard deviation.
4.4.2. Research question 2: Kindergarten teachers' computer knowledge

Research Question 2 asked: "What knowledge do kindergarten teachers in Kuwait have about computers and computer use in a teaching setting?" This second research question was designed to investigate kindergarten teachers' awareness of their own pedagogical knowledge when teaching children using computers. Eight items were presented in the second scale.

The following paragraph and Appendix K summarize the results of the second question of the study. The frequencies, percentages, mean and standard deviation of kindergarten teachers' responses to each questionnaire item are shown in Appendix K.

The average subject score (n = 174) on the 8 knowledge scale was judged to be moderate to strong (2.98) with a standard deviation of .633. The arithmetic means around 2.65 to 3.24 which is approximately 3 which corresponds to "agree" based on the scale which means that the teachers have adequate knowledge on using computers in their classroom. (see Appendix K)

4.4.3. Research question 3: General knowledge about the use of computers in the classroom.

To assess research Question 3, which asked, "How are computers used in the kindergarten classroom curriculum?" frequency counts and percentage of each item in the questionnaire were computed. Figures 4-8- 4-13 report on the third question of the study.
Figure 4-8  How many computers do you have in your classroom?

![Pie chart showing the distribution of the number of computers in classrooms.]

- 5% Don't have
- 2% One computer
- 91% Three or more

Figure 4-9  I integrate classroom computer learning in the following ways:

- Other
- Rewards
- Remediation
- Educational games
- Simulations
- Drill and practice

Figure 4-10  My students use the computer:

- 5 days per week
- 4 days per week
- 3 days per week
- 2 days per week
- 1 day per week
- More than 30 min/day
- 25-30 min/day
- 16-20 min/day
- 11-15 min/day
- 5-10 min/day

84
Figure 4-11  Does your school have computer curriculum guidelines for your use in planning computer instruction in your classroom?

Figure 4-12  Are you involved in choosing software for computer use in your classroom?
As can be noted from the graphs, the majority of teachers use drill and practice programs and educational games as ways in which to integrate the computer in their classrooms. In addition, a large majority of the respondents indicated they felt they needed more training.

4.4.4 Research question 4: Relationship between attitudes and knowledge

To examine research question 4, which asked, "Do teachers with positive attitudes toward computers also have a strong knowledge of computers and computer use in the classroom?" a Pearson Product Moment Correlation coefficient was computed to describe the relationship between the two scales: 1) attitudes toward computers, and 2) pedagogical knowledge of teaching children using computers.

The Kindergarten teachers' attitude toward computer scale was positively correlated, $r = .331$ at the .01 Alpha level, with the knowledge about teaching children to use computers scale.
4.4.5. Research question 5: Factors influencing attitudes and knowledge

To address Research Question 5, which asked, "Do practicing kindergarten teachers’ attitudes and knowledge regarding the use of computers in their classrooms differ by any of the following selected independent variables: age, number of years of teaching experience, level of education, type of computer training, computer access at home, and where they received their computer training"? one-way Analysis of Variance procedure (ANOVA) and T-test were used to analyze whether there were significant differences. The dependent variables are the composite scores of all of the relevant items of the two scales: 1) attitude toward computers and computer use with children; and 2) knowledge about computers and computer use with children.

Tables 4-1 to 4-12 show the group differences for Attitude and knowledge regarding computer use scales, as well as the six demographic variables. Only one out of the six variables, ownership of a computer, exhibited significant difference.

Table 4-1  ANOVA results of attitudes by age

<table>
<thead>
<tr>
<th>Sections</th>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes Towards Computers</td>
<td>20-29</td>
<td>70</td>
<td>3.30</td>
<td>0.49</td>
<td>2.397</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>73</td>
<td>3.14</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 or more</td>
<td>15</td>
<td>3.33</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4-2  ANOVA results of knowledge by age

<table>
<thead>
<tr>
<th>Sections</th>
<th>Age</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Towards Computers</td>
<td>20-29</td>
<td>69</td>
<td>2.99</td>
<td>0.68</td>
<td>0.057</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>70</td>
<td>2.99</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 or more</td>
<td>13</td>
<td>2.92</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From Table 4-1 and 4-2 above, it's clear that the p-value of both sections is greater than 0.05 that means there is no statistical difference between the teachers' attitudes and knowledge based on their age.

**Table 4-3** ANOVA results of Attitude by years of teaching experience

<table>
<thead>
<tr>
<th>Sections</th>
<th>Experience</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>1-5</td>
<td>71</td>
<td>3.24</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towards</td>
<td>6-10</td>
<td>42</td>
<td>3.14</td>
<td>0.52</td>
<td>1.277</td>
<td>0.28</td>
</tr>
<tr>
<td>Computers</td>
<td>11-5</td>
<td>37</td>
<td>3.22</td>
<td>0.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Over 16</td>
<td>8</td>
<td>3.50</td>
<td>0.53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4-4** ANOVA results of knowledge by years of teaching experience

<table>
<thead>
<tr>
<th>Sections</th>
<th>Experience</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>1-5</td>
<td>70</td>
<td>2.91</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of Computers</td>
<td>6-10</td>
<td>39</td>
<td>3.05</td>
<td>0.60</td>
<td>0.704</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>11-5</td>
<td>36</td>
<td>2.89</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Over 16</td>
<td>7</td>
<td>3.14</td>
<td>0.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 4-3 and 4-4 above, it's clear that the p-value of all sections is greater than 0.05 which means there is no statistical difference between the teachers' attitudes toward and knowledge of computers based on their years of experience.

**Table 4-5** ANOVA results of attitudes by degree achieved

<table>
<thead>
<tr>
<th>Sections</th>
<th>Degree Achieved</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>Two Year College</td>
<td>7</td>
<td>3.29</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towards</td>
<td>Bachelors</td>
<td>161</td>
<td>3.22</td>
<td>0.48</td>
<td>0.147</td>
<td>0.86</td>
</tr>
<tr>
<td>Computers</td>
<td>Masters</td>
<td>3</td>
<td>3.33</td>
<td>0.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4-6  ANOVA results of knowledge by degree achieved

<table>
<thead>
<tr>
<th>Sections</th>
<th>Degree Achieved</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Computers</td>
<td>Two Year College</td>
<td>7</td>
<td>3.14</td>
<td>0.90</td>
<td>0.262</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>Bachelors</td>
<td>156</td>
<td>2.97</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Masters</td>
<td>2</td>
<td>3.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 4-5 and 4-6 above, it's clear that the p-value of both sections is greater than 0.05 which means there is no statistical difference between the teachers' knowledge and attitudes based on the degree they hold.

### Table 4-7  t -Test results of attitudes by owning a personal computer

<table>
<thead>
<tr>
<th>Sections</th>
<th>Own P.C</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes Towards Computers</td>
<td>yes</td>
<td>122</td>
<td>3.27</td>
<td>0.51</td>
<td>2.562</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>45</td>
<td>3.09</td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 4-7 above, it is clear that the p-values of attitudes is less than 0.05 which means "There is a statistical difference between the attitudes of those teachers having computers and those who don't". However, from Table 4-8 above, it is clear that the p-values of knowledge is more than 0.05 which means there is no statistical difference between the teachers' knowledge based on their computer ownership.

### Table 4-8  t -Test results of knowledge by owning a personal computer

<table>
<thead>
<tr>
<th>Sections</th>
<th>Own P.C</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Computers</td>
<td>yes</td>
<td>117</td>
<td>3.03</td>
<td>0.66</td>
<td>2.562</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>44</td>
<td>2.82</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4-9  T-test results of attitudes for computer training

<table>
<thead>
<tr>
<th>Factors</th>
<th>Computer Training</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes Towards Computers</td>
<td>Taken</td>
<td>95</td>
<td>3.25</td>
<td>0.53</td>
<td>1.061</td>
<td>0.290</td>
</tr>
<tr>
<td></td>
<td>Not taken</td>
<td>74</td>
<td>3.18</td>
<td>0.42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4-10  T-Test results of knowledge for computer training

<table>
<thead>
<tr>
<th>Factors</th>
<th>Computer Training</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Computers</td>
<td>Taken</td>
<td>91</td>
<td>3.07</td>
<td>0.63</td>
<td>1.061</td>
<td>0.290</td>
</tr>
<tr>
<td></td>
<td>Not taken</td>
<td>72</td>
<td>2.90</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the Table 4-9 and 4-10 above, it's clear that the p-value of both sections is greater than 0.05 which means there is no statistical difference between the knowledge and attitudes of those teachers having computer training and those who don't have.

Table 4-11  ANOVA results of attitudes for place of computer training course

<table>
<thead>
<tr>
<th>Sections</th>
<th>Place of Training</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes Towards Computers</td>
<td>4-year college or university</td>
<td>13</td>
<td>3.23</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In service training</td>
<td>37</td>
<td>3.16</td>
<td>0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>computer store</td>
<td>5</td>
<td>3.20</td>
<td>0.45</td>
<td>1.061</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>I am self taught</td>
<td>41</td>
<td>3.39</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>15</td>
<td>3.20</td>
<td>0.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sections</td>
<td>Place of Training</td>
<td>N</td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>F-value</td>
<td>P-value</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------</td>
<td>----</td>
<td>------</td>
<td>----------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>Knowledge of</td>
<td>4-year college or</td>
<td>12</td>
<td>3.25</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computers</td>
<td>university</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In service training</td>
<td>34</td>
<td>3.15</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>computer store</td>
<td>5</td>
<td>2.80</td>
<td>0.45</td>
<td>1.909</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>I am self taught</td>
<td>41</td>
<td>3.10</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>15</td>
<td>2.73</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From Table 4-11 and 4-12 above, it's clear that the p-value of attitudes and knowledge is greater than 0.05 which means there is no statistical difference in the teachers' attitudes and knowledge with regards to the different training centers they attended.

4.5. Summary

The scales of the instrument developed by the researcher to examine kindergarten teachers' attitudes and knowledge regarding the use of computers in their classrooms are reliable which is reflected by the high internal reliability (Cronbach Alpha .871). The coefficient Alpha suggested that the two scales in the questionnaire are internally consistent and a reliable measure of practicing kindergarten teachers' attitudes toward, and knowledge of, teaching children using computers.

The analysis of Questions One and Two indicated a positive response in the two scales. The results of the Teachers' attitudes toward teaching children using computers scale showed that the majority of kindergarten teachers reported having a positive attitude toward computers and about the use of computers in teaching. In the second scale which is the teachers' knowledge of teaching children using computers a large number of kindergarten teachers believed that they are knowledgeable about computers.
and computer use with children:

The results indicate that teachers who reported having positive attitudes toward teaching children using computers tended to report a high level of knowledge of computers and computer use with young children.

The group differences in the demographic questions and attitudes and knowledge of kindergarten teachers regarding the use of computers in the classroom showed that there were no statistically significant differences in kindergarten teachers' attitudes when compared by age groups, varied teaching experience, degree achieved, computer training, or type of computer training. The T-test result showed a statistically significant difference in the responses of kindergarten teachers regarding their attitudes and their computer ownership.
Chapter 5
RESULTS: QUALITATIVE ANALYSIS

5.1. Introduction

The purpose of the qualitative method of this study was to examine in more detail the experiences and perceptions of six kindergarten teachers in regards to teaching children using computers. Following are the six instrumental case studies (Stake, 1994).

5.2. Participant Interviews and the Educational Context

The following six profiles are intended to provide information to assist the reader in gaining insight into the background and general attitudes of the participants in this study with regard to teaching kindergarten students using computers. In this section, each case is described separately and interpretations of the cases are discussed fully in the last chapter of the dissertation. As stated earlier, the interview participants were chosen based on recommendations by their principals and the school director based on their attitudes toward computers and their level of knowledge about computer use with children in their classrooms. Salwa and Mariam were regarded as having negative attitudes and a low level of knowledge about teaching children using computers. Huda and Nawal were regarded as having moderate attitudes and knowledge about teaching children using computers. Finally, Dalal and Zahra were identified as having positive attitudes and knowledge about using computers with children.

Before reporting on the six teachers' interview profiles, it is important to provide a clear picture of the nature of the Kuwaiti kindergarten classroom curriculum with an emphasis on a description of the computer center. The Kuwaiti kindergarten curriculum is a common early childhood curriculum that emerged from the idea of providing child-
centered curricula. The daily curriculum is organized into learning centers, daily activities and themes. In general, the kindergarten classroom environment is organized into eight learning centers such as library, house, blocks, computers, art, science, math, and finally learning center. The daily activities include a good morning message followed by discussions of specific theme concepts that are to be covered throughout the day. The weekly themes include 12 different themes such as air and water, animals and plants, and computers in my kindergarten. These themes provide the content for teachers to follow in their lesson plan (See Table 2.1).

The teacher ensures that the children pass through each learning center in a way to confirm that children acquire the concepts, directions and skills, in order to train them individually by using the child's booklet of experience and activities. In the year 2000, kindergarten classrooms adopted computers as a new tool and a new learning center.

The computer center is set up within a furniture unit, specially made for this purpose, including four computers with touch screens, in addition to other devices such as a keyboard and mouse, as well as two printers, one inkjet colored and the other laser black and white. The center does not have an internet connection. This design was made on the basis of a central Ministry edict and driven by well-intentioned "child protection" motives (See Figure 5-1). Four children work individually in this center with 12 suitable computer programs, which are provided by the Ministry of Education, serving, in whole or in part, the educational themes offered in the kindergarten curriculum (See Figure 5-2). These programs contain directed activities in addition to several age-appropriate entertainment programs for kindergarten children to use in their spare time blocks. They are exciting and interesting in their audio-visual and motion picture format and use characters the children love.
Figure 5-1  The physical characteristic of the computer center

Figure 5-2  Computers in the center
Salwa is a 36-year-old kindergarten teacher, who has been teaching for 13 years. Her classroom, like all other Kuwaiti kindergarten classrooms, has an assistant teacher. In Salwa’s classroom, only one computer works and the other three are not functioning. Salwa owns a personal computer but she has never used it.

In the interview I asked Salwa about her opinion regarding the use of computers in her classroom as a main theme and as a main center. “In general, it is very nice,” she replied. However, Salwa explained that personally she does not like using computers at all and because of their complexity she avoids using them as much as possible. She said:

You are talking to a teacher who doesn’t like computers at all. I feel it is complex and it will make me nervous...Not only do I hate computers, but also all technology like T.V, recorder and every tool related to computers.

Salwa felt her low interest and confidence in teaching children using computers was due to her lack of positive computer experiences. She felt that these experiences had led to a poor understanding of computers and computer use in the classroom. She further stated that her lack of understanding of computers prevented her from using them as an effective teaching tool. Salwa explained:

From the computer training course that I attended when computers became one of the themes and one of the classroom centers, I felt that computers were never my favorite tool to use in the classroom. For me it was basically knowledge that I memorized to pass the course. Seriously, after the course was over, I forgot everything I memorized. Thus, the computer was never an interesting tool for me. I never had any fun learning it and my memories of learning about computers are not positive. I really don’t have much
enthusiasm or even ways in which I can effectively teach children using computers.

Salwa’s negative attitude toward computers, which resulted from her prior experience, seems to have had a significant impact on how she teaches children using computers.

Salwa mentioned that the computer instructor in the course that she attended four years ago always worked with certain types of teachers, those who asked good questions and were labeled by Salwa as “smart.” Salwa and the rest of the “non smart” teachers had to watch the others conduct activities, rather than being allowed to participate or explore on their own. Salwa felt that she was not allowed to be involved because she was not bright enough. The computer instructor’s “hidden curriculum” reinforced Salwa’s belief that the computer was just for smart people. This belief seems to have generated Salwa’s low confidence, which contributed to her negative attitude toward computers.

Computers are very difficult for me. The instructor presented the information quickly...I have a weak memory...I was doing my best to write down every thing in this course... but I couldn't understand. This is one of the reasons that made me hate computers. I tried to watch the others and figure out what they were doing but it always seemed very confusing. Plus, whenever I asked the instructor a question, he would not help me. In the end I would just try and copy what the other teachers were doing. For example, if they drew a table, I would ask them to draw it for me. If they wrote something in this table, I would copy that also. Then everyone would write what they had learned from the class in their computer notebooks. This part in particular was very difficult for me.

Salwa explained that her weak knowledge of computers was not improved by her
two computer classes at the college level. Those computer courses were mainly about reading textbooks and memorizing information to pass exams, all of which made her perceive computers as being about facts and figures, rather than a valuable tool for exploration and discovery. “I could not understand many things in the book. In fact, there was not much time to understand because we had to take a test every week. Also, the book and the instruction were both in English which is so difficult for me to understand. So, I had to memorize the content to pass, but never received a high grade.” Salwa admitted that her lack of knowledge meant that she was not very interested in teaching children using computers. She explained:

I would never understand how to use computers. I really don’t have like teaching children using computers, but I must use it because it is required by the ministry and it is one of the learning centers in my classroom...It becomes necessary for teachers to have knowledge of computer basics and principles.

Salwa believed that the support that she receives from her teacher’s assistant, who knows how to use computers was very helpful for her; however, she stated that she still needs more help.

I don’t have enough background to teach children using computers simply because I have not learned computers in a way that I should be able to with kindergartners...When computers were first integrated in our classrooms four years ago, I did not remember teaching or doing any lessons using computers. However, after I had a teacher’s assistant who knows how to use computers very well, I started to feel a little bit better about teaching children using computers, but still I need more training and help from other sources to learn more about different ways of using computers with children. Also, I need in-service training to teach me the best ways of using the software programs that are provided by the Ministry of Education more productively.
Salwa gave many reasons for her attitude toward computers and computer use in her classroom. One of the reasons was lack of time. A complaint which was echoed by all of the other teachers was that there was not enough time for children to use computers. What was different about Salwa, maybe as a result of her attitude, was that she perceived the lack of time as an obstacle. She said:

It would be so good to have enough time to let all the children use computers in the classroom. In the centers time, all of my 20 children want to use the computers and then I was the classroom time disciplining the students. They are losing valuable learning time --- all because we are lacking time...

Beliefs, Views and Knowledge about Computer Use in the Classroom

I asked Salwa a question about using computers as a new and additional tool in all kindergarten classrooms, Salwa's philosophy about computer use with children was that it is a beneficial tool. Salwa explained the importance of computers to teach children as follows:

Computers are very useful because through the wonderful educational software programs that the Ministry provided, the child develops several skills such as creativity skills in drawing...when the child controls the mouse, he will learn another skill. As for listening skills, it will grow through listening to a story and directions...In addition, computers develop the memory skills, and exploring through interesting competitions...I feel that the children in my classroom are happy and attracted to computers.

As noted in her explanation and despite her negative attitudes toward computers and computer use with children, Salwa was aware of some of the potential benefits of computers to children's learning and development. Although, she acknowledged that she was not a technical person and she knew little about computers, she stated that:
I have noted that the pictures that are extracted from computers, which I use in my lessons, are very beautiful and cheaper than the ones we bought from the commercial shop. You remember when you came to my class when I was teaching the benefits of water and air and had seen the pictures which I used for the competition, all these pictures were printed out from computers and they are inexpensive and beautiful at the same time. I am sad because I did not get these pictures by myself. Instead, I asked the teacher’s assistant to print them out for me. Really, computers are very useful.

Then, I asked Salwa if she uses computers to teach children reading and whether she prefers reading a story to the children by using computers or by herself. She replied:

I don't support that...I prefer to do it myself. Using motives, sensible excitements and the different tones of the teacher's voice and her moving here and there, these are all more attractive for the children when listening to a story...As for computers, I can use it to write a story and print some pictures then put it in the library center...also computers here should be used for students who know how to read for themselves so they will be able to understand. I don't think it would be a good idea for the children to sit in front of the computer and read a story for the purpose of teaching them reading.

She then added the benefits of computers to teach children science.

When teaching science, computers are better. The wild animals such as lions could be presented on the computer screen. We have a complete software program about wild animals and many wonderful things like the zoo, jungle and voices of animals as if they are real...I used the computers in the theme of water and air, as well to explain the need for creatures to have water and air to live. It was like a story and it was very beautiful when presented through the computer...This is wonderful. I am really attracted to these programs.
Salwa values and understand the role that computers play in how children learn different information, but she also has difficulties integrating computers into her lessons. Her lack of familiarity with different ways of teaching children using computers left her feeling uncomfortable with the use of computers in her classroom.

Salwa also highlighted teachers' need for computer curriculum guidelines to help them in integrating computers effectively in their lessons and helping them understand how and when they should use computers with children. She indicated that teachers depend on themselves and on inadequate computer knowledge when using computers with children.

**Opinion on School Administration**

As the interview continued, I asked Salwa to explain her needs that would require addressing by the schools and the Ministry of Education to help her with using computers in her classroom. She replied: "I suggest to condense the training courses for the teachers not only for the basics but also for the advanced level... Also, I consider the computer instructor's skill very important...I remember that in the course that I attended, our instructor presented the information very quickly and I couldn't understand anything. Also, I hope for the computer center to be more beautiful and minimize its size and its shape because it looks like a place for examinations (see Figure 5.2). These computers are sensitive and quickly damaged. I want continuous maintenance. Also, I need more educational software programs. I need everything that would help me when using computers with my students."

In her suggestions to the Ministry of Education and school administration, Salwa focused on four elements that she believed might help her use computers more effectively in her classroom. The first element she focused on was in-service computer
training. She believed that the existing courses are not sufficient to provide teachers with valuable knowledge on how to use computers in their classrooms. For the second element, Salwa focused on the quality of the computer instructor as another important factor to consider. The third element that she mentioned was the problems with the physical and technical characteristics of the computers in her classroom. Due to the station setup, the computer is isolated from the other (station or collective) activities by design and children are isolated from each other by virtue of the seating setup, reducing the possibilities of collaboration. It is set up as a learning station, not a tool to use across the curriculum. The fourth element that Salwa mentioned was the lack of educational software provided by the Ministry of Education.

5.2.2. Mariam: Insufficient use of computers

Mariam is 26 years old, with a Bachelor's degree in Psychology from Kuwait University. She has six years of experience teaching kindergarten children. Mariam owns a personal computer and she mainly uses it to print pictures for her lessons. As the interview started, I asked Mariam about her first impression when she learned about the integration of computers in all kindergarten classrooms and she said:

My first impression was that I didn't like the idea of the Integration of computers because I didn't know how we were going to use them and how we could provide the programs for the children. Then, when we started to use computers, I felt that the use was easy and simple. The educational Programs, which are provided by the Ministry are very useful for all of our lessons.

In order to obtain more depth from her reply, I asked Mariam how the use of computers was easy and simple and how the educational programs were useful for her lessons. She explained, “In typing and printing pictures. Most of our work as
kindergarten teachers relies on pictures that support the theme. I use Print Art and Clip Art programs.” Like Salwa, Mariam’s use of computers is limited to only printing pictures, which helps her with her teaching.

As the interview continued, I asked Mariam if she likes to use computers in her lessons. She responded, “To be honest with you, although I love computers, I don’t like to use them in my classroom because I don’t know how to use them effectively in my lessons.” Mariam mentioned that the use of computers in all other classrooms in her school and in other schools “is very limited and only in the center time” because it is a required task for all teachers whether they know how to use them or not. She also added that the use of computers is difficult and very limited. As a result, many teachers do not use them at all and most use them ineffectively, without any creativity.

The Need of Support

Mariam, like Salwa, believed that teaching children using computers would not be efficient and successful without adequate computer training for the teacher. Mariam took only one in-service computer training course and, unlike Salwa who was not willing to take more in-service computer training, Mariam wanted to take more courses that teach her how to integrate computers into her lessons. Due to a lack of computer training, Mariam is self-taught.

I am greatly lacking the support I need to improve my teaching style...I attended only one course, which was obligatory for all kindergarten teachers and it was all in English...We didn’t understand and learn anything...There is a major lack of computer training and as a result many teachers are willing to spend their own money for private computer training institutes.
I asked Mariam about her experience with the computer courses that she took when she was a student and how she was taught. She replied:

When I was in the university I took one course about computers, its duration was only two hours per week. In the first hour, the lesson was theoretical but in the second hour the professor left us apply what we had studied. I never stayed for the second hour because I didn't like it and I didn't understand anything from the first theoretical part. I could like using computers if I understood the information very well.

Using Computers to Teach Children

Mariam was interested in using computers to teach children, but had not learned about their use for teaching reading, math, science or any other subject. Listening to her talk about the importance of computers in our lives and the different ways that teachers could benefit from using computers, I felt that she should be encouraged to take advantage of this valuable instrument for teaching children:

I did read a book about different educational programs that a teacher could use in her lessons and it was fascinating to learn about the detailed description of each software that the author went through when providing such programs. I really enjoyed reading the book very much but I never remember learning how such programs could be used for any kind of instructional purposes in different subjects.

Mariam hoped that all kindergarten teachers could use computers in their lessons as an effective learning tool. She was very interested in using PowerPoint to prepare “interesting stories” with colorful pictures and animations so “children will be happy and interested” but she lacked the knowledge to do so.

I would like and hope that all of us learn about computers and use them effectively in our classrooms like the other tools...we should learn how to use it because it is something new and it is the current world language besides English...Till now, we don’t
know how to use it...however, if the teachers are well prepared, they may use computers effectively like preparing stories with animation and beautiful colors using Power Point program...Teachers will use such programs to create interesting stories which the children will be interested in...I think it is easy but I don't know how to use it.

Mariam stated that as a result of her lack of knowledge, the computers in her classroom were not integrated into the curriculum. She mentioned that the computers in her classroom have mostly been used as a reward for a child and as a toy a child uses to play games. Mariam's view of teaching children using computers as being totally dependent on computer knowledge seems to stem from her detachment from experiences such as those described above.

Unlike Salwa's and Mariam's negative attitudes and low knowledge regarding the use of computers in their classrooms, the following are two examples of teachers who have more positive attitudes and more knowledge regarding computer use in their classrooms.

5.2.3. Nawal: Factors affecting the love of computers

Nawal is 37 years old with a Bachelor's degree in Early Childhood Education from the Basic College of Education. She told me that computers had always been her favorite tool. She explained that her interest in computers due in part to her father, who was the main source of encouragement.

I have always been interested in using computers from my early childhood years. At that time, computers weren't widespread. My father encouraged me to use any new tool...he registered me in many computer courses and I learned much from those courses such as Basic, Data 1, 2, 3 and so
on... our daily conversations at home were always centered around computers and the amazing things that computers could do, and different kinds of programs. I had so much fun working for hours with computers with my father. My father was the one who helped me understand the relationship between computers and our daily life. Consequently, I grew up loving computers.

In addition to her father's support, another key contributing factor to Nawal's interest in computers was the support she received from her principal when she first became a teacher.

My former principal when I first became a teacher encouraged us to learn English and other things such as computers to make our school unique...She told the teachers who have computers at home to bring them to the school...She encouraged us to use computers in our teaching process and she was the first who I believe thought about using computers in our teaching. At that time, I remember, when we told others about our use of computers in the classroom, they laughed and said, "Computers and children, this is impossible; the children can't use computers." I believe that my principal innovated the idea of using computers in kindergarten.

Using Computers to Teach Children

Nawal explained how much she liked the educational software that was provided by the Ministry of Education and how much time she spent looking at other educational software and reading as many computer books as she could find locally. She believed that computer software that was provided by the Ministry was a very effective teaching tool, "filled with rich information and many interesting pictures."

To show how much she is interested and believes in the use of computers as a tool for classroom instruction, she told me about how she used to pay a friend to get her educational software from Egypt. Telling me how much this software meant to her and
her students, she suddenly jumped to her feet and asked me if I could bring her some software from Canada. She then spent 15 minutes trying to convince me of how much this software would help her and other teachers. Nawal felt very passionately about the subject:

There are not [many] good educational softwares here in Kuwait. However, there is a publisher in the capital of Egypt that sells children's software in all content areas. A friend of mine brought software from Egypt...the pictures in it look so real. I use it every year to teach about the human body. I wish we had more software like it here where I work.

Criticisms of Curriculum

Nawal was very concerned about the kinds of content and themes in the curriculum that kindergarten teachers were required to teach to kindergartners. She did not feel well prepared enough to teach such themes, not because of a lack of training on her part, but because she believed that the themes were much too difficult for her students. She felt that her students were too young for some themes and that made it difficult for her to have a rewarding teaching experience. She blamed the Ministry of Education for not training teachers or even exposing them to these new themes before implementing them in the curriculum and requiring teachers to teach them effectively.

The particular themes she rejected were the "Computer" and "My Country is Petroleum," yet she tried hard to find educational tools and materials to help with teaching them.

I was not taught enough about these subjects myself before the Ministry decided to incorporate them into the curriculum. For example, I am not familiar with an activity that will help a kindergartner learn about petroleum. As far as the computer is concerned, I do help them play some games and learn how to type their names. I know teachers who hate to use computers and prefer using anything else even if it
requires effort than using computers... One time I went to some audio-visual stores to try and find anything I could to help me teach these themes but I found nothing. I also went to the Kuwait Oil Company (KOC) where I was provided with pictures that explained the process of pumping black oil from underground. They also gave me some uniforms and some plastic tools. They were very helpful, but I am still convinced that the "My Country is Petroleum" theme is inappropriate for kindergarten students and should be included in the upper elementary curriculum.

Like Salwa and Mariam, Nawal blamed time as a major obstacle that prevented her from using computers in her classroom effectively.

I would like a special period for computers and a special teacher who knows how to use computers effectively for teaching children in this period. Now most of the teachers have a small background about using computers, so how could a child learn? I swear by God, in the center time, I find big suffering and difficulty. I love the idea of teaching children using a computer, but how does that come? I have 25 children in my classroom, will all of them use computers? Of course not. There are several centers in the classrooms like the library, sand and water, art, etc. I should pay attention to all the children and join them in the center to discuss the things that they are doing... I should be with all of them and there is no time... only one hour is scheduled for the center time and I find it difficult to coordinate between the different centers. The role of the teacher becomes very difficult.

She added,

Do you think those teachers who hate to use computers and don't know anything about computers are able to teach children using this tool especially that computer implementation is obligatory? It is a main theme which is added to the curriculum and one of the learning centers for children to use and experience with every day... Besides, the Ministry of
Education spent thousands of dollars to purchase these computers and the teacher who doesn't know how to use them, will break them down.

**In-Service Training, Specialized Teacher, and Special Computer Period**

I asked Nawal if there was any support that she would like to have from her school administration and the Ministry of Education. Nawal said that the idea of integrating computers into kindergarten classrooms is an “excellent idea”. Nawal suggested the following: more effective in-service training programs, a teacher who specializes in computers and having a special period for teaching children computer basics.

Although, Nawal disagreed with some of the themes that she was required to teach, and therefore did not feel as fulfilled and confident as she might, her suggestions of ways to improve computer use in the classroom revealed much about her own teaching strengths and how she is willing to be a resourceful teacher who uses computers effectively. This, as will be seen later, was also the way in which Nawal was most like the teachers with the most positive attitudes about teaching children using computers. Her own self-description “I am very comfortable teaching children using computers because I love to see my students wondering and exploring and having fun,” illustrates this point.

5.2.4. Huda: Computers and Learning by Discovery

Huda, at 40, was in her 20th year of teaching. As one of the teachers, recommended as having an average orientation to computer use with children, she was open about both her strengths and weaknesses as a teacher using computers in her lessons. Her strength was that she believed that computers should be used as another
tool in conjunction with other learning tools in the classroom. She wanted to make sure that her students use other materials at the same time that they use computers.

Huda had a relatively high level of confidence, even though she did not consider herself an expert or specialist in computers. She felt that she understood the kindergarten computer theme and therefore had confidence in her ability to at least teach children using computers:

I have never experienced any difficulty with understanding the computer theme and this is because I have a computer at home and I always use it... when we were informed that computers will be used in the new developed curriculum, most of the teachers who don't have or use computers, this news was shocking to them. They were asking, "How are we going to use this machine with children?"... even though the Ministry of Education prepared computer training courses for teachers, this preparation was not for all teachers and the duration was only three days and this is why most of the teachers here don't know how to use computers in their classroom. I attended several courses provided by the Ministry and some of them were privately registered by me. I feel that I have the necessary computer knowledge. I can answer most of the children's questions related to computers although there are times where I cannot give them an answer and I seek help from the other teachers at the school. There are also times when I have to look for information on my personal computers at home.

Huda's level of confidence seemed directly related to her personal comfort level with sometimes not knowing the answers to her students' questions. Throughout the interview, Huda mentioned that if her students struggle with anything including computers, she encourages and teaches them in a way that they can discover the answers to various phenomena on their own. She mentioned several times that she liked to encourage her students to try to provide their own solutions to the discussed problems. She started with a question that required the students to think, and then to
come up with possible answers. Then they discussed each of the answers together to help foster a discovery attitude in the students.

My students know that in the classroom we all learn from each other. I taught them that their ideas are all useful and important for all of us and that we need to work together as a team to be able to learn from each other.

Huda pointed out that it helped her own enjoyment and confidence as a teacher to foster independent thinking among her students.

Lessons From the Past

Huda said that her interest in teaching children using computers evolved from an influential figure, her uncle. She said that she had always wanted to be a teacher, like her uncle. Her uncle not only taught her that teaching children using computers is possible, but that it is also as important as teaching children using any other tools in the classroom, such as blocks and books. Huda perceived herself as a successful teacher because of her ability to teach children using any kind of tools including computers. She was very enthusiastic and insisted on providing me with an example of one lesson about wild animals, where she taught children using computers along with other materials.

For example, when I teach my students about the wild animals such as lions and tigers, I first introduce them with a sample of a lion which looks like a real one and I let the children touch it and know its life, what covers its body and what does it eat and other information that they need to know regarding this theme... Often, when I want to introduce the children with something that it's impossible to bring such as wild animals...I can't bring a real lion to the school (she started to laugh)...I first bring a concrete sample for a lion. In this case, computers are very useful. I personally believe that children need to be exposed to different kinds of materials in the classroom and not just stick
with only limited materials and options such as painting or playing with blocks for instance.

Like many other teachers, Huda revealed that she had experiences in the computer training courses offered by the Ministry that did not benefit her attitudes toward computers. For instance, she said it was "somewhat boring, insufficient and they didn't prepare me to use computers effectively." However, she had enrolled in courses with a private computer company, which enabled her to love computers and become more fascinated by learning more about them and possibly teaching children using such a tool in her classroom.

Huda experienced both success and the delight of exploration and learning in this private computer training. She, and the other members, created a website for themselves, which was a rewarding experience for all members involved.

When I attended the courses that were provided by the Ministry I didn't do very much in terms of exploration and hands-on experience. However, things got better last summer when I registered for private computer training company. In this course we worked to create many different kinds of projects such as developing a personal website. We were all very proud of what we accomplished. The duration of this course was three months. The Kuwaiti television interviewed some of the members who participated in this course. This experience helped to change my view of computers and I have liked them better ever since.

However, Huda did not have any similarly successful experiences with the computer training courses that the Ministry of Education provided for kindergarten teachers. Computers were presented as "a body of knowledge" that she had to memorize to pass tests. She also realized that much of what she had been learning she was quickly forgetting. Thus, the way she had been learning did not lead to true
development of a conceptual and practical understanding of computers and teaching students using such a tool. Huda did not feel that these compulsory computer courses had given her the pedagogical knowledge she needed to be a good kindergarten teacher. Although, she was very disappointed with the compulsory courses, the private courses were very useful for her. In these classes, she did more learning-by-doing. She learned a great deal about the different uses of computers, which she felt provided a beneficial impact on her students in the classroom.

The two private courses that I attended focused on both the technical and the practical part of computers. For example, I learned how to solve any simple technical problems we all face when using computers such as the sudden shut down and the freeze of the mouse and when accidentally you delete anything and many things that I didn't learn from the courses that were provided by the Ministry and which I wish that all teachers know to enable them to solve any technical problems with computers in their classroom. Some of the practical information that I gained was how to develop a story using PowerPoint and Photoshop. The information I learned was very useful and I still remember everything I learned in those two private courses. I think I learn best by actually doing and seeing things in front of my eyes.

Using Computers to Teach Children

Speaking about her college experience and, unlike all the other interviewed teachers, Huda mentioned that she did not take any computer courses in her college because computers were not well-known at that time. Huda mentioned that although, there was a deficit in the number of computers and computers were not recognized as an important tool, she strongly advocated the use of computers in her teaching. As she said, it was a good source to "help construct the best activities for my lessons. Actually, many of the art and classroom activities in my classroom were taken from computers."
Because of her belief that students need a strong facility with language to be able to learn and communicate their knowledge, Huda did not like to use computers as a means of teaching language skills to students. She had specific reasons for not using computers and using other sources for teaching literacy skills.

I do like the idea of using computers to teach children science such as teaching them about animals and so on. The use of computers helps my students to understand the concepts and to visualize the words they hear repeatedly...the use of computers also helps me construct the best activities for my lessons. Actually, many of the science activities that I do in my classroom were taken from the software the Ministry provided. The problem is that in my in-service computer training courses, the instructor never explained about how these computers could be used for instruction. They only explained about the importance of using them to teach children how to paint and draw and how we as teachers can print pictures for our lesson. But I don't like the idea of using computers to teach children reading and writing... using computers to teach children writing will not give them the opportunity to develop their small muscles and their handwriting skills...this will lead to cancel my role and the role of pencils and books.

She also added,

I don't recommend using computers for narrating any story because the narration is not attractive...when I tell the story to the children, I feel they loved it and they were paying attention...

Huda supported the use of computers with children as an alternative tool. However, according to her this use must be under some conditions.

The existence of computers in the classroom is useful, but the child should not use them for a long time...computer use by children for a long period of time may have negative effects on their sight, back, not moving their muscles, and not only that but also the increased use of computers isolates the child from
playing with his friends...My own children play soccer games through computers and they don't go outside to play any more and their muscles are not growing or moving...for me as a teacher, I don't let the children use computers more than 15 minutes and they use them only in the center time.

5.2.5. Dalal: The love of computers

Dalal is 25 years old and has been teaching kindergarten for four years. She graduated from the Kuwaiti University and earned a Bachelor's degree in Early Childhood Education. The computer center contained a variety of children's educational software along with the ones that were provided from the Ministry of Education.

Dalal displayed a highly positive attitude toward teaching children using computers. Not surprisingly, she was eager to disclose many personal stories, and showed a high interest in computer learning and teaching. Her enjoyment of learning and teaching using computers, she said, came from her love for exploring, investigating, and actively interacting with the students in the classroom. It seemed that it was her personal qualities and innate affinity for computers that had allowed for her success in teaching using computers.

As with the other teachers who had positive attitudes about teaching children using computers, Dalal liked to work in situations where unexpected questions or issues arise. She enjoyed working with her students to find solutions for any unpredicted science problems when using computers, saying "when I teach science using computers, I give my students the impression that I know nothing about the phenomena being tested and that I need their help to figure out the answers." She believed that this modeling helped them to appreciate curiosity and encouraged them to wonder about their environment.
I enjoy teaching science using computers because I think it is a captivating subject especially when the teacher uses a good software program that encourages the child to think and try and try till he/she reaches their desire and very important—not only for kindergartners but for all ages. When I teach science using computers I feel like a child myself. I am just as curious as any child in the classroom when using those software! The fact is that in science we all become learners especially when you use a tool that is effective such as computers. I don't believe there is only one right answer to their scientific questions and because of that, I provide them with software that is open-ended and encourage children to think and problem solve...and I also believe it is extremely important to guide the children to find the answers to some of their questions about science on their own.

Using Computers to Teach Children

Dalal expressed a strong feeling of efficacy in teaching children using computers, which she felt came primarily from her background. Just as Salwa felt that her limited knowledge precluded the possibility for teaching success, Dalal felt that it was her high degree of knowledge that guaranteed hers. Dalal's own computer learning had given her a well-developed background of computer knowledge.

It is very important that teachers understand and know how to use computers with young children before learning ways to teach using such a tool. I have never felt afraid that I wouldn't be able to teach the theme of computers. Furthermore, I encourage my students to trust in their own capabilities to discover information while they use computers. What I am trying to say is that I have never felt that I can't teach using this or that tool.
I asked Dalal about how her use of computers engages her students

I love to use the educational software that the Ministry provided especially when I teach children about science... these programs are wonderful because they offer the things that I cannot explain in a way that children understand such as animal proliferation. I have 13 educational software packages in my computer center. Recently I bought several science books that come with software. Children can flip through the pages in the library center and watch and listen to the stories in the computer center...They can see and hear the sounds of the animals and the sounds of the habitat in which they live. The students are so funny because they are always trying to imitate the sounds of the animals.

Dalal added the role of teachers when using computers and the obstacle that was echoed by most teachers,

I always use computers before, during and after my lessons not only in the center time like other teachers...I know teachers who don't care for computers and children. Their role is just limited to prepare the software and the computer for the kids in the center time and then they let the children play without any guidance...the role of the teacher here is very crucial. She must observe, direct, supervise, and assess. In this way, the teacher would know if her students have learned anything from computers and whether they understand the curriculum and the related skills...Here is the problem that all of the teachers face. We don't have enough time for assessing them because we should also assess other children in the remaining centers and we have nine centers as you know.

Dalal explained her teaching philosophy when using computers with children as follows,
I don't solely rely on computers in my teaching. I prefer using different tools such as books, blocks, plastic things, real materials from the environment such as stones, real food, real insects and so on. Change is good and necessary at the same time. The children will feel bored if they use only one tool such as computers or books. Computers present many useful things if they are accompanied by other learning tools such as books, blocks, and coloring.

Computers and the New Generation

Dalal believes that it is crucial for teachers and children to learn how to use computers in a way that would benefit both of them. She believes that teachers need to understand how to interact with and teach their students in a way that will create a successful learning environment. When Dalal was asked about her general opinion on using computers with young children, she explained,

Excellent decision...Now the teaching methods of kindergarten teachers are different from the past methods, which were depending on orders like sit down, stand up, play and so on. The teachers now give the children more freedom to answer and discuss, create and innovate...now the children have strong personalities. Using computers with children will support their inclinations, hobbies, creativity, education, and thinking.

Role of Administration

Dalal felt that the Ministry of Education needed to increase the support and training that the teachers received. Dalal continued her demands from the Ministry saying,

I hope the Ministry provides a special computer for each teacher in her classroom, a special teacher who knows how to use computers effectively, and a special period for computers to teach children the basics...this will make it an easy task for teachers who don't have time to teach all the children the computer basics. In addition, we need intensive
computer training because teachers, even those who know how to use computers, want to develop their knowledge and their computer skills.

5.2.6. Zahra: Previous experience

Zahra had the most positive attitude of all of the teachers I interviewed, and it was, therefore, no surprise to me that her background held all of the influences that, in the other teachers, had correlated positively with a high interest in computers and teaching children using computers. Her mother had been a teacher for twenty years, and had instilled in her a willingness to explore and investigate any new tool such as technology that could help her in her teaching. Her mother had also taught her that being a leader does not mean that you stop being a learner. For example, she related a story about a family summer vacation.

Every winter we traveled to a new country. My father used to use computers to search for countries, hotels, climate, food and other information related to the country that we will visit...I was watching him while he was searching and I remember that he had taken my ideas and advice and led me to do some search with him! I liked that time because it was the first thing that captured my attention to computers and from that time, I used computers for every thing.

Zahra was 26 and had a Bachelor's degree in early childhood education from Kuwait University. She had six years of teaching experience. Her classroom was very well organized.

Learning by Doing

Zahra thought that her computer interest and teaching style flourished because of her personal characteristics of being active and curious. I asked her about her teaching style, and she said,
I enjoy working with young students. Plus, computers allow me to explore along with my students. There was one point where I asked the children if using only books for experiments was enough to learn about science...the children provided me with different teaching methods such as using computers and conducting a real experiment in the classroom.

Zahra regarded her knowledge as a continuous learning process built upon daily. She believed that teaching is learning that never stops and was always thinking up new ideas as she interacted, taught, and listened to her students in the classroom.

I learn from my children when they use computers because when they use computers they ask me all kinds of fascinating questions that lead the whole class in a different direction. It is the knowledge that we acquire daily.

Using Computers to Teach Children

I asked Zahra to explain the ways that the educational software was useful for her teaching. She replied,

Children's educational software is very interesting. Educational software is made for children to learn from, so it is a very good source for me to help me discuss the topic that my students would understand and like. I use this software as a source of information.

Role of Administration

Similar to the other teachers, Zahra required in-service programs that helped her update her teaching. She also preferred to work with teachers with different backgrounds and methods so she can continue to learn.
Recently, we have been experiencing a delay in providing teachers with in-service programs generally and computer training specifically. I need to be enrolled in a program where they teach us different teaching techniques when using computers. I want to learn new different ways of presenting information using computers for students. Also, I am looking for classes in which teachers work together and learn from each other using computers, like a workshop.

5.3. Summary

The data here indicate that a variety of teachers exist in the Kuwaiti kindergarten classrooms. From my six case studies, there seems to be an emerging pattern between background and classroom success. There is also an emerging theme in the suggestions and complaints made by the teachers regarding their ongoing training and support. Some of the teachers I interviewed expressed negative attitudes toward teaching children using computers, believing that such attitudes were the consequence of their own educational background and computer-related learning experiences. Furthermore, they indicated that they had limited exposure to computers at the elementary, high school, and pre-service college preparation levels. Some teachers also stated that they lacked self-confidence when teaching using computers. Others had learned that computers should be used only for playing and painting.

The teachers who had been less successful in learning about computers seemed to fear computers as a teaching tool. Salwa and Mariam were less than successful computer learners. Each needed to overcome a perceived lack of computer knowledge and low confidence in their abilities to teach children using computers. Most importantly, both teachers' prior experiences had created a framework that had begun to define not only what was possible for them, but also for their students. Surprisingly, this also affected how they perceived computers as a tool to teach kindergartners.
Salwa and Mariam seemed intimidated by teaching using computers because they did not have sufficient pedagogical knowledge of computers.

Nawal and Huda expressed a more typical interest in teaching children using computers. Their interest in computers possibly arose from both their academic experiences and the influences of people at home. They conveyed that they had some positive experiences and were somewhat confident about teaching children using computers.

Dalal and Zahra, with positive attitudes toward teaching children using computers, thoroughly enjoyed using computers in their teaching and exhibited a high level of confidence in doing so. They were confident in their pedagogical and content background knowledge and attributed their self-assurance and success to the fact that they, as teachers, liked to explore, investigate and actively interact with students in the classroom. While this may have been part of their personalities, the attitude was also nurtured by positive educational experiences and role-modeling at home.

There were low, average and strong interests among the practicing teachers I interviewed regarding the use of computers as an instructional tool. Not surprisingly, teachers with a low interest and a weak academic background in computers and computer use with children had learned that computers should be used only in the center time and solely for painting, playing games and printing pictures. Teachers also had trouble finding good educational software. Those with an average interest in computers and computer use with children noted that they used computers to start their lesson as a motivator and sometimes in the middle of the lesson. Teachers with high/positive attitudes toward teaching children using computers stated that using computers was very effective for teaching children. They seemed to have no problem
finding the right software for their everyday teaching.

All of the participants in this study indicated that the Ministry of Education did not provide them with adequate computer training necessary to be truly effective when using computers in a classroom. Further, even in schools with adequate budgets, the teachers felt that the money was not spent wisely by the administrators in charge. The teachers expressed that they would be much more effective if their classrooms were better designed and equipped with materials that were more conducive to teaching and learning using computers.
Chapter 6  
DISCUSSIONS, LIMITATIONS, RECOMMENDATIONS, AND FUTURE RESEARCH

6.1. Overview

The purpose of this study was to investigate practicing kindergarten teachers' attitudes toward and their knowledge about teaching children using computers. Chapters Four and Five dealt with the results emerging from the data gathered from 174 questionnaires and open-ended interviews with six practicing kindergarten teachers. This chapter consists of four sections. The first section discusses the major findings with links to the previous theoretical and empirical findings reported in the literature. The second section deals with the limitations of this study. The third section, then discusses the Implications of the Findings for Educational Policy and Practice. Finally, areas for future research are suggested.

6.2. Discussion of the Findings

I used qualitative interviews to describe the personal perceptions and academic experiences of six practicing kindergarten teachers. Specifically, I sought to examine in a more personal way these teachers' attitudes and pedagogical knowledge regarding teaching children using computers. My goal was to provide the clearest picture possible of kindergarten teachers in Kuwait and their views about computer integration into the curriculum. In order for this portrayal to be accurate, the qualitative and quantitative findings must show a relationship. Therefore, I will first discuss the interview data and then demonstrate how both sets of data are explained and supported by each other.
6.2.1. Qualitative findings

The data indicated that a variety of teachers exist in Kuwaiti kindergarten classrooms. All six interviewed teachers suggested some possible patterns among teachers' background and classroom success.

Background and Academic Experiences with Computers

Research (e.g., Khine, 2001; Landerholm, 1994; Powell & Lord, 1998; Powell, 1999; Rovai & Childress, 2003; Yildirim, 2000; ) has suggested that teachers with negative attitudes toward teaching children using computers tend to have had poor computer education and weak computer-related experience. This background leads to a low interest and a lack of confidence in teaching when using computers.

Low attitude and pedagogical knowledge. Salwa, a teacher with a negative attitude and low level of knowledge, had a computer learning experience quite similar to my own when I was an undergraduate student in Kuwait University. I took a required course about technology and education and I remember the way I was taught about computers. Our computer instructor was required to teach a large volume of information and we had to learn, or to be more accurate, memorize, this large amount of information. Since there was not enough time to emphasize anything but a significant amount of information, the instructor did not have the opportunity to be creative or do any hands-on computer activities with us.

There is an existing correlation between computer courses taken in college and teachers' attitudes and knowledge regarding computers and teaching students using computers (Kolehmainen, 1992; Rovai & Childress, 2003; Sadik, 2006). Teachers with negative attitudes had less exposure to computers and had chosen to take fewer
computer courses than teachers with positive attitudes toward teaching using computers. This correlation has been noted by many researchers (e.g., Collet & Shiffler, 1985; Powell, 1989; Reiff & Powell, 1994; Savenye, 1993) and it shows a relation between attitude and teachers' pre-service computer courses. In other words, weak pre-service preparation seems to generate attitudes of poor self-efficacy and anxiety among teachers in the classroom with computers, and vice-versa. In addition, pre-service teachers who are exposed to content and courses about computer use in the classroom can have their attitudes positively influenced toward the use of computers in their classroom (Powell & Lord, 1998). Powell and Lord also correlated teachers' anxiety about teaching using computers with their feelings of being unprepared and unqualified because of a lack of computer training in college.

Both Mariam and Salwa indicated that their college computer experiences taught them that learning about computers is equivalent to reading textbooks and "cramming" for exams. Their prior computer learning experiences had negatively influenced their use of computers in their teaching, evidenced in their attitudes and performances. Based on their own college computer courses, both teachers had concluded that the computer is a body of facts, learned only through memorization. Not surprisingly, they both complained that the computer courses they had taken in college did not teach them the necessary or appropriate techniques for classroom application. This result is in line with Willis and Mehlinger's (1996) argument. They argued that much of the pre-service and in-service computer training concentrates on computer literacy topics rather than on methods of using technology to support instruction. Computer training must focus on the connection between computers and the curriculum and how computers can support the goals and objectives of the school.
Mariam and Salwa’s experience is consistent with the context in which they were trained. Exposure to formal computer coursework by teachers, both at the pre-service kindergarten level in Kuwait, and at the elementary school level in the United States, usually amounts to one compulsory technology course called “Technology in Education” (Leh, 2000, p. 2). Leh indicated that the technology course content is mostly skill-based and does not emphasize how teachers could use computers with their students. “The focus must be on learning to teach with technology rather than learning about technology” (Gimbert & Cristol, 2004, p. 208). As a result, teachers simply do not feel comfortable teaching using computers. Similarly, the U.S. Congress Office of Technology Assessment (1995) found that almost none of the colleges and universities in the United States required technology courses as a central component of their teacher preparation programs. Clearly, given the above information, it seems reasonable that teachers with negative attitudes toward and/or minimal knowledge about computers and computer use in their classroom could benefit from an intensive and relevant in-service preparatory program.

Average attitude and pedagogical knowledge. Nawal and Huda were both known to have average, moderate attitudes toward teaching using computers, as well as typical knowledge of teaching children using computers in their classrooms. Nawal had developed early favorable attitudes toward computers because of her father’s help and influence. He provided her with special computer learning experiences. Huda, on the other hand, was influenced by attending private computer training. The two courses, which allowed her hands-on experience with computers, were designed to help teachers enjoy learning about technology. Teachers in this private course were involved in problem-solving activities and conducted experiments with the help of several
computer instructors and other attending teachers. These students were neither bored with nor afraid of computers. Instead, they felt confidence in their ability to succeed. Like Mariam and Salwa, both Nawal and Huda stated that their subsequent college computer experiences were unpleasant. Each complained about the amount of information they had to memorize to pass exams.

Computer courses, as they are currently taught in many colleges and universities, are often based mostly on the notion that computers are a body of facts that should be memorized (Powell, 1999). Such an approach does not emphasize an understanding of the concepts behind the facts. This then communicates to students that such concepts are unimportant. Consequently, pre-service primary grade teachers seldom seem to have a holistic understanding of computers or an understanding of computers as tools of discovery. Much of the literature on information technology and teacher education could be summarized in one sentence: Most pre-service teachers know very little about effective use of technology in education and leaders believe there is a pressing need to substantially increase the amount and quality of instruction teachers receive about technology (Willis & Mehlinger, 1996). Like Willis and Mehlinger, Powell and Lord (1998) contended that computer courses at the pre-service level should be designed to encourage teachers to acquire positive attitudes and perceptions about computers and teaching with computers.

**Political Entities, Standard Curricula and Teacher Preparedness**

In Kuwait, the Ministry of Education plays a significant role in how teachers perceive teaching using computers. For instance, despite her love of learning and teaching using computers, Nawal had major concerns about the new kindergarten curriculum. Five years ago, the Ministry of Education decided on new themes for the
kindergarten curriculum. Several of these themes seemed difficult for some of the kindergarten teachers who had had no training in the new curriculum's content (Al-Ahmed, 2005-2006). "My Country is Petroleum" and "Computers in My Kindergarten" were the themes that Nawal found difficult; accordingly, she requested that she be able to participate in an in-service training program so that she could learn to teach the themes more effectively. Al-Ahmed and Nawal contended that the Ministry should not implement a new curriculum before training its teachers.

Nawal felt that the Kuwaiti Ministry of Education should not only inform teachers of upcoming changes, but should also offer services to help teachers understand the new themes. This will enable teachers to communicate the curriculum more effectively to their students. Therefore, it is essential for both policy makers and educators in Kuwait's Ministry of Education and colleges to recognize the need for well developed pre-and in-service programs, if the use of computers is seen as important. If this is the case, the Ministry should consider helping teachers enhance their knowledge and practical understanding of computers and most importantly, provide training on how to teach with computers in their classroom.

Need for more in-service computer training. All of the participants in this study (interview and questionnaire participants), regardless of their orientation toward computers, indicated a lack of adequate in-service computer training for using computers with young children in meaningful ways. The interview participants complained that they did not have adequate training for using computers to foster children's education. They felt that a more illustrative instructional way of teaching the use of computers as a learning tool would both enhance their teacher effectiveness and improve the children's learning environment.
However, while the interviewed teachers acknowledged the educational system's financial constraints, they expressed that the principals and administrators did not spend the money effectively provided by the Ministry of Education. The teachers said that funds allotted for the kindergartens' budget were almost never used for new educational materials, new educational software, private computer training courses, or supplies for classrooms. Instead, funds were spent on decorating school buildings or organizing traditional celebrations such as Kuwaiti Independence Day. These were perceived as foolish expenditures by some of the six teachers, who felt that they were in serious need of support and useful computer training. In fact, rather than providing teachers with money to spend on registering for private computer courses and paying for effective educational software, the administration expects teachers to pay for such things out of their own money. Teachers, then, seem to have little choice other than to self-furnish their classrooms with as many materials and as much equipment as possible, if they are to be considered "good teachers" in the eyes of their principals. Moreover, positive recognition and approval of teachers by the Ministry of Education is very important, for a teacher must receive three consecutive outstanding year-end evaluations by the administration and at least three positive evaluations from the kindergarten division superintendent at the Ministry of Education, in order to be considered for a promotion.

**Need for a dedicated computer period with a computer specialist teacher.** All of the interviewed teachers, regardless of their attitudes toward computers, indicated that lack of time was an obstacle in their ability to use computers with all students. They suggested that the Ministry could provide them with a teacher who knows how to use computers well. In addition, the teachers prefer a special period for all children to learn
how to use computers.

The participants in this study saw themselves as very much in need of additional support and help regarding the effectiveness of their instructional use of computers. They believe strongly that such support would be enormously helpful in helping them to overcome their feelings of intimidation regarding computers and teaching children using computers.

High attitude and pedagogical knowledge. The two teachers who were known for their positive attitudes and high level of computer pedagogical knowledge tended to share personal stories and showed high interest in teaching using computers. They stated that they liked to explore, investigate and become actively involved with their students in the classroom. Henniger (2002) suggests that young students are curious and learn more effectively through play and exploration. Zahra thought that her interest and experience with computers was linked to her active and curious personality. She felt that this was reflected positively in her students' interest in learning more about different computer uses and added that she was sure that if primary grade students experienced the fun of using computers, they would surely develop more positive attitudes toward them. Her own passion was so inspiring that I started to wonder if it would be helpful for Kuwaiti teachers to have translated versions of the outstanding developmental software such as those used in United States like Arthur's Camping Adventure, Kidspiration, Word Central, and Bear Imagine (Haugland & Ruiz, 2002).

Dalal, the other teacher with a positive attitude and strong pedagogical knowledge, believed that teaching children using computers encourages their curiosity and wonder about their environment. Similarly, Dalal related her interest in computers to her curiosity about animals and nature. She acknowledged that some of the most
favorable experiences that she had when she used computers were with her students. Both Dalal and Zahra believed that their confidence in teaching children using computers was a result of their strong computer training and educational background.

Their confidence in their ability to teach using computers also seems to rest directly on their strong pedagogical knowledge. Yet this is not a static factor. Zahra viewed her knowledge of computers and teaching children using computers as a process that was always growing, as she interacted, taught and listened to students in the classroom. She believed that teaching is a life-long learning process. This notion of learning as an on-going process is supported by Osborne (1998) who stated that teachers construct knowledge while teaching their students in the classroom. Teachers' pedagogical knowledge is "continuously altered as the teacher and students interact" (p. 437), and should be evaluated as evidence of a teacher's ability to teach and learn.

Using Computers to Teach Children

The teachers I interviewed who had negative attitudes and low interest in teaching children using computers lacked the appropriate knowledge on how to use computers with their students and integrate computers in their lessons. They stated that they simply use the educational software provided by the Ministry with children in the center time only, in direct contrast to their peers with positive attitudes and high levels of pedagogical knowledge. Salwa and Mariam believed that they might use computers to teach science and other subjects if they themselves have the opportunity to learn different ways of using computers in different subjects. Their poor knowledge and attitudes, devoid of enthusiasm or adventure, were not improved by pre-service pedagogical training. These results paralleled findings from previous studies concerning the impact of teachers' attitudes and knowledge on computer use (Khine, 2001;
Landerholm, 1994; Powell, 1999; Powell & Lord, 1998; Rovai & Childress, 2003; Yildirim, 2000).

The teachers whose attitudes and knowledge of teaching children using computers were classified as average seemed more positive about the importance of computers to teach children. However, Nawal's acknowledgment was limited, in that she regarded the use of computers as appropriate only to motivate or start, a science lesson, a stance that was indirectly recommended in the Teacher's Theme Manual guide, designed by the Ministry of Education. Nawal had great interest in using computers and the educational software, however she was concerned about her inability to implement them. She felt that she needed more training in the use of computers.

Additional training may be most critical for teachers whose attitudes and knowledge might be classified as either low or low/average. In fact, all teachers, regardless of their orientation toward computers, believed that computers are important to education and they wanted to learn to use them effectively in their classrooms. That is, in order to use computers comfortably and effectively, teachers need to be better prepared to teach students with computers.

Huda seemed to feel more confident in her pedagogical knowledge and had more confidence in her ability to understand and teach the new themes. She saw the computer as a very practical enhancement tool to teach science, in that the software contain commonly used words and sentences that children could understand and learn more easily. According to Huda, the use of computers helps students learn not only the lesson content, but also to develop abstract thinking, problem solving and verbal skills. A number of authors indicate that when teachers select developmentally appropriate
software that meets children's interest and needs and matches their learning objectives, computers provide an ideal opportunity to engage critical thinking, as well as encourage children to reason, experiment, explore, solve problems, and collaborate with others (Haugland, 2000; Haugland & Ruiz, 2002; Svensson, 2000). Others suggest that the instructional use of computers facilitates children's development of mathematical, writing, and science skills (Clements, 2001, 2002).

The two teachers I interviewed who were known to have positive attitudes and high levels of knowledge also seemed to have a stronger sense of familiarity and understanding of the many methods of teaching that could enhance their competence in the classroom. These teachers' prior knowledge of computers likely influenced their inclination to use computers in their instruction. Dalal and Zahra both had a strong knowledge of computers and displayed confidence in finding and selecting age appropriate, accurate children's educational software for their classroom. It seems likely then that this is why they had fewer problems teaching children using computers.

In-service Teachers' Experiences

In most developed countries, professional development for teachers is considered crucial to any comprehensive educational policy. In addition, professional development can help teachers keep up to date with new and effective teaching and learning practices (Mouza, 2003). In Kuwait, also, there is a need to improve the quality of computer use in kindergarten schools. Yet interview participants in this study indicated that the pre-service computer courses both at Kuwait University and the Basic College of Education did not prepare them for teaching young students using computers.
The need for computer technology training to support the implementation of computers in early childhood education is widely recognized (Bilton, 1996; Wood, Willoughby & Specht, 1998) and is reaffirmed by the present research results. In addition to feeling that the administration did not support their professional development needs, the interviewed teachers explained that they were given no instruction regarding the new curriculum implemented by the Ministry of Education.

New studies conducted by the Kindergarten Division in the Ministry of Education examined the effectiveness of in-service programs developed for kindergarten teachers. Their results have reinforced the conclusion that teachers who attended professional development programs were more effective in teaching and applying the new curriculum than those who attended only pre-service computer courses (Al-Ahmed, 2005-2006). This result is supported by Mouza's (2003) study which reported that teachers who participated in a professional development program demonstrated improvement in their technological skills and they became aware of new pedagogical strategies with the use of computers. It seems reasonable to conclude that meaningful in-service programs will likely improve teachers' understanding of computers, making them better able to share this understanding with their students. Such on-going education seems crucial for the teachers' professional development and for creating successful kindergarten environments.

The Role of Peer Observation in Teacher Learning

Professional development is a critical ingredient in effective use of computers in the classroom. Many researchers believe that an effective school environment should encourage teachers to work and learn together and to share their experiences, opinions, and ideas (Mouza, 2003; Steinberg, 1998). Two examples of professional
opportunities that the interviewed teachers expressed a particular interest in were visiting other schools and peer observation. They saw in these activities the opportunity to exchange teaching techniques, ideas and difficulties when using computers in their lessons. A number of the interview participants had already had some exposure to this in-service experience and felt strongly that they would benefit from the ideas of other successful kindergarten teachers. In fact, one participant stated that she first learned about using computers when teaching science by observing another teacher in a neighboring school. All of the teachers interviewed for this study had specific suggestions for adequately improving their teaching using computers. They wanted to enroll, for example, in courses where they might learn about educational software development and computer curriculum design.

6.2.2. Quantitative and qualitative findings

The qualitative findings, described above, supported the quantitative results of the study, providing further unique and specific details. This will become apparent in the following sections. Attitude and knowledge were shown to be related and dependent on each other for all questionnaire participants.

Attitudes and Pedagogical Knowledge

In perhaps the most significant results of the questionnaire, the variables of attitude and knowledge regarding the use of computers were shown to be positively correlated with each other. The three pairs of teachers who participated in the interview portion revealed very different attitudes toward and knowledge of using computers in their classroom. The interviewed teachers with negative attitudes or low levels of knowledge believed that their low interest and confidence in computers resulted from
weak educational backgrounds and a lack of positive computer learning experiences. They explained receiving inadequate pre-service preparation, had a major impact on their attitudes, self-efficacy and anxiety regarding the use of computers with their students.

The findings indicate that it is possible to predict a relationship between teachers who did not like computers as students and teachers who have negative attitudes toward teaching using computers. Several studies reported that teachers' educational background and knowledge about computers and using computers in their teaching related to their attitudes and feelings of being unqualified or unprepared to teach with computers (Powell, 1999; Yildirim, 2000). This seemed to be the case for my Kuwaiti subjects as well. That is, teachers' knowledge had a major impact on their attitudes toward teaching using computers.

Interviewed teachers with positive attitudes and high levels of knowledge stated that they had useful learning experiences in their K-12 schooling and college years. They expressed a high interest and confidence in computer use in their classroom. They described themselves as active and curious and felt it was these personal characteristics that contributed to their flourishing interests in computer use with their students. Dalal and Zahra, who had positive attitudes toward and high levels of computer knowledge, attributed their self-assurance and success to the fact that they had strong knowledge of computers. They had learned to use the computer as a tool in their everyday life and they conveyed this in their teaching. This fact suggests that a high level of computer knowledge may strengthen teachers' self-perceptions of their ability to teach students using computers.

The above-mentioned findings from the qualitative results of the study were consistent with the results of the questionnaire, which similarly reported that
kindergarten teachers' attitudes toward teaching using computers, positively correlated with their pedagogical knowledge. Teachers with positive attitudes toward teaching children using computers tended to believe they had high pedagogical knowledge and vice versa.

Pre-service Courses and Teaching with Computers

Interviewed teachers with positive attitudes stated that they had quality learning experiences at the pre-service level, while teachers with negative attitudes and low levels of knowledge had not experienced beneficial computer learning experiences at the pre-service level. They stated that college computer courses taught them that computers are a body of facts, not to be experienced, but memorized. They felt that they had learned none of the necessary techniques that might be applied in the classroom and this negatively impacted their self-efficacy as teachers. The kinds of courses they expressed a desire for were similar to those recommended by Powell (1999) in his study *Interrelationships between importance, knowledge and attitude of the inexperienced*. Powell discovered that the integration of a computer simulation program of various teaching and learning situations within a pre-service curriculum course for early childhood majors had positive effects on students who were exposed to this method on their knowledge and attitudes toward computers and computer use with children. That is, the use of computerized simulations in pre-service computer courses decreased students' anxiety and improved their attitudes toward the use of computers in their teaching. Powell suggested that quantity and quality of pre-service computer courses could be factors that influenced teachers' attitudes toward computers and teaching using computers. Eleven percent of the 174 teachers who answered the questionnaire for my study received their computer training from Kuwait University or
Basic College of Education and they took only one pre-service computer course. Thirty-three percent of the participants received inservice training. That is, the majority of the teachers had not received any computer training and they were self-taught (36%). This finding may suggest that the participants either did not receive pre-service or in-service computer training due to the fact that many are currently working or may not have the time or the opportunity to receive training.

**Attitudes, Knowledge and Teaching Children Using Computers**

Interviewed teachers with negative attitudes and low levels of knowledge stated that they had no inclination to use computers, because they had no prior experience with using them with their students. Their particular stance may also indicate an overall passivity in learning "new" ways of teaching using computers.

Because the majority of the surveyed teachers had positive attitudes toward computers and computer integration into the curriculum, not surprisingly, 76 of the 166 teachers who answered the following item responded positively "I integrate computers with the lessons we are working on in the classroom," and 83 of the 160 teachers who answered the following question responded positively as well "I know how to identify developmentally appropriate software." These items, in particular, revealed an interesting finding regarding the background and ability of Kuwaiti kindergarten teachers in teaching using computers. However, interviewed teachers, regardless of their views and attitudes toward the use of computers, suggested that there is a strong need for pre-service and in-service computer programs to teach them how to use computers effectively with their students. These findings supported the questionnaire results, which indicated that 133 of the 172 teachers strongly agreed that they would like to learn to use a computer in their classroom. Also, 97 of the 170 teachers disagreed that they
have adequate training to use computers and only 32 of the 170 teachers agreed that they have adequate computer training. According to the existing literature, the use of computers in the classroom requires teachers to have a good computer background, such that they will be able to choose software with accurate information.

Unlike the previous findings on teachers' attitudes and knowledge regarding the use of computers, the questionnaire data of this study surprisingly indicated that no significant differences in kindergarten teachers' attitudes were found when compared by their age, varied teaching experience, degree achieved, computer training, or type of computer training. However, questionnaire results indicated that teachers who own a personal computer at home reported having significantly more positive attitudes toward computers and computer use in their classrooms than did those who did not own personal computers. Therefore, the availability of computers at home seemed to influence Kuwaiti kindergarten teachers' attitudes toward computers. In the case of their knowledge of computers and computer use in their classroom, the findings indicated that there were no differences in teachers' knowledge about computers when analyzed by their age, teaching experience, degree achieved, computer training, type of computer training, and computer ownership.

Teachers with average to positive attitudes and high levels of knowledge were very enthusiastic about using computers in their classroom. Questionnaire data indicated that 125 of the 174 teachers strongly agreed that computers make learning fun. Interviewed teachers with positive attitudes and high levels of knowledge were convinced that computers were an appropriate and effective tool for teaching children. They took the responsibility to provide their students with the best software they could get.
There was a significant correlation between teachers' positive attitudes and high levels of knowledge about using computers in their teaching. Conversely, teachers with negative attitudes and low levels of knowledge held little regard for teaching children using computers. The qualitative findings are supported by the questionnaire results. There were positive correlations between teachers' knowledge for teaching students using computers and their attitudes toward teaching students using computers.

6.3. Limitations of the Study

This study is not without limitations. Caution should be exercised regarding the types of inferences drawn from the present study's results because of these limitations.

This study is limited in terms of its non-random sampling procedure and the characteristics of its participants. This study gathered data from volunteer kindergarten teachers in Kuwait who use computers daily as a main learning center. Therefore, the results from this study can be generalized only to similar groups of early childhood professionals. In other words, the research results may not adequately describe early childhood professionals from other countries like the United States and Canada, who may or may not use computers in their classroom, for instance.

In addition, the teachers surveyed were limited in their knowledge and experience with the use of computers in their classroom. Consequently, some of them responded to the questionnaire questions based on their theoretical understanding of computer use in the classroom.

Because the timing of the theme (Computers in My Kindergarten) and the practicalities and the logistics of conducting this study, unfortunately in-class observations were not appropriate. Therefore, this research study used questionnaires and interviews as two main sources of data collection. That is, this study captured the
teachers' perceptions of their use of computers in their classrooms and did not capture their actual use of computers.

6.4. Implications of the Findings for Educational Policy and Practice

In this section, I will examine teachers' comments that were made earlier in the analysis of the interview data regarding school administrators and Ministry assistance. It is my sincere hope that some of the emerging conclusions will be useful to early childhood teachers, educators and the Ministry of Education in the State of Kuwait and other countries as well.

6.4.1. Need for professional development

All six of the interviewed teachers and 77.3% of the questionnaire participants emphasized that they needed professional development to improve their teaching when using computers with their students to enable them to develop creative activities using computers with their students. Most believed that their pre-service computer classes prepared them inadequately for teaching using computers. They wanted in-service courses to help them learn the most recent teaching strategies using computers, in order to upgrade their teaching quality. More specifically, they wanted in-service courses that would teach them more about the new themes (i.e., Computers in My Kindergarten and My Country is Petroleum), how to teach them effectively and how to construct activities that would help their students better understand the themes.

6.4.2. Suggestions for university and basic college of education

Of primary importance, given the discussion above, is a need for greater consideration regarding the design of computer courses in both Kuwait University and
the Basic College of Education. Useful computer content and pedagogy that promote positive attitudes toward computers and computer use with students must be addressed when designing a pre-service computer course. Furthermore, offering diverse experiences such as practice, inquiry-oriented process approaches and the use of children's educational software may affect teachers' understanding of computers, as well as their attitudes toward the different methods of teaching using computers in a more positive way. Productive computer courses at the level of pre-service education may encourage students to acquire positive attitudes toward computers and teaching using such tools. In short, Kuwaiti educational institutions should supply strategies that help future and current kindergarten teachers effectively link what they learn in university and college with actual day-to-day teaching with computers. Teachers well trained in using computers in their classrooms will help the coming generation to be successful learners in the Information Age.

In addition, the Kuwait University and The Basic College of Education may wish to take into consideration the content of the current required computer courses and the way that professors presently teach this content to their students. In addition, meaningful learning of computers in pre-service programs could be accomplished when integrating computer learning into methods courses and student-teaching (Willis & Mehlinger, 1996).

My questionnaire findings suggest that the majority of kindergarten teachers in this study had positive attitudes and high levels of knowledge regarding teaching children using computers. Yet, a considerable number of teachers reported that they wanted to know more about the use of computers in their classrooms. It seems most reasonable that such perceptions and understanding be encouraged and promoted through carefully designed, current computer courses at the college level.
6.4.3. Suggestions for the ministry

Lack of computer curriculum guidelines and educational software can be a major barrier to teaching using computers. The superintendent indicated that the Ministry is working hard to design curriculum guidelines for teachers about the use of computers in their classrooms (Al-Ahmed, 2005-2006). Therefore, it seems that Ministry and school administrations might wish to provide their teachers with specific computer guidelines to help them best integrate computers into the curriculum. Another need seems to be in the area of available educational software in the market. Here again, the Ministry may support teachers by providing them with a guide or monthly report that lists the available children's educational software, including the names and locations of sellers.

The Ministry or the schools' administration should also consider supporting teachers by paying for a portion of the software's cost. Many teachers are responsible for purchasing even basic materials, such as curtains to cover classroom windows, small cushion seats for the children, paper, crayons, plastic plates, posters, books, beans, costumes, kitchen supplies, blocks, and puzzles. As mentioned earlier, because school principals grade teachers' performances at the end of each year, teachers are under great pressure to show their skills and creativity. This requires new, innovative and stimulating materials. Presently, teachers purchase educational materials and software with their own money.

Further, in-service professional programs could be made available for all teachers, with research-based computer methodology courses especially recommended. According to the interviewed teachers of this study, unfortunately, much of the provided in-service computer training concentrates on computer literacy topics rather than on methods of using computers to support instruction in the classroom.
Finally, the Ministry should encourage the teachers to use computers in the kindergarten classrooms by providing financial assistance to those who need to participate in seminars and workshops to improve their computer skills.

6.5. Suggestions for Future Research

My suggestions for further research are based on areas that, although addressed in some capacity in this study, still need attention if we are to truly enhance and develop primary grade teachers' attitudes and knowledge of computers, as well as using computers with their students. The following are suggestions for further exploration.

1. Given the findings of this study, a next logical step would be to conduct an ethnographic study to observe teachers in their natural setting -- the classroom -- to understand more fully how they teach children using computers and how and when they use computers in their lessons. In addition, examining the teachers' role during the application and use of computers by children is considered crucial. Classroom observations would provide a picture of the effect of educational software on children's understanding.

2. A study should be conducted to investigate the type of training that is being offered to students majoring in early childhood education at Kuwait University and Basic College of Education.

3. Although my emphasis in this study was to examine teachers' attitudes and beliefs about the use of computers in their classrooms, it is plausible that teachers' beliefs about literacy is an important factor and needs to be studied in the future research.
Although, the above recommendations are not exhaustive, they are a starting point for future research related to early childhood teachers’ attitudes, knowledge and practices regarding the use of computers in their classrooms. The recommendations and suggestions may provide additional data to be used by early childhood program directors, teacher preparation programs, and others who are interested in enhancing the early childhood classroom with computers. It is hoped that these recommendations and suggestions will significantly contribute to improved teacher attitudes and knowledge regarding the use of computers in the classroom in particular, and more effective and beneficial instructional practices in Kuwaiti kindergarten classrooms.

6.6. General Conclusion

This study explored teachers’ attitudes, knowledge and reported practices regarding the use of computers in their classrooms. Using both quantitative and qualitative methods, I have attempted to recognize what it is that enables some teachers to reach high levels of efficacy and self-confidence, and what holds other teachers back from such experiences. In general, I found that it is teachers’ attitudes, which reflect their training, background, and personalities, that determine their efficacy in the classroom. Attitudes, it should be noted, are changeable; changes in teachers’ training and introduction to new methods of teaching can greatly influence their confidence and effectiveness. Among these innovations is teaching children using computers, which can provide an entry point to the material for both teachers and students, and may foster the strength of exploration that has so far been lacking in much of the training of both teachers and students.

One of the outcomes of this study is an increase in my own understanding of computer use by Kuwaiti kindergarten teachers. I am fascinated to find out that all
participants, regardless of their attitudes toward the use of computers, were willing to learn more about the use of computers in their classroom. It is my sincere hope that, through greater attention to their preparation and their evolving perceptions, these teachers will find both the tools and access that they need in order to experience success and fulfillment, both for themselves and their students.
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Appendix A - Project of Computerizing Education in Kuwaiti Kindergarten

The idea of computerizing kindergarten emerged after inserting computers in high school in 1987 and intermediate classes in 1991. It became necessary to insert the computer in other educational phases. As the kindergarten phase is the main gate and natural entrance of the primary classes, and considering the kindergarten and primary classes as two connected phases, it was natural to start inserting computers in kindergarten according to the following phases:


1. The first phase started in five kindergartens distributed over the five educational areas in Kuwait.
2. This phase was financed by the money specified for the project of inserting computers in the intermediate classes, financed by Kuwait Establishment for Scientific progress, with a cost of around one hundred thousand Kuwaiti Dinars.
3. The project was performed as follows:
   a. Equipping the classes of the kindergarten second level with wooden units for the computer's corner, at the rate of unit per class.
   b. Equipping each corner with four computers and touch screens, linking them with a small network and a colored printer.
   c. Providing programs necessary for each kindergarten.
   d. Training the teachers and technical supervisors on the computer programs.

1. 48 teachers and technical supervisors participated in the performance of the essay phase, distributed on the five kindergartens.
2. Two computer directors and one computer engineer at the school computer unit supervised the essay phase, under the supervision of the Assistant of Secretary of Planning and Information.

Second Phase of the Project (1999/2000):

1. 34 kindergartens joined the project so that the total participating kindergartens amounted to 39.
2. The number of classes of the second level benefiting from the project amounted to 195 classes and the number of benefiting children amounted to 7128.
3. The cost of this phase amounted to KD 450,000, financed by the amounts specified by Kuwait Establishment for Scientific progress.
4. Five training sessions were held for the teachers, technical supervisors and directors of kindergarten.

Third Phase of the Project (2000/2001):

1. The number of kindergartens participating in the project during this phase increased to 82, distributed over the various educational areas in Kuwait. These kindergartens include 420 classes benefiting from the project for this year and 10069 children.
2. The cost of this phase amounted to KD 500,000, borne by the Ministry of Education from the balance of the Information Center.

3. Eight training sessions were held for the kindergarten teachers to train them on the use of computers, the method of running the programs available for the educational themes for the children of the second level in kindergarten.

Justifications of Inserting Computers to Kuwaiti Kindergarten

The alphabet illiteracy is no more an obstacle faced by children in our current society, particularly with the laws, necessities of education and various media. Technology occupies the mind of several parents and education officials, and as childhood is a critical period to understand concepts and develop skills, we should develop these behaviors of the child since his early age, taking in consideration the entertainment and suspense of the computer programs that may direct and use the energies of the children in a way satisfying their tendencies and directions, instead of wasting them on something useless.

Furthermore, we can state several justifications of inserting computers to kindergarten as follows:

1. Huge and terrible increase of the quantity of data, diversification of the knowledge sources and appearance of new data containers depending on the computer, which necessitates that we provide the child with necessary skills and knowledge so that he becomes acquainted, since his early age, to these characteristics of our present world.

2. Creating convenient circumstances encouraging the child to innovate, create and invent, in which the computer plays a major role.

3. All schools of the Ministry of Education use computers to complete their administrative work by providing the Ministry with a computer and printer, specifying them for the management, in each school and all education phases, including kindergarten.

4. Many teachers of kindergarten have major interest in computers by being registered in training sessions concerning computers outside the Ministry, at the Kuwait Teachers Association, Kuwait University, Public Authority for Applied Education and Training and Kuwait Computers Association, as well as private companies in order to acquire and develop their computer skills.

5. The Ministry of Education in the State of Kuwait builds a major policy in the insertion of computers in education and starting the performance of inserting computers in the intermediate phase, covering more than half the intermediate schools in the State of Kuwait in the current academic year 1997/1998, after making the teaching of computers generalized in high school, both systems, which makes the insertion of computers in the rest of phases necessary to complete the process and that Kuwait continues in being major in this field.

6. Flexibility of the programs and activities offered to kindergarten children and the formation of the semester, including different fields, which facilitates the possibility of
adding computers to the activities in a smooth way not making a big change to the nature of the programs, but enriches them and assists their clarification and progress.

7. Presence of several essays, even limited in their dispersal and application field to insert computers to kindergarten, confirming the wish of the kindergarten administration and parents to insert computers and seek the provision of several devices using them through the Ministry of Education or through the creation of financing resources such as the revenues of scholar canteens or contributions of several local and private companies and establishments.

The objectives of the project of computerizing the education in kindergarten may be resumed as follows:

1. Ensuring the reinforcement of the role of computers in all educational phases, whether as an academic course with a fixed location on the map of the educational plans or as a tool contributing effectively in the assimilation of a larger number of students for all academic fields.

2. Developing computer awareness of the children and their estimation of its importance and the role of this technology in several life fields, its effect on the increase of production and achievement of more services and luxury to the humans.

3. Achieving a minimum limit of computer culture for the children, enabling them to be aware with the requirements of the era.

4. Enriching the environment with more educational activities aiming at the facilitation of education and providing a high brain enjoyment.

5. Offering developed computer programs using several media for the interaction of the child with them, helping the growth of his different brain capacities.

6. Integration of the computers with other fields offered to the child, achieving the purposes of the educational process in all dimensions and encouraging the student to use it in high phases and helping the teacher to use it in all activities.

7. Benefiting from the large quantity of educational programs available in the market, locally, in the Gulf, Arab world and internationally, serving this phase, encouraging the production establishments of these programs in the local market, Gulf countries and Arab countries to produce Arab educational programs, distinguished technically and educationally.

8. Creating job opportunities to the Kuwaiti graduates in the computer field, whether from Kuwait University or the Public Authority for Applied Education and Training.

9. Participating in the programs of reformation and development of education through the use of computers and reinforcing its role in the educational system whether by offering it as educational course or using it in the development of the teaching methods and technologies of various academic fields or even by using it for the service of the academic administration in general.
Bases and Standards

Through the above-mentioned in the study concerning the construction of the kindergarten programs and within the insistence on the adoption of a philosophy confirming the integral role of the computer in the education field, we deem that the education in kindergarten shall be computerized according to the following bases and standards:

1. The project is performed with the children of the second level in kindergarten than the first level, for the following reasons:

   a. Rate of attendance of second level children is normally higher than the first level, in which the attendance rate is relatively low.
   b. The child is more consistent in the kindergarten environment, second level, than the first level representing the first phase of the movement of the child from his home to a new environment.
   c. Response of the child to the various activities is higher in the second level than the first level.
   d. Ability to concentrate is higher in the second level than the first level, as the child is able to follow all that is displayed on the screen and interact positively in a way reflected on the performance of activities related to experience.

2. Computer is offered in kindergarten as a main basis in the academic semester, joined to others and participating in their function of assisting all experiences studied by the child in an integral and global manner.

3. Adding experience to those of the second level, under the title “Computers in my Kindergarten”, in which the child learns the introduction to computers, their role and use in the kindergarten and society, as well as using it in several ready programs reinforcing the main computer skills.

4. The kindergarten teacher will work on the computers and their experience on the second level, insisting that this shall be performed according to teachers’ standards for each semester, whenever possible and in coordination with a computer specialist, who may be called computer coordinator, appointed particularly for this purpose by one per class.

The corners of the various educational activities represent the most important components of the kindergarten classroom, such as the house, sciences, educational games, technical and office education, deliberate listening and learning, in addition to pictures and figures. These corners are used in the activities serving the experiences where the teacher organizes the experience on time through the biggest number possible of corners and through many directed and free activities, leaving every child free to choose the corner in which he wants to work in each period. The teacher ensures that the child passes by the corner of education even if periodically with other corners in a way to confirm that children acquire the concepts, directions and skills, training them individually by using the child’s booklet of experience and activities related thereto through educational applications, toys and devices.

Within our project, we suggest the addition of computers to the other corners mentioned
above.

Components of the Computer's Centre

The computer's centre is formed of an integral furniture unit, specially made for this purpose, including four computers of various sizes, with touch screens in addition to other devices, keyboard and mouse, as well as two printers, one inkjet colored and the other laser uncolored. Four to ten children may work in this corner, according to the density of the classroom, by providing convenient computer programs, serving, in whole or in part, the educational courses offered in the second level, such as directed activities in addition to several convenient entertainment programs for the age period of the kindergarten children to be used in the free activities. These programs shall not highly depend on the use of language, they shall be exciting and interesting in their audio-visual, motion picture and characters loved by children. Such programs shall be provided through three possible sources:

1. Ready local, Arab and international entertainment and educational programs according to a mechanism that may be resumed as follows:

   a. Analyzing the terms of each course of the second level from their various sides.
   b. Preparing a list of the programs available for the kindergarten children, in terms of education and entertainment, through the publications of the producing companies and various titles related to Internet.
   c. Studying the lists and specifying the names of programs that may contribute, in one way or another, in offering courses as directed activity or free activity.
   d. Purchasing samples of the specified programs, perusing, studying them and specifying their conformity to the religious and moral standards and society's philosophy, as well as specifying the courses conformant to them in whole or in part.
   e. Preparing lists including the names of courses, provided that each course is accompanied with the names of programs conformant to their contents, clarifying the conformity degree, in whole or in part, provided that each program encloses a guide including the names of the course(s) used as well as technical and educational services to be used.

2. Working on the translation of several international education or entertainment programs into Arabic, through legal channels or contracting with several producers of Arab programs available in this field to perform specified amendments thereto, in order to be conformant to the project's objects and contents of the various courses. It is necessary to adopt a clear policy in this regard, guaranteeing the quality of the product and its conformity to the religious, moral, philosophical and educational standards for the children in this critical age.

3. Preparing, developing and building educational and entertainment programs serving specified aims or courses rarely found in the ready programs contributing in the offer thereof, through:

   a. Appointing technical teams of the computer skills available among the workers at the Ministry, in addition to referring to skills available at Kuwait University, Public Authority for Applied Education and Training, Kuwait Institute for Scientific Research and other
government educational and computer establishments.
b. Benefiting from the skills and capacities of some programs, updating convenient mechanisms for the performance of the same, whether through assignment, tenders or competitions specified at light of the above-mentioned conditions.

**Computer Theme**

The theme suggested to be added to the second level’s themes under the name “Computers in my Kindergarten” as the activities of this course according to their nature and sides specified around basic elements such as the computer, its components, drawing and programs.

**Basic Concepts of the Computer Theme:**

We suggest that this course includes the following basic concepts:
b. Computer’s components, apparent parts and accessories.
c. Computers in kindergarten.
d. Computers in society.
e. Safe use of computers.
f. Drawing on computers (coloring, copy and paste, drawing).
g. Using ready educational and entertainment programs.

The theme shall be presented through various activities, individual and collective, in many methods that differ according to the concept, within a character loved by children. The activities’ methods start by using the various corners inside the class, referring to various technologies such as video games, real forms and others, like the external visits of the establishments using computers, etc.

It is useful to use activities related to the production of the children, such as the pictures collected by them on the computer, their computer courses, etc. and prepare them in a publication or permanent exhibition at the school’s hall.

It is preferred that this theme is given to the second level, as mentioned above, and with the beginning of the first academic semester, whenever possible, provided that a student booklet is prepared with a book of the teacher’s instructions considering the basic concepts of the above-mentioned course as basic terms. The convenient programs shall, accordingly, be specified with the various forms of activities that may be given in the course through the various corners in addition to the computer’s corner.
Planning of the Computer Theme

(Second Level)

Aspects of the Computer Theme

Basic Concepts and Skills

1- The computer is a machine.
2- Computer parts.
3- What the computer can do?
4- Role of computers in kindergarten.
5- Role of computers in society.
6- Safe use of computers.
7- Introduction to and use of the keyboard.
8- Introduction to and use of the mouse.
9- Using computers for drawing, coloring, copy and paste.
10- Choosing and running convenient programs.
11- Following steps of educational programs.
12- Saving, calling-in and printing the children’s work.

Partial Concepts and Skills

1- A computer corner in my class.
2- The computer is an electrical device.
3- The computer has many parts (screen, treatment unit, keyboard).
4- The correct seat for the safe use of computers.
5- With computers we can draw easily.
6- The keyboard enters data to the computer.
7- The mouse moves the cursor on the screen.
8- The computer is affected by temperature, humidity and dust.
9- Encouraging the child to draw on the computer, to express his thoughts and master his skills in this field.
10- Following the steps and performing the ready programs.
11- Saving, calling-in and printing (through icons) partially.
12- Introduction to several linguistic terms.

Interests and Trends

* Interesting the children and directing their trends towards:
  1- Collecting pictures or graphs of computers.
  2- Enquiry concerning computers and its parts’ functions.
  3- Taking care and preserving the computer.
  4- Choosing harmonious colors.
  5- Enquiry of the educational and entertainment programs and their method of use.
  6- Organizing outputs and saving the works of the child.
Objectives of the Computer Theme:

Upon ending the course, the child can:

Cognitive Skills
1- Recognize the computer corner in his classroom.
2- Recognize the computer in a set of other devices.
3- Recognize the material apparent parts of the computer.
4- Enumerate the interests of using the computer.
5- State at least two uses of computers in kindergarten.
6- State at least two uses of computers in society.
7- Notice that the computer works on electricity.
8- Notice that the computer may run more than one program.
9- Pronounce the word “computer” correctly.
10- Recognize the keyboard and its parts.
11- Enquire about the problems he faces in running the computer and dealing with programs.
12- Express all that he sees on the computer programs correctly.
13- Look for the right key.
14- Follow the steps of the computer program and state the importance of programs in running the computer.
15- Read the word “computer”.

Social-emotional Skills
1- Estimate the importance of the computer and its services offered.
2- Enjoy the dealing with the computer and behave well upon facing a problem.
3- Cooperate with his colleagues on the computer.
4- Respond to the teacher’s instructions upon using the computer.
5- Choose the ready program convenient to the course he learns.
6- Perform all that is assigned by the teacher.
7- Enjoy the comprehension of the computer’s subjects.
8- Estimate the importance of computers in studying the other courses.
9- Use the computer and its programs while studying the various experiences.
10- Collect pictures and books on the computer.

Sensorimotor Skills
1- Sit on the computer correctly.
2- Sing songs on the computer.
3- Mix a drawn form and his thoughts on the computer.
4- Run the computer safely and correctly.
5- Use the keyboard correctly.
6- Hold and use the mouse correctly.
7- Watch pictures and books on the computer.
8- Color forms using the computer programs.
9- Use copy and paste in making pictures on the computer programs.
10- Draw using the computer.
11- Express by drawing a given or invented idea, using the computer.
12- Save, call-in and print his works on the computer.
13- Interact with the ready chosen programs positively and correctly.

**Activity Methods**

- Description of methods, technologies and accompanying books – Assembling pictures
- Preparing forms and graphs – Preparing a list of tales – Computer programs – Magnetic cards, tapes and educational games.
- Providing devices and tools (cinema, television, computers, printers).
- Organizing visits and trips to the Information Center – Airlines – Airport – Sultan Educational Club Center – Banks – Kuwait Petroleum Company

**Reference**

Appendix B - The cover letter

Dear kindergarten teachers,

As I prepare for a Ph.D in Curriculum Studies at the University of British Columbia, Canada, I am gathering information for my research that concerns investigating the attitudes and knowledge of practicing kindergarten teacher toward computer integration into the curriculum.

The success of a considerable part of this research rests upon your contribution in answering the attached questionnaire. Your participation is voluntary. You are not required to write your name on the questionnaire; your response on both questionnaire and interview will be treated with absolute confidentiality, the data obtained will be used only for the purpose of the research. If you are willing to participate in a follow-up interview, please write your name and phone number at the end of the questionnaire. Thank you for your cooperation, assistance, and time. If the questionnaire is completed, it will be assumed that consent has been given.

Sincerely,
Mona Mohammad
Appendix C: Teacher Questionnaire

Thank you very much for taking the time to complete this questionnaire. Your responses will be kept strictly confidential.

*Early Childhood Teachers' Attitudes, Knowledge, and Reported Practices Regarding Computer Integration into Kindergarten Curriculum*

SECTION 1: Demographic

**PLEASE CHECK THE ANSWER THAT DESCRIBES YOU BEST**

<table>
<thead>
<tr>
<th>[ ] 20-29</th>
<th>[ ] 30-39</th>
<th>[ ] 40 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] 1-5</td>
<td>[ ] 6-10</td>
<td>[ ] 11-15</td>
</tr>
<tr>
<td>[ ] over 16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. What is your age range?

<table>
<thead>
<tr>
<th>[ ] Two-Year College</th>
<th>[ ] Bachelor's</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Master's</td>
<td>[ ] Doctorate</td>
</tr>
<tr>
<td>[ ] other: Please specify</td>
<td></td>
</tr>
</tbody>
</table>

2. How many years of teaching experience do you have?

| [ ] Yes | [ ] No |

3. What is your highest degree achieved?

| [ ] Yes | [ ] No (if “No” skip to section 2) |

4. Do you own a personal computer?

<table>
<thead>
<tr>
<th>[ ] educational games</th>
<th>[ ] using the internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] internet for e-commerce</td>
<td>[ ] word processing</td>
</tr>
<tr>
<td>[ ] spreadsheets</td>
<td>[ ] power point</td>
</tr>
<tr>
<td>[ ] other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

5. If you own a personal computer, how do you use it? (check all that apply)

| [ ] Yes | [ ] No |

6. Have you taken computer training?

<table>
<thead>
<tr>
<th>[ ] four-year college or university</th>
<th>[ ] inservice training</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] computer store</td>
<td>[ ] I am self-taught</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
</tr>
</tbody>
</table>

7. Where did you receive your computer training? (check all that apply)

**SECTION 2: General Knowledge About the Use of Computers in the Classroom.**

1. How many computers do you have in your classroom?

- ----- 0
- ----- 1
- ----- 2
- ----- 3 or more

2. I integrate classroom computer learning in the following ways. (check all that apply)

- ----- drill and practice
3. My students use the computer: (check one in each column)

<table>
<thead>
<tr>
<th>Time Duration</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10 minutes daily</td>
<td>1 day per week</td>
</tr>
<tr>
<td>11-15 minutes daily</td>
<td>2 days per week</td>
</tr>
<tr>
<td>16-20 minutes daily</td>
<td>3 days per week</td>
</tr>
<tr>
<td>25-30 minutes daily</td>
<td>4 days per week</td>
</tr>
<tr>
<td>more than 30 minutes daily</td>
<td>5 days per week</td>
</tr>
</tbody>
</table>

4. Does your school have computer curriculum guidelines for your use in planning computer instruction in your classroom?

- Yes
- No
- Don’t know

5. Do you think it is necessary to introduce the computer to children in early childhood education?

- Yes
- No

6. Are you involved in choosing software for computer use in your classroom?

- Yes
- No

7. Do you feel you need more training in the use of the computer?

- Yes
- No
SECTION 3: Attitudes Towards Computers

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>Strongly agree</th>
<th>agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would like to learn to use a computer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I would encourage colleagues to use the computer.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. I can think of many things I would use the computer for.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. A computer could help me with a lot of things.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Being able to use the computer will be important for my life.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The computer lets you make mistakes without making you feel bad.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. The computer makes learning fun.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Everyone will have to know how to use a computer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. All children should have access to a computer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I know that I will not understand how to use computers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Using a computer is time consuming.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I prefer to learn how to use a computer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I feel that the use of computers in schools will help children to learn mathematics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I feel that the use of computers in schools will negatively affect children’s reading and writing abilities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I feel comfortable with all the computer jargon.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I feel pressure from others to integrate the computer more into my classroom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. I enjoy learning about new technology.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I feel that I have had adequate training in using computers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I believe that I effectively use the computer in my classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SECTION 4: Knowledge Towards Computers

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>Strongly agree</th>
<th>agree</th>
<th>disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I know enough about computers to integrate them into my classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I integrate my computer lessons with the lessons we are working on in the classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I know how computers can promote children's learning through play.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I know how computers can be used to teach preschoolers oral language skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I know how computers can be used to teach preschoolers social skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I know how to identify developmentally appropriate software.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I know how computers can be used to teach preschoolers reading skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I know how computers can be used to teach preschoolers writing skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dear teacher:

Thank you very much for your cooperation and the time you spent to complete the questionnaire. Your responses will be very helpful to me. I would like to conduct a follow-up interview regarding teacher's attitudes, knowledge, beliefs and practices regarding using computers in their classrooms. I would like to ask you if you could participate in this interview. If you are interested please write your name and phone number to allow the researcher contact with you. I will appreciate your participation very much. Thank you.

Yes, I am interested in the interview. ( )

Name: ________________________
Phone No: ____________________
Appendix D - Questionnaire construction

The following table gives an example of some of the questions that were adopted and some that were rejected from the four adopted instruments. Space and time do not permit me to do this to every item. But this should give the reader a rationale for choosing and/or rejecting the questions.

<table>
<thead>
<tr>
<th>Questions Kept</th>
<th>Questions Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landerholm's (1994) study:</td>
<td>Landerholm's (1994) study:</td>
</tr>
<tr>
<td>1- Do you think it's necessary to introduce the computers to children in early childhood education?</td>
<td>1- Are you currently using computers in your classroom? (reason for rejecting: all participants in Kuwait are using computers in their classroom as a required theme in the curriculum).</td>
</tr>
<tr>
<td>2- Do you have a computer curriculum guideline for your use in planning computer instruction in your classroom?</td>
<td>2- Do your children use a computer in a school lab? (Reason for rejecting: No computer labs exist in all kindergarten schools in Kuwait).</td>
</tr>
<tr>
<td>Popovich et al. (1987) study:</td>
<td>Popovich et al. (1987) study:</td>
</tr>
<tr>
<td>1- I know that I would not understand how to use computers.</td>
<td>1- I would prefer to order items in a store through a computer that wait for a store clerk. (Reason for rejecting: All items that have positive reaction to computers were rejected from this instrument).</td>
</tr>
<tr>
<td>2- I prefer not to learn how to use a computer. (All items that have negative reaction to computers were adopted).</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E - Interview questions

Background questions:

1. How long have you been a kindergarten teacher?
2. What is your age?
3. What degree do you have? Where did you get your degree?
4. Do you own a personal computer? If yes, for what purpose do you use it?
5. Do you know how to use computers? If yes, where did you receive your training?

General views about the use of computers in the classroom:

1. What was your first impression when you heard about the integration of computers in your classroom?
2. Do you think that teaching children using computers is a good idea?
3. What are the benefits of using computers with children?
4. What are the negative effects of using computers with young children?
5. Do you like to use computers in your classroom as an instructional tool?
6. Do you prefer using other tools than computers to teach your students?
7. Who do you think have the impact on you to love or hate computers?

Computer training (in-service and pre-service):

1. Did you take any computer training in your pre-service education? If yes, how many courses did you take?
2. Did this course teach you how to use computers with children in your classroom?
3. Have you received any computer training from your school? If yes, how many training did you receive?
4. Do you think those courses were effective in training you how to use computers in your teaching?
5. What are your suggestions to improve those courses to best benefit you and other teachers?

Knowledge about computer use in the classroom:

1. How often do you use computers in your classroom?
2. How do you use computers with your students? And when do you use them?
3. What type of software do you use most with your students?
4. Do you know how to choose the right software for your students?
5. Do you know how to integrate computers with your lessons to best meet your goals and objectives?
6. Do you think the software that you have in your classroom appropriate and meet the children’s needs and development?
7. Do you use computers along with other tools when teaching children?
8. Do you force children to go to computer center?
9. When do you prefer to use computers when teaching your students?
Policy makers and school administration:

1. What are the demands that you and other teachers want your school administration to offer in order to best use computers with your students?
2. What are your suggestions and hopes that you would like to offer to the Ministry of Education to better develop the integration of computers into the kindergarten curriculum?
3. Any other suggestions?
Your signature below will indicate that you have received a copy of this consent form for your own records.

Your signature will indicate that you consent to conduct this study in your kindergartens through the principals.

Please circle one of the following options:

Yes, I consent (or, agree) to conduct this study, "Practicing Kuwaiti Kindergarten Teachers' Attitudes, Knowledge, Beliefs and Practiced Regarding Computer Integration into the Curriculum: A Mixed Methods Study" in my kindergartens through the principals.

No, I do not consent (or, agree) to conduct this study, "Practicing Kuwaiti Kindergarten Teachers' Attitudes, Knowledge, Beliefs and Practiced Regarding Computer Integration into the Curriculum: A Mixed Methods Study" in my kindergartens through the principals.

Name _____________________________________________

Date _____________________________________________

Phone number ______________________________________

Signature _________________________________________
Please circle one of the following options:

Yes, I consent (or, agree) to distribute the questionnaires to teachers in my school

No, I do not consent (or, agree) to distribute the questionnaires to teachers in my school.

Principal name __________________________ Date ________________

Printed name of principal signing above
Your signature will indicate that you consent to participate in this study.

Please circle one of the following options:

Yes, I consent (or, agree) to participate in this study, “Practicing Kuwaiti Kindergarten Teachers’ Attitudes, Knowledge, Beliefs and Practiced Regarding Computer Integration into the Curriculum: A Mixed Methods Study.”

No, I do not consent (or, agree) to participate in this study, “Practicing Kuwaiti Kindergarten Teachers’ Attitudes, Knowledge, Beliefs and Practiced Regarding Computer Integration into the Curriculum: A Mixed Methods Study.”

_________________________  __________________________
Teacher signature        Date

_________________________
Printed name of teacher signing above
Please circle one of the following options:

Yes, I consent (or, agree) to participate in the interview portion of your study.

No, I do not consent (or, agree) to participate in the interview portion of your study.

______________________________  ________________________
Teacher signature                  Date

______________________________
Printed name of teacher signing above

______________________________
Phone number
Appendix J – Frequencies, percentages, means, and standard deviations for the attitudes towards computer section

1. I would like to learn to use a computer.

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Agree</td>
<td>36</td>
<td>20.9</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>133</td>
<td>77.3</td>
</tr>
<tr>
<td>Total</td>
<td>172</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Missing System: 2

Total: 174

2. I would encourage colleagues to use the computer.

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Agree</td>
<td>50</td>
<td>28.7</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>122</td>
<td>70.1</td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total: 174

1.1% 28.7% 70.1% 77.3% 20.9%
3. I can think of many things I would use the computer for.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>5</td>
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<td>61</td>
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<tr>
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<td>62.1</td>
</tr>
<tr>
<td>Total</td>
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4. A computer could help me with a lot of things.

<table>
<thead>
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<td>0.6</td>
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<tr>
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<td>42</td>
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<tr>
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<td>130</td>
<td>75.1</td>
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<td>Missing</td>
<td>System</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

5. Being able to use the computer will be important for my life.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
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<tbody>
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<tr>
<td>Total</td>
<td>174</td>
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</table>
6. The computer lets you make mistakes without making you feel bad.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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<td>78</td>
<td>46.4</td>
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<tr>
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<td>43</td>
<td>25.6</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
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</table>

7. The computer makes learning fun.

<table>
<thead>
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<th>Frequency</th>
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<td>Missing System</td>
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<td></td>
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<td>Total</td>
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8. Everyone will have to know how to use a computer.

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<th>Frequency</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>Total</td>
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</table>
9. All children should have access to a computer.

<table>
<thead>
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<th>Percent</th>
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</thead>
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<td>Agree</td>
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<td>27.7</td>
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<td>124</td>
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<td>Missing System</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

10. I know that I will not understand how to use computers.

<table>
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<tr>
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<th>Frequency</th>
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</thead>
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<tr>
<td>Agree</td>
<td>50</td>
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<td>19.3</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

11. Using a computer is time consuming.

<table>
<thead>
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<tr>
<td>Agree</td>
<td>84</td>
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<tr>
<td>Strongly agree</td>
<td>44</td>
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<tr>
<td>Total</td>
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<td>100.0</td>
</tr>
<tr>
<td>Missing System</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
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</table>
12. I prefer not to learn how to use a computer.

<table>
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<tr>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
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</tbody>
</table>

13. I feel that the use of computers in schools will help children to learn mathematics.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
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<td>2.3</td>
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<tr>
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<td>57</td>
<td>33.1</td>
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<tr>
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<td>111</td>
<td>64.5</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

14. I feel that the use of computers in schools will negatively affect children’s reading and writing abilities.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
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<td>5.8</td>
</tr>
<tr>
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<td>30</td>
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<tr>
<td>Agree</td>
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<tr>
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</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>
15. I feel comfortable with all the computer jargon.

<table>
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<td></td>
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<td></td>
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</table>

16. I feel pressure from others to integrate the computer more into my classroom.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
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<td>6.0</td>
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<tr>
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<td>13.2</td>
</tr>
<tr>
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<td>52.7</td>
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<tr>
<td>Strongly agree</td>
<td>47</td>
<td>28.1</td>
</tr>
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<td>Total</td>
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<td>100.0</td>
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<tr>
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<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

17. I enjoy learning about new technology.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.6</td>
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<tr>
<td>Disagree</td>
<td>9</td>
<td>5.3</td>
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<tr>
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<td>37.6</td>
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<td>Strongly agree</td>
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<td>Total</td>
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<tr>
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<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
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</tr>
</tbody>
</table>
18. I feel that I have had adequate training in using computers.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
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<tr>
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<td>97</td>
<td>57.1%</td>
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<tr>
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<td>32</td>
<td>18.8%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>14</td>
<td>8.2%</td>
</tr>
<tr>
<td>Total</td>
<td>170</td>
<td>100.0%</td>
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<tr>
<td>Missing</td>
<td>System</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>174</td>
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</tbody>
</table>

19. I believe that I effectively use the computer in my classroom.

<table>
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<tr>
<th></th>
<th>Frequency</th>
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<tr>
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<tr>
<td>Agree</td>
<td>83</td>
<td>49.7%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>32</td>
<td>19.2%</td>
</tr>
<tr>
<td>Total</td>
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<td>100.0%</td>
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<td>System</td>
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<td>Total</td>
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<tr>
<td>Statement</td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------</td>
<td>----------------</td>
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<tr>
<td>I would like to learn to use a computer.</td>
<td>3.75</td>
<td>0.50</td>
</tr>
<tr>
<td>I would encourage colleagues to use the computer.</td>
<td>3.69</td>
<td>0.49</td>
</tr>
<tr>
<td>I can think of many things I would use the computer for.</td>
<td>3.59</td>
<td>0.55</td>
</tr>
<tr>
<td>A computer could help me with a lot of things.</td>
<td>3.75</td>
<td>0.45</td>
</tr>
<tr>
<td>Being able to use the computer will be important for my life.</td>
<td>3.73</td>
<td>0.46</td>
</tr>
<tr>
<td>The computer lets you make mistakes without making you feel bad.</td>
<td>2.94</td>
<td>0.80</td>
</tr>
<tr>
<td>The computer makes learning fun.</td>
<td>3.72</td>
<td>0.49</td>
</tr>
<tr>
<td>Everyone will have to know how to use a computer.</td>
<td>3.76</td>
<td>0.44</td>
</tr>
<tr>
<td>All children should have access to a computer.</td>
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<td>0.47</td>
</tr>
<tr>
<td>I know that I will not understand how to use computers.</td>
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<td>1.03</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
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<td>0.81</td>
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<tr>
<td>I enjoy learning about new technology.</td>
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</tr>
<tr>
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<td>0.80</td>
</tr>
<tr>
<td>I believe that I effectively use the computer in my classroom.</td>
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<td>0.78</td>
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<tr>
<td>General mean and standard deviation</td>
<td>3.22</td>
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</table>
Appendix K - Frequencies, percentages, means, and standard deviations for the knowledge about computers

1. I know enough about computers to integrate them into my classroom.

<table>
<thead>
<tr>
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<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
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<tr>
<td>Disagree</td>
<td>67</td>
<td>40.6</td>
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<tr>
<td>Agree</td>
<td>64</td>
<td>38.8</td>
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<tr>
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<td>26</td>
<td>15.8</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

2. I integrate my computer lessons with the lessons we are working on in the classroom.

<table>
<thead>
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<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
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</tr>
<tr>
<td>Strongly agree</td>
<td>43</td>
<td>25.9</td>
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<tr>
<td>Total</td>
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<td>100.0</td>
</tr>
<tr>
<td>Missing System</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

3. I know how computers can promote children’s learning through play.

<table>
<thead>
<tr>
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<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Agree</td>
<td>95</td>
<td>56.5</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>44</td>
<td>26.2</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing System</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>
4. I know how computers can be used to teach preschoolers oral language skills.

<table>
<thead>
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<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Disagree</td>
<td>14</td>
</tr>
<tr>
<td>Agree</td>
<td>96</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
</tr>
</tbody>
</table>

Missing System | 6 |

Total | 174 |

5. I know how computers can be used to teach preschoolers social skills.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>41</td>
</tr>
<tr>
<td>Agree</td>
<td>85</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
</tr>
</tbody>
</table>

Missing System | 7 |

Total | 174 |

6. I know how to identify developmentally appropriate software.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>49</td>
</tr>
<tr>
<td>Agree</td>
<td>83</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
</tr>
</tbody>
</table>

Missing System | 14 |

Total | 174 |
7. I know how computers can be used to teach preschoolers reading skills.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>5</td>
</tr>
<tr>
<td>Disagree</td>
<td>39</td>
</tr>
<tr>
<td>Agree</td>
<td>85</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>166</td>
</tr>
</tbody>
</table>

8. I know how computers can be used to teach preschoolers writing skills.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>5</td>
</tr>
<tr>
<td>Disagree</td>
<td>53</td>
</tr>
<tr>
<td>Agree</td>
<td>77</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>166</td>
</tr>
</tbody>
</table>

### Statement Means and Standard Deviations

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know enough about computers to integrate them into my classroom.</td>
<td>2.65</td>
<td>0.80</td>
</tr>
<tr>
<td>I integrate my computer lessons with the lessons we are working on in the classroom.</td>
<td>2.95</td>
<td>0.78</td>
</tr>
<tr>
<td>I know how computers can promote children's learning through play.</td>
<td>3.08</td>
<td>0.68</td>
</tr>
<tr>
<td>I know how computers can be used to teach preschoolers oral language skills.</td>
<td>3.24</td>
<td>0.62</td>
</tr>
<tr>
<td>I know how computers can be used to teach preschoolers social skills.</td>
<td>2.98</td>
<td>0.72</td>
</tr>
<tr>
<td>I know how to identify developmentally appropriate software.</td>
<td>2.81</td>
<td>0.71</td>
</tr>
<tr>
<td>I know how computers can be used to teach preschoolers reading skills.</td>
<td>2.93</td>
<td>0.76</td>
</tr>
<tr>
<td>I know how computers can be used to teach preschoolers writing skills.</td>
<td>2.81</td>
<td>0.77</td>
</tr>
<tr>
<td><strong>General mean and standard deviation</strong></td>
<td><strong>2.92</strong></td>
<td><strong>0.63</strong></td>
</tr>
</tbody>
</table>