5-31-2005

Computer use in preschool: effects on social interactions

Teresa Hartner
Rowan University

COMPUTER USE IN PRESCHOOL:

EFFECTS ON SOCIAL INTERACTIONS

By
Teresa Hartner

A THESIS

Submitted in partial fulfillment of the requirements of the
Master of Arts Degree
of
The Graduate School
at
Rowan University
May 1, 2005

Approved by _____

Date Approved May, 2005

ABSTRACT

Teresa Hartner
COMPUTER USE IN PRESCHOOL:
EFFECTS ON SOCIAL INTERACTIONS
2004/2005
Dr.Louis Molinari
Master of Arts in Elementary Education

The purposes of this thesis was to examine the impact of computers on the social behavior of preschoolers, specifically, (a) to study the frequency and level of peer interactions in the computer center , (b) compare these to interactions when the computer center was not available, and (c) investigate gender differences in the computer center.

Fourteen preschool children of various ethnic backgrounds were videotaped or observed for 15 minutes a day for two three week periods. During the first three-weeks the computer, housekeeping, block and art centers were observed. During the second three weeks the computer center was not used. Analysis of social interactions was done using Chi Square which revealed that having a computer center in the preschool classroom did make a significant difference in the social interactions of the group studied. When looking for significant patterns of social interaction across genders it was found that boys chose the computer center fifty percent more often than the girls and a larger number of low-level interactions took place with the male students using the computer center compared to the female. In theory, the significant difference found when taking the computer center away should encourage early childhood educators to further investigate the use of computers in their own classrooms.

ACKNOWLEDGEMENTS

I would like to extend my heartfelt gratitude and sincere appreciation to the many people who given me their support in different ways.

First, it gives me great pleasure to acknowledge the guidance, constructive criticism, compliments and incredible patience provided by my professor Dr. Louis Molinari. He will always be remembered as a key factor that geared my career towards this end. His support during undergraduate as well as graduate school has been instrumental in providing me the confidence to complete my degree.

A special thank you goes to my fellow teacher, Donna Johns, for her moral as well as technical support. Without her patience, encouragement and support this paper would not have been possible.

Finally, I would like to acknowledge the support given during these past four years by my family. Without their understanding and forgiveness I would not have been able to get to this point. They have stood beside me as I took on the challenges and obstacles of my graduate work. Their encouragement and support helped me not only to overcome but also to preserve and excel. Thank you all for your support in the completion of this degree.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLES/FIGURES

CHAPTER

CHAPTER ONE

INTRODUCTION

Many forces and trends help shape the early childhood curriculum in the public schools. These are usually accompanied by a variety of conflicting theories of development and learning. Some topics appear to provoke more controversy than others; the use of technology with young children ranks high on the list of provocative topics. As computers play an increasingly prevalent role in today's world, it is important for early childhood educators to carefully evaluate the role of computers in the lives of young children. There is no doubt that technology is an important aspect of education today, but there has been much debate over when and how these techniques should be used with the preschool and primary school children.

Computers are being introduced into the preschool setting at a rapid rate. Soon, it may be that computers will be more common than fish tanks in our preschool classrooms. According to a 2003 US Department of Education study, three quarters of five year olds were using computers regularly in 2001 (Debell & Chapman, 2003). This trend is accompanied by excitement, experimentation, and a variety of educational aims. Regardless of the aim, this introduction of computers at an early age is causing concern among some parents and professionals. Significant research can be found to both support and dispute the benefits of placing computers in the preschool classroom. The following study examined the impact computers have on the social behaviors of the preschool child in a public/military only school. Do computers have the potential to influence a preschool child's social behavior, and if so, in what ways? Before we automatically include computers as part of our preschool curriculum, we need to further examine the

research for positive as well as negative effects they might have on our youngest students.

Facilitating and encouraging social skills are important components of any preschool program (Campbell & Fein, 1986). The constructivist theories of Piaget (1971, 1972), Bruner (1966, 1973), and Vygotsky (1978) flood early childhood education. The idea that information is constructed through social exchanges appears throughout the research. Many preschool teachers would likely agree with this, but can and should computers be used to help promote social development? Information provided in this study could help teachers of young children to decide whether or not they should include computers as part of their preschool program.

Statement of the Problem

Could it be that social interactions in a preschool classroom will be enhanced in a computer rich environment? Should computers be considered an important component to a developmentally appropriate preschool, and if so, how should they be used? This study will investigate the use of computers in the preschool classroom and attempt to discover if their use promotes positive affects that would justify including computers as an intricate part of a preschool classroom. Although some researchers have claimed that cooperative interactions can occur in a computer center in an early childhood classroom (Clements, 1994; Haugland & Wright, 1997), a study looking at the amount of social interactions and conflict resolution techniques of four and five year olds remains limited (Muller & Perlmutter, 1985).

The research that has been reported regarding the social dimensions of computer use in the preschool setting has been inadequate. Some researchers such as Clements,

1994 have asserted that computers, when added to an early childhood program as an activity center, can be a very social activity since young children can engage in high levels of spoken communication, social interactions, and cooperation while negotiating the computer programs and games. They also contend that while working at the computer center, young children generally prefer to work with a partner, share leadership roles, negotiate turns, and resolve differences of opinion regarding the direction the game should take, seek help from peers, and initiate interaction.

To the contrast we have Dr. Healy, the author of *Failure to Connect: How Computers Affect Our Children's Minds-And What We Can Do About It (*Simon & Schuster, 1999*)* who disputes the benefits of using computers in the preschool classroom. Although she does admit that we do not currently have good research to support the hypothesis that using computers in the preschool years may cause the brain to develop in a different way than it was meant to evolve, she does give credible support to this theory. She believes, as do other people she interviewed, that preschoolers and kindergartners really have no business "playing with these machines." Dr. Healy states that there is no objective evidence that using computers is doing young children any good. In fact as she points out in her book, it may cause a great bit of harm.

Conclusions from this study may help to end the confusion surrounding computer use in the preschool classrooms and answer the question, "Can computers in my preschool classroom enhance social interactions in my students?" It may also help teachers who do decide that computers can in fact enhance their preschool classrooms to look more closely at how the computers are being implemented in their classrooms and the impact they may have on their young students.

Purpose of the Study

The purpose of this study was to examine the impact of computers on the social interactions of preschoolers, specifically to study the frequency and level of peer interactions when a computer center was present and compare these to the frequency and level of interactions when the computer center was not available. This study hopes to highlight the social environment offered by today's computer technology and encourage teachers to help decide the value of a computer center as an important part of the early childhood curriculum. It can also help the teacher evaluate whether or not the computer can provide the ingredients of active learning, and where peer interactions are encouraged or discouraged (Spiegel-McGill, Zippiroli, & Mistrett, 1989).

Prior research in this area has seemed to focus on the impact of computers on primary grade children's cognitive and social development (Clements & Nastasi, 1992). Much of the prior research focused on preschoolers has looked at integrated classrooms and the impact on children with special needs (Spiegel-McGill, Zippiroli, & Mistrett, 1989); the effects on children's off-computer play behaviors (Fein, Campbell, & Schwartz, 1987), gender variations (Williams & Ogletree, 1992) and children's overall developmental progression (Haugland, 1992). This study will focus on levels of social interactions, adapted from the High Scope Preschool Observational Record (High Scope Educational Research Foundation, 2003), that take place at the computer center, and compare these to the levels of social interactions in a classroom without the computer center.

If the computer center does in fact encourage and or provide for high level social interactions in the preschool classroom equal to other "typical" learning centers, then one might be able to conclude that they do in fact have a place in the preschool classroom.

Using this information could be used to justify the inclusion of computers in the pre-kindergarten classroom as part of their regular center activity time.

Hypotheses

The hypotheses for this study are: 1) there will be no significant difference in the social interactions of preschoolers when they have access to a computer center compared to their social interactions when the computer center is unavailable as measured by the High Scope Preschool Observational Record (High Scope Educational Research Foundation, 2003). 2) There will be no significant difference between the number and level of social interactions of the boys at the computer center compared to the girls as measured by the High Scope Preschool Observational Record (High Scope Educational Research Foundation, 2003)

Method of Study

An experimental design was used with two three-week sessions. The independent variable used was having the computer center available during the first three weeks, and not available during the following three weeks. The students were observed and their social interactions coded.

Prior to the actual study, a video camera was set up in the classroom for several weeks, to help the students become accustomed to having their interactions taped. This was done in order to avoid the cameras influencing the children's normal social interactions and to ward off "the novel" effect something new added to the room might cause. Since it was necessary to watch and code up to four centers at the same time, a video camera was used to record two of the observed areas. The researcher watched and coded the remaining areas.

During the first three weeks of the study, a video camera was set up to record the students' interactions in the computer and block center. The recorded observations took place for fifteen minutes each day, Monday through Friday. When a student was absent the observations did not take place. This allowed for the same number of students' to be observed during each observation. The teacher observed and coded the social interactions taking place in the house area and the art area. Using an adapted version of the High Scope Child Observation Record (COR), the children's social behaviors were coded. The video taped areas were reviewed and coded at the end of each day. The students social behavior was given a level one (little or no interaction) if the child spent the majority of the time playing or working alone with little interaction with another student. At times this might have included a nod of the head, glance or a one-word answer. A level two (some interaction) was given when children interacted back and forth with a short phrase or sentence that may or may not have related to the subject at hand. These interactions did not continue throughout the observation. They were often followed by periods of silence. Finally, a level three was given when children interacted back and forth with each other, continuing to add to the play/work situation. Conversations were noted as directly dealing with the subject at hand. The exchange lasted for more than ten minutes of the fifteen minutes of observed time and consisted of at least eight or more exchanges.

During the next three weeks, a video camera was once again set up to record the students' interactions at the centers, but this time the computer center was closed. Students only had the option of going to the block center, manipulative center or art center. As in the first session, their interactions were reviewed and recorded.

At the end of the six-week period, the results were looked at and compared. Some of the things that I hoped to discover were: 1) If there would be a difference in the levels of social interactions at the computer center compared to the other "traditional" centers, 2) If taking the computer center away made any difference in the level of student social interactions and 2) Would there be a significant difference between the levels of social interactions of the boys and girls when the computer center is opened compared to when it is closed?

Limitations

The first limitation that should be noted is that the researcher is also the classroom teacher therefore; there could be bias in reporting the information. The researcher was limited to using her own class due to district policy.

A second limitation could be that the children involved in the study attended a preschool program in the year prior to the study. They were exposed to computers as part of their daily routine. Familiarity with the computer and programs may have an influence on the results obtained from this study.

A third limitation of the research is that reporting the data involves a certain amount of subjectivity on the part of the researcher. Although there will be an attempt to minimize such affects, potential bias cannot be totally eliminated.

Definition of Terms

The following definitions were used in the study:

computers- Two *Hatch* brand computers that were designed specifically for preschool children. They are positioned on one table, with a computer on each end, and a printer in the middle. They come with built-in software that meets the developmental needs of preschool children. The students are able to use the computers with minimum help from the adults in the room.

constructivist: Belief that students learn best when they gain knowledge through exploration and active learning. Hands-on materials are used and students are encouraged to explore in order to develop new knowledge instead of memorizing and reciting facts.

COR- Pre-school Child Observation Record. This is an instrument developed by the High Scope Educational Research Foundation. It outlines the various stages of development of children from the ages of two and a half years to their sixth birthday. It has six categories. The one used in this report was the Social Relations.

developmentally appropriate education: Curriculum and instruction that is in accord with the physical and mental development of the student.

early childhood education: The education of young children. As defined by the National Organization for the Education of Young Children (NAEYC), this would be children from birth to eight years old.

preschool classroom- A classroom that is set up into the following centers or areas: Computer, housekeeping, art, music, blocks, and library. The activities in each area are

geared toward children between the ages of 3-6. The centers are set up in such a way as to promote independent use by the student.

social interactions- Times when the students engage in a conversation with another child, which consists of at least two conversational exchanges.

subjects- Pre-Kindergarten students ages four years one month to five years six months who attend a full day preschool program on a military base in New Jersey.

Organization of the Thesis

Chapter One:

Chapter One of this thesis includes the significance and purpose of the study. The method of study will describe the design of the study and instrument used. This chapter also includes the limitation of the study, a definition of terms as they relate to this study and the organization of the thesis.

Chapter Two:

Chapter Two of this thesis includes a review of related literature. Chapter Two also includes information from early childhood specialists who have completed research and have written papers and/or books on computer use in the early childhood classroom.

Chapter Three:

Chapter Three of this thesis describes the setting, context of the study, sources of data, description of the instrument, population studied, instruments used, observations, analysis of the data and a summary.

Chapter Four:

Chapter Four of this thesis provides my findings from the observations. The results were analyzed and significant patterns noted. These were described using various tables and charts.

Chapter Five:

Chapter Five of this thesis provides a summary and conclusion of the study.

CHAPTER TWO

LITERATURE REVIEW

We know that computers are increasingly a part of preschoolers' lives. Between 80 % to 90 % of early childhood educators attending the annual conference of the *National Association for the Education of Young Children (NAEYC)* reported using computers in their preschool classrooms (Haugland, 1997). Earlier research on young children and technology indicated that it was no longer necessary to ask whether the use of technology was "developmentally appropriate" for pre-school students (Clements & Nastasi, 1993). In 1998, Dr. Jane Healy, in her book, *Failure to Connect,* questioned the motives of such organizations as NAEYC. Anderson (2000) reported that children working at the computer showed cooperative play parallel to the proportions of cooperative play one might find in the block center and the context for initiating and sustaining interaction was transferred to play in other areas. This was especially true for boys. Few would deny that children are interested, fascinated, and motivated by computers, but do the benefits outweigh the harm they may be causing?

Critics of The Research

There continues to be disagreement with current research about computer-use by young children (Cordes & Miller, 2000; Healy, 1998). Critics such as these feel that technology in schools waste time, money, and childhood itself by speeding up the pace and cutting down on essential learning experiences. Cordes and Miller (2000) report that children need time for active, physical play; hands-on lessons of all kinds, especially in the arts, as well as direct experiences of the natural world. They go on to say that these

are not "extras" but are essential for healthy child development. Dr. Healy, a noted psychologist, debates the rage over computer use with young children in her book, *Failure to Connect.* In her research, Healy sights a variety of reasons why using computers by young children (up to age seven) is undesirable. Some of the many reasons she gives are: they could subtract from other developmental tasks young children need, young children's brains develop differently than older students and computer use may hurt their brain development, concentration may be distorted, computer use by young children could set up undesirable emotional and motivational patterns that has the potential to cause ill long term effects. Finally, she addresses the social interactions of young children stating that her research found that young children need personal and long interactions with adults, not computers, for academic success and emotional stability.

Shade and Watson (1990) report that computer activities should only be used when combined with other off computer activities such as blocks, reading books, pretending, puzzles, outside play, sand, water, and exploration with writing materials. Similarly, Haugland (1992) argues that a balanced approach is best. Both note that computers can be harmful if used improperly.

Benefits of Computer Use In Preschool

Since computers are already in homes and classrooms and young children are using them, educators need to look for ways to take advantage of these powerful tools to help enhance student learning and development, especially in the social area. As researchers have pointed out, computers can have benefits in the classroom, such as increasing motor skills, enhancing mathematical thinking, encouraging creativity, improving critical thinking and producing high levels of motivation (Shade & Watson, 1990; Heft &

Swaminathan, 2002; Shade, 1994). Computers also can deepen a child's self-concept and promote higher levels of spoken communication and co-operation (Haugland, 2000).

Social/Emotional Development

Previous research dismissed a serious and early concern that computers would isolate children. In a study conducted by Swigger (1984), children's use of the computers was observed for three consecutive weeks. As the children worked at the computer, the observer recorded the time and program selected. Similarly, when the session was completed, the time was recorded. The study looked at peer relationships while using the computer and particular programs. During this study, the children never used the computer alone. Results such as these seem to confirm that computers serve as springboards of social interactions. Spontaneous helping and teaching were also noted throughout this study.

McCormick (1987) indicated that computer activity was more effective than toy-play in stimulating vocalization in a regular preschool environment and evoked higher levels of social play. Young children have needs that are different from those of older children and adolescents. Children from birth to age eight are learning rapidly, using all of their senses and their entire bodies to take in sensations and experience the world around them. They learn during this time through play and exploration in five essential developmental dimensions (Kagan, Moore, & Bredekamp, 1995). One of these dimensions is social and emotional development.

Heft and Swaminathan (2002) maintain that computer usage can offer an environment that encourages rich social interactions as well as opportunities to practice conflict resolution techniques. The researchers looked at the impact of computers on social

behavior of preschoolers. Fourteen preschoolers were observed working at the computer over a two-month period. Data was collected and coded. Later, interviews took place with the teachers and students. Results found 91 peer interactions and 33 teacher interactions took place over the course of the study. Heft and Swaminathan (2002) found that in addition to academic enhancement, computers can also be used to increase social interactions and behaviors.

King and Alloway (1992) found that young children showed pro-social behaviors when working on computers and increased their attention spans while interacting with computers and each other. Early childhood educators want to encourage an environment where children not only learn from the computers but also learn from each other. This research seems to indicate such a possibility exists.

In the early childhood classrooms, research done by Watson, Nida, & Shade, (1986) indicated that as much social behavior occurred around the computer as in other areas typically found in the preschool classroom. This study concluded that the computer did not lead to social isolation as was once thought. These researchers found that rarely were the children alone at the computer; they were usually in groups of two or three. Another finding in this study was that after the initial novelty wore off, the computer area did not dominate the children's activity center choice.

It seems for the research that computer-use in a preschool classroom needs to be monitored closely. These questions need to be asked: Is the computer detracting from normal social activities like play and physical interactions with the environment? Are certain children being allowed to use the computer to escape from the social world of a

preschool classroom? If the answer is no, then perhaps computers do have a real place in our preschool classrooms.

Room Arrangement

As the research clearly points out (Clements & Nastasi, 1993), technology does not replace human interactions or relationships, or take the place of activities such as reading stories, using blocks, working in the art area or sharing conversations with children. Properly used, however, computers and software can serve as a springboard for social interactions and conversations (Clements & Nastasi, 1993). This research points out the human element in the equation. It is the adult's responsibility to arrange the classroom appropriately, such as placing two chairs in front of the computer to encourage children to work together, and placing computers close to each other to facilitate sharing ideas (Clements, 1999) in order for this technology to increase, not impair, language, literacy and social skill development in our youngest students.

Research demonstrates that when working with a computer, preschool children prefer working with one or two partners to working alone (Clements, Nastasi, & Swaminathan, 1993). Children seek help from one another, and seem to prefer help from peers to help from the teacher (King & Alloway, 1992; Clements & Nastasi, 1992). The instructional strategy of placing two or more chairs at the computer and placing the computers, side-by-side, helps to encourage cooperative learning.

Software

Children interact with the computer differently using different types of software. For example, Hohmann (1998) states that open-ended programs such as *Milli's Math House & Bailey's Book House,* preschool computer *programs* by Edmark continue to set the

standard for appropriate content, active involvement, and for clever embedding of the learning concepts in preschool computer activities. However, in the book *The Computing Teacher* written by Lemerise (1993), the author suggests that a curriculum designed around only software that encourages free exploration can lead to boredom. His research has shown that children work best with this type of software when they are assigned to open–ended projects rather than asked to just "free explore." Bergin, Ford, and Hess (1993) observed kindergarten children over four months as they worked in pairs at the computer with a selection of appropriate software. The researchers found that the combination of computer and appropriate software kept children highly interested and motivated. Children were cooperative with each other and exhibited consistent sharing and turn-taking behavior.

Two research studies have directly assessed the effects of developmental (open-ended) and non-developmental (drill and practice) software on young children. The first study (Haugland, 1992) compared the effects of developmental and non-developmental software on preschool children's cognition, creativity, and self-esteem. For an eight-month period, three classrooms of 4-year old children were exposed to computers for one hour, three days weekly, during self-selected activity time. Children in the fourth classroom did not have computer exposure. Of the three classrooms where children used computers, one classroom had non-developmental software (drill and practice), the second had developmental software (open-ended), and the third had developmental software reinforced with supplemental activities.

Children were assessed using a battery of assessment instruments. The children in all of the classes with computer exposure had significantly greater gains in self-esteem.

Children using non-developmental software demonstrated significantly less creativity and their scores dropped by 50%. This drop did not take place when children had no computer exposure or when they used developmental (open-ended) software. It can be concluded that non-developmental software may have a detrimental effect on children's creativity, a finding that should concern anyone using drill-and-practice software with young children.

Another study investigated how different kinds of software affect children (Shade, 1994) by focusing on children's emotional responses to developmental and non-developmental software. One half of the 72 children, ages four to eight, used the computer with a peer, and the other half used the computer by themselves. Each child was videotaped for three 10-minute sessions as she or he used software randomly selected from each of three levels of software developmental appropriateness (high, medium, and low), as defined by Haugland and Shade (1990). Children's facial expressions of emotion (e.g., interest, happiness, anger, sadness) and other affect-related behaviors (e.g.,self-absorption, physical exuberance) were examined as a function of the child's age, the child's gender, the presence of a peer and the developmental appropriateness of the software.

Shade (1994) found that, regardless of age, gender, or social condition, children expressed no negative affect (anger, fear, sadness, disgust) when they were presented with any type of software. They showed a high degree of interest, joy and surprise to all three levels of software appropriateness. In contrast with other studies, the subjects studied seem to be interested in drill and practice software just as much as the open ended type.

Liu (1996) suggested that when preschool aged children have control over software choices, they tend to engage in the activity longer and they do not seem to become bored as easily. Clements (1994) said that "the effectiveness of computer learning depends critically on the quality of the software, the amount of time children work with the software, and the way in which they use it" (p.33).

The evidence suggests that teachers of young children need to be aware of the influence different kinds of software can have on the child's development in many key areas including the social/emotional area. Open-ended types of software "lead the human learner to exercise powerful ideas," according to Papert, (1980). The NAEYC position statement agrees, saying that open-ended types of software allow children to engage in creative play and conversations (NAEYC 1996).

Conflicts

One of the social skills that may be encountered while working at a computer will be conflict resolution techniques (Clements, 1994). When children are working on the computer, issues such as who will type, whose turn, and what program to use need to be resolved. Children go about solving these types of problems in different ways. Sometimes, one child may dominate the other without any negotiation, but more often children will discuss how to run things (Clements & Nastasi, 1992). Clements & Nastasi also looked at the types of social interactions that occurred in different computer environments. The subject's social process was examined. Situations where students engaged in cooperative work were recorded as well as times that conflict arose. Successful conflict resolution was coded and recorded when it appeared. The results were that students who used open ended as well as those who used closed programs spent

a large portion of their time working cooperatively (60-70%). Similar amounts of conflict were recorded in both groups, but the group using open-ended software out performed those in the drill and practice software (closed ended) on a post-test measure of higher order thinking in mathematics. Teacher intervention may be necessary at times but should be viewed as an opportunity to teach and guide the children toward positive social interactions, a social skill that is part of most pre-school curriculums (Stone, 1993).

Special Needs

Research has shown that computer based activities can support and aid the development of young children with disabilities. Spiegel-McGill, Zippiroli, and Mistrett (1989) concluded that computers may serve as social facilitators for children with significant social interaction deficits and speech and language impairments. The researchers compared three play conditions on the amount of time each of four handicapped children would interact with a socially competent non-handicapped peer during play time in an integrated preschool. Computer use was compared to using a remote controlled robot, and this was in turn compared to a situation where the students only associated with each other. Results revealed that when the computers were in use, social interactions with non-handicapped students were higher than when the robot or just playing was in use. The two groups in which the handicapped preschoolers had mild social interaction deficits and physical disabilities showed similar performances across the three conditions. This preliminary study points out that other activities might not increase social interactions as readily as computer use by children with language and speech impairments.

The Teacher's Role

The amount of teacher participation has also been shown to affect social interaction among young children using the computers (Clements, Nastasi, & Swaminathan, 1993). When children are learning to use computers, they need help from teachers in loading and running software. A teacher's presence at the computer can help decrease aggression among the children. Conversely, when a teacher is too involved in the process there is not as much interaction between the children. As the teacher becomes less involved in computer activities, children tend to interact more with each other (Borgh & Dickson, 1986; Clements, et. al., 1993).

In a research study conducted by Haughland, (1994) where early childhood teachers were surveyed regarding their software choices, 85% placed high priority on characteristics of developmentally appropriate software as opposed to drill and practice (the electronic version of workbooks and ditto pages). It was concluded that early childhood teachers were asking that software reflect the developmental needs of young children and facilitate the curriculum goals they have for these children.

The key to obtaining maximum benefit from computers in the preschool classroom is good teaching. The teacher must have a solid knowledge base of the computer's role in the learning process, be familiar with the technology, and make it their business to find ways the computers can enrich the learning environment (Elliott, 1996). According to Elliott, computers can be used for problem solving, play, drawing, writing, and story experiences as well as for social exchanges. Elliott also points out that in no way should computers take the place of physically manipulating real objects, "computer activities are not intended to replace existing concrete experiences." (p.7)

Curriculum objects for early childhood normally center on experiences that stimulate every aspect of children's development social, emotional, physical and cognitive. Computers have the potential to enhance all these areas but the teacher must examine the computer environment closely to be sure that the computer is relevant to the child's needs. The domain being addressed will shift depending on if the child is working by himself or with a partner (Seng, 1998).

Summary of Findings

There is a substantial body of research on technology use with young children. Some of this research focuses on the use of computers to enhance social, language, and cognitive skills. Many of the studies highlight the opportunities for language use and social interaction that computer technology offer. On the other side of the coin is contradictory research such as Healy, (1998), who professes that computers have no real purpose in the preschool classroom, and could possibly pose a threat to our youngest students.

Technology cannot and should not replace human interaction or relationships or take the place of activities such as reading stories together, playing with blocks, working in the art area or sharing conversations with children. Perhaps one could say that when used properly and in moderation computers can enhance a preschool child's social interactions and conversations. Along with this, considerations should be given to the room set up, choice of software (Is it developmentally appropriate?), number of computers available, number of chairs at each computer (two or three), adults input and participation as well as children having free access and control of the learning experience. Timing is crucial. Children need time to explore and experiment. Young children are comfortable clicking

various buttons to see what will happen, thus, providing a developmentally appropriate environment that meets the needs of the child. However, the teachers should be aware of what they are doing and if the activities are meaningful. After all, we as teachers, ultimately have the power in our classrooms to use the computer in such ways that they will add to and not take away from our students' learning opportunities.

CHAPTER THREE

METHODS

Context of Study

The research study took place at a public preschool program funded by the state of New Jersey. The program is part of a preschool to fifth grade school located in a military community and includes about 20% minorities of average social economic background. All students reside in free housing, provided by the United States government, which is located within one mile of the school. The parents of the students participate in one of four branches of the military: Army, Navy, Air Force or Coast Guard.

The classroom is equipped with two computers that share one printer. These computers were designed by the Hatch Company and were designed to meet the needs of preschool students. They are located on one child size computer table that holds both the computers and the printer. The computers are located on the outside wall of the classroom facing the window. Two chairs are situated at each computer, and there is space for other children to stand behind the chairs. The arrangement allows the students not controlling the computers to watch the action on the screen and offer suggestions. The ratio of students to computers is 1:7.

Sources of Data

Population

All students were native English speakers. The participants were fourteen preschool students (seven boys and seven girls) who attend a pre-kindergarten through fifth grade public school. The class has two female teachers. The researcher was one of the teachers in the classroom. The students ranged in age from four years, three months to five years,

three months at the time of the study. The parents signed a permission slip in order for their child to participate in the study. Sampling was based on convenience.

Instruments

Observations

The children were observed during their center time (free choice time) that takes place during the morning from 9:45 until 11:00 a.m. Although there were usually seven choices of activities (blocks, math/manipulative, science, housekeeping, library, writing, and art) available to the children, for the purpose of this study only four center activities were used (blocks, math/manipulative, housekeeping, and computers). The computer and blocks were video taped and the housekeeping and art center were observed and coded at the time of observation. The library, art, and writing areas were not included in this study because the arrangement of these activity centers were more appropriate for solitary or parallel constructive play than for cooperative interactions. During the first half of the study, which lasted three weeks, the children were able to choose from any of the four centers (computer, block, house or art). During the second part of the study (which took place during the fourth, fifth and sixth week) the computer center was not opened to the students. They could chose from only the block, house or art center. At all times two teachers were in the room with the students. The observations lasted approximately fifteen minutes for the duration of this study. As children worked in the areas, they were either observed or coded immediately, or videotaped and coded at the end of that day.

The software used in the computer center was *Kid-pix, Bailey's Book House, Sammy's Science and Millie's Math House.* This software contained activities that included creation games, free painting, and counting games. It also involved problem solving,

sorting, matching, and counting, as well as free exploration and creativity exercises such as painting and face making. An attempt was made to control for variability in software quality by using only high quality developmentally appropriate software that was congruent with the National Association for the Education of Young Children standards.

Institutional Review Board

Institutional Review Board approval was requested and obtained since this study dealt with minors. The objective was stated as well as a description of the design. Under the guidelines of the IRB, parent's written permission was obtained (see Appendix A).

Data Analysis

The data was obtained by observations and viewing videotapes of the students working in the various areas. Their social interactions were observed, coded and recorded. The following describes how the interactions were coded:

Level one-Low- Little or no interaction was noted. The child spent the majority of the time playing or working alone with little interaction with another student.

Level two-Medium-Children interacted back and forth with a short phrase or sentence that may or may not have related to the subject at hand. These interactions did not continue throughout the observation. They were often followed by periods of silence.

Level three-High-Children interacted back and forth with each other continuing to add to the play situation. Conversations were noted as directly dealing with the play situation. The exchange lasted for more than ten minutes of the fifteen minutes of observed time and consisted of at least eight or more exchanges. This was done for fifteen minutes, once a day, for six weeks skipping days when a student was absent. The first three weeks included the computer center while the second three weeks the computer center

was not available. This information was then totaled and analyzed and frequency tables were generated using the information.

The data was analyzed for significant patterns pertinent to the research questions using Chi Square Analysis. In order to justify using computers in the preschool classroom the researcher looked at the levels of socialization taking place when the computer center was included and compared these results to social interaction taking place when the computer center was removed from the room.

Randomly selected video clips were studied and then analyzed by another person using the same coding system. Inter-rating reliability needs to be established at 80%.

Description of Observations

The students were given daily opportunities to work at one of four centers (computer, art, block or art) as part of their morning free choice time for the first three weeks of the study. The computer center contained developmentally appropriate software. The preschoolers were video taped as they worked at the computer center and block area. Direct observations and coding took place in the house and art area. The children were observed for approximately fifteen minutes each day. A timer was used to aid in keeping a similar amount of observation time. Data was collected through observations and video recordings. The researcher later reviewed the video-clips. Use of the video allowed the researcher to record interactions in all four areas at the same time.

While in the computer center, children worked both separately and together on the two computers that were placed side by side (refer to picture Appendix B). Sometimes other children would join in as observers. The same took place in the other centers that were observed. One difference that stood out at the computer center but not in any of the other

centers was the amount of time children stood by waiting for their turn or just watching the other children work on the computer. In all other centers all children were actively engaged in the activity. At times children at the computer center, who did not have control of the mouse, looked bored. They would yawn, slide down in their chair, look around the room and shift their attention from one computer screen to the other. All evaluations of the children were done through non-participant observation, with field notes being taken either directly or from their recorded actions. The researcher was not an active participant in this study. Students needing adult assistance were referred to the other teacher in the room. The interactions with this adult were not included in the observations as peer interactions were being studied. Natural interactions seemed to be the norm.

CHAPTER FOUR

FINDINGS

Profile of the Sample

The subjects in this study consisted of fourteen students, seven girls and seven boys. They ranged in age from four years four months to five years four months. The ethnic composition of the group was: four African Americans, two Hispanic, and eight Caucasians. One or both parents are in the U.S. military in various capacities. The school is part of a military base and therefore many families will only attend this school for one or two years. Eleven of the students had prior preschool experience where they had access to a computer with developmentally appropriate software.

Research Questions

Research Questions: Can using computers in a preschool classroom enhance social interactions of students? To what extent do computers influence preschool students' social interactions? Can and should computers be used to promote social development? Is there a gender difference in computer use and levels of social interactions among preschool students?

Data Analysis

This study consisted of 420 coded social interactions that took place during the six-week period. Fourteen children were observed each day for one fifteen-minute period for a total of thirty days. The center the child chose was recorded along with a level of social interaction he or she displayed for the majority of the fifteen-minute period. The data was analyzed and patterns were noted.

Data was analyzed using Chi Square Analysis and significant patterns pertinent to the research questions and hypotheses were studied. The following questions were examined using the data collected: 1) could it be that social interactions in a preschool classroom will be enhanced in a computer rich environment? 2) should computers be considered an important component to a developmentally appropriate preschool classroom and if so, how should they be used? In other words, do computers promote positive effects, regarding social interactions, which would justify including them as an intricate part of a preschool classroom? The hypotheses of the study were that 1) There will be no significant difference in social interactions of preschoolers when they have access to a computer center compared to their social interactions when the computer center was unavailable and 2) There will be no significant difference between the number and levels of social interactions of the boys compared to the girls while working at the computer center. The second hypothesis was looked at because prior research indicated that boys often favor using the computer more than girls (Haugland & Wright, 1997). While no explicit attempt was made in this study to control for gender, any gender variations that appear as a significant pattern were analyzed.

During the first three weeks the computer center was open along with the art, house and block center. Each child's choice area along with a code that rated their social interaction as low=1, medium=2 or high=3 (as measured by the adapted High Scope Preschool Observational Record) was recorded. At the end of this three-week period low, medium and high level of interactions were tallied and recorded. It was found that there were a total of 105 low level interactions, 39 medium level interactions and 66

high-level interactions that took place during this three-week period. The total number of observations during this time was 210.

During the next three weeks the computer center was closed. The areas observed were the art, block and house. Again, children's choice area along with a code rating their social interactions was recorded. At the end of this three-week period these interactions were also totaled and recorded. It was found that this time 55 low-level interactions took place, 54 medium-level and 101 high-level took place.

Next, the totals from the first three weeks (Low-105, Medium-39, High-66) were compared to the totals from the second three-week period (Low-55, Medium-54, High-101) looking for a significant difference in social interactions when the computer center was opened and comparing that to when the computer center was closed. Chi Squared analysis showed that there was in fact a significant difference in social interactions when the computer center was open compared to social interactions when the computer center was not included as a choice area. This can be seen in Table 1. As is shown in the table the degree of freedom was two and Chi Squared=25.37.

When the computer center was closed, the high level of social interactions increased by 30% while low-levels decreased by 50%. The results show that the computer center may have a negative affect on the social interactions of the preschool children in this study. These findings negate the null hypotheses that there would be no significant difference in social interactions of preschoolers when they have access to a computer center compared to their social interactions when the computer center was unavailable.

Table 1

Comparing Level of Interactions when Computer Center Was Open vs. Closed				
	Low Interaction	**Medium Interactions**	**High Interactions**	**Total**
Computer Open	105	39	66	210
Computer Closed	55	54	101	210
Total	160	93	167	420

Degrees of freedom: 2
Chi-square = 25.379684180027
p is less than or equal to 0.001.
The distribution is significant.

Along with comparing social interactions in the various centers, gender differences were looked at and compared to previous research in this area. The boys were observed using the center 46 times out of a possible 105, in other words, a boy went to the computer center during the observed time 43% of the time. When looking at the girls, we see that the girls were observed using the computer 20 times out of a possible 105 or, 19% of the time. This indicates that the boys chose the computer center 45% more often than the girls. This can be seen in Table 2.

Table 2 represents the number of social interactions observed, stratified by gender and levels (low, medium, high) which shows there was a greater number of times boys who used the computer center during the fifteen days of observations. Although this study does confirm the findings of Clements, (1994) that cooperative social interactions can

occur at the computer center, this earlier study did not consider the levels of those interactions or look at gender as influencing the results. Table 2 looks at all three levels of social interactions (low, medium, and high), comparing boys to girls. This table clearly shows the boys using the computer center more often than the girls. The difference in low-level being observed more times in the boys than the girls can be attributed to the fact that the boys used this center twice as much as the girls. This could also account for the fact that no high-level interactions were observed in the girls while at this center. A larger number of children would be needed in order to see any significant patterns emerging in the social levels of the boys verse the girls while working at the computer center.

Table 2

Comparison of Boys' and Girls' Social Interactions while Working at the Computer Center.

Levels of Interactions	**Low**	**Medium**	**High**	**Total**
Boys Social Interactions	32	6	6	44
Girls Social Interactions	16	3	0	19
Total	48	9	6	63

Comparing Centers

Art CenterInteractions

The graphs (figure 1 and 2) show the low and high social interactions taking place in each individual center when the computer center was available and when it was unavailable.

When looking at the low level interactions in the art center (figure 1), we see little difference between the number of low-level social interactions; 32 low-level interactions took place in the art center when the computer center was open compared to 27 low-level interactions that took place when the computer center was closed. Although social interactions at the art center seems to be effected little by the computer center closing, the art center does seems to promote more low level interactions than the other two centers that were left open after the computer center closed. For the duration of the study, there were a total of 59 low level interactions taking place in the art center compared to the total of 28 low level interactions that took place in the block area and 26 low level interactions that took place in the housekeeping area. In fact, the art area shows more low-level interaction taking place during the length of the study than both the block and house together, which equals 54. The only other area that had a larger number of low-level interactions taking place was the computer center. The computer center had 48 low-level interaction taking place during the first half of the study. No comparison can be made during the second half of the study as the computer center was no longer a choice area.

It is important to note that although a larger number of low level interactions took place in the art center, observations showed the students in the art center were all very engaged in their activity. In contrast to this, students scoring in the low level in the

computer center were often observed looking back and forth between the screens, looking around the room, slouching down in the chair making noises watching other students in other centers and in general looking more bored than engaged in the activity at hand. This can be seen more clearly by looking at the sample descriptions of the observations on page 37.

A figure 2 look at high-level interactions taking place at the computer center and compares them to high level of interactions taking place at the other three centers. When looking at the art area in the graph (figure 2) we see that very few high level interactions took place, (0 when computer open and 4 when computer center closed). This seems to show that having the computer center open or closed seem to have little effect on the high levels of interactions taking place in the art area. Throughout the six-week study there were only four high level interactions total observed in the art center. However, it is worth noting that the children were extremely engrossed in their activities so much so that they didn't seem to notice other children in the area.

Figure 1

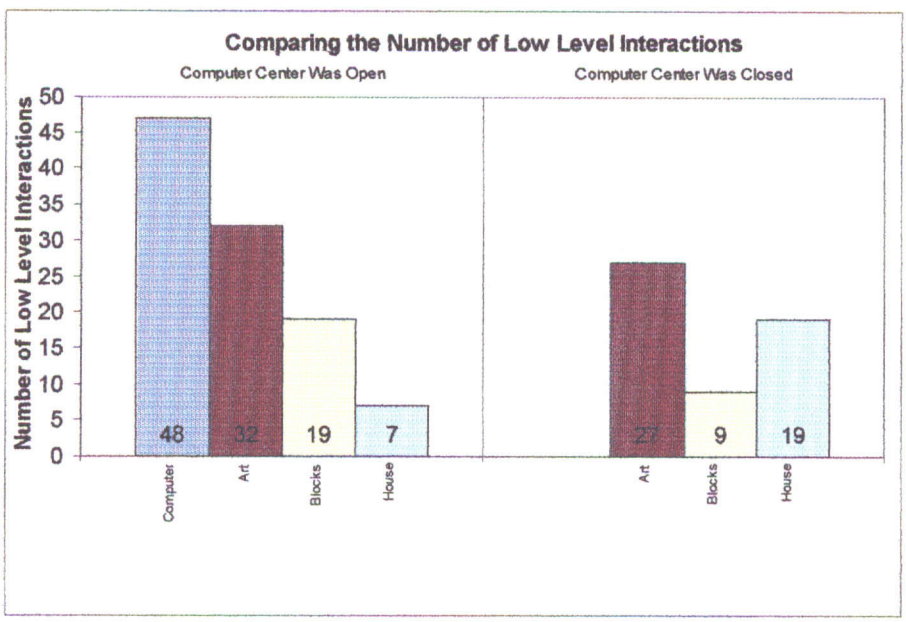
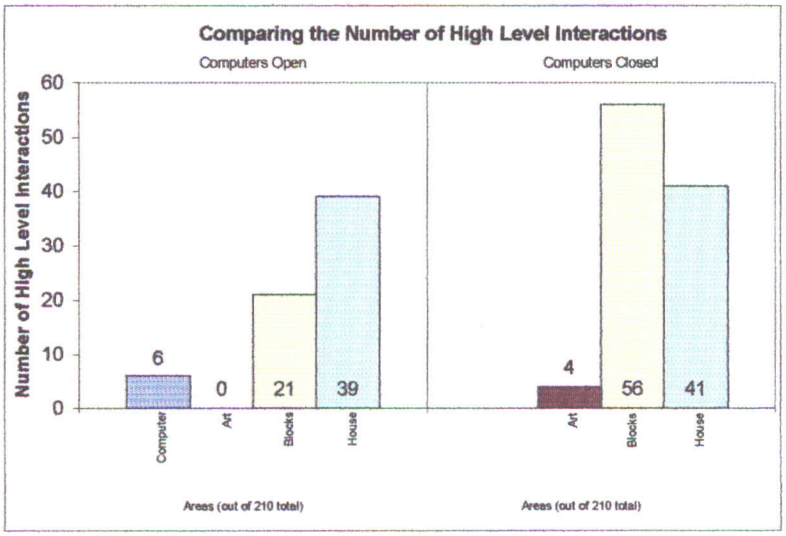


Figure 2



Block and House Center Interactions

This study confirms that the highest levels of social interactions are taking place in the house and block area as opposed to the other centers in the room as can be seen in the graph (figure 2). This is consistent with the research done by Anderson, 2000 which was presented at the 2000 Conference of the National Association for the Education of Young Children. This research showed that the highest proportion of complex social interactions occurred in the house and block area compared to the other centers available in a preschool classroom including the computer center.

When looking at the graph in figure 2, the high level interactions taking place at the block area were 21 when the computer center was open compared to 56 when the computer center was closed. This shows almost 150% increase taking place in the block center when the computer center closed. One explanation for this large increase would be that when the computer center was closed many of those students (the majority of which was boys) moved to the block area and their social interactions increased from a level one to a level three. This supports the theory that more social interactions take

place in other centers of a preschool classroom compared to the computer center. Students who showed little or no interaction while working at the computer center scored in the high range when they moved to the block center. This would explain the jump from 21 high interactions in the block area to 56 high interactions when the computer center was closed.

When comparing the house area with and without the computer center being open it can be seen that 39 high level interactions took place when the computer center was opened compared to 41 when the computer center closed showing only a slight increase (figure 2). This may be attributed to the fact that the computer center was used by twice as many boys as girls (47%). When the computer center closed, the majority of those boys moved to the block center. This would confirm other studies (e.g., Haugland & Wright, 1997) that have shown that more boys use the block and computer area than girls.

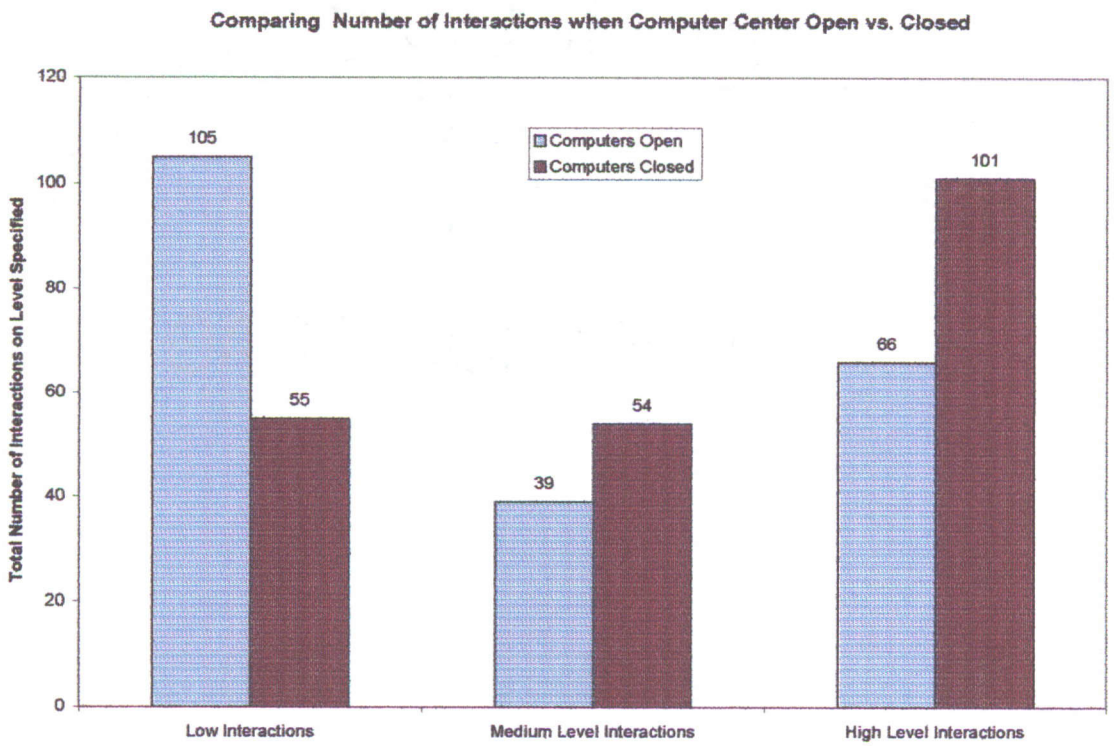
When the computer center was open there were 105 low level interactions compared to 55 when the computer center was closed (figure 3). This tells us that there are about 50% more low-level interactions taking place overall when the computer center is open. Slightly less than half of those low level interactions took place at the computer center.

Figure 3 also shows an increase in medium level interaction in which the children are communicating but where the communication does not reach a highly interactive level. There were 39 medium level interactions when the computer center was open compared to 54 when the computer center was closed.

At the highest level of communication and social interactions taking place we see that 101 high-level interactions took place when the computer center was closed compared to

only 68 taking place when the computer center was open. This can be seen in figure 3. One might conclude that closing the computer center forces children to move to other centers in the room, which tend to encourage more high-level social interactions.

Figure 3



Descriptions/ Examples of Social Levels Used in this Study:

The following are description and examples of the social behaviors within the levels that were observed during this study as adapted from the *High Scope COR Assessment*:

1. Level One: Child spent the majority (10 minutes or more) of the time playing or working alone with little interaction with another student. A nod, a one-word response to another child in which the conversation ended there or a glance at the other child was coded a one.

Art Center- Child 9 takes Styrofoam block and adds a variety of materials to her block. Child 14 is with her in the area. They both are working on their project but

they don't interact with each other. Child 9 looks at Child 14's project and then back to her own. This continues for the entire fifteen-minute observation.

Block Center-Child 7 is playing in the block area. Four other children are in the area but child does not seem to notice. At one point he does say something (observer couldn't hear) but the other child gives no response. This child continues to play by himself around the other children but does not interact with them.

Computer Center-Child 4 stares at the computer screen with his hand on the mouse and reacts with a laugh to the program in front of him. Child 6 is on the other computer next to child 4. He is clicking randomly and staring at the computer screen. He does not look at the other child next to him or anyone else around him. Child 1 is sitting behind the two children who are currently on the computer. He watches first one screen and then the other. He seems to be waiting for a turn. He continues for the duration of the observation moving his head back and forth but does not make any gestures or words to either child.

House Center- Child 7 puts blood pressure cuff on himself and when it doesn't fit tries it on a doll. He continues to work on this for about five minutes. Child 3 who is also in this area holds a doll. She does not communicate or look at child 7. Child 7 does ask the teacher to "look at my baby." Then Child 3 also asks the teacher to look at her doll. The children continue to play on their own without talking to each other. They do at times try to engage the teacher in a conversation. After about five more minutes child 3 asks to leave the area. Child 7 continues to entertain himself making sandwiches with pretend food. At the end of a fifteen-minute observation, both clean up and move to new areas.

2. Level Two: Children interacted back and forth with a short phrase or sentence that may or may not have related to the subject at hand. These interactions did not continue throughout the observation. They were often followed by periods of silence.

Art Center- Child 9 and child 14 are both in the art area. Child 14 says out loud, "I'm using red" and holds up the red glue. Child 9 acts as if she doesn't hear child 14 and continues gluing letters and shapes onto construction paper. She then gives this to the teacher and says, "This is for you." After getting a few items for her foam structure she is now making she says to herself but aloud, " I'm gonna do pink" referring to the glue. Both children continue to work on the art creations but do not interact with each other.

Block Center-Child 6 is in the block area as are two other children. The other two children are interacting back and forth discussing what they are doing. One of the other two children takes a truck away from Child 6 who does not respond. After about five minutes child 6 does look at one of the other two children and says, "I'm going to join you." When the children do not respond, he goes back to the cars and blocks he was

playing with and continues his play. A few minutes later child 6 says to the other two children, "Hey guys, want to play with me? He repeats this louder and again, no response. He watches them, tries several more times to join them and then he moves to a new area.

3. Level Three: Children interacted back and forth with each other continuing to add to the play situation. Conversations were noted as directly dealing with the play situation. The exchange lasted for more than ten minutes of the 15 minutes of observed time and consisted of at least eight or more exchanges.

House Center-Child 10, 11, and 13 are in the house area. They have been playing together for some time when the observation begins. Child 10 uses a book to write down words. She is dressed in a Snow-White gown. She says to child 11, "this is my homework." Child 13 is pretending to talk on the phone. She says, "Hello, no, we didn't get any." One child moves to the child on the phone and pretends to place an order. This child responds by writing down her order (pretending) and then gathers the items ordered. One girl is the mother, one is the big sister and the other is the storekeeper. They talk about what they are doing with each other, work together and make adjustments in their play. This play continues for the duration of the observation with each adding to the play.

Block Center-Child 1, 2 and 7 has joined together in the block area. They have built a tall tower out of red cardboard blocks by taking turns adding to the structure. They all worked together talking about what they were doing. Child 7 got the play animals and added them to the structure after discussing this with the others who agree with the idea. They are heard often talking about ways to change the structure and then set out to complete this task. Child 7 decides that they need signs for their structure and they all agree. They take turns adding signs to the structure and then decide to get cars to run under their tower. After about ten minutes the tower falls down and all three giggle. They immediately set out to rebuild the structure discussing how they will make it different this time. Child 2 picks up one of the cars and shows it to the others and says, "This says, Hot Wheels." They all examine the car and look in the box for others that have the same name. Next, they line the cars in a circle each taking turns and talking about the car they have added. When two of the children disagree about which sign should go where, Child 2 says, "We need to talk about it." And they do.

Summary of Findings

This study, as well as the previous ones, show social interaction taking place at the computer center, but not necessarily at the highest level that seem so important to a preschool child's social development. The findings suggest that there is a significant

difference in levels of interactions taking place at the computer center that may be taking away from important high levels of interactions that might take place if the computer center was unavailable. The analysis shows a significant difference in social interactions when the computer center is removed. This difference consisted of higher levels of social interaction increasing and lower levels decreasing. The research also suggests that preschool teachers and administrators might want to look closer at the benefits and risks a computer center may produce before automatically including them as a part of their developmentally appropriate classrooms.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary of the Problem

If facilitating and encouraging social skills in preschool is important as pointed out in the study done by Campbell & Fein, (1986), then this study may indicate a need for further studies using a larger sample. This study indicated a need to look more closely at the computer center and continue our investigation into whether it is producing the results we are looking for in our preschool students, and if so, at what expense.

This study shows that computers may have the potential to influence a preschool child's social behavior by promoting low level interactions and decreasing high levels of social interaction that are so very important during the preschool years.

The problem that was looked at was: Could it be that social interactions in a preschool classroom will be enhanced in a computer rich environment? This study contradicts the hypothesis that there would be no significant difference in the social interactions of preschoolers when they have access to a computer center compared to when the computer center was unavailable. From this limited study, one might conclude that since computers do in fact seem to increase low level interactions and decrease high level interactions, one should be cautious when considering the computer an important component to a developmentally appropriate preschool classroom. At best, one should use this study to investigate for himself/herself if the use of computers in his/her classroom is affecting levels of social interaction and to look for significant differences in social interactions both when the computer center is used and when it is not used.

After reviewing this limited study, preschool teachers considering adding a computer center to their classroom might want to monitor their own students' behaviors, keeping in mind the need for developmentally appropriate software, proper room arrangement, teacher interactions and monitoring closely the way computers are being used in the room. If children are consistently choosing this center over the other centers, or sitting and watching instead of interacting, including a schedule that has the computer center opened on some days and not others might be considered.

Summary of the Method

The purpose of this research was to determine if computers should be considered an important component to a developmentally appropriate preschool classroom. The study looked at the ways in which having a computer center opened encouraged or discouraged social behavior in preschool children. Specifically, it looked at the children's interactions with their peers while a computer center was open and compared them to their social interactions when the computer center was closed. It also looked at whether there was a gender difference in the use and levels of social interaction at the computer center. During the first three weeks social interactions were observed and coded while the children participated in one of four choice center areas: computer, house, art or blocks. During the second three weeks the computer center was closed and again social interactions were observed and coded. They were given a rating of one for low-level interactions, two for medium amount of interaction and three for high social interactions in which the child sustained the interaction for ten of the fifteen minutes observed and multiple exchanges occurred.

These interactions were totaled and a Chi Square analysis was done to check for significant differences. This analysis did show a significant difference in social interaction when the computer center was not used. A significant number of high interactions occurred when the computer center was closed and the low social interaction decreased greatly.

In looking at gender differences it was noted that the boys did use the computer center 50% more often than the girls and they showed a higher percentage of low-level interaction compared to the girls.

Developmentally appropriate software was used in the computer center as consistent with the research that found that the effectiveness of computer learning depends critically on the quality of the software, the amount of time children work with the software, and the way in which they use it (Clements, 1994). Also taken into consideration was the room set up. This was consistent with the research done by Clements & Nastasi, (1993) they found that room set up was critical in order to encourage social interactions at the computer center.

The variety of patterns seen within peer social interactions, as well as their frequency and levels, clearly shows that preschool children demonstrate a large range of social interactions while working at the computer center as well as the other centers studied in this room. During the study, the level of interactions varied. This should be expected since children interact differently each day and to each different situation. However, it was clear that in this study higher levels showing more intense social interactions took place in the block and house area than in the computer or art area.

Although an earlier study done by Heft and Swaminathan (2002) observed many rich social interactions taking place at the computer center, this did not hold true in the present study. What does seem to hold true are some of Dr.Healy's thoughts and predictions as noted in her book, *Failure to Connect: How Computers Affect Children's Minds*. Dr. Healy states in her book that observational studies have shown that young children working aimlessly on the computer waste about 85% of their time, unless an educator or parent has helped them set up a particular goal. They tend to jump from one thing to another not really accomplishing much of anything. This was observed many times during the observations done at the computer center. Also, it should be noted, that in no other area were children sitting by watching and waiting for their turn. In all other areas observed the children were engaged in an activity, not just sitting by waiting and observing.

Conclusions and Implications

As technology changes, especially with regards to computers, new and exciting uses will continue to be developed. Today, computers are a big part of the school system and now have worked their way into pre-school settings, as well. More and more children between three and five years of age have become extremely familiar with the operation of a computer.

Recent efforts to introduce computers into preschool classrooms have precipitated considerable controversy regarding the effect the experiences have on children's development. The purpose of this study was to examine the impact of computers on children's level of social interactions and to determine if they should be included as a basic component of a developmentally appropriate preschool classroom. Chi Square

Analysis showed a significant difference in levels of social interaction when the computer center was open compared to when the computer center was closed. Since information in young children is constructed through social interactions as was researched by Piaget (1971, 1972), Bruner (1966, 1973), and Vygotsky (1978), one could conclude that the types of social interactions taking place are also important. The outcome of this study seems to point in the direction that computers in the pre-school setting might not be as beneficial as some previous studies had reported. The results of this limited study seem to show that less unoccupied behavior, less interactive, and more parallel play occurred when the computer center was opened. This could be the result of several factors such as: while waiting for their turn the students were not taking advantage of other areas of the room that seem to promote more social interactions, students needing more teacher guidance at this type of center in order to maximize their potential or that when the computer center is available less socially developed students will choose this area over the other areas where more social interactions and skills may be required of them.

This study provided a valuable insight regarding young children and computers. First of all, the research measured the effect computers have on preschool children in the normal routine of classroom life. The computer was not given greater importance than any other learning center in the classroom. This is critical because children's responses to computers may be significantly different when the computers are isolated for research purposes.

Secondly, the computer center may have the potential to promote socialization in the preschool child, but perhaps not to the extent observed in the house and block center and therefore careful consideration should be taken if children are spending the majority of

their time in this area. However, additional studies are clearly needed in the social interactions of preschool children working at the computer center. These studies should also take place in naturalistic settings to substantiate and further define the effects computers may or may not have on the children's social behavior. While this study is the beginning, it does suggest that computers may be affecting social interactions in our youngest students and that looking at those social encounters is critical.

If computers are to be considered an important part of a preschool classroom than attention needs to be paid to the computer set up (side by side), carefully selecting the software, as well as considering having an adult monitor to facilitate the computer center activity. Although the computer center does have benefits, one needs to carefully examine motives for adding the computer center to the preschool classroom. Finally, as we progress in this technological age, educators need to investigate the idea that future investigations of computers and software may actually be less beneficial to our youngest students than was first thought. As Dr. Healy states in her book *Failure to Connect,* "We need continued research in how these machines are affecting the brains of our preschool students." Since she also points out that from prior medical research the brain is malleable during the preschool years, we need to be sure that computers are not doing harm to the developing brain of our young students as Dr. Healy contends, when they substitute computer learning for other activities. Research in this area remains limited.

Future efforts to evaluate the impact of this technology on young children's behavior and development need to be mindful of the possibility that effects will depend as much on the quality of the children's non computer experiences as on the computer curriculum to which they are exposed. In some classrooms, the computer might be able to provide

stimulation and challenge that might otherwise be lacking; in other classrooms it may compete with other valuable social experiences that might otherwise take place if the computer were not available. Preschool teachers need to continually assess the impact of this technology on children and evaluate the benefits within their own classrooms.

In conclusion, like clay, blocks, crayons, or any other learning resource we provide young children, computers are neither good nor bad. How the computers will affect our youngest students depends upon how they are utilized; it depends upon the wisdom of adults to make wise choices regarding appropriate experiences for the young child.

Recommendations for Future Research

Given the small size of the sample studied and limited time of the actual study, the reliability of the findings remains questionable. It is recommended that a study be conducted over a longer period of time with a larger sample that would better represent the preschool population.

A second area that might be considered for continued research is the influence that the individual preschool computer programs have on the children's social interactions. In this study the programs were not looked at separately. Therefore, it is entirely possible that some programs encourage more social interactions than others. Although all programs used were considered "developmentally appropriate" as rated by Haughland/Shade Developmental Scale (1990) looking at each program separately might be worth exploring.

It might also be useful to monitor the students who are using this center and be mindful of some that may need to be encouraged to try new areas. Balance seems to be the key.

A final area that should be investigated and that may provide some more insight into this area would be a study exploring the extent that the room arrangement, teacher/adult involvement, or ages of the students effects their social interactions in the computer center.

One can clearly see there are numerous areas that warrant further investigation. Computers are powerful tools that if used properly may have a place in the preschool classroom. Although this study showed that the computer center did not provide as much social interactivity as some of the more traditional centers (blocks and housekeeping), looking at software, classroom management, and resources may be the key to facilitating interactions that would warrant their use in the preschool classroom and that could perhaps increase the social interactions taking place at the computer center.

Due to the size and homogeneity of the sample, generalizations of the findings to other populations remain uncertain. Further research is needed to replicate the present study using similar methods of data collection with a more diverse sample.

REFERENCES

Anderson, G. T. (2000). *An empirical comparison of the proportion of cooperative play of 4 year- old preschool children observed as they interact in four centers: Block, computer, housekeeping, and manipulative.* National Association for the Education of Young Children, Atlanta, Georgia.

Bergin, D. Ford, M. & Hess, R.(1993). Patterns of motivation and social behavior associated with microcomputers use of young children. *Journal of Educational Psychology 85*(3), 437-445.

Borgh, K. & Dickson, W., (1986). *Two preschoolers sharing one microcomputer: Creating pro-social behavior with hardware and software.* In P.F. Campbell & G.G. Fein (Eds.), Young Children and microcomputers, Englewood Cliffs, New Jersey: Prentice-Hall.

Bruner, J. (1973). *Going beyond the information given.* New York: Norton.

Campbell, P. & Fein, G. (1986). *Young children and microcomputers.* (pp.46-57). Englewood Cliffs, New Jersey: Prentice-Hall Inc.

Clements, D.H. (1994). The uniqueness of the computer as a learning tool: Insights from research and practice. In J.L. Wright & D.D. Shade (Eds.), *Young children: Active learners in a technological age*, 31-50. Washington, DC: National Association for the Education of Young Children.

Clements, D. (1999). *Young children and technology. Dialogue science, mathematics, and technology education* .Washington, DC: for the Advancement of Science, Project 2061.Retrieved October 18, 2003 from the World Wide Web: http://www.project2061.org/tools/earlychild/experience/clements.htm

Clements, D.H. & Nastasi, B.K.(1992). The role of social interaction in the development of higher-order thinking in logo environments. In E. De Corte, M. C. Linn, H. Mandl, & L.Verschaffel (Eds.), *Computer-based learning environments and problem solving* (pp. 229-248). New York: Springer-Verlag.

Clements, D. H., & Nastasi, B. K. (1993). Electronic media and early childhood education. In B. Spodek (Ed.), *Handbook of research on the education of young children* (pp. 251-275). New York, NY: Macmillan.

Clements, D.H., Nastasi, B.K. & Swaminathan S. (1993). Young children and computers: Crossroads and directions from research. *Young Children 48* (2): 56-64.

Cordes, C., & Miller, E. (Eds.) (2000). Fool's gold: A critical look at computers and childhood. College Park, MD: *Alliance for Childhood.* Retrieved October 18, 2003 from the World Wide Web:

http://www.allianceforchildhood.net/projects/computers/computers_reports_fools_gold_intr

Debell, M. & Chapman, C. (2003). Computer and internet use by children and adolescents in 2001: statistical analysis report. Washington, DC: Department of Education; 2003. Retrieved December 18, 2004 from the World Wide Web: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=200414

Elliot, A. (1996). Learning with computers. *Australian Early Childhood Association Resources Book Series* 3 (2): 1-21.

Fein, G., Campbell, P. & Schwartz, S.(1987). Microcomputers in the preschool: Effects on social participation and cognitive play. *Journal of Applied Developmental Psychology 8*, 197-208.

Haugland, S.W. (1992). Effects of computer software on preschool children's development gains. *Journal of Computing in Childhood Education 3*(1)15-30.

Haugland, S.W. (1994). Early childhood computer software. *Journal of Computing in Childhood Education. 5*, 83-92.

Haugland, S.W.(1997). How teachers use computers in early childhood education. *Journal of Computing in Childhood Education 8*, 3-14.

Haugland, S.W. (2000). *Computers and young children.* ERIC Digest. What role should technology play? Retrieved October 18, 2003 from the World Wide Web: http://www.ericfacility.net/databases/ERIC_Digests/ed438926.html

Haugland, S.W., & Shade D.(1990). *Developmental evaluations of software for young children*: 1990 edition. New York: Delmar.

Haugland, S.W., & Wright, J. L. (1997). Young children and technology: A world of discovery. New York: Allyn & Bacon.

Healy, J. M. (1999). *Failure to connect: how computers affect our children's minds--and what we can do about it*. New York, NY: Touchstone.

Heft, T. & Swaminathan, S. (2002). The effects of computers on the social behavior of preschoolers. *Journal of Research in Childhood Education. 16*(2): 162(13).

High Scope Educational Research Foundation. (2003). *Preschool child observation record:* 2nd Edition. Ypsilanti, Michigan.

Hohmann, C. (1998). A medley of preschool packages. *Child Care Information Exchange* 122, 93-95

Kagan, S. L., Moore, E., & Bredekamp, S. (Eds). (1995). National Education Goals Panel (1995). *Reconsidering children's early development and learning: Toward common*

views and vocabulary. (National Education Goals Panel, Goal 1. Technical Planning Group Report 95-03). Washington, DC: National Education Goals Panel. Retrieved October 18,2003 from the World Wide Web: http://www.negp.gov/Reports/child-ea.htm

King, J.A., & Alloway, N. (1992). Preschooler's use of microcomputers and input devices. *Journal of Educational Computing Research 8*: 451-68

Lemerise, T. (1993). Piaget, Vygotsky, and Logo. *The Computing Teacher 20*, 24-28.

Liu, M. (1996). An exploratory study of how pre-kindergarten children use the interactive multimedia technology. *Journal of Computing in Childhood Education. 7*, 71-92.

Muller, A.A., & Perlmutter, M. (1985). Preschool children's problem-solving interactions at the computer center. *Journal of Applied Developmental Psychology 6*: 173-86.

McCormick, L. (1987). Comparison of the effects of a microcomputer activity and toy play on social and communication behaviors of young children. *Journal of the Division for Early Childhood. 11*(3):195-199.

Papert, S. (1996). *The children's machine: Rethinking school in the age of the computer.* New York.

Piaget, J. (1971). *The science of education and the psychology of the child.* New York: The Viking Press.

Piaget, J. (1972). *To understand is to invent.* New York: The Viking Press.

Seng, S. (1998). Enhanced learning: Computers and early childhood education. Paper presented at the Educational Research Association Conference, Singapore. (ERIC Document Reproduction Service No. ED 431 524).

Shade, D. (1994). Computers and young children: Software types, social contexts, gender, age, and emotional responses. *Journal of Computing in Childhood Education 5* (2), 177-209.

Shade, D.D., & Watson, J.A. (1990). Computers in early education: Issues put to rest, theoretical links to sound practices, and the potential contribution of micro-worlds. *Journal of Educational Computing Research 6* (4): 375-92.

Spiegel-McGrill, P., Zippiroli, S.M., & Mistrett, S.G. (1989). Microcomputers as social facilitators in integrated preschools. *Journal of Early Intervention, 13*(3), 249-260.

Stone, S. (1993). Taking time to teach social skills. *Childhood Education, 69*, pp.194-195.

Swigger, K. (1984). Social patterns and computer use among preschool children. *AEDS Journal, 17*, 35-41.

Vygotsky, L. S. (1978). Mind in society. The development of higher psychological processes. In M. Cole, V. John-Steiner, S. Scriber & E. Souberman (Ed.), Harvard University Press.

Watson, J.A., Nida, R.E., & Shade, D. D.(1986). Educational issues concerning young children and microcomputers: Lego with Logo? *Early Child Development and Care*, 23, 299-316.

Williams, S.W., & Ogletree, S. (1992). Preschool children's computer interest and competence: Effects of sex and gender role. *Early Childhood Research Quarterly.*

APPENDIX A
IRB Approval Letter

Rowan University
INSTITUTIONAL REVIEW BOARD
HUMAN RESEARCH REVIEW APPLICATION

RECEIVED DEC 01 2004

INSTRUCTIONS: Check all appropriate boxes, answer all questions completely, include attachments, and obtain appropriate signatures. Submit an **original and two copies** of the completed application to the Office of the. Associate Provost for Research Expediter(s): Be sure to make a copy for your files.

FOR IRB USE ONLY:
Protocol Number: IRB- 2004-201
Received:_____ Reviewed:_____
Exemption: ___Yes ___No
Category(ies):
Approved _____ (date) 12/03/04 Complete Approve

Step 1: **Is the proposed research subject to IRB review?**
All research involving human participants conducted by Rowan University faculty and staff is subject to IRB review. Some, but not all, student-conducted studies that involve human participants are considered research and are subject to IRB review. Check the accompanying instructions for more information. Then check with your class instructor for guidance as to whether you must submit your research protocol for IRB review. If you determine that your research meets the above criteria and is not subject to IRB review, **STOP**. You do not need to apply. If you or your instructor have any doubts, apply for an IRB review.

Step 2: **If you have determined that the proposed research is subject to IRB review, complete the identifying information below.**

Project Title:

A Study Investigating Social Interactions in a Computer Rich Preschool Classroom.

Researcher: **Tersa Hartner**

Department: **El.Education** Location _____

Mailing Address: **5 Keith Lane** (Street)
Burlington, NJ 08016 (Town/State/Zip)

E-Mail: **Teachprek94@aol.com** Telephone: **609-239-4277**

Co-Investigator/s:

Faculty Sponsor (if student)* **Dr.Molinari**
Department **El.Ed** Location: Robinson Hall - 2nd Floor
E-Mail: molinari@rowan.edu Telephone: 856-881-0585 (home)
856-256-4739 (office)

APPENDIX B

Computer Center: Pre-school Classroom