To the Graduate Council:

I am submitting a dissertation written by Cynthia Susan Miller entitled “Impact of Increased Technology use on the Free-time Choices of Fifth and Seventh Grade Students in a Southern School District.” I have examined the final electronic copy of this dissertation and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Learning and Leadership.

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Dr. James Tucker, Chairperson

We have read this dissertation
and recommend its acceptance.

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Impact of Increased Technology Use on the Free-time Choices of Fifth and Seventh Grade Students in a Southern School District

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DEDICATION

To Harold Leon Miller who lived with, loved, and tolerated educators his entire adult life. We miss you, Pop.

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I would like to acknowledge the members of my dissertation committee, Dr. James Tucker, Dr. Hinsdale Bernard, Dr. Valerie Rutledge, and Dr. Karen Adsit. Dr. Tucker was amenable and ambiguous enough to force me to take a stand and defend it, Dr. Bernard was knowledgeable yet patient as I struggled through the statistics, Dr. Rutledge was as supportive as she was particular with my English grammar, and last but not least, Dr. Adsit was my technology guide and guru extraordinaire. Thanks, I could not have made it without you.

ABSTRACT

The study sought to determine if increased technology use affects the free-time choices of students. While technology options have grown exponentially, time remains a fixed commodity. Therefore, it is suggested that students who increasingly use technology must draw time from more traditional childhood activities. Students' free-time activities were examined to document discernable patterns among the activities valued by students who use technology extensively and the activities valued by students who use technology less frequently.

Study participants were fifth and seventh grade students in a semi-rural suburban county in the southeastern United States. The data collection instrument was a self-reporting survey in which students were asked to specify their relative interest in six traditional activities in comparison to specific technology-based alternatives. Students were also asked to estimate the number of minutes per week they spent on traditional and technology-related activities.

Based on their time estimates, high and low quartiles of technology use were established. The forced-choice responses of students in the upper quartile of technology use were compared to the forced-choice responses of students in the lower quartile of technology use to determine if there were differences in their expressed preferences for the six traditional activities included in the study. Although findings revealed that students in the upper quartile of technology use were less interested in all six traditional activities studied than were students in the lower quartile of technology use, reading for fun, supervised activities, outdoor activities, and having a hobby were activities more

readily relinquished than were spending time with family and playing with friends, indicating their relative value among the two groups.

As students abandon traditional childhood activities to pursue technology-driven options, adults who are concerned about childhood development might explore alternative means for obtaining the benefits those six activities once provided. Recommendations are made for replicating the study among different populations. Although gender and grade level were two variables that were examined in this study, it would be beneficial to determine if findings would be similar among students with more or less access to technology, with divergent socio-economic means, and from diverse ethnic backgrounds.

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NOMENCLATURE

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M	Arithmetic mean
n	Number in a subsample
N	Total number in a sample
p	Probability
Q	Quartile
SD	Standard deviation
t	Computed value of t test
χ^2	Computed value of a chi-square test

List of Abbreviations

ALA	American Library Association
GPS	Global Positioning System
HFQ	High Frequency Quartile
IRB	Institutional Review Board
LFQ	Low Frequency Quartile
NOP	National Opinion Polls World
PASW	Predictive Analytic Software
PC	Personal Computer
SMS	Short Message Service
SPSS	Statistical Package for the Social Sciences
UTC	University of Tennessee at Chattanooga
ZPD	Zone of Proximal Development

CHAPTER ONE

INTRODUCTION

Background Information

Technologies, such as computers, computer gaming equipment, cell phones, and the Internet, are ubiquitous in the lives of American children (Montgomery, 2000). Although today's children seem to view each of these modern technologies as a necessity, parents and educators are not in agreement about the relative advantages and disadvantages these technologies offer the developing child (Shields & Behrman, 2000).

There is reasonable debate concerning the advantages and disadvantages of technology ownership and use. Before children are of driving age, the ability to balance hectic work schedules and coordinate "taxi-service" to and from myriad events makes equipping children with cell phones a sensible solution for their harried parents. Additionally, many parents and educators believe that computers and the Internet allow children to obtain valuable educational information (Prensky, 2001; Prensky, 2005; Turrow, 1999). On the other hand, some parents, educators, and medical professionals contend that the potential for harm outweighs the would-be benefits of increased technology use (Wartella & Jennings, 2000). While many concerned adults fear children's exposure to inappropriate content (Montgomery, 2000), others are more alarmed by the possibility of children becoming dependent upon or addicted to technology use (Orzack, 1998).

Statement of the Problem

Since the proliferation of personal computers late in the twentieth century, many studies have been conducted that have served to document the rise in technology ownership and use. Internet studies conducted by the Pew Internet Project (PIP) are quite extensive. In a generational study, PIP reports that 87% of Americans between the age of 12 and 17 use the Internet while the statistic for all Americans is 63%. PIP studies relating specifically to teen Internet use include: Teen Life Online, Teens and Social Media, Parent and Teenage Usage, Social Networking Websites and Teens, and Teen Content Creators and Consumers (PewInternet, n.d.).

Internet activities in which children engage range from traditional educational projects to emailing, chatting online, programming, creating Web pages, instant messaging (IM), podcasting, blogging, and social networking. (Future of Children, 2000; Goldwasser, 2008). An mKids study (conducted by National Opinion Polls World in 2005) revealed that almost half (44%) of 10-18 year olds in the United States own a cell phone. Given the growth of cell phone service plans, which include 24/7 Internet access and the tendency for young people to be early technology adopters, observers are likely to witness cell phones as the new medium for teenage Internet access. While it is obvious that young people are engaged with technology as never before, the focus of previously conducted studies was on what children "do" with technology. The unanswered question is what children *"don't do"* because of their engagement with technology; in essence, what must children forgo to afford more technology time.

Purpose of the Study

Early studies by Barker and Bronfenbrenner provided the conceptual framework for this study. Barker's foundational study (1951) was an attempt to document all the activities that a small child, left to his own imagination, engaged in during one day. Bronfenbrenner's seminal study (1979) helped to establish the relationships and interactions among various spheres of influence and the effects they had individually and collectively on children's development.

Of course, these early studies on childhood activities did not address the issue of technology use in the lives of modern children. Technology has certainly changed the behavioral setting described by Barker and has surely had an impact upon the spheres of influence depicted by Bronfenbrenner. Although research has been conducted to determine what contemporary children do with technology, what children ignore as they engage with technology has remained largely unexplored. The purpose of this study was to determine the effect of technology use on the free-time choices of modern children.

Need for the Study

The need for the study lies in the fact that educators spend a substantial amount of time and energy planning structured learning activities for their students. For the past two decades, teachers have been advised to incorporate technology instruction in the classroom to better prepare their students for the demands of a technologically-advanced society. As more and more students are engaging in technology use at home, it would behoove concerned adults to evaluate whether there is still a need to supplement students' technology knowledge or whether other activities that students are missing should be enhanced via the educational setting. In effect, it is important to determine what children

are not doing as a result of their engagement with technology. This study attempted to describe patterns of technology use in children and to determine which activities children ceased to engage in as they increasingly spent time using technology. For examples, if technology use carved out time from making connections with the natural world, or drew time away from social interactions with family and peers, then parents and educators would be well advised to supplement those activities in varied behavioral settings. It is hoped that findings from this study will serve to foster conversations about the types of activities students need and that the findings will serve as an aid when planning curricular goals.

Research Questions

1. Since time is a finite commodity, and it is a certainty that children are engaging in the use of technology, what activities are being relinquished to make time available for technology use?

2. Do relinquished activities demonstrate consistent patterns as students self-select their increasing engagement with technology?

Methodology

Subjects included in the study were fifth and seventh grade students and were drawn from six of the eight elementary schools and all three of the middle schools in the Southern School District (not the true name of the school system). The number of potential subjects was approximately 1,500. The study's research procedures were reviewed and approved by the Institutional Review Board (IRB) of the University of Tennessee at Chattanooga (UTC) prior to any data collection. Approval from the

Assistant Superintendent of the Southern School District was obtained before gaining access to the students who were included in the study.

The study was quantitative by design with a self-reporting survey as the primary information-gathering instrument. The survey questions were designed to elicit information about students' use of free-time outside of school hours. To maintain confidentiality, the survey asked general-information questions (such as age, grade, and gender) but did not ask for any information that could specifically identify any individual student. Students were asked to approximate the time they spend in a variety of activities (including technology use). Before the survey was administered to the subjects in the study, it was piloted with a group of students outside of the study population to ensure that it was both readable and understandable for the intended grade levels. Piloting the survey also helped to determine if the questions contained therein were adequate to generate the information sought by the study. Adjustments were made to the survey based on the pilot sampling.

Once the survey was finalized, survey packets were distributed to all fifth- and seventh-grade students (through the coordinated efforts of their teachers and principals) in the Southern School District. Upon receipt of completed surveys, responses were coded into categories and means for the time spent in each of a variety of activities were determined using Predictive Analytic Software Statistics (PASW statistics, formally SPSS). Quartiles were used to establish levels of technology use. Subjects whose responses indicated that their technology use was in the top or bottom quartiles were examined more closely to determine if there were significant positive or negative trends

between technology use and a variety of other activities among peers within similar environmental settings.

Statistical information obtained from the surveys was reported along with any conclusions that could be drawn from the findings of the study.

Basic Assumptions

1. Students did not purposely misrepresent the amount of time spent in their various free-time activities.
2. The researcher was sensitive to personal bias and attempted to keep it out of the study.
3. Some students had more access to technology than did others.
4. Students who had more access to technology engaged in its use to a greater degree.

Limitations of the Study

Considering the speed at which new technologies emerge, the particular items used by the subjects of this study may already be obsolete. However, if current trends hold, even though particular technology options may be less favored, it is unlikely that children would be less involved with the use of technology any time in the foreseeable future.

Although the study explored the free-time choices of students, not all students had the same access to technology. Although the question of how technology availability and access affects student choice is still valid, the study was not able to address this question. That is, this study did not attempt to determine if students with limited access to technology would have made the same choices had more technology been available to them.

Students surveyed in the study were asked to self-report the amount of time they spent using technology. Students who perceived ownership or use of technology as a status symbol may have over-reported the time they spent using technology. On the other hand, students who had been previously chastised for the amount of time they spent with technology may have under-reported their technology use. Over-reporting by non-users and under-reporting by users may have affected the findings of the study.

Delimitations of the Study

Because subjects included in this study were drawn from the same school district within a small, semi-rural suburban county, the findings cannot be directly generalized to other populations. As with any exploratory endeavor, there is a need to replicate the study with a variety of participants in sundry settings before the results can be generalized to other settings.

Definition of Terms

Baby Boomer – refers to a person born during a period of time that had a marked rise in birthrates (often called a baby boom). “Baby boomers” in this case refers to babies born in the United States during the 20 year period (approximately 1945-1965) following World War II.

Blog – is a personal diary or journal which is housed online. A blog is frequently updated and intended for general public consumption. Blogs are defined by their format: A series of entries on a single webpage which are listed in reverse-chronological order. Blogs generally reflect the personality of the author or represent the interests of the website that hosts the blog. Topics often include philosophical musings, commentary on social issues, and links to other sites the author favors, especially those that support a

point being made on a post. The author of a blog is often referred to as a blogger. The act of writing on a blog is called blogging.

Chat Room – is a "room" in cyberspace where people congregate for online conversations – reading and writing messages. Multiple conversations take place simultaneously and anonymously in real time.

Digital Divide – refers to the gap between those people who have effective access to digital and information technology and those who do not. Originally referring to the imbalances in physical access to technology, the term now encompasses the acquisition of skills needed to participate effectively as a digital citizen as well. Groups most often compared when discussing the digital divide include socioeconomic (rich/poor), racial (majority/minority), generational (young/old) or geographical (urban/rural). The term global digital divide refers to differences in technology access between countries.

Internet Access – is, for the purpose of this study, the ability to connect to the World Wide Web in a time efficient manner at a reasonable cost. Internet access can be achieved through a personal computer or a hand held communication device such as a cell phone.

Online – connected to the Internet or to the World Wide Web.

Resource Class –is, in this study, an elective or related arts class for middle school students. Examples of these classes include: band, chorus, keyboarding, study skills, weight training, etc.

Social Network – is an online community of people who share interests and activities or who are interested in exploring the interests and activities of others. Social

network services are web-based and provide a variety of ways for users to interact, such as email, instant messaging services, and posting.

Technology – is any electronic media which allows the user to interact with the content.

Tweens – are children between the ages of eight and twelve.

Wired – having and using an Internet connection.

Organization of the Study

An introduction to the study comprises Chapter One. Chapter Two contains a review of available literature that pertains to the students' use of technology, and the spheres of influence that affect childhood development; Chapter Three details the methodology used in conducting the study; Chapter Four presents the results of the study. Chapter Five provides a summary of the findings and discusses implications drawn from those findings.

CHAPTER TWO

LITERATURE REVIEW

Growth of Technology Use

Many people who grew up in the second half of the 20th century recall a time when many of today's technologies were only available in the world of science fiction (e.g., Star Trek's data disks, digital library, communicators, flat screen televisions, and talking computers). These once revolutionary technologies have modern equivalents which have rapidly become common-place in the lives of our children and grandchildren (Christensen, n.d.; PCMag, 2008). Incorporating the use of a variety of components such as informational DVDs, external hard drives, and the Internet, the once futuristic digital library of Star Trek has become a reality; and voice communication by satellite is now taken for granted. Although it cannot be readily confirmed, parents and educational policy makers may have been influenced by their own early exposure to advancements in technology as envisioned through the science fiction genre (Jones, Handel, & Jones, 2005). What is clearly evident is that even "baby boomers" are beginning to adopt advancing technologies as they become available (Aucion, 2007; InsightExpress, 2007).

Though baby boomers are rapidly embracing technology, studies document that young people are still leading the charge. As late as 2005, children between the ages of 12-17 were more likely to use the Internet than any other age group (See Figure 1). While teens of all races are more likely to be online than their parents, adults who are also parents, regardless of race or ethnicity, are more likely to go online than non-parents. Also, while 80% of all parents go online, 84% of parents of online teens go online

themselves. When broken down by race, 82% of white parents and 81% of English-speaking Hispanic parents go online. By stark contrast, just 62% of African-American parents go online (Lenhart, Madden & Hitlin, 2005).

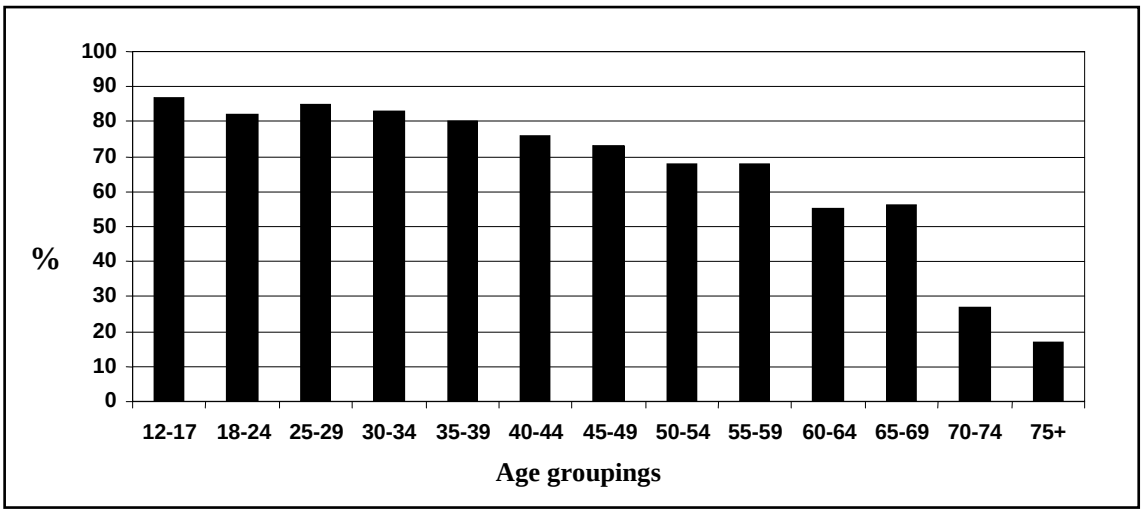

Figure 1. Percent of Americans online by age

If students were not regular Internet users in elementary school, entering junior high seems to be a milestone event pushing students to seek Internet connectivity. Though only 60% of the sixth graders report using the Internet, by seventh grade the figure jumps to 82% (Lenhart, Madden & Hitlin, 2005). The percentage of Internet users climbs steadily from seventh to twelfth grades, reaching a zenith of 94% by the end of high school. Much of the lag among sixth graders appears to come from boys. Though 79% of sixth-grade girls report going online, less than half (44%) of sixth grade boys do so. A full 59% of wired teens aged 15-17 go online at least once a day while 43% of younger teens report going online that frequently. By comparison, 11% of 12- to 14-year olds say they go online every few weeks, compared to just 6% of older teens. Only 6% of sixth graders go online several times a day compared to one-quarter (25%) of eighth graders, and close to two in five (39%) 12th graders (Lenhart, Madden & Hitlin, 2005).

Of Americans who use the Internet, 90% use email (Fox & Madden, 2005). Teens who participated in focus groups for the Lenhart, Madden, and Hitlin study (2005) said that they view email as something you use to talk to "old people," to communicate with institutions, or to send complex instructions to a large group. When talking to friends or for casual written conversations, online instant messaging is the clearly the mode of choice for today's online teens. Internet users between the ages of 12 and 28 years old have embraced other online applications that enable communicative, creative, and social uses more rapidly than do users older than age 28 (Fox & Madden, 2005; Lenhart, Madden & Hitlin, 2005).

Other popular uses of the Internet among youth are: to develop or refine their self image (Galanxhi & Nah, 2007; Hung-Yi, 2008; Montgomery, 2007; Reid & Reid, 2007), create an alter-ego or "second life" (Chatfield, 2008; New Scientist, 2007; Yee, Bailenson, Urbanek, Chang & Merget, 2007), and/or to explore intimate health issues and their budding sexuality in teen chat rooms (Smahel & Subrahmanyam, 2007; Subrahmanyam, Greenfield, & Tynes, 2004; Subrahmanyam, Smahel & Greenfield, 2006). Sadly, however, findings reveal that often youth who gain their identity and primary companionship online become lonelier as a result. This phenomenon is due in part to the "weak" nature of the emotional ties that are formed in cyberspace as opposed to the stronger ties that can be created with face to face contact (Subrahmanyam, Greenfield & Tynes, 2004; Subrahmanyam & Lin, 2007; Wilfong, 2006).

The rapid diffusion rate of Internet use is unparalleled – the spread of Internet use has been described as nine times faster than that of radio, four times faster than the personal computer, and three times faster than television (Chaney, 2000). Moreover,

accessing the Internet through the use of personal computers may soon be supplanted by Internet access via personal communication devices such as cellular telephones (Markman, 2006; Prensky, 2005; Walsh, White, & Young, 2008).

As recently as the 1990s, cell phones were approximately the size and weight of a brick, and the cost of using one was so prohibitive that the lucky owner usually kept one in his or her car for "emergency use" only. In the article *Backpacks, Lunchboxes and Cells* (National Opinion Polls World, 2005), an mKids study (a study of the mobile youth market in the United States developed by senior researchers at National Opinion Polls World Technology) revealed that nearly half of all American children aged 10-18 own their own cell phone. Teens and tweens are on the cutting edge of cell phone technology and are no longer enthusiastic about acquiring typical single-function cell phones. The majority of mKids want multi-functioning cell phones, with 71% expressing interest in wireless phones that convert into mp3 players and 70% of teens and tweens seeking cell phones with digital cameras (National Opinion Polls World, 2005).

Lenhart, Madden, and Hitlin's study indicated that,

> As the platforms for instant messaging programs spread to cell phones and handheld devices, teens are starting to take textual communication with them into their busy and increasingly mobile lives. IM is a staple of teens' daily internet diet and is used for a wide array of tasks — to make plans with friends, talk about homework assignments, joke around, check in with parents, and post 'away messages' or notices about what they are doing when they are away from their computers (Lenhart, Madden & Hitlin, 2005, p. ii).

Until quite recently, having a cell phone with a service plan that included affordable, unlimited Internet access was not an option. Perhaps this is why current research has not yet investigated teenage use of cell phones for anytime/anywhere accessing of the Internet. Still, in less than 20 years time, a cell phone transformation has been witnessed, wherein even the simplest "voice-only" phones have more complex and powerful chips than did the 1969 on-board computer which guided the *Eagle* spacecraft to the surface of the moon (Prensky, 2005).

Relative Advantages and Disadvantages of Technology Use

Debate rages concerning the advantages and disadvantages of technology use (Attewell, Suazo-Garcia & Battle, 2003; Goldwasser, 2008; Miller, 2006; National Science Foundation, 2005; Wang, Bianchi & Raley, 2005). As stated previously, equipping children with cell phones makes sense for parents who are juggling careers and all the extracurricular events that have become a staple for America's youth. In addition, few would argue against providing a newly-licensed teenage daughter with a cell phone so that she will have immediate access to parents or emergency assistance in the case of an accident or breakdown. Phone companies are using the Global Position System (GPS) feature on newer phones as a marketing strategy, assuring parents that providing younger children with these new phones will allow parents to know their child's whereabouts (Birkett, 2003; Noguchi, 2005). Although a locator service adds another level of oversight, it should be pointed out that such service can only locate the phone, not the person. Regardless, the pitch appears to be working because a growing number of children eight to twelve years old (about 41% in the United States) now own their own cell phone. As noted by Noguchi (2005), Firefly Mobile Inc. signed up more than

100,000 users in a six-month period, and Enfora is marketing phones equipped with LeapFrog educational software to entice the “six-and-over” crowd. Many wireless carriers are adding control features to ease parental concern regarding when, how, and how often their children’s are able to use their cell phones.

A study recently conducted by Indiana University (2008) used the global positioning feature available on cell phones to track their subjects. The researchers reported a pilot study, which evaluated the feasibility of using GPS-enabled cell phones to track where 14- to 16-year-old girls spent their time.

> We didn't know if the technology would work, if the kids would take the cell phones with them or would leave them at home. But they did carry the phones and the GPS data revealed that they were spending more time away from home, school, and surrounding areas than anticipated (p. 1).

Because many parents and educators believe that the Internet can help children with their homework by allowing them to discover information that is both intriguing and valuable, children who do not have Internet access are now seen as being disadvantaged (Turrow, 1999, Prensky, 2001). White and English-speaking Hispanic teens are more likely than African-American teens to report going online. Caucasian youth report 87% Internet usage, while Hispanic youth report 89% usage, and in comparison, 77% of African-American youth report online usage. Additionally, teens from the lowest-income families are the least likely to report use of the Internet. Teens from households earning under $30,000 per year are less likely than any other income group to report Internet use; less than three-quarters (73%) of teens from these families use the Internet. By contrast,

90% of teens from families earning more than $30,000 a year go online. At the highest income levels, households earning more than $75,000 a year, 93% of teens go online (Lenhart, Madden & Hitlin, 2005).

In the minds of many parents and educational policymakers, “equality of digital opportunity” is fast becoming synonymous with “equality of educational opportunity” (Chen, 2000). As a result, growing numbers of parents are now providing children access to computers and the Internet at home (Woodward & Gridina, 2000). Among households with children between the ages of two and seventeen, “…home computer ownership jumped from 48% in 1996 to 70% in 2000, while connections to the Internet catapulted from 15% to 52% over the same five-year period” (Shields & Behrman, 2000, p. 5). A few studies appear to corroborate the perception that home computer use is related to better performance (Rocheleau, 1995; Subrahmanyam, Kraut, Greenfield & Gross, 2000).

Census findings have documented the increased availability of computers and Internet access in American public schools as well (Institute of Educational Science, 2006). Statistical information from 2005 found that nearly 100% of public schools in the United States have access to the Internet, compared with only 35% in 1994. Public schools have made consistent progress in expanding Internet access into instructional rooms. In 2005, 94% of public school instructional rooms had Internet access, compared with 3% in 1994. In 2005, the ratio of students to instructional computers with Internet access in public schools was 3.8:1, a decrease from the 12.1:1 ratio in 1998, when access was first measured. The ratio of students to instructional computers showed some differences by school characteristics in the 2005 study. For example, small schools had fewer students per computer than did medium-sized and large schools (2.4:1 compared

with 3.9:1 and 4.0:1, respectively). In addition, schools with the lowest level of minority enrollment had fewer students per computer than did schools with higher minority enrollments. Larger and less affluent schools, especially those with larger minority populations, have less access to computers and the Internet, indicating there is still a digital divide.

While proponents of specific technologies have stressed the potential educational benefits for children (e.g., Becker, 2000; Prensky, 2005, Tynes, 2007), many others fear that the dangers of unbridled Internet use far outweigh the perceived advantages. Detractors have expressed fears about inappropriate commercial, sexual, and violent content (e.g., Montgomery, 2000; Montgomery, 2007; Subrahmanyam, Smahel, & Greenfield, 2006; Tynes, 2007).

Although there is a tendency to view these arguments as being current, discussions about potential benefits and dangers have accompanied the advent of each novel technological medium, including films in the early 1900s, radio in the 1920s, and television in the 1940s (Valkenburg, 2007; Wartella & Jennings, 2000). These debates continue for each medium, largely based upon content; i.e. the accessibility of content by children and the suitability of the content for children.

Although the debates continue, the issue of content suitability is generally driven by social values and is often quite specific within diverse subcultures; arguments are, by and large, not inherent in the media itself. For example, in anticipation of the 25th anniversary of Banned Book Week, the American Library Association (ALA) recently published a list of the ten most challenged books in the 21st century. According to the ALA, the organization received more than 3,000 “book challenges” between 2000 and

2005. (Book challenges are defined as formal, written complaints filed with a library or school requesting that materials be removed because of content or inappropriateness.) The Harry Potter series, by author J. K. Rowling, which many educators credit with inspiring a whole new generation of children to pick up a book, has been challenged in 18 states and thereby leads the current Banned Books List (American Library Association, 2008). The most frequently banned books in the 21st century are:

1. The Harry Potter series by J. K. Rowling
2. *The Chocolate War* by Robert Cormier
3. The Alice series by Phyllis Reynolds Naylor
4. *Of Mice and Men* by John Steinbeck
5. *I Know Why the Caged Bird Sings* by Maya Angelou
6. *Fallen Angels* by Walter Dean Myers
7. *It's Perfectly Normal* by Robie Harris
8. The Scary Stories series by Alvin Schwartz
9. The Captain Underpants series by Dav Pilkey
10. *Forever* by Judy Blume

Because content issues are not media specific, it is expected, that, as new technologies emerge, supporters and detractors will continue to argue about their effects on children. This argument seems to confuse the messenger with the message and ignores an important point: as children engage in newly developed and often highly attractive technologies, they are forced by time allocation to disengage from other activities. Along this vein, people who fear that technology (beginning with television but extending to video games and computers) has interfered with more traditional activities among

American youth have substantial research backing (Attewell, Suazo-Garcia & Battle, 2003; Ginsburg, 2007, Grossman, 1995, Mander, 1977; Winn, 2002). A few specific concerns are: (1) first-person shooter games break down natural inhibitions and lead to a more violent society (Funk, 2005; Gentile & Gentile, 2007; Grossman, 1995; Staude-Müller, Bliesener, & Luthman 2008), (2) increased "screen time" leads to obesity (Marshall, Biddle, Gorely, Cameron, & Murdey, 2004; U.S. Department of Health and Human Services, 2005; Vandewater, Shim, & Caplovitz, 2004) (However, it should be noted that game producers are attempting to ameliorate these findings by developing more active video products such as Fit® and Dance Revolution®), and (3) significant technology use leads to technology addictions. A plethora of studies delve into the possibility of gaming, Internet, and cell phone addictions (American Academy of Sleep Medicine, 2008; Chatfield, 2008; Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Rutger, 2008; Porter & Kakabadse, 2005; Walsh, White & Young, 2008).

Conceptual Framework

The fact that learning is very often a social event has been well established. Researchers such as Lewin, Bandura and Vygotsky were foundational theorists who influenced the development of social learning theory (Schunk, 2004). Lewin is recognized as the "founder of social psychology" and was one of the first researchers to study group dynamics and organizational development. Bandura's work established the premise that learning can take place without an outwardly displayed behavior as he demonstrated that children often learn by simply watching someone else (a model) perform a task. By noting what happens to the model (outcome), the child can decide if he or she wants to engage in the activity. Vygotsky's *Zone of Proximal Development*

(ZPD) is a seminal social-learning construct. The concept of the ZPD states that while there is a range of activities that a child can accomplish alone, the range can be greatly increased with the help and support of an experienced guide. The works of these theorists support the conclusion that observations and guidance from immediate environments are critical in directing, supporting, modifying and maintaining the behaviors of a developing child.

In 1951, Roger Barker published, *One Boy's Day*. Barker's book depicts the many activities in which a young child growing up in Midwest, Kansas (a fictitious city) was involved during one summer day. The story in *One Boy's Day* is replete with descriptions of dawn to dusk activities. These include detailed encounters with adults and children, as well as many hours spent in an unstructured, free-flowing learning environment where the child busied himself by exploring nature and the world that encompassed him on that particular day. Barker's attempted to understand what children and adults actually do on a daily basis as they go about their lives. The study contributed to the development of the concept of behavioral settings, one of the foundations of ecological psychology. Barker's studies suggest that observing children in their natural setting could provide insights into the child's behavior and interests.

Following Barker's work, Urie Bronfenbrenner (1979) pioneered Ecological Systems Theory; his theory proposed that children are influenced by five types of nested systems. Bronfenbrenner named these systems: the *microsystem* (such as the family or classroom); the *mesosystem* (an interaction of two microsystems); the *exosystem* (external environments which influence development indirectly, e.g., the work environment of the parents); and the *macrosystem* (the larger socio-cultural context). A revised edition of

Bronfenbrenner's work (2006) added a fifth system, called the *Chronosystem* (the evolution of the external systems over time). Each system contains roles and norms that powerfully shape an individual's social development. For example, children often modify their behavior, even their demeanor, when entering a church or library. Further, the roles and norms displayed by adults and peers in the children's ecological systems serve as models for appropriate actions in each setting.

Bronfenbrenner believed that the norms valued in any particular setting are influenced by all five systems. On the microsystem level, children in different families behave differently in the same setting (i.e., children in one family may have been taught "silence is golden" while in a contrasting family children are expected to actively discuss political events during the evening meal.) An interaction between two microsystems (mesosystem) might involve different behavior expectations for children at home and at school (children learn that certain words and actions tolerated at home are not accepted at school and adjust their behavior accordingly.) The pressure of a parent's work environment (exosystem) may mean that children learn to play outside for thirty minutes while dad and/or mom has a chance to unwind after work. Societal influences (macrosystem) pressure people to conform to cultural norms (people in various regions of the world think, act, and dress quite differently due to cultural pressures.) Chronosystem changes may include the acceptance of once taboo behaviors (for examples, hair and skirt lengths or women working outside the home).

Bronfenbrenner's systems might be conceptualized as a bull's eye of concentric rings (see Figure 2) with the inner rings having more direct influence between and among

participants. Outer rings still have a great deal of influence on behaviors, but individuals are less able to control or to be controlled by members therein.

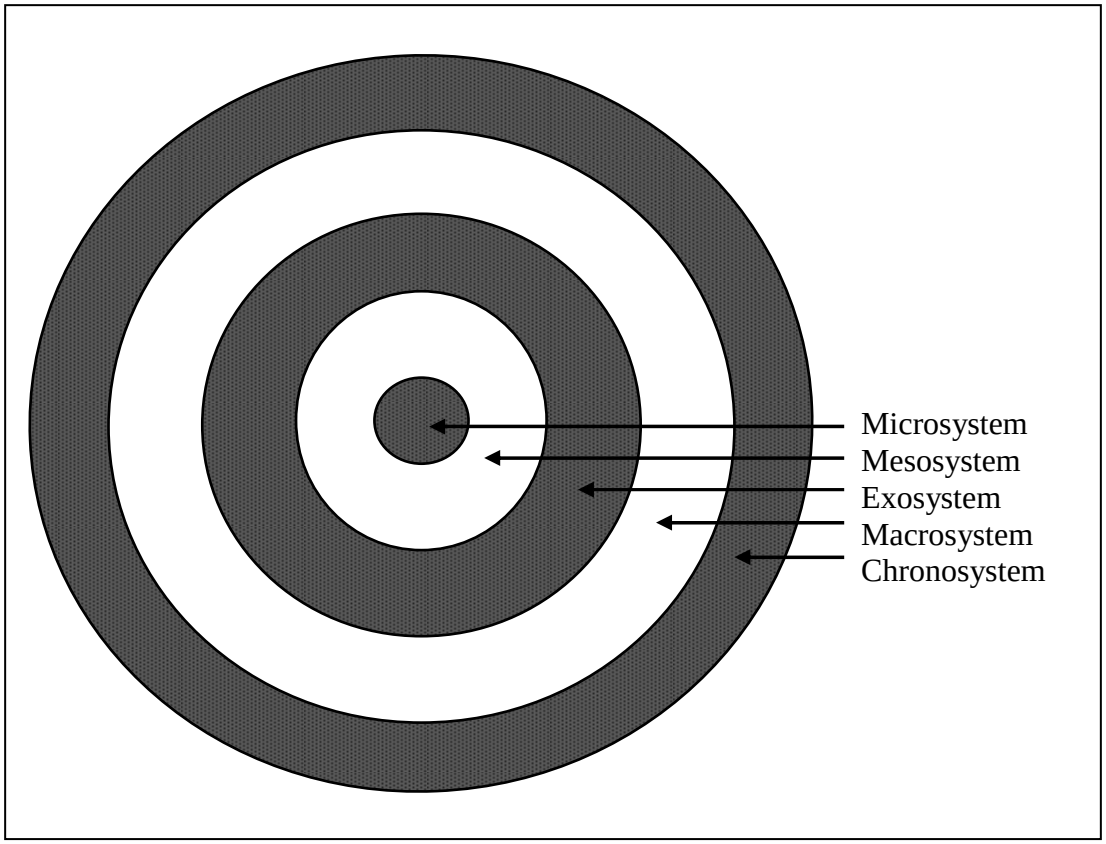

Figure 2. Perception of Bronfenbrenner's ecological system.

The studies of Barker (1951) and Bronfenbrenner (1979) offer insight to my study. First, works by Barker point out that little is known about what individuals (especially school-aged children) actually do in naturally occurring, out-of-school environments. This conclusion, 50 years later, remains alarmingly true. Second, both Barker and Bronfenbrenner recognized the power of environments to shape and alter the development of individuals. Third, Vygotzky demonstrated the power of learning through social contact in the ZPD, an event familiar to every individual who ever learned how to use a new technology with the guidance and support of a friend. These themes underlie the present investigation into the current prevalence of technology as an influence in the

lives of school-aged children. In addition to the time demands of technology, some current studies indicate that parents are over-committing their children (Dunn, Kinney & Hofferth, 2003; McHale, Crouter & Tucker, 2001) leaving children with less time to connect with nature (Louv, 2008), care for a pet (Kritt, 2000) or engage in a variety of unstructured childhood activities.

Even in the same era, one would not expect the subject from Barker's studies to engage in the same activities if he moved to a more metropolitan "behavioral setting" such as New York City or Paris. Moreover, if the child was reared within a microsystem where modern technology was at his or her disposal, one would expect the choice of activities to be markedly different. Clearly children's behavioral settings and environmental systems have changed in the decades since Barker and Bronfenbrenner published their works.

The worldwide expansion of communication technologies is an example of chronosystemic change within our macrosystem. It is a phenomenon over which people have little control. Technology is here, it is cheap, and it has been embraced by society. The expansion and availability of modern technologies are having a tremendous influence on the ecological systems in which today's children operate.

With the increased availability of technology, it is obvious that a significant number of children are spending more of their time engaged in its use. According to a "Plugged In" survey conducted in 2000, the on-line activities in which children engage

> …range from traditional educational projects, such as writing fiction and nonfiction, doing research for school, and benefiting from homework help, to the newer pastimes of writing email, chatting online, programming, and

> creating Web pages. Favorite activities include: playing games, drawing pictures, writing letters, and surfing the Web (Future of Children, 2000, p. 186).

However, due to the rapidly changing nature of technology, Goldwasser (2008) added instant messaging, podcasting, blogging, and social networking to the list of technologies used by modern children.

Of course, earlier studies on childhood activities, such as those conducted by Barker and Bronfenbrenner, did not address the issue of technology use in the lives of children. However these new technology-rich settings are now in existence and no doubt affect the course of behavior and social development of the modern child. Unstructured, free-time behavior now has within it myriad technology-driven experiences not available to the children in Barker's 1951 study or the systems described by Bronfenbrenner in the 1970s. Although there are studies that focus on what children do with technology during unstructured time, what activities are ignored as children increasingly engage with technology is largely undocumented. My study intended to determine the effect of technology use on the free-time choices of contemporary children.

Significance of the Study

Because planning structured learning activities for students takes a significant amount of an educator's time and energy, it is important for us to determine what activities our students most need to guide and foster appropriate development. For the past quarter-century, teachers have been charged to incorporate technology instruction in the classroom to better prepare their students for the demands of a technology-driven society. As more students are engaging with technology for longer periods of time and

for more varied purposes, it is logical to assume that caring adults should re-evaluate the activities that our students are neglecting in their preference for technology-driven engagement. This study attempted to describe patterns of technology use and to determine which activities children cease to engage in as they increasingly spend time using technology. Findings from this study will serve to foster conversations about the types of activities our students need and will serve as an aid when planning curricular goals.

CHAPTER THREE

METHODOLOGY

Overview

This chapter discusses the research design and the methods used to conduct the study. It includes: (a) a description of the research population, (b) a description of the data collection instrument and measures taken to ensure validity, (c) the research questions and their corresponding hypotheses, and (d) the procedures used for data collection and analysis.

Subject Demographics

The subjects involved in this study were fifth and seventh grade students in the Southern School District (a pseudonym). The school system can best be characterized as suburban, although there is variability throughout the service area with some communities being quite rural and others bordering a medium size city of approximately 150,000. The system is rapidly expanding and has added one new school every two years during the past decade.

The Southern School District is quite homogeneous in race with a minority population of less than one percent. Each of the district schools (all of which have been assigned pseudonyms) has a substantial poverty rate (for the purposes of this study, poverty was defined as qualifying for free or reduced lunch). Percentages for elementary schools were: Battleground Elementary, 46%; Boyd Town Elementary, 32%; Cloudland Elementary, 64%; Graceville Elementary, 36%; Gold Town Elementary, 46%; Tiger Stream Elementary, 36%; Westend Elementary, 63%; and Woodward Elementary, 39%.

Middle school percentages were: Gold Town Middle School, 46%; Lakeside Middle School, 55%; and Traditions Middle School, 30% (Food Services Staff, Southern School District, personal communication, May 23, 2008).

The system serves approximately 800 students at each grade level in elementary and middle school. Overall, this school system serves approximately 10,500 students in 16 schools: two primary schools, eight elementary schools, three middle, and three high schools.

Eleven schools in the county were asked to participate in the study – eight elementary schools and three middle schools. Of the eleven schools invited, two elementary schools declined, leaving nine participating schools. The two schools that declined participation were Gold Town Elementary and Boyd Town Elementary. It is a requirement of the Southern School District that permission from the principal of the participating school be obtained before research can be conducted at that school. The principals of these two schools did not sign the consent form that the county required. One principal stated that she did not want to burden her teachers with the added responsibilities of conducting the study, while the second principal said she asked her teachers if they were willing to participate and that they indicated they did not have the time required. Of the participating elementary schools, five serve kindergarten through fifth grade. The other elementary, Battleground Elementary School, has a “twin school” on the campus grounds with the two schools being divided into primary and elementary grades. The primary school serves kindergarten through second grade, and elementary school serves third through fifth grade (which contained the target population). All three

of the middle schools that participated in the study serve sixth through eighth grade students.

As originally outlined, the survey was to be administered by the classroom teacher in the elementary schools and by the homeroom teacher in the middle schools. However, schools were given latitude and a few changes were made during the administration of the survey. In five of the elementary schools, the survey was administered by the individual classroom teacher, as originally designed. In Battleground Elementary School there were five fifth-grade classes and the students had a rotating schedule. In this school, all of the survey paperwork was maintained by the homeroom teacher, but the history teacher (who was also the principal's designee) administered the survey to each of the fifth grade classes as they rotated through his classroom. At Traditions Middle School, the homeroom teachers administered the survey, as originally conceptualized, but in the other middle schools, the survey was administered in resource classes during the seventh grade students' elective periods.

Sample

Though participation in the study was offered to all fifth and seventh grade teachers in the Southern School District, it should be noted that not all schools participated. The result was a cluster sampling of students from the classrooms in which the survey was administered. Patton (2005) indicates the major drawback of cluster sampling is that clusters tend to be more homogeneous than the population as a whole. The prescribed method for overcoming this drawback is to include more clusters or to take a purposive sampling of appropriate clusters. I included every available cluster. Beyond Patton's recommendation to include as many clusters as possible, the opportunity

to participate was extended to each classroom for two reasons: (1) to avoid rancor within the district because some students or classrooms were included while others were left out of the study, and (2) to ensure that every child had an opportunity to voice his or her opinion.

Nature of the Research Design

Based on the writing of McMillian and Schumacker (2006), the study should be described as quantitative in nature and non-experimental by design. The study was not considered to be truly experimental because (a) there was no manipulated (independent) variable, (b) there was no control group, and (c) the subjects were not randomly assigned to treatments. Responses from the survey were used to calculate the average technology use among "tweens" in the Southern School District. Additionally, information obtained from the survey questions was used to determine which activities students continued to value and which ones became less appealing as these students increasingly engaged in the use of technology. The study was descriptive of activities based upon assignment (stratification) of individuals determined by technology use patterns.

Instrument Design

The data collection instrument used in the study was a self-reporting, paper and pencil survey. The survey was designed to investigate the primary questions described in Chapter One. While conducting the literature review, I simultaneously searched for appropriate surveys that could be used to collect the data needed for the proposed research. Although there were a few examples of surveys that collected information on technology use (National Public Radio, 2000; Pappas, n.d.; Pew Internet Project, 2000-2008), none fit my purpose, resulting in the need to create a unique survey instrument. I

used information gleaned from the preceding surveys along with information from the Future of Children (2000) and Goldwasser (2008) to create the categories relating to student technology use that were included in the newly constructed survey. Additionally, I considered the microsystem and mesosystem spheres of influence espoused by Bronfenbrenner (1979) to establish likely traditional activities (outdoor activities and spending time with family) to include in the survey. Student selections from these categories were used to investigate the research question in this study.

The survey instrument (Appendix A) was comprised of three sections. The first section of the survey secured background information, which included the student's age, the student's classroom or homeroom teacher, and the student's gender. The survey did not request any information that could be used to identify the responses of an individual student. A total of three questions comprised section one of the survey. In the second section of the survey, students were asked to indicate preferences for using their free-time to engage in technology-based activities in contrast to more traditional activities. This section was constructed in a forced-choice format. An example question illustrating this procedure is as follows: When you can choose, would you rather…"Play with friends____… or … surf the Internet ___." The survey was iterative in that the same stem ("Play with friends") is contrasted with various technology options ("Play video games," "Surf the Internet," or "Text on a cell phone"). Stems are related to microsystems (Bronfenbrenner, 1979) out-of-school, non-technology based activities ("Play with friends"), and responses are out-of-school, technology-based activities ("Surf the Internet"). A total of six forced-choice stem and response items were included in section two of the survey. Finally, the third section of the survey was used to secure students'

estimates of time spent engaged with free-time choices. In this section students were asked to estimate the minutes of time they spent during an average week engaged in specific activities. Stems for these questions were related to microsystems activities (Bronfenbrenner, 1979), out of school technology use ("I spend ____ minutes a week surfing the Internet") and non-technology based activities ("I spend _____ minutes a week playing with friends"). Section three was comprised of 19 "time estimate" items.

Since the survey was constructed solely for the purpose of this study, I was advised by members of my research committee to take steps to ensure the instrument demonstrated content validity, a point also made by McMillan and Schumacher (2006) in *Research in Education*. The newly constructed survey and instructions for its administration were sent to an ad hoc committee of ten individuals who had experience with late elementary and/or middle school students (each respondent had children in this age range or taught children in this age range) as well as a high level of interest in, and familiarity with, the technology utilized by students in this age range. Respondents from the ad hoc committee were asked to determine if the survey, as developed, could be expected to answer the research questions outlined in chapter one. This procedure is in line with the content validation procedures described by Popham (2005) and helped to ensure that the content of the survey was applicable for its intended purpose. Nine of the ten members of the ad hoc committee responded to my request.

In general, the comments from the respondents were affirmative and criticisms of the original survey were minimal. However, some of the survey items and survey instructions were modified based on the recommendations of the respondents (See Appendix B for detailed replies). While each respondent stated that he or she felt that the

survey would obtain the desired information, several specific recommendations were offered as possible revisions for the survey instrument. Two respondents expressed the opinion that "playing multi-player video games with friends" should be included as a technology choice, for examples, games such as *World of Warcraft*® (Blizzard Entertainment, 2004) and *Halo 3*® (Microsoft Game Studios, 2007). One correspondent, who recently completed his own research, suggested that a "carrot" (some sort of prize or award) be offered for survey completion since he had difficulty in obtaining adequate return rates. Another respondent suggested that "free-time" should be defined in the survey instructions as "hours before and after school, and on weekends, and holidays." Additionally this respondent recommended that the "gender specific" organized sports "baseball and football" be replaced with the more "gender neutral" sport of soccer. One respondent suggested the inclusion of "hang out with friends" in the list of suggested activities in the "play with friends" category and that more specific instructions were needed in the forced choice section (i.e., tell the students to put a "√ "or "x" by the item they prefer). The same respondent suggested that an example of a completed item be included in the second and third sections of the survey. (For a comparison, see the revised survey incorporating suggestions from the ad hoc committee in Appendix A and the survey as originally constructed in Appendix C.) After all changes were made in the survey, the readability level was determined though Microsoft's tool package. On the Flesch-Kincaid Grade Level scale the document had a readability level of 4.1 or the first month of grade four.

The survey was piloted in a classroom (outside of the school system used in the actual study) to ensure that students were able to complete the survey instrument without

difficulty. The pilot study was conducted within a classroom in a neighboring county that had eighteen, third grade students. The classroom teacher was enthusiastic about the study and was able to garner parental consent and student assent from all but one of the students in her classroom. However, on the day of the actual study, four students were absent, resulting in 14 participants in the pilot study. Of the 14 completed surveys, 13 were useable. One survey was incomplete in that the student selected only one item in each forced-choice sections instead of selecting an item in each of the eight pairs (see Appendix A). Because 13 of 14 surveys were successfully completed it was determined that the survey, as constructed, was adequate for use with fifth and seventh graders in the actual population. The results of this pilot survey did not necessitate changes in administration procedures and only minor revisions to the wording of the directions and to specific survey items were needed.

Research Questions and Null hypotheses

Research Question One: Do students relinquish traditional activities as they become more involved in technology use?

The corresponding Null hypothesis: Students do not relinquish traditional activities as they become more involved in technology use.

Research Question 2: Do relinquished activities demonstrate consistent patterns as students self-select their increasing engagement with technology?

The corresponding Null hypothesis 2: No consistent patterns will emerge as students self-select their increasing engagement with technology

Survey Distribution, Completion, and Collection

Once my dissertation committee and the department head approved the proposed study, permission to proceed with the study was obtained from the Institutional Review Board (IRB) of the University of Tennessee at Chattanooga. The rights of subjects were protected through the review and authorization of the Institutional Review Board. Permission to conduct the study in the Southern School District was secured from the Assistant Superintendent of Schools. The principals from the schools involved in the study were contacted to request authorization to obtain survey information from their student population. Of the eleven principals contacted, two declined participation (because of teachers' time constraints), while nine consented. Of the nine principals who allowed the study, six designated a "contact person" to run the administration of the survey within their school.

After permissions were secured from the IRB and school system personnel, survey packages were compiled. Each package contained an appropriate number of surveys (based on maximum class size), instructions for survey administration (See Appendix D), parental consent forms (Appendix E), student assent forms (Appendix F), a small candy incentive for students who brought back signed parental consent forms (incentives were awarded whether the signed parental consent form granted or denied participation in the study), and a return envelope for completed forms and surveys.

When surveys were delivered to the participating schools, I was given the number of students currently enrolled in each classroom to calculate return rates following the completion of the study. Of the nine participating schools, only one (Tiger Stream) had an introductory meeting to discuss the study and its procedures with the teachers who

would participate. At the other schools the principals, or their designees, were given an introduction to the study; and subsequently passed the information onto the classroom teachers involved in the study.

One survey package was provided to each teacher. Each package contained administrative instructions which detailed the dates and procedures to be followed when giving the survey to their students to complete. Teachers were advised that before administering the survey it was imperative that they obtain a signed parental consent form for each child. The parental consent form was sent home approximately one week before the survey was conducted. Additional points stressed were: (a) the need to ensure confidentiality, (b) student's right to refuse to participate, (c) procedures for survey completion by students, and (d) a timeline for returning the research information. Furthermore, the survey instructions required teachers to separate consent forms (both parental and student) from the completed surveys to ensure there was no visible link to the child's personal opinions, further protecting the anonymity of the subjects.

After the teachers administered the survey and returned their materials to the school office, I returned to each school and collected the completed surveys and consent forms. The date of collection was approximately three weeks after delivery of the survey materials and was directly scheduled with principals or their designees.

Summary of Survey Timeline

Step One: The dissertation committee approved the research proposal.

Step Two: The IRB approved the study.

Step Three: A pilot study was conducted resulting in slight modifications to the survey documents.

Step Four: The Assistant Superintendent of the Southern School District granted authorization to petition principals for permission to conduct the study in local schools.

Step Five: School principals granted permission to conduct the study among their student populations.

Step Six: Surveys packets were compiled for distribution.

Step Seven: Packets were distributed to participating schools and student population was noted so that return rates could be calculated at the end of the study.

Step Eight: Parental consent forms were disseminated by teachers one week prior to the survey date.

Step Nine: Parental consent and student assent forms were collected and tracked by teachers.

Step Ten: Surveys were administered to fifth and seventh grade students from whom teachers had acquired parental consent and student assent forms.

Step Eleven: Consent forms, assent forms, and completed surveys were packaged by teachers and sent to the school office or the principal's designee.

Step Twelve: All survey materials were collected from the participating schools and stored in a secure location.

Data Analysis: Coding

As the survey materials were collected, each completed survey was consecutively numbered so that it could be identified for subsequent referrals. In all, information gleaned from 29 variables was linked to each subject's survey by a unique identification number. From section one of each survey, the student's age, gender, and grade level were documented. Section two was a forced-choice section (Appendix A). In this section,

students were asked if they would rather engage in a traditional activity or a technology activity when they were allowed to choose. The forced choice items consisted of a traditional activity "stem" and a technology activity "response." The six traditional activity stems (outdoor activity, read for fun, spend time with family, play with friends, have a hobby, and supervised activities) were compared with eight technology activity "responses." When a student chose the traditional activity, the item was assigned the value of 1. When a student chose the technology activity, the item was assigned the value 2. The values for all of the responses on each traditional activity were totaled. Since there were eight response options, the range of scores for each of the six traditional activities was between 8 and16. For example, a student who chose "playing with friends" eight times would have a score of 8. If a student chose the traditional activity four times, and the technology activity four times, the result would be a score of 12. If a student chose the technology activity eight times, his or her score would be 16. Thus lower scores indicated that the student expressed greater value for the traditional activity and a higher score indicated that the student expressed less value for the traditional activity. In section three, the minutes spent on each activity (19 variables) were entered for each student. The coded surveys were now ready for statistical analysis.

Data analysis: Descriptive Statistics

Descriptive statistics were used to compare and contrast the population by age, gender, grade and school. Presenting the mean for technology use by gender and grade was a second application for the descriptive statistics.

Data Analysis: Examining the Null Hypotheses

Students were stratified by their use of technology. The activities valued by students in the first quartile of technology use (high-tech) were compared to the activities valued by respondents who were in the last quartile of technology use (low-tech) to determine if there were significant differences by gender and grade level. The high-tech users and low-tech users became the focus of more intense examination. Using data analysis software, I identified the forced-choice subset scores (survey section two) of all of the high-tech users and compared them to the forced-choice subset scores for all of low-tech users. Further statistical analysis was used to examine the null hypotheses and disclose trends among high-technology users and low-technology users based on their expressed preferences for traditional activities versus technology-based activities.

Summary

Students in fifth and seventh grade were asked to complete a self-reporting survey to determine if there were significant differences in the perceived value of six traditional activities between groups when students were stratified by the amount of their technology use. In Chapter Four, the findings obtained from the surveys are presented, and in Chapter Five the implications of the findings are discussed, along with recommendations for future studies.

CHAPTER FOUR

RESULTS OF THE STUDY

Chapter Four describes (a) how data were collected and prepared for analysis, (b) how statistical procedures were conducted, and (c) how statistical analyses were used to address the research questions proposed in Chapter Three.

Survey Distribution and Return Rates

The primary data collection tool used in this study was a traditional paper and pencil survey (See Appendix A). All of the survey materials – cover letter, directions for administration, surveys, parental consent forms, student assent forms, and a return envelop – were distributed to participating schools during April 2009 and collected during the first two weeks in May. In each school a principal or teacher acted as facilitator to help the researcher distribute and collect the forms. This person also helped assure that the conditions of the IRB were strictly monitored. Table 1 details the number of potential subjects by school and the number of completed surveys that were returned at the end of study. Of the 1,509 surveys distributed, 604 were completed and returned with parental consent and student assent. Based on these figures, the calculated return rate was 40.02%.

Coding the Data

As the survey materials were collected, each completed survey was given a unique identification number. To insure anonymity, information gleaned from each survey was associated only with its identifying number and individual surveys cannot be

linked to the identity of any individual respondent. The original survey materials are stored in a separate, secure location and will be destroyed after the completion of this study.

Table 1

Number of Surveys Distributed and Returned

School	Distributed	Returned	%
Battleground Elementary School	129	87	67.44
Cloudland Elementary School	72	31	43.05
Graceville Elementary School	109	67	61.46
Tiger Stream Elementary School	98	45	45.91
Westend Elementary School	79	51	64.56
Woodward Elementary School	82	51	62.20
Gold Town Middle School	296	92	31.08
Lakeside Middle School	285	48	16.84
Traditions Middle School	359	132	36.76
Totals	1,509	604	40.02

To input responses into a statistical software program, codes were assigned for the following survey items: schools (1 through 9); gender (1 = female, 2 = male); and forced-choice options (1 = traditional preference, 2 = technology preference). Student responses for age, grade, and the minutes spent on specific free-time activities were input directly into statistical software programs since they were already in numeric form.

Prior to entering the data, all forms were carefully examined and errors and omissions were identified. Surveys with obvious errors were not used because information provided by the students did not follow the guidelines or conveyed unreasonable answers. For example, when students were asked to determine the average number of minutes spent doing an activity during a typical week, invalid responses: “a lot,” “always,” and “most,” were sometimes provided. In these cases a quantitative value

could not be tabulated. Because high and low technology users were determined from "students' self-reported estimate" of the time they spent engaged in these activities, surveys that were missing this essential information were excluded from the study. Other surveys contained answers that were clearly out of range. For example, one student indicated that he devoted 10,000 minutes each week "playing video games", while another stated that she spent "24/7" texting on her cell phone. Since these figures would not leave any time for compulsory activities, e.g. eating and sleeping, the answers given could not reasonably be included in the study. After careful consideration and consultation, a decision was made to eliminate any survey that indicated a student spent more than 30 hours engaged in any particular free-time activity during a week. As noted, surveys with obvious exaggerations or clearly suspect data were excluded from further consideration. Other surveys with minor errors or omissions did not seem to warrant loss of all data, as when students failed to indicate their gender or age (in section one) or skipped a subset item (in section two). In such circumstances the decision was made to use surveys with minor omissions to gain insight from as broad of a sample as possible. The items skipped were not included in the averages and therefore had no effect on statistical outcomes. However, the resulting slightly different "*n*" in subgroup calculations reflects this decision.

After this screening process was complete, the number of usable surveys was reduced from 604 to 482, which left a useful return rate of 31.94%. Thus the study sample was established at 482 (N=482) with subsets in the survey having slightly different numbers (*n*) when those subsets included students who skipped a "non-essential" response when completing their surveys.

Demographics

Demographic information was obtained from the first section of the survey and included the students' age, gender, and teacher's name. (The teacher's name was used to determine the student's grade level and to track which teachers had returned packages of completed surveys. Names were not used in any other way as a part of the study.) Demographic information served as a framework for the study and provided a working portrait of the study population.

Table 2 presents the ages of the students who participated in the study. Subjects ranged from 10 to 15 years of age, with 11 year-old students having the highest recorded frequency (n = 183). While there is a chance of "cross- over" among 12 and 13 year-old students, most of the 10, 11, and 12 year-old students were enrolled in fifth grade, while the 13, 14, and 15 year-old students were enrolled in seventh grade. No further analysis was conducted by age since the findings would, in essence, be repeated when looking at subjects by grades.

Table 2

Survey Population by Age

	Age							
	10	11	12	13	14	15	omitted	Totals
n	77	183	66	134	20	1	1	482
%	16.0	38.0	13.7	27.8	4.1	.2	.2	100

In Table 3, the subjects have been categorized by grade. Although more surveys were distributed to middle schools than to elementary schools, more elementary school students participated in the survey. Two hundred eighty-one (58.3%) of the surveys were completed by fifth graders, while 201 (41.7%) were completed by seventh graders.

Table 3

Survey Population by Grade

Grade	*N*	%
Fifth grade	281	58.3
Seventh grade	201	41.7
Total	482	100

The male to female ratio was very close in the study population (Table 4). Of the 482 respondents, 241 (50.1 %) were females and 240 (49.9 %) were males, while one student failed to indicate his or her gender.

Table 4

Survey Population by Gender

Gender	*N*	%
Male	240	49.9
Female	241	50.1
Total	481	98.8

Free-time Choices

Analyses were conducted to establish the type and extent of traditional activities that students within the study chose during their free-time. This information was obtained from the second section of the survey (Appendix A). In this study students were asked to state their preferences among the following six traditional activities: engaging in outdoor activities, reading for pleasure, pursuing a hobby, spending time with family, playing with friends, or participating in a supervised activity. The study design compared traditional activities to eight technology options: surfing the Internet, reading and writing emails, monitoring or creating social websites, IMing (instant messaging), talking and texting on cell phones, playing games on cell phones, playing video games on a game

console, or playing multi-user games via the Internet. (See the survey, Appendix A for all forced-choice options.)

The forced-choice responses of each student were tallied for the six traditional activities. The resulting scores created a continuum ranging from eight (occurred if the student always selected the traditional activity) through sixteen (occurred if the student always selected the technology option).The means and standard deviations for the scores on each of the six traditional activities are displayed in Table 5.

Table 5

Mean Scores for Traditional Activities

Activity	*M*	*SD*
Play with Friends	9.51	1.72
Spend Time with Family	9.95	2.12
Have a Hobby	10.86	2.16
Outdoor Activities	10.90	1.99
Supervised Activities	11.11	2.62
Reading for Fun	13.08	2.42

Keeping in mind that the mean increases when students indicate a preference for the technology option and decreases when students choose the traditional option, it is evident that “reading for fun” was the least-valued traditional activity (*M* = 13.08) and “playing with friends” was the most valued traditional activity (*M* = 9.51). It was noted that the greatest diversity of responses was found within the “supervised activities” category (*SD*= 2.62) and the “reading for fun” category (*SD*= 2.42). Activities used as examples in the first category included: organized sports, church youth groups, music and dance lessons, and boys and girls clubs; and in the second case included: reading a book,

comic strip, or magazine but not reading for a school assignment. A larger standard deviation indicates greater variations among the answers of respondents.

Table 6 shows the mean scores and standard deviations on the six traditional activities when stratified by grade level. Again "reading for fun" was named by students as the least-favored traditional activity, while "playing with friends" was the most-favored traditional activity reported. Supervised activities had the largest deviation in scores for both grade levels (fifth grade, *SD* = 2.56, seventh grade, *SD* = 2.71), as it did for the study population at large, meaning there was a more-varied response among the students on this question. When considering these scores, note that the results are quite similar across the two grades with the possible exception of "reading for fun," in which case older students were even less likely to select the traditional activity. Paying particular attention to the standard deviation in "reading for fun" by grade (fifth grade, *SD* = 2.44, seventh grade, *SD* = 2.32), it can again be seen that responses in this area were quite varied among study participants.

Table 6

Mean Scores of Traditional Activities by Grade

	5th grade		7th grade	
Activity	*M*	*SD*	*M*	*SD*
Outdoor Activities	11.00	2.05	10.75	1.91
Read for Fun	12.73	2.44	13.57	2.32
Have a Hobby	10.88	2.24	10.85	2.04
Spend Time with Family	9.84	2.04	10.10	2.22
Play with Friends	9.56	1.71	9.44	1.73
Supervised Activities	11.09	2.56	11.13	2.71

Table 7 displays the mean responses to the six forced-choice comparisons by gender. The presumed difference between males and females on "reading for fun"

remains a key difference (as it was in age comparisons), with females far less likely to reduce this activity to engage with technology. Additionally, males appear to be less likely to exchange “outdoor activities” and “time with family” for technology-driven activities.

Table 7

Mean Scores of Traditional Activities by Gender

	Male		Female	
Activity	*M*	*SD*	*M*	*SD*
Outdoor Activities	10.46	1.94	11.33	1.95
Read for Fun	13.50	2.42	12.66	2.35
Have a Hobby	10.74	2.27	11.00	2.03
Spend Time with Family	9.66	2.06	10.25	2.15
Play with Friends	9.28	1.63	9.72	1.78
Supervised Activities	11.19	2.78	11.04	2.46

A closer examination of Tables 5, 6, and 7, reveals that “playing with friends” and “spending time with family” consistently had the lowest means for subgroups. The results indicate that subjects picked these two traditional activities over the technology options more often than they did when considering the other four traditional activities. Conversely, “read for fun” had the highest mean score for the general population and in each of the subgroups, indicating that more of the students picked a “technology option” compared to this traditional activity than when comparing the technology options to the other five traditional activities. The standard deviations for “reading for fun” and “supervised activity” were the highest in the study population at large, as they were in gender and grade subsets, emphasizing that the degree of variance in these responses was

greater than in the responses received when comparing technology options to the other four traditional activities.

In summary, the mean scores for the six traditional activities were displayed (1) for the entire study population, (2) by grade level, and (3) by gender, providing an image of the free-time choices made by the sample at large and the subgroups noted within it. The findings, thus examined, provided insight into potential differences in the various subgroups of the study sample defined by grade and gender. Table 8 exhibits the means of the six traditional activities ranked by gender and grade.

Table 8

Means Ranked by Gender and Grade

	Male		Female		5th		7th	
Activity	*M*	Rank	*M*	Rank	*M*	Rank	*M*	Rank
Outdoor Activity	10.46	3	11.33	5	11.00	4	10.75	4
Reading for Fun	13.50	6	12.66	6	12.73	6	13.57	6
Having a Hobby	10.74	4	11.00	3	10.88	3	10.85	3
Family Time	9.66	2	10.25	2	9.84	2	10.10	2
Playing with Friends	9.28	1	9.72	1	9.56	1	9.44	1
Supervised Activity	11.19	5	11.04	4	11.09	5	11.13	5

Subjects were also stratified by their technology use. The third section of the survey was used to determine the upper and lower quartiles of technology users (see Appendix A). In this section students were asked to report the amount of time they spent each week on a variety of traditional and technology activities. The “minutes per week” spent in technology activities were averaged and all 482 students were ranked high to low according to their technology use. Students whose self-reported technology use placed them in top quartile (or high-frequency quartile) will hereafter be labeled HFQ (n = 120), while students whose self-reported technology use placed them in the bottom quartile (or

low-frequency quartile) will hereafter be labeled LFQ (n = 120) students. Student scores from these two groups were compared and contrasted with each other in all of the remaining statistical analyses. Scores from the second and third quartiles were not used in any inferential statistical analyses.

Demographics of Students in HFQ and LFQ

Demographics of the HFQ and LFQ students served as a blueprint to guide us through the remaining research analyses. Of the students identified as HFQ, 137 were fifth graders and 103 were seventh graders (Table 9).

Table 9

Breakdown of HFQ and LFQ Population by Grade

Grade	*N*	%
Fifth grade	137	58.1
Seventh grade	103	42.9
Total	240	100

Males were represented in the HFQ and LFQ a bit more frequently than were females. The number of males in the HFQ/LFQ was122, while the number of females was 117 (see Table 10).

Table 10

Breakdown of HFQ and LFQ by Gender

Gender	*N*	%
Male	122	51.0
Female	117	49.0
Total	239	100

Research Questions

Research Question One: Do students relinquish traditional activities as they become more involved in technology use?

The null hypothesis for Research Question One states: Students do not relinquish traditional activities as they become more involved in technology use. If, as stated in the null hypothesis, there is no difference in the activities relinquished by the students as they increasingly engaged with technology, then HFQ and LFQ choices made in the second section of the survey should be consistent. A chi-square test was conducted to compare the "expected" choices with the "observed" choices made by the HFQ and the LFQ for a given traditional activity against each of the technology choices. In gathering data for these analyses, a student was asked to select "Do an outdoor activity" in contrast with eight technology choices. A student's score for the category was determined from values assigned to the eight force-choice items, i.e. a traditional selection was assigned a value of 1 and a technology selection was assigned a value of 2. Thus, if the student selected "Do an outdoor activity" in all eight comparisons, the resulting score would be 8 (sum of traditional choices each having a value of 1). If the student selected the traditional activity five times and the technology activity three times, the resulting score would be 11 (five traditional choices added to the three technology choices, or 5 + 6 = 11). If the student selected the technology option each time it was available the resulting score would be 16 (sum of technology choices each having a value of 2). Using data gathered in this manner and running all six traditional comparisons from the HFQ and LFQ, Tables 11 through 16 display the resulting scores and the percentages of HFQ and LFQ who obtained them. While it was evident that the HFQ did, in general, pick the

technology options more frequently than did the LFQ, closer examination revealed that there was a great deal of fluctuation around the obtained scores in each category.

Table 11 presents the results for the chi-square distribution of LFQ and HFQ respondents for "Outdoor Activity." Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine combinations on Outdoor Activity ($\chi^2 = 53.39$, $df = 8$, $p < .000$); thus the null hypothesis is rejected. As expected, the pattern demonstrates that the LFQ chose more traditional activities while the HFQ gravitated toward more technology activities.

Table 11

Cross tabulation of HFQ and LFQ Outdoor Activity

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	29	80.6	7	19.4
7 traditional, 1 technology	9	30	76.9	9	23.1
6 traditional, 2 technology	10	16	51.6	15	48.4
5 traditional, 3 technology	11	18	41.9	25	58.1
4 traditional, 4 technology	12	16	48.5	17	51.5
3 traditional, 5 technology	13	7	26.9	19	73.1
2 traditional, 6 technology	14	1	5.9	16	94.1
1 traditional, 7 technology	15	0	0.0	8	100.0
0 traditional, 8 technology	16	2	33.3	4	66.7

Table 12 presents the results for the chi-square distribution of LFQ and HFQ respondents for "Read for Fun." Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine combinations on Read for Fun ($\chi^2 = 31.43$, $df = 8$, $p < .000$); the null hypothesis is rejected. When considering this traditional activity, the HFQ was again more likely to

select a technology activity than was the LFQ, as expected. However, it must be noted that many of the LFQ abandoned the traditional activity as well.

Table 12

Cross tabulation of HFQ and LFQ Read for Fun

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	13	92.9	1	7.1
7 traditional, 1 technology	9	17	85.0	3	15.0
6 traditional, 2 technology	10	6	42.9	8	57.1
5 traditional, 3 technology	11	17	58.6	12	41.4
4 traditional, 4 technology	12	23	51.1	22	48.9
3 traditional, 5 technology	13	10	45.5	12	54.5
2 traditional, 6 technology	14	6	33.3	12	66.7
1 traditional, 7 technology	15	7	41.2	10	58.8
0 traditional, 8 technology	16	19	32.2	40	66.8

Table 13 presents the results for the chi-square distribution of LFQ and HFQ respondents for “Have a Hobby.” Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine combinations on Have a Hobby ($\chi^2 = 32.64$, $df = 8$, $p < .000$); as a result, the null hypothesis is rejected. Substantiating the expected pattern, more LFQ chose the traditional option than did the HFQ. However, in this traditional activity several of the achieved scores (10, 11, 12, and 16) were almost evenly divided between the two groups.

Table 14 presents the results for the chi-square distribution of LFQ and HFQ respondents for “Spend Time with Family.” Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine combinations on Spend Time with Family ($\chi^2 = 30.38$, $df = 8$, $p < .000$); the null

hypothesis is rejected. The established pattern was repeated in this traditional activity as well. More HFQ picked the technology activity while more LFQ picked the traditional activity. However, a larger proportion of the HFQ were loath to choose the technology activity above spending time with family.

Table 13

Cross tabulation of HFQ and LFQ Have a Hobby

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	33	71.7	13	28.3
7 traditional, 1 technology	9	23	79.3	6	20.7
6 traditional, 2 technology	10	17	42.5	23	57.5
5 traditional, 3 technology	11	18	40.9	26	59.1
4 traditional, 4 technology	12	11	42.3	15	57.7
3 traditional, 5 technology	13	6	23.1	20	67.9
2 traditional, 6 technology	14	4	36.4	7	63.6
1 traditional, 7 technology	15	1	16.7	5	83.3
0 traditional, 8 technology	16	5	50.0	5	50.0

Table 15 presents the results for the chi-square distribution of LFQ and HFQ respondents for “Play with Friends.” Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine combinations on Play with Friends ($\chi^2 = 19.33$, $df = 8$, $p = .013$); therefore, the null hypothesis is rejected. While still significant, notice that the confidence level is lower in this category than in the other five. Less than 20 students, from either group, were more interested in the technology activities than they were in playing with friends.

Table 14

Cross tabulation of HFQ and LFQ Spend Time with Family

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	72	66.1	37	33.9
7 traditional, 1 technology	9	10	45.5	12	54.5
6 traditional, 2 technology	10	16	51.6	15	48.4
5 traditional, 3 technology	11	8	33.3	16	66.7
4 traditional, 4 technology	12	4	16.7	20	83.3
3 traditional, 5 technology	13	3	25.0	9	75.0
2 traditional, 6 technology	14	3	27.3	8	72.7
1 traditional, 7 technology	15	1	33.3	2	66.7
0 traditional, 8 technology	16	1	50.0	1	50.0

Table 15

Cross tabulation of HFQ and LFQ Play with Friends

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	62	62.6	37	37.4
7 traditional, 1 technology	9	18	51.4	17	48.6
6 traditional, 2 technology	10	14	41.2	20	58.8
5 traditional, 3 technology	11	13	33.3	19	66.7
4 traditional, 4 technology	12	5	26.3	14	85.7
3 traditional, 5 technology	13	3	33.3	6	66.7
2 traditional, 6 technology	14	1	14.3	6	85.7
1 traditional, 7 technology	15	1	100.0	0	0.0
0 traditional, 8 technology	16	1	50.0	1	50.0

Table 16 presents the results for the chi-square distribution of LFQ and HFQ respondents for “Supervised Activities.” Apart from the middle combinations, there was a significant difference between the proportions of LFQ and HFQ in each of the nine

combinations on Supervised Activities ($\chi^2 = 26.74$, $df = 8$, $p = .001$); the null hypothesis is therefore rejected. In this traditional activity, the expected pattern emerged. LFQ picked the traditional activity more often than the HFQ. However, both groups were tightly clustered around the achieved scores of 9, 10, and 11.

Table 16

Cross tabulation of HFQ and LFQ Supervised Activity

Selection array (eight forced-choice items)	Score	LFQ		HFQ	
		f	*% of score total*	*f*	*% of score total*
8 traditional, 0 technology	8	40	72.7	15	27.3
7 traditional, 1 technology	9	18	58.1	13	41.9
6 traditional, 2 technology	10	14	51.9	13	48.1
5 traditional, 3 technology	11	18	52.9	16	47.1
4 traditional, 4 technology	12	12	38.7	19	61.3
3 traditional, 5 technology	13	5	26.3	14	73.7
2 traditional, 6 technology	14	4	36.4	7	63.6
1 traditional, 7 technology	15	1	25.0	3	75.0
0 traditional, 8 technology	16	6	24.0	19	76.0

As previously stated, the null hypothesis was rejected for all six of the traditional activities studied. Table 17 serves as a summary of the chi-square scores results. The findings clearly indicate significant differences between the expressed free-time preferences of the HFQ students and the expressed free-time preferences of the LFQ students in each of the six categories examined within the study. Four of the six comparisons – outdoor activity, read for fun, have a hobby, spend time with family – would be expected to occur by chance less than one time in 1,000 cases, while "supervised activity" would be expected to occur once in one thousand cases, and "play with friends" would be expected to occur one time in one hundred thirty cases.

Table 17

Chi-squared Tests of HFQ and LFQ

Activity	Chi-squared ($\chi 2$)	Degrees of Freedom (df)	Probability (ρ)
Outdoor Activity	53.39	8	.000
Read for Fun	31.43	8	.000
Have a Hobby	32.64	8	.000
Spend Time with Family	30.38	8	.000
Play with Friends	19.33	8	.013
Supervised Activity	26.74	8	.001

After determining that there was a significant difference between the expected choices and actual choices made by students in the top and bottom quartiles, a *t*-test (Table 18) was conducted to see if the mean scores of students in the HFQ (n = 120) were statistically different than the means of students in the LFQ (n = 120).

Table 18

Comparison of Means among LFQ and HFQ

	Mean Scores (M)				
Activity	LFQ	HFQ	t	df	(p)
Outdoor Activity	9.992	11.842	-7.451	237	.000
Reading for Fun	11.889	13.541	-5.244	236	.000
Having a Hobby	10.170	11.392	-4.480	236	.000
Spend Time with Family	9.102	10.375	-5.038	236	.000
Playing with Friends	9.137	10.033	-3.982	235	.000
Supervised Activity	10.136	11.764	-5.169	235	.000

Comparisons of the scores of HFQ students and LFQ students revealed statistically significant differences between the groups in all six categories. The differences were in the expected direction; that is, students in the HFQ selected the technology activity over the traditional activity in each of the six categories. The results of these analyses support the rejection of the first null hypothesis. It can be stated with a

high degree of certainty that there is a significant difference in the preferences between HFQs and LFQs.

Research Question 2: Do relinquished activities demonstrate consistent patterns as students self-select their increasing engagement with technology?

The null hypothesis for Research Question 2 states: No consistent patterns will emerge as students self-select their increasing engagement with technology. Statistical tests performed for Research Question 1 partially shaped the answer to Research Question 2. Reiterating the findings reported above, statistically there was no single traditional activity that students "gave up" as they increasingly engaged with technology. On the contrary, HFQ subjects, in this study, moved away from all traditional activities as their technology use figures increased. However, while statistically different, some traditional activities were better represented in students' reports (based upon means) than others. For example, students across all technology use levels valued "family and friends" more than the other traditional activities. But to more fully explore Research Question Two, separate analyses were conducted to determine if other patterns emerged when looking at HFQ and LFQ data stratified by gender; and when looking at HFQ and LFQ data stratified by grade.

Subgroup Analyses

Subsets of students drawn from the original 240 HFQ and LFQ were analyzed to see if additional trends emerged using *t*-tests within the subgroups. The eight comparisons that were made are displayed in Table 19 along with the table number in which the findings were reported.

Table 19

T-test by Subgroups

Comparisons	Table Number
Gender Subsets	
LFQ Female to HFQ Female	Table 14
LFQ Male to HFQ Male	Table 15
HFQ Female to HFQ Male	Table 16
LFQ Female to LFQ Male	Table 17
Grade Subsets	
LFQ Fifth to HFQ Fifth	Table 19
LFQ seventh to HFQ seventh	Table 20
HFQ Fifth to HFQ Seventh	Table 21
LFQ Fifth to LFQ Seventh	Table 22

Subset Comparisons by Gender

From the originally identified 240 HFQ and LFQ subjects, 117 were females. The mean scores of HFQ girls (n = 63) were compared to LFQ girls (n = 54) via a t-test. The results, displayed in Table 20, reveal that there were significant differences between the two groups in all categories. In all cases, HFQ females preferred technology more often than LFQ females did. An examination of the findings among HFQ girls and LFQ girls reveals that they mimic the trend established among the HFQ/LFQ students in the overall study population. As females self-select increased engagement with technology, they too; devalued all of the traditional activities.

Of the original 140 HFQ/LFQ students, 122 were males: HFQ boys (n = 57) and LFQ boys (n = 65). Note that in Table 21, all comparisons proved to be statistically significant, albeit one, “having a hobby,” was more narrowly judged to be different. This trend was observed in all other subset comparisons (population and females) and is a result of fewer LFQ and HFQ students reporting that they have a hobby.

Table 20

Comparison of Means among LFQ Females and HFQ Females

	Mean Scores				
Activity	LFQ	HFQ	*t*	*df*	*p*
Outdoor Activity	10.444	12.127	-4.430	115	.000
Reading for Fun	11.463	13.079	-3.736	115	.000
Having a Hobby	10.037	11.651	-4.417	115	.001
Spend Time with Family	9.315	10.571	-3.279	115	.000
Playing with Friends	9.222	10.159	-2.955	115	.004
Supervised Activity	10.092	11.667	-3.608	115	.000

Table 21

Comparison of Means among LFQ Males and HFQ Males

	Mean Scores				
Activity	LFQ	HFQ	*t*	*df*	*p*
Outdoor Activity	9.615	11.526	-6.083	120	.000
Reading for Fun	12.250	14.053	-4.022	119	.000
Having a Hobby	10.281	11.105	-2.035	119	.044
Spend Time with Family	8.922	10.158	-3.719	119	.000
Playing with Friends	9.064	9.895	-2.578	118	.011
Supervised Activity	10.172	11.875	-3.704	118	.000

Overall, there was a significant difference between the activities valued by the HFQ boys and LFQ boys. Consistent with the findings in the study's general population, all of the traditional activity options were chosen less frequently as boys self-selected their increased engagement with technology. As was the case with HFQ/LFQ girls, "having a hobby" and "playing with friends" were the two categories that displayed closer aligned results than the other four traditional activities examined in the study.

In Table 22, the difference between the means for female HFQ (n = 63) and male HFQ (n = 57) are displayed. Few differences were noted. Females high-tech users were

more likely (t = -2.436, df = 118, p = .016) to "read for fun" than were their male counterparts, since higher mean scores indicate that males chose the technology option over the traditional option more often than did females. Notwithstanding, the category still had the highest mean score for both genders (indicating this activity was the least valued in the subset). In the other five categories, there were no significant differences between male HFQ and female HFQ; the male and female HFQ were found to be very similar.

Table 22

Comparison of Means among Female HFQ and Male HFQ

	Mean Scores				
Activity	Females	Males	t	*df*	p
Outdoor Activity	12.127	11.526	1.624	118	.107
Reading for Fun	13.079	14.053	-2.436	118	.016
Having a Hobby	11.651	11.105	1.450	118	.150
Spend Time with Family	10.571	10.158	1.068	118	.288
Playing with Friends	10.159	9.895	.762	118	.448
Supervised Activity	10.667	10.206	-.436	117	.664

Table 23 presents the results of *t*-test comparisons made between the female LFQ (n = 54) and male LFQ (n = 64). The "friends and family" categories had the lowest mean scores overall (indicating a high preference for these activities), although for male LFQ "outdoor activity" was a very close third. Among male and female LFQ "outdoor activity" was the only category in the comparison that displayed a significant difference (t = 2.625, df = 116, p = .010). Reading for fun once again had the highest mean across both genders (indicating this activity is less likely to be retained).

In summary, when examining the differences in females (HFQ/LFQ) and males (HFQ/LFQ), the findings were very similar to those exhibited in the aggregated data set

(HFQ/LFQ), that is, there were statistical differences in every category; gender does not seem to have an effect or create a new pattern. However, when comparing male to female HFQ, "reading for fun" *t*-test scores indicated girls were more likely to "read for fun" (t = -2.436, df = 118, p = .016); while in the male LFQ to female LFQ comparisons, *t*-test scores indicated males were more likely to choose an outdoor activity (t = 2.625, df = 116, p = .010). The means of the six traditional activities ranked by gender are exhibited in Table 24.

Table 23

Comparison of Means among Female LFQ and Male LFQ

	Mean Scores				
Activity	Females	Males	*t*	*df*	*p*
Outdoor Activity	10.444	9.594	2.625	116	.010
Reading for Fun	11.463	12.250	-1.639	116	.104
Having a Hobby	10.037	10.302	-.663	115	.509
Spend Time with Family	9.315	8.937	1.157	115	.250
Playing with Friends	9.222	9.032	.657	114	.513
Supervised Activity	10.093	10.206	-.272	115	.786

Table 24

Ranking of Preferences by Gender

	Male				Female			
	LFQ		HFQ		LFQ		HFQ	
Activity	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Outdoor Activity	9.594	3	11.500	4	10.444	5	12.127	5
Reading for Fun	12.250	6	14.053	6	11.463	6	13.079	6
Having a Hobby	10.302	5	11.105	3	10.037	3	11.651	3
Spend Time with Family	8.937	1	10.158	2	9.315	2	10.571	2
Playing with Friends	9.032	2	9.895	1	9.222	1	10.159	1
Supervised Activity	10.206	4	11.875	5	10.093	4	11.667	4

Subset Comparisons by Grade

The next series of *t*-tests examined subsets by grade level among the 240 HFQ/LFQ users. First (in Table 25) fifth grade LFQ (n = 69) were compared to fifth grade HFQ (n = 67). Again, there were significant differences between stated preferences in every one of the six traditional activities.

Table 25

Comparison of Means among Fifth Grade LFQ and HFQ

	Mean Scores				
Activity	LFQ	HFQ	*t*	*df*	*p*
Outdoor Activity	10.044	12.045	-6.054	134	.000
Reading for Fun	11.015	13.373	-6.004	133	.000
Having a Hobby	9.928	11.552	-4.776	135	.000
Spend Time with Family	8.841	10.388	-5.007	134	.000
Playing with Friends	9.074	9.985	-3.248	133	.001
Supervised Activity	9.856	11.879	-5.335	133	.000

The second *t*-test (Table 26) compared the means of seventh grade LFQ (n = 50) against seventh grade HFQ (n = 53). There were significant differences in the means of only four categories when contrasting seventh grade LFQ and HFQ. Strikingly missing were significant differences when examining the mean of students' stated preferences in "having a hobby" (t = -1.524, df = 100, p = .131) and "reading for fun" categories (t = -1.436, df = 101, p = .154).

In the third subset by grade level, *t*-tests (Table 27) were used to compare mean differences between the fifth grade HFQ (n = 67) and seventh grade HFQ (n = 53). There were no significant differences found in the stated preferences of either group. It is interesting to note that in two of the comparisons, i.e. "read for fun" and "playing with friends," the seventh grade HFQ was more likely to choose the technology option than

the fifth grade HFQ. In the other categories (outdoor activity, having a hobby, time with family, and supervised activity), the fifth grade HFQ was more likely to pick the technology option than was the seventh grade HFQ.

Table 26

Comparison of Means of Seventh Grade LFQ and HFQ

	Mean Scores				
Activity	LFQ	HFQ	*t*	*df*	*p*
Outdoor Activity	9.920	11.585	-4.421	101	.000
Reading for Fun	13.080	13.755	-1.436	100	.154
Having a Hobby	10.510	11.188	-1.524	100	.131
Spend Time with Family	9.469	10.359	-2.114	100	.037
Playing with Friends	9.225	10.094	-2.343	100	.021
Supervised Activity	10.531	11.623	-2.050	100	.043

Table 27

Comparison of Means among Fifth Grade HFQ and Seventh Grade HFQ

	Mean Scores				
Activity	5th	7th	*t*	*df*	*p*
Outdoor Activity	12.045	11.585	1.230	118	.221
Reading for Fun	13.373	13.755	-.930	118	.354
Having a Hobby	11.552	11.189	.956	118	.341
Spend Time with Family	10.388	10.359	.076	118	.940
Playing with Friends	9.985	10.094	-.313	118	.755
Supervised Activity	11.879	11.623	.535	117	.594

The fourth *t*-test compared the means of fifth grade LFQ ($n = 69$) and seventh grade LFQ ($n = 50$). Table 28 displays the results of that comparison. There was only one statistically significant difference between fifth grade LFQ and seventh grade LFQ, which occurred in “reading for fun” category ($t = -4.583$, $df = 116$, $p < .000$).

Participating in an outdoor activity was the only traditional activity that seventh grade LFQs said they were more likely to engage in than the corresponding fifth grade LFQs.

Table 28

Comparison of Means among Fifth Grade LFQ and Seventh Grade LFQ

	Mean Scores				
Activity	5th	7th	*t*	*df*	*p*
Outdoor Activity	10.044	9.920	.370	117	.712
Reading for Fun	11.015	13.080	-4.583	116	.000
Having a Hobby	9.928	10.510	-1.463	116	.146
Spend Time with Family	8.841	9.470	-1.934	116	.056
Playing with Friends	9.074	9.225	-.517	115	.606
Supervised Activity	9.855	10.531	-1.619	116	.589

When examining the comparisons made across grade levels (HFQ/LFQ), several trends became apparent. In every grade level subset, “playing with friends” and “spending time with family” had the two lowest mean scores, while “reading for fun” had the highest mean score; the same trend was also observed in all gender comparisons (HFQ/LFQ). Plainly stated, “reading for fun” had the highest mean score across the grade level comparisons, with the fifth grade HFQs significantly more likely to opt out of reading than the fifth grade LFQ and the seventh grade LFQ significantly more likely more likely to opt out of reading than fifth grade LFQ. When comparing fifth grade LFQ to seventh grade LFQ, each *t*-test score was a negative number except for “outdoor activity” indicating that the seventh grade LFQs was more likely to choose technology options than was the fifth grade LFQ. Yet, when comparing fifth grade HFQ to seventh grade HFQ, the *t*-test scores were negative for “reading for fun” and “playing with friends” but positive for the four other traditional activities (outdoor activities, having a hobby, spending time with family, and supervised activity) indicating that, on average,

the seventh grade HFQ picked the traditional activity more often than the fifth grade HFQ. Table 29 exhibits the means of the six traditional activities ranked by grade.

Table 29

Ranking of Preferences by Grade

	Fifth Grade				Seventh Grade			
	LFQ		HFQ		LFQ		HFQ	
Activity	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Outdoor Activity	10.044	5	12.045	5	9.920	3	11.585	4
Reading for Fun	11.015	6	13.373	6	13.080	6	13.755	6
Having a Hobby	9.928	4	11.552	3	10.510	4	11.189	3
Spend Time with Family	8.841	1	10.388	2	9.469	2	10.359	2
Playing with Friends	9.074	2	9.985	1	9.225	1	10.094	1
Supervised Activity	9.855	3	11.878	4	10.531	5	11.623	5

The conclusions drawn from these analyses lead to the rejection of the second null hypothesis. The follow patterns emerged when comparing and contrasting the HFQ/LFQ study population and the HFQ/LFQ when stratified by grade and the HFQ/LFQ when stratified by gender.

1. Although there was no single traditional activity that lost favor among the sample in this study as students increasingly engaged with technology, their stated interest in all of the traditional activities diminished. This finding was born out in each of the HFQ/LFQ subgroups as well.
2. There was one significant difference between the stated preferences when comparing HFQ boys and HFQ girls, i.e. HFQ girls were more likely to “read for fun” than were HFQ boys. When comparing LFQ boys to LFQ girls, boys were significantly more likely to choose an “outdoor activity” than were girls.

3. The fifth grade LFQ was significantly more likely to “read for fun” that was the seventh grade LFQ. The seventh grade HFQ was no more or less likely to “have a hobby” or “read for fun” than the seventh grade LFQ.

Summary of Results

In summary, these results allow the rejection of both of the null hypotheses and allow the acceptance of the alternative, namely: (1) students’ self-reported data suggest that they draw time away from all measured traditional activities as they engage with technology, and; (2) though less pronounced, data reveal that some traditional activities are more likely to be neglected than others. Age and gender affect the particular specific traditional activities neglected.

CHAPTER FIVE

SUMMARY, FINDINGS, DISCUSSION, AND RECOMMENDATIONS

Chapter 5 summarizes the four previous chapters including an introduction to the study, a brief review of the literature, a sketch of the methodology, prominent findings, and implications for practice and future research. These implications are organized in three major areas (a) childhood development, (b) parents, teachers, and mentors, and (c) recommendations for future research.

Introduction to the Study

Computers, gaming equipment, cell phones, and the Internet are a few of the technologies that have become staples for modern American children (Montgomery, 2000). Though young people might argue that each of these technologies is a necessity, there are rational discussions among parents, educators, and mentors concerning the advantages and disadvantages of technology ownership and use (Shields & Behrman, 2000). While many parents and educators believe that computers and the Internet allow children to obtain valuable educational information (Prensky, 2001; Prensky, 2005; Turrow, 1999), others argue that the potential for harm outweighs the benefits of increased technology use (Wartella & Jennings, 2000).

Review of the Literature

Studies such as the Pew Internet Project (PewInternet, n.d.) and The Future of Children (2000) have documented the rise in technology use, especially among school age children. Students not only use technology and the Internet for traditional educational

projects but also for emailing, chatting online, programming, creating Web pages, instant messaging (IM), podcasting, blogging, and social networking. (Future of Children, 2000; Goldwasser, 2008). The focus of current studies is on what children "do" with technology. What remained unaddressed is what children neglect as they become more involved with technology. What do children forgo to afford more time for technology?

Early environmental psychologists such as Barker and Bronfenbrenner provided the conceptual framework for this study. One Boy's Day (1951) was Barker's foundational study which attempted to document all the activities in which a small child engaged during a single day. Bronfenbrenner's seminal piece, *The Ecology of Human Development* (1979) investigated the relationships and interactions among various spheres of influence and the effects they had on the development of children. Technology use, of course, was not considered in either study. The advent of technology as a medium for learning and instruction has, no doubt, had an influence on what children do each day. One could not document the life of many American children without considering the influence technology has on them, i.e. how technology affects the everyday choices of children and how it shapes their development.

Methodology

This exploratory study was non-experimental by design. There was no control group and no manipulated variable. The study was conducted in a rural southeastern community. Each school within the Southern School District that had fifth and seventh grade students (eleven schools: three middle schools and eight elementary schools) was asked to participate in the study. The principals at two elementary schools declined participation for their schools stating that teachers were overburdened already and did not

want to participate. At the nine remaining schools (three middle schools and six elementary schools) each fifth and seventh grade teacher was asked to have their students participate. Almost every teacher within the remaining nine schools administered the survey to their students. Therefore the study population was a cluster sampling of students whose teachers were willing to administer the study to their students.

The three-part survey instrument was specifically designed for this study. The first part of the survey simply asked the student's age, gender, and teacher's name. In the second section of the survey six traditional activities were compared to eight technology activities. Students were asked to state their preference for each activity via forced-choice stem and response items (see appendix A). The third section of the survey asked students to estimate the number of minutes during the average week they spent on a variety of traditional and technology activities. Information obtained from the surveys was used to answer the two primary research questions.

Research Question One: Do students relinquish traditional activities as they become more involved in technology use?

Research Question 2: Do relinquished activities demonstrate consistent patterns as students self-select their increasing engagement with technology?

Prominent Findings of the Study

The main purpose of the study was to determine if students “give up” – reduce or eliminate – traditional activities as they increasingly engage with technology. Since time is a finite variable and there is little doubt as to whether or not children have and are using technologies that were never before available, technology must affect the free-time choices of children. Intuitively most people would agree that some children use

technology extensively during their free-time activities while others do not, but are there groups of students that constitute high and low technology users? Also, does the cadre of choices made by children indicate a difference in their perceived value of traditional activities? These are questions that I explored in the pursuit of this study.

The findings presented in Tables 11 through 16 (in Chapter 4) indicate that there are significant differences in the choices made by students who, by their own time estimates, were placed in the high quartile of technology use (HFQ) when compared to the choices made by students who, by their time estimates, were placed in the low quartile of technology use (LFQ). Furthermore, the HFQ were significantly more likely to devalue all of the traditional activities examined in this study than were the student in the LFQ.

Findings also indicate small but significant patterns of continued engagement with traditional activities as related to gender and grade level. Looking at Tables 24 and 29 readers can see that while the mean scores were different in each group, three of the rankings (not the absolute scores) were consistent across each group and subgroup. (Keep in mind that higher scores are created when more subjects choose the technology option over the traditional option.) Spending time with family and playing with friends were found to be the two most valued traditional activities across grade, gender, and HFQ/LFQ groupings. Thus, even the most avid technology users in this study valued spending time with family and playing with friends more than any other traditional activity.

In contrast, the single most devalued activity among all students was found to be reading for fun. Though the means were less separated in some subgroups, every

subgroup, regardless of grade, gender, and HFQ and LFQ status, ranked reading for fun last among the six traditional activities included in the study (Tables 24 and 29).

The three remaining traditional activities (outdoor activities, supervised activities, and having a hobby) were ranked inconsistently by subgroups with a particular activity gaining favor among one subgroup and losing favor with another (Tables 24 and 29). However, these activities, too, were found to be of less value to HFQ students than to LFQ students. Because of these findings, it was concluded that the free-time choices of children in the HFQ and children in the LFQ were consistently different and that HFQ children significantly devalued traditional activities.

I also found evidence that patterns do emerge in technology preference and use, even among the HFQ group (See Tables 11 through 16). In Table 30 readers can note the average number of minutes HFQ children used in a variety of technology activities.

Table 30

Mean Minutes of HFQ on technology options

	Male		Female		HFQ
Technology Activity	5th (n= 28)	7th (n=29)	5th (n=39)	7th (n=24)	all (n=120)
Surfing the Internet	188.21	146.21	256.46	250.17	212.63
Reading or Writing Emails	49.29	19.38	91.95	64.58	58.99
Checking or Creating Social Websites	56.32	72.14	122.95	111.17	92.77
Instant Messaging	34.71	8.38	94.41	149.54	70.72
Talking on cell phone	82.43	149.14	220.33	236.58	174.20
Texting on cell phone	107.93	212.45	377.00	538.67	306.78
Playing games on cell phone	20.00	6.90	30.80	10.13	18.37
Playing video games on a game console	395.36	415.59	159.00	123.96	269.15
Playing multiuser video games via the Internet	207.68	191.83	168.85	89.17	167.53

It was surprising that in some areas little use was reported by any subgroup (playing on games on cell phones), that some technologies were clearly preferred based upon gender (females talked on cell phones more than their male counterparts), and that some activities were preferred based on gender and grade level (texting on cell phone was preferred by girls in general but rose significantly between fifth and seventh grade for both groups). Overall, HFQs are not a homogeneous group relative to reports on which technologies are selected and utilized.

Noting mean times for reading and writing emails, IMing, talking, and texting, it is evident that male HFQ spend less time using technology to communicate than do their female counterparts. As noted in the literature review, two studies (Fox & Madden, 2005; Lenhart, Madden & Hitlin, 2005) reported that email use declines as youth engage in other forms of communication. When comparing the use of all communication options in fifth and seventh grade, the findings in this study reflect the same trend. In Table 30, readers will note that the mean time used for emailing declined in boys and girls when examining students in fifth and seventh grade. It can also be seen that all of the other forms of communication had increased use by reported times in seventh grade (with IMing among boys being the only exception).

One particularly intriguing result is the proportion of time that seventh graders spend on cell phone use. It was noted that cell phone "texting" took a substantially larger portion of students' free-time than did "talking" on a cell phone. Studies by Lenhart, Madden & Hitlin (2005) and National Opinion Polls World (2005) indicated that texting among youth was on the rise nationally as well. A study by Reid and Reid (2007) stated that while voice calls (talking) accounts for about 80% of cell phone revenue, the advent

of short message service (SMS) is expected to dominate mobile messaging in both traffic and volume in the last quarter of the present decade. This finding was foreshadowed by a member of the "ad hoc" committee used to establish the validity of the survey instrument. When referring to a teenage daughter and her friends, JBro (Appendix B, page 114), said "They text on their phones MUCH more than they talk. They rarely talk on the phone anymore and she texts non-stop while she is doing other things." There must be reasons for the massive increase of what some suggest is an inefficient form of communication (Reid & Reid, 2007). Is it the allure of the technology itself or is there is a social or psychological benefit perceived by children in this developmental stage? Is it because "texting" is something adults don't do and therefore has become a young person's domain? Is it because text messages can be cautiously crafted to create and sustain a carefully guarded persona (Reid & Reid, 2007)? Is texting necessary to be accepted in some social groups? Or is this simply the age many adolescents first receive cell phones? Any or all of these may play a part, and while this study cannot explain the rationale for technology selection, it was able to document significant patterns in use and offer speculations about possible factors for future investigation.

Although seventh grade boys do text an average of 70 minutes more than fifth grade boys, sadly the amount of time spent on the activity does not compensate for the amount of reading they miss in traditional genres. While boys are more likely to give up traditional reading than girls (Table 24), they are also less likely to read while engaged with communication technology than are girls. Note the time comparisons in Table 30 for reading and writing emails, IMing, and texting on a cell phones.

With the exception of playing games on a cell phone (where the number of minutes spent on the activity was too small to have any real impact), findings indicate that HFQ boys spend more time gaming than do HFQ females. Coupled with the comparisons across gender in communication technology, readers should note that boys spend much less time engaged in social interactions. The results presented in Table 24, show that boys were more likely to choose an outdoor activity than were girls (lower means indicate more value for the traditional activity). As is the case with hunting, fishing, and camping, outdoor activities are often events that a few closely-knit individuals take part in together, rather than an activity in which large groups participate at once. It might be that boys are more comfortable communicating person-to-person with a closer set of friends than in the large arenas that females use readily. Table 24 indicates that males maintained lower scores (selecting the traditional option more frequently) in the two categories "spending time with family" and "playing with friends" than did females, which might lend support to this argument.

When regarding "checking and creating social websites," "playing multi-user video games via the computer," "texting," and "surfing the Internet" (which are thought to consume large chunks of time among people who have a technology addiction), findings show little need for concern among the sample population. It should be noted, however, that in this study, student surveys that reported more than 30 hours of use on any particular activity were excluded because those responses were considered "unreasonable" in that they left no time for mandatory activates such as eating and sleeping. Although "time spent" is not the only measure of an addiction, many types of addiction are revealed by inordinate amounts of time spent engaging therein. (American

Academy of Sleep Medicine, 2008; Chatfield, 2008; Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Rutger, 2008; Porter & Kakabadse, 2005; Walsh, White & Young, 2008). Judgments about the amount of time that would signal an addiction are outside the scope of this study; albeit, it is interesting to note that more surveys were excluded as "outliers" because of the high amount of time estimated in the category "playing with friends" than were excluded because of "outlying" responses in any of the technology categories.

In summary, differences have been noted by gender and age between the relatively close developmental periods of both fifth and seventh grades. The ages of students involved in the study population ranged from 10 to 15, which is an age span in which many developmental changes occur. Several of the findings in the study indicate that traditional and technology activities valued (by rankings in Table 29, and by time engagements in Table 30) among fifth graders had lost their allure by the seventh grade. Other activities that seemed to hold little interest in fifth grade had substantial appeal by seventh grade. It is at about this time that peer pressure begins to play a big role in the lives of children and peer relationships assume prominence in the lives of many children (Hamachek, 1995). It cannot be determined if changes noted among the subjects in this study are due to changing interests, maturity, or a need to conform to peers.

At least two possibilities could help to explain why some technologies waxed while other waned between the fifth and seventh grade years. One possibility is that children who are now in seventh grade were not as thoroughly exposed to technology options as were current fifth graders. As more technology is introduced and adopted into American life, younger children get more exposure. This view suggests that it would be

natural for the younger children (fifth grade) to use technology more than older children (seventh grade) because of their greater exposure. Heavy use of some technologies in fifth grade could be confounded by availability; a home computer may be more often available to fifth grade students than a personal cell phone.

The second possibility is that all children are so thoroughly saturated with some technology options (emailing and surfing) that by seventh grade children move to other technology options that fit better their developmental stage, align closer with their changing interests, have become more available to them, or all of the above. Partial support for this argument might be observed by looking at the activities that are more often seen in fifth than in seventh graders: surfing the Internet, writing email, instant messaging, and playing games on cell phones. Some of these activities are introduced in first grade or earlier. Do children simply tire of them or are they "mastered" to be used when needed, while allowing other technology activities to capture their current attention? The data do not tell us, but again, the differences do exist and determining the cause may be important.

The current study does not imply favor for a particular argument, nor does it try to answer the more provocative question of "why." The study can only provide simple quantifiable patterns of use; it is merely a "cross-sectional snap-shot" of the activities in which students in this setting, at this time, were engaged. The setting for this study was a small semi-rural, suburban school district in the southeastern part of the United States, if these children were placed in a different setting or if other children were placed in this setting, they might have given widely varying responses. The time during which the study occurred was in 2008 and 2009. Even during this short time-frame, the technology

options favored by students changed considerably. For examples, “Guitar Hero” games were quite popular during this time-frame which might account for the semi-high gaming means among females. Additionally, though “twittering” and “tweeting” were not even considered as technology options worth including in the study as it was conceptualized less than two years ago, if the study was replicated, these options would, of course, be included. Students who participate in studies that take place after this one (i.e. a different time setting) are likely to make widely different choices.

Nevertheless, the findings that were garnered from the study at hand do yield meaningful insights about the students who participated. While it can be determined from the study that differences exist, it cannot be determined if the trends found will continue over time, or if these differences will have an impact on development of these children (in the broadest sense) when considering their future physical, social, emotional, intellectual, and vocational capacity. Because these activities are so deeply embedded and apparently highly valued in the contextual child-rearing culture, it can be speculated that if trends found within the HFQ continue, and as more children become enamored with technology, their choices would impact developmental outcomes. While it would be inappropriate to directly assign a social value on this shift in the free-time activities, it is quite realistic to suggest that in the future students will have the developmental benefits of engagement in technology, but they may well lose, or have dramatically reduced, benefits that would have been acquired through traditional activities. Additionally, this study suggested that two groups of students have emerged from this dichotomy of technology use. Will the two groups function together well in school? Will they be able to compatible in workplace? If interests and values diverge, will the diversity prove

beneficial or will it mark another inequality that results in social tension? Will the disparities parallel those found between readers and non-readers, those adept at math and those who are not, perhaps even between the educated and the non-educated? Assuming that the trend is long term, the emerging differences should be watched lest they expand the current digital divide (Prensky, 2001; Prensky, 2005). But will it prove the case that for everything gained, something is lost? If so, what will be the cost?

Implications

It should be noted that while the significance levels in most of the findings were very high (less than one in a thousand chance that the differences found between LFQ and HFQ would be found randomly, or by chance), the study is exploratory in nature and has not been corroborated through replications with a variety of students in diverse settings. Findings from the study indicate that there is a difference between the two groups of students and that the differences affect the students' free-time choices. The larger question, one that the study cannot answer, is how to ensure that both groups of children get the most benefit from technology use without forfeiting that which is of value in the traditional activities.

Childhood Development

The traditional activities selected for inclusion in the study would belong in the microsystem region of Bronfenbrenner's model (see Figure 2). Bronfenbrenner (1979) deemed microsystems as highly influential in the development of children. It was noted in the findings that the two traditional activities that retained the most value among all participants were spending time with family and playing with friends. However, reflecting on the methodology one must consider if the measure has factual validity. The

results were based upon self-report measures by students who represent the particular culture of the students in the study. It may be that there was strong social pressure to spend time with family and friends while other options may not have the same "emotional" value or desirability. Even though all results were anonymous, it may be more acceptable for a participant to indicate that he or she would be willing to reduce the amount of time spent on a hobby to use technology than it would be to indicate his or her willingness to relinquish spending time with family to accomplish the same goal. Thus, there may be some doubt about the self-report in this sensitive area. Of course, this is not known to be the case and the findings do indicate that children value family and friends and would rather spend their free-time with them than with technology, suggesting that family and friends still have a great deal of influence on childhood development.

The dismal scores among students in reading for fun must be considered a cause for alarm. Some argue that many technology-based activities are, in fact, reading activities (Goldwasser, 2008, Hardy, 2005) and this may be so. But it may be argued, too, that reading online may have some differences. First, readings may tend to be briefer in nature, perhaps many short articles rather than a book-length reading. Second, the content is perhaps less likely to be known to care givers, a cause for concern documented in the literature (Montgomery, 2000; Montgomery, 2007; Subrahmanyam, Smahel, & Greenfield, 2006; Tynes, 2007). Third, it is suspected that much that is read online (especially while surfing the Internet as a free-time activity) might not be considered great works of literature but might instead be the equivalent of "tabloid journalism." Notwithstanding, student responses suggest that they either do not regard the electronic version as reading, or they do not find enjoyment in even this type of reading. Lack of

interest in reading for fun, within the context of childhood development, would seem to beg for hasty recourse.

Supervised activities are often seen as very important to the educational and maturational development of children and adolescents. Examples include, but are not limited to, organized sports, music lessons, scouting, and church youth groups. In this study, supervised activities had the second highest mean (were valued next-to-last) among all participants (Table 5) with seventh graders even less likely to participate in a supervised activity than fifth graders (Table 29). A construct of Vygotsky's *Zone of Proximal Development*, leads one to understand that children are able to learn more with the help of an experienced guide. While in reality, all of the information that students can obtain from attending these supervised activities is also available via the Internet, one might argue that a major benefit of being involved in a variety of organized activities comes from the help and support of an experienced guide. Additionally, it is through a variety of social interactions that people learn to negotiate their boundaries, fight for their beliefs, and compromise with others to live peaceably in their community. For example, one might learn the rules and strategies of playing baseball from the Internet or by playing a baseball video game. However, there are benefits to actually playing baseball that the virtual version cannot provide, among them physical activity, camaraderie, and teamwork, to name but a few.

The apparent devaluation of outdoor activities (a trend that that was higher among females) (see Table 24), is also a concern. If one views outdoor activities as an opportunity to commune with nature, take a walk in the woods, lie on one's back and look at the clouds, or go fishing or swimming in a lazy stream, one might be inclined to

believe that giving up outdoor activities is part of the frantic pace at which people live their lives. However, the global society is experiencing a period in time when ecological concerns may dominate much public thinking and public policy. If it is assumed for the moment that outdoor activities sharpen this interest (Louv, R. 2008), then the results found in this investigation are even more disconcerting.

In summary, there were differences found among the free-time choices of children involved in the study. However, to say that the childhood development of the students is significantly different because of their free-time choices would be beyond the scope of the study and a misapplication of the findings therein.

Parents, Teachers, and Mentors

Though it is obvious that our world is becoming more technology-driven with each passing year, parents, teachers, and mentors must decide how to balance the need to prepare children for their place in the world with the need to ensure that there is more to their lives than the technology they are able to use. One cannot compare the value of a piano lesson to the value of watching a sunset or to the value of learning to format a table in a word processing document. It is known that exposing children to a variety of activities is developmentally appropriate, especially as children begin to value activities based on their own judgments and criteria.

Some of the traditional activities examined in the study are more readily available to children than are others. For example, while it is true that each family structure is different, it is hard to argue that children have not been exposed to spending time with family. While there are as many personal definitions of what constitutes a “family” as there are families, and the activities in which any particular family may be involved are

unique, most children know what is meant when one says “spend time with family.” They have a point of reference because they have been involved with “family.” A child who wants to read for fun usually has ample opportunity to check out books in the school library (even if he or she has limited access at home). On the other hand, children cannot regularly attend a supervised activity without the support of a caring adult to provide transportation, pay the enrollment fee, and make a time commitment to ensure that the child will be able to attend the meetings as scheduled. If a child has never had an opportunity to participate in flag football, Girl Scouts, or guitar or piano lessons, he or she would be less likely to know the underlying value of the activity. Caregivers (including parents, teachers, and other mentors) must seek to provide a broad range of opportunities for children to balance their development. A study by McHale, Crouter, and Tucker (2001) found that choices made in middle childhood affect a child’s future social adjustment. At the same time, care must be taken not to over-commit children to the point where they no longer have free time in which to make their own choices (Dunn, Kinney & Hofferth, 2003).

Teachers have the additional problem of balancing the needs and interests of all the children within their classrooms. Good pedagogy demands that instruction be delivered in the way each child learns best. With technology-driven and non-technology-driven students sitting side-by-side in the classroom, the balancing act becomes even more of a challenge for teachers who have already been charged with making accommodations for the modalities and multiple intelligences found among their students. Using an assortment of instructional techniques with a variety of technology-

based and non-technology-based delivery options is vital to ensure that each child's needs are met.

Consider, as well, that the hobbies, supervised activities, and other special interests of an individual child, can be an important point of contact between the child and the instructor. Using a shared point of interest to build rapport, a teacher can engage the student at their current level while using the shared interest to foster the child's academic progress. Additionally, if other schools follow the lead of Berkley and Mount Holyoke (FairTest, 2009), whose administrators have chosen to deemphasize the use of standardized tests when making admissions decisions, it is through special interests that students have an opportunity to "stand out" among their peers. At the school level, the study would suggest that a variety of developmentally-appropriate traditional and technology-driven, after-school activities would help to meet the needs of all students while supplying a greater spectrum of colors with which students are able to paint the canvas of their lives.

It should be noted that my study does not indicate, nor is it my intent to imply, that technology is bad for children. It is rather suggested that it is prudent to first look at what children are doing, and to what extent, before attempting to determine which developmental needs remain. Parents, teachers, and others who care about children have a mandate to provide activities for children that best develop their character as they prepare them for life as responsible citizens. For the past quarter of a century caring adults have worried, and rightly so, about whether technology education was vital to our children's success. However, many children have embraced technology and are using a variety of technologies on their own; indeed, often they cannot remember a time when

the technology was not available to them. The crux of the matter is that many studies have investigated what children are doing with technology (Future of Children, 2000; Goldwasser 2008; NOP, 2005, PewInternet, n.d.), but until now there have been no studies available that seek to determine activities that children are giving up as they increasingly engage with technology. Is it not reasonable to suggest that a better variety of educational and developmental experiences can be planned to supplement the unique needs of today's students if it is first determined what those needs are? While some suggestions will be uncovered through research findings, ultimately the answers will emerge through continued and varied dialogues. The dialogues would need to include parents, teachers, mentors, and, of course, the children, who have the final say on how they spend their free-time.

Limitations

As with all exploratory research, the findings in this study cannot be generalized to any other population in any other setting. In answer to the research questions, it can be stated with a great deal of certainty that HFQ students in this study were more likely to pick a technology-driven activity to pursue during their free-time than were the LFQ students. However, several factors, which might have made a significant difference in the findings, were not accounted for in this study: (1) access to specific technologies, (2) socioeconomic status of students, and (3) differences in maturation or motivation among students.

First, the study did not seek to determine the specific technologies to which students had access. It is not known to what extent access to technology, or lack thereof, colored the choices made by students. Though the survey wording ("When I can choose, I

would rather") indicated that students could choose technologies that were not really available to them, it cannot be assumed that the children would pick a technology they had heard of but had not experienced. It is not known if students who expressed value for traditional activities would have opted for broader technology use if they perceived its availability.

Second, students involved in the study were rural and suburban children in a school district with pockets of poverty and affluence. The study did not stratify children by their socioeconomic status, therefore it cannot be determined how, or if, socioeconomic status would affect the findings.

Third, the study did not seek to determine if the trends identified were due to maturation or motivation among students. Since the study was conducted at a fixed point in time, determining if student choices would change over time is beyond the scope of this study.

Implications for Future Research

This was an exploratory study, and there are no published studies available to support or disprove the findings therein. Without corroboration it would be unwise to generalize the findings from this study to any other population. To establish the ability to generalize its results, the study would need to be replicated in a variety of other settings with diverse populations.

While this study did not examine whether children would make different choices if more technology was available to them, future studies might be used to: (a) determine if socioeconomic status makes a difference in choices made by students, (b) determine

what technology is available to children before undertaking the study, or (c) provide students opportunities to use each technology before administering the survey.

Future studies could be used to determine if the findings of this study were consistent among children in lower grade levels and higher grade levels. Due to the limited scope of this study, it is not known if younger students would make the same choices as did fifth and seventh graders. Findings cannot reveal if the trends discovered would continue as students matured. Longitudinal studies using the same population would be needed to determine if the choices made by the students remained consistent over time.

Future studies could determine if differences among fifth and seventh grade student were due to maturation or motivation. That is to say, studies could be used to determine if student lose interest in some technologies as they mature of if they lose interest because they are exposed to other activities that pique their interest.

Conclusions

While other studies have sought to determine what technologies children use and to what extent, this study is unique in that it sought to determine which, if any, activities children give up to spend more time with technology. Study findings indicate that esteem for six traditional activities eroded as students spent more of their free-time with technology. The study needs to be replicated among other populations before it can be generalized. In future studies, controls may be used to determine if the findings would be consistent across a variety of populations: (a) rural, suburban, and urban; (b) lower and higher grade levels, and (c) different socioeconomic levels. Other studies might also seek to determine if availability of the technology affects findings and if the findings remain

consistent over time (longitudinal studies).

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Appendices

Appendix A: Survey of Students' Free-Time Choices

Note: Free-time is any time outside of normal school hours. Free time would include before and after school hours, weekends, and holidays.

Age _____ Gender _____ Teacher _____

In each of the following sections please place a check mark (✓) beside the activity you would most often prefer to do during your free-time.

Example:
Play the guitar ___✓___ or Play the radio _____

For this set of items, "outdoor activities" is anything you do that involves nature. Examples - Take a walk in the woods. Fish or hunt. Collect leaves or insects. Watch birds. Plant flowers.

When I can choose, I would rather:

Outdoor activities ___	or	surf the Internet _____
Outdoor activities ___	or	read or write emails _____
Outdoor activities ___	or	"log onto" or create a social web site ___
Outdoor activities ___	or	Instant Message with friends ___
Outdoor activities ___	or	talk or text on a cell phone _____
Outdoor activities ___	or	play games on a cell phone _____
Outdoor activities ___	or	play video games on a game console _____
Outdoor activities ___	or	play multi-user video games on the Internet _____

For this set of items "read for fun" includes reading a book, comic strip, magazine, but not reading for a school assignment.

When I can choose, I would rather:

Read for fun ___	or	surf the Internet ___
Read for fun ___	or	read or write emails ___
Read for fun ___	or	"log onto" or create a social web site ___
Read for fun ___	or	Instant Message with friends ___
Read for fun ___	or	talk or text on a cell phone ___
Read for fun ___	or	play games on a cell phone ___
Read for fun ___	or	play video games on a game console ___
Read for fun ___	or	play multi-user video games on the Internet

---

For this set of items “a hobby” is something you build, do, or make. Example - Build a model car or plane. Make necklaces or bracelets. Take photographs. Paint a picture.

When I can choose, I would rather:

Have a hobby ___	or	surf the Internet ___
Have a hobby ___	or	read or write emails ___
Have a hobby ___	or	“log onto” or create a social web site ___
Have a hobby ___	or	Instant Message with friends ___
Have a hobby ___	or	talk or text on a cell phone ___
Have a hobby ___	or	play games on a cell phone ___
Have a hobby ___	or	play video games on a game console ___
Have a hobby ___	or	play multi-user video games on the Internet

---

For this set of items “spend time with my family” means anything that you do with family members but not with friends.
Examples – Eat a meal together. Talk about things that happened at school. Watch TV or a movie. Play cards or a board game.

When I can choose, I would rather:

Spend time with my family ___	or	surf the Internet ___
Spend time with my family ___	or	read or write emails ___
Spend time with my family ___	or	“log onto” or create a social web site ___
Spend time with my family ___	or	Instant Message with friends ___
Spend time with my family ___	or	talk or text on a cell phone ___
Spend time with my family ___	or	play games on a cell phone ___
Spend time with my family ___	or	play video games on a game console ___
Spend time with my family ___	or	play multi-user video games on the Internet

---

For this set of items, “play with friends” would include time playing with other children who are not members of your family. Examples – Ride bicycles, skateboards, motorbikes, etc. Play unorganized sports with neighbors (dance, jump rope, shoot basketball, touch football, hide and seek). Hang out with friends.

When I can choose, I would rather:

Play with friends ___	or	surf the Internet ___
Play with friends ___	or	read or write emails ___
Play with friends ___	or	“log onto” or create a social web site ___
Play with friends ___	or	Instant Message with friends ___
Play with friends ___	or	talk or text on a cell phone ___
Play with friends ___	or	play games on a cell phone ___
Play with friends ___	or	play video games on a game console ___
Play with friends ___	or	play multi-user video games on the Internet ___

For this set of items "supervised activities" are things you do with group members and a leader or teacher. Examples – Play a team sport such as soccer. Take dance, guitar, or cheerleading lessons. Meet with your Boy Scout, Girls Club, or church youth group.

When I can choose, I would rather:

Do a supervised activity _____	or	surf the Internet ___
Do a supervised activity _____	or	read or write emails ___
Do a supervised activity _____	or	"log onto" or create a social web site ___
Do a supervised activity _____	or	Instant Message with friends ___
Do a supervised activity _____	or	talk or text on a cell phone ___
Do a supervised activity _____	or	play games on a cell phone ___
Do a supervised activity _____	or	play video games on a game console ___
Do a supervised activity _____	or	play multi-user video games on the Internet

---

In this section you are to **estimate the number of free-time minutes** that you spend during the **average week** on each of the following activities?

Example: I spend 90 minutes a rehearsing with my band.

I spend _____ minutes a week surfing the Internet.
I spend _____ minutes a week reading or writing emails.
I spend _____ minutes a week checking or creating social web sites such as "My Space".
I spend _____ minutes a week talking to people using an instant messenger.
I spend _____ minutes a week talking on a cell phone.
I spend _____ minutes a week texting on a cell phone.
I spend _____ minutes a week playing games on a cell phone.
I spend _____ minutes a week playing video games alone on a game console such as Wii or DS, or on a computer.
I spend _____ minutes a week playing multi-user video games with family members, friends, or on the Internet.
I spend _____ minutes a week hanging out with friends.
I spend _____ minutes a week riding a bike, skateboard, motor-scooter, etc.
I spend _____ minutes a week watching TV or movies.
I spend _____ minutes a week eating with my family.
I spend _____ minutes a week talking or playing with my family.
I spend _____ minutes a week playing organized sports.
I spend _____ minutes a week taking lessons (dance, music cheerleading, etc.)
I spend _____ minutes a week at meetings (Boy Scouts, Girls Club, church youth groups, etc.)
I spend _____ minutes a week on a hobby.
I spend _____ minutes a week reading for fun.

Appendix B: Detailed Responses Concerning Content Validity

Respondent 1 (MW)

Considering your survey will be dealing with tweens, most of whom have computer experience, I would suggest structuring the survey in a different fashion.

Mark all that apply

Would you rather **surf the Internet** or

Have a hobby _____

Play with friends _____

Do a supervised activity _____

Read for fun _____

Spend time with my family _____

Play outdoors _____

Would you rather **read or write emails** or

Have a hobby _____

Play with friends _____

Do a supervised activity _____

Read for fun _____

Spend time with my family _____

Play outdoors _____

Of course, you probably have strong reasons for the current structure.

Could minutes per week be changed to hours per week if you allowed decimals? Most people have problems thinking in minutes per week, and many of the activities do occupy more than 60 minutes per week for an average person.

Do you have a "carrot" to encourage the student to fill out the survey: During my dissertation I eventually had to provide a few carrots to encourage participation? What percentage return rate are you expecting?

Respondent 2 (KD)

Description of free-time? Outside school day, weekends, holidays?

Perhaps some less gender specific sport such as soccer

Estimate of number of minutes spent? – During free-time or anytime?

"Reading for pleasure" – or reading for fun as in previous section?

Respondent 3 (CH)

You might consider adapting this question now that video games are actually interactive. Ex role playing games where several people play together cooperatively with talking or the Wii where a couple of friends actually play together.

Play with friends ___ or play video games on a game console ____

The rest of the questions look good to me.

Respondent 4 (BC)

The survey looks good to me. I would be interested in the results

Respondent 5 (DP)

In the survey administration letter. "Therefore, permission slips" should be changed to "Therefore, the enclosed permission slips"

"Play outdoors" should be changed to "Outdoor activities or play"

Need directions in section two. Put a ✓ or an ✕ by each item you prefer. Provide an example and put an example with the time.

"Hang out with friend" should replace "play with friends"

Respondent 6 (JBro)

I have a quick response for now. I will give more input later. My daughter and her friend looked at the survey. They said it was often not an either/or answer. A lot of the time she does more than one at a time. They text on their phones MUCH more than they talk. They rarely talk on the phone anymore and she texts non-stop while she is doing other things. They also said it was a mood thing. They did not want to give up one thing for the other, it just depends on their mood. They would like it better if it had a percentage of time spent on each or maybe a rank of importance.

That may not give you this information you are looking for though. Also, these girls are 13 so they are a little old for the survey. I can hand this out to cheerleaders and have them take it if you would like. They range in age from 11 to 13 (the high majority being 11-12)

Respondent 7 (JBra)

As to the Survey Administration document: it was pretty straight forward and there should not be any question as a result.

As to the survey instrument: I believe it was constructed to get your measurable information.

I don't see a parent permission letter. That will be the sticky wicket in all of this.

Who is your target group? You would get quite different results from this survey if it were given in public school as opposed to a private or parochial school where the family unit might play a larger part in free-time.

Respondent 8 (MM)

…I had a few thoughts. Under the section of reading for fun, what do you think about adding reading books versus online reading, like ebooks or blogs. Going to library versus looking up stuff online. They now have the games like World of Warcraft that is an online social world that friends can meet and do quests. This might be going too far but it might show that they prefer the virtual interaction over real interaction.

Respondent 9 (KH)

I believe you will get a lot of valuable information from your survey. One thing I might add is an option on the "playing outside" question is to give them choices playing unorganized sports, like shooting basketball, rollerblading, skateboarding, or playing neighborhood football or baseball.

Appendix C: Original Survey of Students' Free-Time Choices

Age _____ Gender _____ Teacher _____

For this set of items, "play outdoors" is anything you do that involves nature. Examples - Take a walk in the woods. Fish or hunt. Collect leaves or insects. Watch birds. Plant flowers. Please place a

When I can choose, I would rather:

Play outdoors ___	or	surf the Internet _____
Play outdoors ___	or	read or write emails _____
Play outdoors ___	or	"log onto" or create a social web site ___
Play outdoors ___	or	Instant Message with friends ___
Play outdoors ___	or	talk or text on a cell phone _____
Play outdoors ___	or	play games on a cell phone _____
Play outdoors ___	or	play video games on a game console _____
Play outdoors ___	or	play video games on a computer _____

For this set of items "read for fun" includes reading a book, comic strip, magazine, but not reading for a school assignment.

When I can choose, I would rather:

Read for fun ___	or	surf the Internet ___
Read for fun ___	or	read or write emails ___
Read for fun ___	or	"log onto" or create a social web site ___
Read for fun ___	or	Instant Message with friends ___
Read for fun ___	or	talk or text on a cell phone ___
Read for fun ___	or	play games on a cell phone ___
Read for fun ___	or	play video games on a game console ___
Read for fun ___	or	play video games on a computer ___

For this set of items "a hobby" is something you build or make. Example - Build a model car or plane. Knit or sew. Take photographs. Paint.

When I can choose, I would rather:

Have a hobby ___	or	surf the Internet ___
Have a hobby ___	or	read or write emails ___
Have a hobby ___	or	"log onto" or create a social web site ___
Have a hobby ___	or	Instant Message with friends ___
Have a hobby ___	or	talk or text on a cell phone ___
Have a hobby ___	or	play games on a cell phone ___
Have a hobby ___	or	play video games on a game console ___
Have a hobby ___	or	play video games on a computer ___

For this set of items "spend time with my family" means anything that you do with family members but not with friends.
Examples – Eat a meal together. Talk about things that happened at school. Watch TV or a movie. Play cards or a board game.

When I can choose, I would rather:

Spend time with my family ___	or	surf the Internet ___
Spend time with my family ___	or	read or write emails ___
Spend time with my family ___	or	"log onto" or create a social web site ___
Spend time with my family ___	or	Instant Message with friends ___
Spend time with my family ___	or	talk or text on a cell phone ___
Spend time with my family ___	or	play games on a cell phone ___
Spend time with my family ___	or	play video games on a game console ___
Spend time with my family ___	or	play video games on a computer _____

For this set of items, "play with friends" would include time playing with other children who are not members of your family. Examples – Ride bicycles, play hide and seek, or play touch football. Go over to a friend's house.

When I can choose, I would rather:

Play with friends ___	or	surf the Internet ___
Play with friends ___	or	read or write emails ___
Play with friends ___	or	"log onto" or create a social web site ___
Play with friends ___	or	Instant Message with friends ___
Play with friends ___	or	talk or text on a cell phone ___
Play with friends ___	or	play games on a cell phone ___
Play with friends ___	or	play video games on a game console ___
Play with friends ___	or	play video games on a computer ___

For this set of items "supervised activities" are things you do with set group of members and a leader or teacher. Examples – Play a team sport such as baseball or football. Take dance or music lessons. Cheerleading. Boy Scouts, Girl Scouts, or church youth group.

When I can choose, I would rather:

Do a supervised activity _____	or	surf the Internet ___
Do a supervised activity _____	or	read or write emails ___
Do a supervised activity _____	or	"log onto" or create a social web site ___
Do a supervised activity _____	or	Instant Message with friends ___
Do a supervised activity _____	or	talk or text on a cell phone ___
Do a supervised activity _____	or	play games on a cell phone ___
Do a supervised activity _____	or	play video games on a game console ___
Do a supervised activity _____	or	play video games on a computer ___

In this section you are to estimate the number of minutes that you spend during the average week on each of the following activities?

I spend _____ minutes surfing the Internet.
I spend _____ minutes reading or writing emails.
I spend _____ minutes checking or creating social web sites such as “My Space”.
I spend _____ minutes talking to people using an instant messenger.
I spend _____ minutes talking on a cell phone.
I spend _____ minutes texting on a cell phone.
I spend _____ minutes playing games on a cell phone.
I spend _____ minutes playing video games on a game console such as Wii or DS,.
I spend _____ minutes playing video game on a computer.
I spend _____ minutes hanging out with friends.
I spend _____ minutes riding a bike, skateboard, motor-scooter, etc.
I spend _____ minutes watching TV or movies.
I spend _____ minutes eating with my family.
I spend _____ minutes talking or playing with my family.
I spend _____ minutes playing organized sports.
I spend _____ minutes taking lessons (dance, music cheerleading, etc.)
I spend _____ minutes at meetings (Boy Scouts, Girls Club, church youth groups, etc.)
I spend _____ minutes on a hobby.
I spend _____ minutes a reading for pleasure.

Appendix D: Cover Letter to Teachers

Date

Dear fellow teacher,

I am a doctoral student at the University of Tennessee at Chattanooga (UTC) and a third grade teacher at Graysville Elementary School. As part of my degree requirements, I am conducting a research project which will determine the activities in which students prefer to participate during their free time hours. As we well know, technology options have become increasingly available to today's children while the time available for their use has not expanded. The enclosed survey will seek to determine what (if any) traditional activities our students "give up" as they increasingly engage with technology.

Information gleaned from the study will be used to foster conversations about the types of activities today's students should be offered to help shape their development. Survey responses and their sources will be kept confidential at all times. Completed surveys will be kept in a locked cabinet until the close of the study at which time they will be destroyed. Information obtained from the survey will be used primarily for academic purposes. The name of our schools, teachers, and even our county will be changed to protect our privacy if survey information is subsequently published in an academic journal.

Being a classroom teacher myself, I understand how valuable instructional time is to you; therefore, I scheduled this research project after the completion of CRCT testing. To advance educational research and to aid in my degree completion, I am asking for your help. Thank you, in advance, for your willingness to assist me in this endeavor.

Sincerely,

Susan Miller

Appendix E: Direction for Survey Administration

The Institutional Review Board at UTC requires that parents and students give written permission before students are allowed to take part in this study. You will find both the student assent and the parental consent forms in this package. Please read the student assent form aloud as an introduction to the study (THE WEEK OF) and obtain student assent. Send home the enclosed parental consent forms home during (THE WEEK OF) in order to give parents time to respond before the survey takes place during (THE WEEK OF). **Only administer the survey to those students for whom you receive signed parental consent and student assent forms.**

Before administering the survey, students should again be assured that information they provide will be kept confidential. Even students with parental consent may opt not to complete the survey at any point and will not be penalized for refusal to participate. Student surveys are not labeled with any identifying marks and should not be linked with individual student responses.

The survey should take approximately 30 minutes to administer. Survey items may be read aloud if desired. Questions regarding the meaning of included terms can be answered by you as the survey administrator.

After administering the survey, please place the parental consent and student assent forms and the completed surveys in separate envelopes (included in package) and return them to the school office for collection by (DATE).

If you have any questions or concerns, please contact me by phone, 423 488-6931, or by email, Susan-Miller@utc.edu; or contact my advisor, Dr. James Tucker at (?).

Thank you for your support.

Susan Miller

Appendix F: Student Assent Form

Student's Name _____ Teacher _____

Our class has been asked to take part in a study. The person who is doing the study wants to find out about students' free-time choices. If you take part in the study you will be asked to fill out a survey. First the survey will ask what thing things you like to do in your free-time. Then the survey will ask how much time you spend doing those things.

Your answers will help teachers plan after-school activities that help students grow and develop. You will help teachers learn about what kids your age like to do.

The survey is not like a test you usually have in school. You won't be graded on your answers. All you have to do is try to answer each item as best you can, and you will do fine. No one will know which answers are yours because your answers will be grouped with all of the other students who have taken the survey.

Before you can take part in the study you must have your parent's okay. You will take home a form that asks your parents if you can be in the study. Your parents can say, either "Yes, you can be in the study or, No, you cannot be in the study." If you bring back the signed form, you will get a piece of candy even if your parents will not let you be in the study.

Also, you can decide not to do the survey even if your parents say it is okay. Saying "No" to the study will not affect your grades and no one will be angry with you. If you have any questions about being in the study please ask your teacher before you sign the form.

The study on free-time choices has been explained to me and any questions I had have been answered. I would like to take part in the study.

_____ _____

Student's Signature Date

Appendix G: Parental Consent Form

[*Date*]

Dear Parent:

I am a third grade teacher at Graysville Elementary school and a student of Dr. James Tucker in the College of Education at the University of Tennessee at Chattanooga. As part of my degree program, I am conducting a research study to determine what, if any, traditional activities student "give up" as they expend more time using technology. The information will be used to help teachers plan instructional and free-time activities that interest students and promote healthy growth and development.

I am requesting permission for your child to participate in the study. The student will be asked to complete a 30 minute survey to be administered by his or her classroom teacher. First, the survey will ask which activities students prefer to do in their free-time, both with and without technology (For examples: hike in the woods, play video games, read a book, surf the Internet, text friends, etc.). Secondly, students will be asked to approximate the amount of time they spend on these activities during an average week. The student's participation in this study is voluntary; he or she may choose not to participate or to withdraw from the study at any time without affecting his or her grade. While the results of the research study may be published, each child's responses will remain anonymous.

If you have any questions concerning the research study, please call my faculty advisor Dr. James Tucker at [*phone number]* or email him at [*address*].

This research has been approved by the UTC Institutional Review Board (IRB). If you have any questions concerning the UTC IRB policies or procedures or your child's rights as a human subject, please contact Dr. M. D. Roblyer, IRB Committee Chair, at (423) 425-5567 or email instrb@utc.edu.

Sincerely,

Susan Miller
Graysville Elementary School
944 Graysville Road
Ringgold, GA 30736

Parental Informed Consent Form

I understand that participation in the Students' Free-Time study is optional and refusal to participate will not affect my child's grades in any way.

_____ My child has permission to take the Students' Free-Time Choices Survey.

_____ My child does not have permission to take part in the Students' Free-Time Choices Survey.

_____

Signature of parent or guardian

VITA

Cynthia Susan Miller was born in Key West, Florida and attended several public schools along the southeastern coast of the United States. She has lived in the greater Chattanooga area since 1972. She graduated from Tennessee Temple University in 1979 with a B.S. degree in Secondary Education and minors in Physical Education and Bible.

Ms. Miller earned a M.Ed. in Elementary Education from Berry College, in Rome, Georgia in 1999. While attending Berry she was inducted into Pi Delta Kappa educational honor society.

Subsequently, Ms. Miller received an Ed. S. in Educational Technology from the University of Tennessee at Chattanooga in 2002. Findings from Ms. Miller's thesis, "Evaluating the importance of common components in school based websites: Frequency of appearance and constituents judged value," were published in TechTrends.

Ms. Miller has worked for the same school district 16 years in a variety of capacities: Paraprofessional, First Grade teacher, Title 1 teacher, Physical Education and Health teacher, and currently as a Third Grade teacher. She has developed and presented technology courses for teachers and students. She presented "Battling Obesity with Technology" at the Georgia Technology Conference in 2007. Students under Ms. Miller's guidance placed winning entries in the International Student Media Festival in 2004 and in 2009.

Ms. Miller is currently an Ed.D candidate at the University of Tennessee at Chattanooga, and plans to graduate in December, 2009. After graduation she would like to continue to explore technology and its effects on child development.