

INFORMATION TECHNOLOGY AND THE NET GENERATION: THE IMPACT OF
TECHNOLOGY ON ADOLESCENT COMMUNICATION AND INTERACTION

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ABSTRACT

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Today's adolescent has been born into a world filled with technology. Adolescents are the most frequent users of technology, and use technology in more ways than their adult counterparts. To date, the literature on adolescent information technology (IT) use has primarily focused on dangers and risk to adolescents, including physical, emotional, and developmental.

Using an ecosystemic perspective and a developmental lens, this dissertation examines the ways in which IT impacts adolescents as they communicate and interact with other people from a strengths based perspective, using qualitative methods to capture the voice and experience of adolescents. Chapter one provides an overview of the topic and an outline for the dissertation. Chapter two provides a review of the literature, both historical and current, on the phenomenon of adolescent technology use. Chapter three focuses on what adolescents are accessing using technology, and how they see this impacting their daily lives and development. Chapter four examines how adolescents are using technology to communicate. Chapter five provides a discussion of the overall findings of the dissertation, with implications for Social Work practice, education, policy and research.

This dissertation is based on a qualitative study that used semi-structured interviewing with 128 middle school students in the Midwest. Adolescent use of technology was universal among the study sample. Adolescents reported a variety of activities involving technology, and

discussed the pervasiveness of technology in their everyday lives. These middle schoolers regularly reported benefits of using technology as well as awareness of potential risks, and confidence in their ability to protect themselves from these risks.

Adolescents were found to value technology and eagerly accept new technologies into their everyday lives. Social Work practice, education, policy, and research need to comprehend the pervasiveness of technology use among this population, and incorporate technology into all levels of work with adolescents and young adults.

KEY WORDS: Adolescents, Adolescence, Information Technology, Adolescent Development

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Figure 2: Coding frame: Classes are divided into categories that are described by characteristics. Characteristics are lists of items, linkages, and connecting themes (Harold, 2000). Individual questions were coded into independent classes. Examples of categories included: Access, Resource, Relationships, Self-Evaluation, and more. Characteristics were coded for each category56

CHAPTER 1: INTRODUCTION AND OVERVIEW

Statement of the Issue

Today's adolescent was born into a world of technology. Since the introduction of the internet for personal use in 1994, the way individuals interact with the world has changed dramatically. Young adolescents are already able to identify technological resources available and how best to use them (Hannafin, Hannafin & Gabbitas, 2009). Adolescent internet use has increased from 74% in 2000 to 95% in 2009 (Madden, Lenhart, Duggan, Cortesi & Gasser, 2013). Adolescents are also able to adapt to the rapidly changing technologies offered in the marketplace, and have an intrinsic understanding of technology that escapes many adults.

As with every major advancement in media and technology, there are generalized fears and panic about the possible impacts of information technology, especially on young people (Quigley & Blashki, 2003, Wartella & Jennings 2000). In fact, concern over new media forms in the United States dates back to the 1920's and the public outcry over the danger of silent movies (Wartella & Jennings, 2000). The nature of technology changed with the introduction of the internet, from a consumer media to an interactive media (Patchin & Hinduja, 2010), and with that change came new fears and concerns. One of the major concerns continues to be increased access to children for pedophiles (Wartella & Jennings, 2000). This fear is further exacerbated by the fact that many parents do not have the technical know-how to adequately guide or protect their children in their online activities.

The fears of harm to adolescents related to using information technology stems partially from the amount of use engaged in by adolescents. They are the most frequent users of information technology on the planet, and use technology for more tasks than do their adult counterparts. Studies have shown that all or nearly all adolescents use technology to complete school work, either at school or at home (Jackson, 2007). Most teens (85%) engage in

technology assisted communication, including text messaging, instant messaging, email, and social networking sites, at least occasionally (Lenhart, Arafteh, Smith & Macgill, 2008).

Adolescents are increasingly using cell phones to communicate with others and to access the internet, including social networking sites such as Myspace and Facebook (Strasburger, Jordan & Donnerstein, 2010, Madden, et. Al, 2013).

With all of the concern surrounding the possible negative impact of technology use by adolescents, little time has been spent examining the possible positive effects; however several potential benefits of technology use have been identified, including enhanced cognitive development, increased scholastic achievement, and increased social interaction (Straker & Pollock , 2008). Considering the pervasiveness of technology in American life, and the continually changing and advancing forms of interactive technology being developed, further exploration into the positive impacts of technology and ways to promote and enhance these positive effects is needed. This is the perspective taken in this dissertation, in which adolescent technology use is viewed from a strength-based perspective.

Adolescent Development- Theoretical Basis

Adolescence is a unique developmental period marked by dramatic change and growth. Any study of adolescent behavior should be grounded within a framework of adolescent development, to better understand the interplay between the adolescents' behavior and their development. This dissertation will focus on early adolescence (ages 10-14), and examine adolescent technology use with consideration of adolescent development, and how the adolescent is shaped by his/her environment.

There are many indicators used to define adolescence, though most theorists agree that adolescence occurs during the second decade of life (Bronfenbrenner, 2001; Erikson, 1986; Hall, 1904; Steinberg & Lerner, 2004; Steinberg, 2005). Adolescence was first defined by G. Stanley Hall as a time of "storm and stress" (Hall, 1904). Theorists and researchers since have attempted to dispute this negative view of adolescence, and instead replace it with a more adaptive model, where adolescents learn and evolve into young adults at a rapid pace (Lerner & Galambos, 1998; Steinberg & Morris, 2001; Harold, Colarossi & Mercier, 2007).

The ecological model of child development focuses on the experiences a child has within their environment (Bronfenbrenner, 2001). In this model, the subjective experience of the environment is just as important as the objective properties of that environment (Bronfenbrenner, 2001). This is a helpful paradigm in examining technology use and adolescent development, since adolescents have such a high appreciation for technology, and often interact within a cyber environment. Adolescents have been born into a technology driven world, and therefore will experience that world in a different way than their parents and other adults. Today's adults are incorporating technology into their everyday lives, whereas adolescents have experienced

technology as part of their everyday lives since they were born. The ways adolescents experience their environment is equally as important as the actual things they experience. Acknowledging that technology impacts how adolescents experience their environment, and seeking to understand the adolescent's own narrative of this impact can lead us to a greater understanding of how adolescents develop into young adults in this age of technology.

Description of the Research Study

The main goals of this dissertation are to document the historical trends in technological advances, and their supposed impacts on adolescents, and to examine two areas of potential impact of technology use on adolescents in today's world. Specifically, this work explores the impact of increased access to the world around them, and the impact on communication and interpersonal interaction. To study these areas, a qualitative study was completed by a research team from the Michigan State University School of Social Work, led by Rena Harold, Ph.D. This study was a continuation of a quantitative study led by Linda Jackson, Ph.D, of the Michigan State University Department of Psychology.

Methods

Sample

The study was funded by the National Science Foundation (Grant #HSD0527064), and set out to examine the impact of technology use on the psychosocial development of adolescents, aged 13-14 years. Semi-structured interviews were conducted with 128 eighth graders in the Midwest region of the United States. The adolescents who participated in the study were from four different middle schools (one urban, two suburban, and one rural). Almost 51% of the interviews occurred at the suburban school, 21.9% at rural school A, 15.6% at rural school B, and 11.7% at the urban school. Although the researchers had wondered if there would be a difference in use patterns between urban and rural schools, there were no significant differences between students in each of the schools. Race/Ethnicity was diverse at the urban school, (51% White, 32% Black, 10% Hispanic) but much more homogenous at the other schools, which were 95% or more white. Very few differences were noted in use patterns or beliefs between the different demographic groups represented. Where differences are noted they are included in the appropriate chapters. The sample proved adequate to thoroughly explore the topic, as exhaustive descriptions were obtained, and saturation achieved.

Design

Prior to data collection, the interview protocol was piloted with adolescents not included in the sample to ensure appropriate item wording and minimize bias. All interviews were recorded using digital audio recorders, and interviewees were asked for their permission to be recorded before recording began. Interviews took place over a three-month time period. The goal of the interviews was to allow adolescents to share their own perceptions, experiences and insights with the researchers. Questions were focused in the following areas:

- Use of technology
- Access to technology
- Comfort level using technology
- Concerns with technology
- Inter-relational aspects of technology use.

Demographics were also collected for each student, including grade, gender, race, and religion.

Of the adolescents sampled, 94% were in eighth grade, 6% were in seventh grade, 58% were female, 42% were male, 81% were White, 4% were Black, 2% were Hispanic, and 2% were Native American. 68% of the subjects reported that they were Christian, 20% reported no religious affiliation, 4% reported being atheist, 6% stated that they didn't know what their religion was, and 1% stated they were Jewish.

Coding

The data were first divided into initial **theoretical classes** by question, driven by the research. As in all qualitative work, the participants then attached their own meanings to these classes. These meanings emerged by examining their answers, and a set of *categories* were developed for each class. The *characteristics* of the particular categories and their *connecting themes* are a result of an interactive process between the researchers' initial assumptions and the meanings of the various classes and categories to the student participants (see Figure 1).

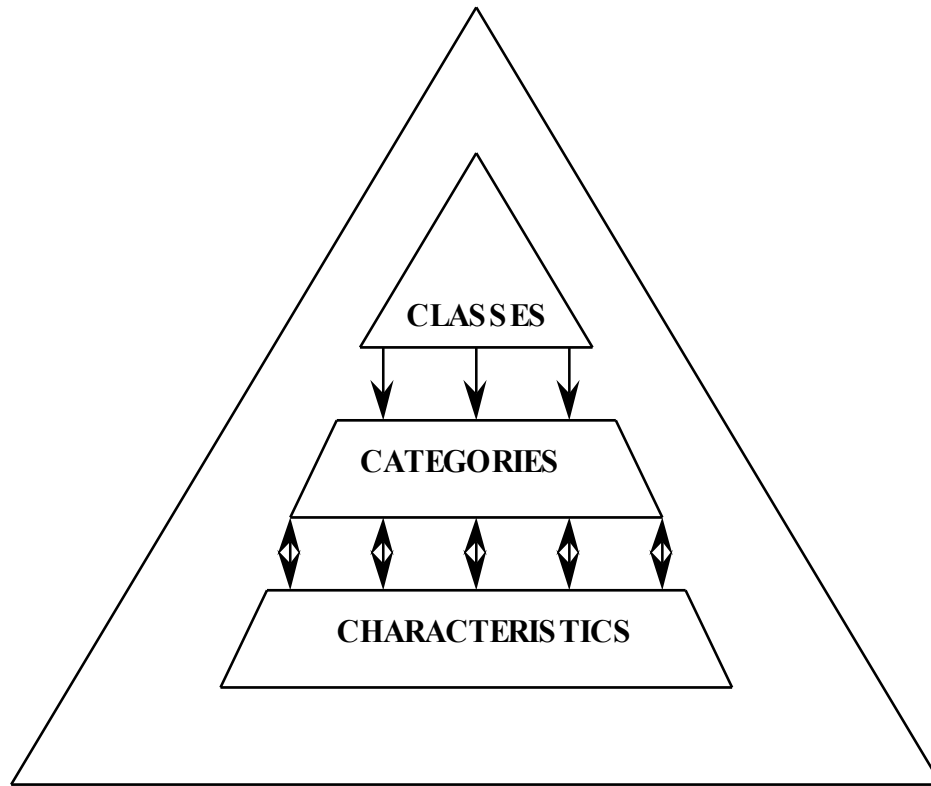


Figure 1. Coding frame: Classes are divided into categories that are described by characteristics. Characteristics are lists of items, linkages, and connecting themes (Harold, 2000). Individual questions were coded into independent classes. Examples of categories included: Access, Resource, Relationships, Self-Evaluation, and more. Characteristics were coded for each category (See Appendix A: Coding Categories Table).

Level I Coding - Classes

Students were given basic information about the study at the beginning of each interview, including the purpose of the study (to learn more about how adolescents are using technology). They were informed that participation was voluntary and that they could skip any question they didn't want to answer. The questionnaire placed a framework on the process by which student participants told the researchers about their experiences with Information Technology (IT). An

important first step in coding the questionnaires was to organize the information presented by the students into classes, beginning by looking at the data by question.

Researchers worked independently to code questionnaires by class, looking for categories and themes within each class. This helped to keep coders open to the content of the students' answers, rather than the influences of other coders. The researchers then came together to discuss which categories and themes/characteristics emerged from the data. This process increased the likelihood that there would be a shared understanding about which data should be included in the coding of each class. Altheide (1987) referred to this as conceptual coding, an approach that requires coders to identify a series of comments that reflect information about a particular concept.

The amount of information within each class varied from student to student. For example, when asked the question "What would your life be like without technology?" student responses ranged from very brief responses, such as:

"It would be really boring."

To more explicated and elaborate answers, such as:

"I don't know. Well I guess it would be kind of weird cause, like... when my parents are gone and they just wanna make sure that I'm okay and stuff. So they wouldn't know if I was okay and we live, we live out in the country so we don't really have neighbors either and um, and I wouldn't be able to talk to my friends as much cause I don't live by them. Um, I guess it'd be kind of boring."

In addition, comments were sometimes made that seemed out of sequence in that they referred to a different class/question from the one currently being examined. However, once a coding frame was in place, the use of NVivo 9.0 (QSR, 2009) made it possible to code data that

were found “out of order” in terms of the way students talked about certain issues. For example, when asked when they used technology, one student responded:

“Um, the computer, like from say, three to four, and that’s my hour I get...”

This student answered the question related to time of day, but also spoke to rules enforced by parents, a question which was asked about later in the interview.

It became clear that, as Altheide suggests, one item is frequently relevant for several purposes, in this case, for several classes (Altheide, 1987). This phenomenon was incorporated into the coding process during all of the stages, i.e., certain data fell into more than one code.

After coding the information presented by the participants into the various classes, it was clear that students had ideas about IT that were both similar to and different from those of the research team. For example the researchers hypothesized that most, if not all the adolescents, would report liking video games, but in fact, when asked if there were any types of technology students did not like, many reported video games. This began an interplay between the deductive framework of the researchers and the topics, issues, and meanings that had been inductively derived from the participants themselves.

Level II Coding - Categories and Characteristics

This first level of coding organized the data to make it more manageable and produced a framework that laid a path for the next level of analysis. In keeping with the commitment to utilize an interactive approach between deductive (the original research framework) and inductive (meanings that were identified by students) analyses, and because the foundation for the Level I classes was the questionnaire of the researchers, Level II coding began with an exploration of the students’ responses. Coders reviewed the questionnaires, and recorded all topical areas discussed. Some of these were present in the initial description of the class developed by the researchers, and others came from the participants’ discussion of issues that

were important for them in that particular class. This list of topics became the *categories* for Level II coding. Items from the list of topics were designated as categories when the research team reached a consensus on the designation, based on prevalence in the data set (the topic had to be discussed by a number of respondents, not just a few. There were no hard and fast rules set forth for this criteria, however categories all represent topics which were discussed by multiple students), and the contribution the topic and discussion made to understanding the phenomenon of adolescent technology use, as determined by the research team.

The Level II coding process outlined here is modeled, in part, after Glaser and Strauss' (1967) description of constant comparison. Qualitative analysis takes a grounded approach to the data, expecting ideas, concepts, and even theories to develop from the data. But perhaps even more importantly, the approach of this project reflects the interaction of induction, deduction, and verification (Glaser & Strauss, 1987). It demonstrates how concepts, issues, and hypotheses can be derived either from theory or from the data. Level II coding used a process of joint coding and analysis. Discussion and comparison were used to ground the theoretical classes to the data thereby creating data-driven categories (Berg, 2007; Lofland & Lofland, 1994).

After organizing the stories into the classes, the coders independently read the material in each of the classes to get an overall sense of that particular class. The coders then met as a group and reviewed them allowing the coders to discuss and compare these issues, and develop a list. The interaction between the coders resulted in further clarification of several issues, and the addition of some that no individual coder had identified alone. An example that illustrates this point is the identification of the multi-tasking issue. Many students responded to questions that were seeking to determine how much time students spent using technology with answers indicating that they used more than one form at a time. Once the issues were identified, the coders examined the list looking for ways in which the various ideas fit together or reflected similar categories. Using the issues that had been lifted from the students' stories, the coders

organized the second level of the coding frame around the following *categories* that were identified across all classes. (Discussion among the researchers resulted in the category of ‘multi-tasking’).

The next step was to continue coding the data to this further level of specificity, organizing the issues within each **class** by *category*. The coders met as a group to read each class of material, line by line, and describe the nature of the issues in the class. Decisions to place issues within certain categories were discussed among the coders until consensus was reached regarding the appropriate placement. These issues within each *category* became the *characteristics* that defined that category.

Level III Coding - Linkages and Connecting Themes

The next step in the process was to examine meanings and connections between various sets of categories. The 31 categories were analyzed using a number of approaches. Relationships between the various categories were explored, looking both vertically and horizontally. For example, looking at how the students describe how they use IT for communication may tell us something about what they use and when they use it. Looking at the relationship between their self-reported skill and the how and when they use IT, gives us yet another glimpse into their IT world.

Additionally, data were examined in depth within a particular category prior to exploring linkages and connecting themes. For example, combing through comments about “communication” across classes, provided an interesting example of data analysis within a particular category, allowing the researchers to look across themes. It is important to note that the nature of qualitative data where individuals may make conscious or unconscious choices about what to discuss makes it difficult to accurately interpret the absence of data on a particular topic. The methods of both data collection and analysis have allowed the meanings that middle

school students have about IT to emerge from the data. The large number of interviews conducted as well as the use of constant comparison between these meanings and the theoretical frame of the researchers provided a thick data set that allowed for the investigation of the role of IT in the lives of today's middle school students.

Analysis

Descriptive statistical content analysis was performed on the data using SPSS 15.0 software and Microsoft Excel 2007. Qualitative analyses were completed using NVivo 9.0 software (QSR, 2009). Data analysis was guided by the framework of grounded theory (Glaser & Straus, 1967). Grounded theory relies on capturing the research participants' lives, thoughts and feelings through the telling of their stories. It also places the researcher in both the data collection and analysis, resulting in the analysis helping to shape the data collection methods that are utilized (Glaser & Straus, 1967).

Validity and trustworthiness (Johnson, 1997; Marshall & Rossman, 2006) were addressed in several ways in this study. An audit trail was created, maintained, and centralized throughout the study process. This was a particularly key element toward the trustworthiness of this project, as four researchers needed access to the most updated and accurate study elements without jeopardizing the integrity of the data. Concerted effort went into the design and implementation of currency and confidentiality.

The study was designed for maximum data gathering from extensive researcher discussion and brainstorming during the building of the interview questionnaire. Extensive pre-planning created commitment and investment by all researchers to the purpose, rationale, and building of the study. Researchers invested time into processing and defining concepts and building consensus for the specific purpose of maximizing uniformity in the interview process.

Each researcher tested the interview instrument with a middle school student prior to study implementation that offered the opportunity to assess the usefulness of each interview question and add, in this case, clarity to questions and a further attempt to maintain the language of the interview questionnaire at a fourth grade reading level.

Every researcher participated in the interview process, kept personal notes and reflections, and debriefed after each round of interviews. Each researcher did an independent coding of three transcribed interviews that was followed by extensive group discussion that led to the development of an initial coding frame. The first pass at coding was done in teams to train the researchers in the coding process and build and maintain coding consistency that led to a high level of confidence in the independent coding that. Data analysis was strengthened by researcher triangulation and the full participation of the four researchers (Johnson,1997). The trustworthiness of this study rests in its significant sample size and the investment, cohesion, and consensus of multiple researchers/coders through the process of training and peer debriefing. Coding, analysis, and reporting utilized extensive direct quotation, a low inference descriptor method (Johnson, 1997). This method allows for the actual voices of the research participants to be the focus of the analysis and reduces the influence of bias on the part of the researcher.

Major Research Questions

After setting the historic content for this work in the first manuscript (chapter 2), two major research questions guide the next two manuscripts. The first focuses on the effects of increased access afforded by information technology (chapter 3). The second (chapter 4) focuses on the impact of IT use on communication and interpersonal interaction among adolescents. Each chapter provides some insights that give clues to the answers to these questions.

- I. What are the implications of the increased access (to other people, information, etc.) afforded to adolescents by recent advancements in interactive technology in regards to adolescent development and well-being?
- II. How do adolescents use technology to communicate, and what impact does using technology have on the communication styles and the development of communication and interpersonal skills of adolescents?

Overview of the Multiple Manuscript Dissertation and Manuscripts to be Presented

The methods and characteristics of IT use among adolescents will be included, as well as the adolescents' impressions of the impact of this use. A strengths based perspective will be utilized, focusing on the possible positive impacts of technology use while presenting areas of possible concern and intervention. The Ecological Model of Child Development offered by Bronfenbrenner (2001) will provide a theoretical basis for the examination and evaluation of these qualitative data.

Chapter 1 provides an overview and outline of the entire dissertation, as well as provides brief background information relating to adolescent technology use and adolescent development. The research study is explained, and major research questions to be answered by the following manuscripts are identified.

The first manuscript, found in the second chapter, is a review of the current literature on adolescent technology use within the context of adolescent development. The chapter discusses the recent increases in interactive technology use among adolescents. Historical references outline the concerns and fears related to advancements in media and technology over the last 100 years. This chapter discusses the transition from consumer media to interactive technology and the increases in rates of use for adolescents. It also explores the lack of a strengths based perspective in past research on adolescent technology and media use.

Chapter 3, which presents the second manuscript, addresses the question of access. It identifies how and where adolescents are accessing technology, and what they are accessing using technology, including information, including adult content, other people, and new experiences. Possible hazards of this seemingly unlimited access will be discussed, as will

potential benefits. Chapter 3 concludes with a discussion of the implications of this heightened level of access to the outside world on adolescent development and social work with this population.

Manuscript 3, in Chapter 4, explores the idea of Technology Assisted Communication and its effects on today's adolescents. It will examine the types of technology that adolescents use and prefer for communication, and how adolescents express and understand tone in technology assisted communication (TAC). It will also look at how adolescents balance virtual and face-to-face communication, and how technology can act as an aid in interpersonal interaction, including maintaining long distance relationships and assisting with difficult conversations and interactions.

The final chapter of the multiple manuscript dissertation summarizes the findings and the main points outlined in the previous manuscripts. It discusses the pervasiveness of technology in adolescent life, adolescents' preferences towards communication focused and assisted technology, technology as an enhancer of existing social relationships, and the ability of adolescents to perceive tone and inflection in text based communication. It analyzes the strengths and weaknesses of the research study and outlines implications for Social Work practice, education, and policy. It will conclude with areas and suggestions for future research on the topic.

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CHAPTER 2: THE IMPACT OF INFORMATION TECHNOLOGY AND MEDIA ON ADOLESCENTS: THE CURRENT KNOWLEDGE

Abstract

Media and technology use by adolescents have been a concern since the late nineteenth century. Concerns usually peak when new forms are introduced and made available for public consumption. With the current rate of advancement in the world of technology, it can be assumed that the lives of adolescents (the most prolific users of new technology forms such as the internet and mobile computing) will be impacted. Any research that focuses on adolescents' technology use must be informed regarding the concerns and actual occurrences of advances to-date. This paper will review the available research on adolescent media and technology use and the public concerns related to the introduction of radio, films, television, video games, and computers.

Introduction

Advances in media and technology bring new and exciting opportunities and provide new ways of learning and interacting. They also bring fears and concerns, especially for parents trying to protect their children. Adolescence is a developmental stage often marked by increases in exploration and separation on the part of the child, and increased worry and concern for parents (Erikson, 1963, 1986; Geldard & Geldard, 2010; Judd, 1967). Adolescence is also a period marked by an increase in peer interaction and a growth in the intensity of peer relationships (Havighurst, 1951; Judd, 1967; Laursen, 1996). Over the last 100 years, media and technology have frequently been scrutinized in the developmental process of adolescents, as they provide access to information and material that parents may feel is unsafe or inappropriate (Wartella & Jennings, 2000). This paper outlines the major themes found in a review of the literature on adolescent technology and media use from the late 1890's to the present day.

Background and Significance

Throughout history, every major advancement in the fields of media and technology has been viewed as a risk to society, and especially to young people (Quigley & Blashke, 2003; Wartella & Jennings, 2000). Technology use is especially high during adolescence, showing a significant increase in use even from the high rates of use observed among younger children (Jackson, 2007; Jackson et al., 2008, Madden, Lenhart, Duggan, Cortesi & Gasser, 2013). Unlike previous media advancements that introduced new forms of consumption media, or media that only allows the user to be passive, the most recent advancements have introduced the world to interactive media, which allows the user to be an active participant in media exchange (Wartella & Jennings, 2000; Patchin & Hinduja, 2010). This transition to a “wired” world has undoubtedly had a tremendous impact on adolescents, as they historically have been the largest consumers of media and are now the most proficient and frequent users of information or interactive technology (Bryant, Sanders, Jackson & Smallwood, 2006; Mikami, et al, 2010; Lenhart, 2009; Lenhart, Rainie & Lewis, 2001; Lenhart, Madden & Hitlin, 2005; Seal-Wanner, 2007; Valkenburg & Peter, 2009). In fact, recent data show that more than 94% of adolescents use the internet, and more than half (63%) use it every day (Patchin & Hinduja, 2010, Lenhart, 2009, Madden, et al, 2013).

Methods

For this literature review, several electronic databases were searched, including ProQuest, PsychInfo, Social Services Abstracts, and Social Work Abstracts. Results were limited to peer reviewed journal articles and published books. Keywords used in the search included “adolescents,” “media,” “technology,” “internet,” “adolescent development,” “information technology,” and “media regulation.” Items were included if they directly related to the topic (adolescent use of technology), focused on adolescence as the population of interest, and were published after 1994, when the internet became available in U.S. homes. Sources published prior to 1994 were included when they contributed to the understanding of adolescent development and have not been refuted in the literature, as is the case with Erikson’s landmark 1963 work. Pieces published prior to 1994 were reviewed and included to the point of saturation, with attention to commonly cited pieces prevalent in more current work. Three main themes were identified using this process: 1) The fears that guide most of the current research around adolescent technology use are similar to the fears that have accompanied every advancement in media and technology since the late 1800’s, beginning with the introduction of the radio and silent movies, 2) The current research focuses on fears and potential/actual risk of adolescent technology use and does not utilize a strengths based approach, and 3) The perspective of adolescents themselves has been largely ignored in the research to date on adolescent technology and media use. The literature will be reviewed and discussed here using a framework designed around these three main themes, with examples covering a time span of approximately 120 years.

The Fear of Exposure

Public fears surrounding children's exposure to media can be traced back to the turn of the twentieth century in the United States (Davis, 1911; Wartella & Jennings, 2000). Research on each new type of media has followed a similar progression, first focusing on the amount of time children spend with the new technology, then moving to attempts at determining what children are being exposed to through the use of the new technology, and then finally to a search for negative effects of that use. Interestingly, the failure of previous research to agree on any conclusive detrimental effect of media consumption or technology use has in no way hindered the continued concern over adolescents' exposure to media and technology or the further research in this area.

An unstated but underlying assumption of early research, which focused on the amount of time children spent with media, was that the more exposure children had to media, the more detrimental the effects. This belief is apparent in research relating to each advancement of media technology, including film, radio, television, video games, and the internet. In 1911, 62% of adolescents aged 11-14 years reported viewing movies at least once or twice per week (Davis, 1911). A 1934 study showed adolescents to be spending 10 hours per week with media, i.e., films and radio (Lundberg, Komarovsky & McInerney, 1934). In the mid 1980's, one study determined that kids were spending 14 hours per week with television alone (Timmer, Eccles & O'Brien, 1985). More recently, Roberts, Focher and Rideout (2005) determined that adolescents spend, on average, 6.5 hours per day with some sort of media technology, and in 2010, Strasburger, Jordan and Donnerstein found that number to be more than 7 hours (they included print media, which may account for some of the difference) .

Researchers continue to attempt to quantify the amount of time adolescents spend with technology. However, it may be getting more and more difficult to separate “technology” time from down time, in large part due to the ever increasing portability of technology, such as smart phones, tablets, and growing wireless connection abilities. These types of studies seek only to determine the amount of exposure to the various forms of media and technology, without supporting the notion that increased exposure is harmful.

The current research on time use also is missing one key factor. Most kids now frequently use more than one form of technology at a time. Kids are not texting friends for two consecutive hours, for example, and are often texting while listening to music on their iPod and playing a video game. Current research fails to take into account this “multitasking” phenomenon. For example, Strasburger et al. set out to measure the health effects of media on children. These researchers measured how much time adolescents use several different forms of technology (including television, computers, and video games) and totaled the amount of time with each type to conclude that adolescents spend more than 7 hours each day with technology and media (Strasburger, Jordan & Donnerstein, 2010). However, it is possible that adolescents are using more than one form at a time, which would dramatically decrease the overall amount of time per day they are using technology.

Once researchers believe they have a handle on how much exposure children have to the “latest” technology, the literature tends to move toward exploring to what kids are being exposed. A 1929 study found that children frequently viewed content thought to be too mature for their age (Mitchell, 1929). This study, which used a sample of more than 10,000 children in Chicago, noted that most of this exposure to adult content resulted from children viewing movies, and that adult content included crime, violence, and sexually explicit material. It is

noteworthy that the types of content thought to be “adult” in 1929 are quite different from now, and although the topics (violence, sexuality, etc.) may be similar, the extent and depth to which these topics are portrayed is much greater than it was in 1929 (Mitchell, 1929).

The progression of research on radio followed the same pattern as that of films; initial attempts set out to quantify use, then the focus turned to identifying what radio programs children were listening to and what possible dangerous content they contained (Eisenberg, 1936; Gordon, 1942). The main concern with the content of early radio programs was the depictions of crime and violence, thought to be enticing youngsters into lives of crime through the romanticizing of mobsters and moonshiners in popular programs (Wartella & Jennings, 2000).

Later research on children’s exposure to crime, violence, and sexual content on television became prolific enough, and public concern strong enough, that beginning in 1960, the federal government began regulating what could be broadcast (Lisosky, 2001, Wartella & Jennings, 2000, Watkins, 1987). There is no research to this day that undisputedly identifies a causal relationship between television viewing and negative outcomes for children (Robinson, 1999; Straker & Pollock, 2008; Vandewater, Shim & Caplovitz, 2004). Ohannessian reports that some studies have claimed to have found positive correlations between playing violent video games and aggressive behavior in children and adolescents, however, these studies have a number of methodological weaknesses, including samples that are small or non-representative, and measurement instruments with questionable reliability and/or validity (2009). A further review of the literature provides some examples of this assertion.

The American public has been concerned about children’s exposure to violence and the risk of resulting aggression since the 1930’s (Blumer, 1933). The first concerns were raised

about films and radio, with television and video games becoming targeted as they were introduced. Several school shootings committed by adolescents brought about increased concern in the 1990's (Sherry, 2001). One response was a nationally commissioned study, named the "National Television Violence Study" completed from 1996-1998. This study confirmed public fears that viewing violence contributes to antisocial effects, including increased aggressive behavior and attitudes, de-sensitization to violence, and fears of victimization (Federman, 1996, 1997, 1998). However, the methods used in this study were not clearly stated, and it is unclear whether the conclusions drawn were actually based on careful and rigorous analysis of the data or were more in response to strong public demand that the government do something to respond to the tragic school shootings across the country. It is noteworthy that the "outbreak" of school shootings was treated by the media as epidemic in nature, when in fact there were only a handful of such incidents. The horrific nature of these isolated incidents may have overshadowed the actual fact of their rareness.

A meta-analysis completed in 2001, indicated that even though more than 30 studies had been completed during the 1990's there was still no agreement about the existence of, or level of, effect on children playing violent video games (Sherry, 2001). The meta-analysis concluded there was a correlation between video game use and aggression, but the effect size was very small, and actually smaller than effect sizes previously found in studies analyzing the connection between television viewing and aggression. A more recent literature review (Anderson & Gentile & Buckley, 2007) failed to provide convincing data after reviewing a number of studies, and instead used expert testimony to conclude that viewing violence leads to "significant" harmful outcomes for children.

The studies previously mentioned follow the same pattern and share some very important factors. They start out from a problem-oriented perspective, already believing that violence in the media causes violent behavior among viewers, especially children and adolescents. They fail to provide data that unequivocally demonstrate a causal relationship between violent media and aggressive behavior. All of the studies state the need for further measures to prevent or mediate the impact of violent media on children.

There are many studies that attempt to determine if a relationship exists between adolescent media use and obesity. Childhood obesity is a concern for a number of reasons, including the perceived increase in rates of childhood obesity in the last twenty years, and the many negative health effects of childhood obesity, including increased risk of diabetes and hypertension. Strasburger (2011) reported that numerous studies, many of which are longitudinal, show that media use is contributing to the overall worldwide obesity epidemic. In what ways or on what level media is contributing is not further explained. In fact, when studies that set out to empirically test the hypothesis that media use impacts weight (or physical activity level, which is assumed to contribute to weight), only very weak correlations were found (Chen & Kennedy, 2001; Dietz, 2001; Robinson, 2001; Robinson & Killen, 1995; Robinson, 1999; Durant, Baronowski, Johnson & Thompson, 1994). Often when these studies do find a correlation, the methodology is questionable. For example, Robinson (1999) conducted a random controlled trial that included two matched elementary schools. Although the study used third and fourth graders, and not adolescents, it provides an example of problem methodologies used in this area of research. The intervention school students received a series of lessons, administered by their regular teachers, which set out to encourage students to reduce their viewing time. They were challenged to “tune out” for one ten day period, and to reduce their overall viewing time

each week. The study showed that on average, the intervention group gained slightly less than one-half kilogram less weight over the school year than the control group, leading the researchers to conclude that reducing the amount of time viewing television leads to healthier weights.

There are several issues with this study, which illustrate some problems common to this area of research. First, the researchers relied on self reports of students and parents to measure the amount of television viewing time. Since the intervention students had received training aimed at reducing their amount of television viewing time (which included training in being a “smarter” viewer by viewing less) it is possible that this group would under-report, due to a social desirability bias. Also, even though the researchers were able to establish a statistically significant finding, the real world significance of less than half of one kilogram over a year among a population that is experiencing dramatic growth and bodily change is highly questionable. Other studies have been unsuccessful in showing a correlation between media use and physical activity or obesity (Vandewater, Shim & Caplovitz, 2003; Griffiths, 1999).

There has been a noticeable increase in the amount of time children spend with media and technology (Madden, et al, 2013), but no definitive finding that increased exposure is related to any increase in negative outcomes. Concerns over the negative impact of technology and media have included the risk of increased violent or sexual behavior in children, decreased cognitive ability, increased behavioral problems, decreased educational outcomes, and increased health risks, including obesity and heart disease resulting from more sedentary living (Davis, 1911; Mitchell, 1929; Blumer, 1933; Lundberg, Komarovsky, & McInerney, 1934; Eisenberg, 1936; Gordon, 1942; Schramm, Lyle, & Parker, 1961; Watkins, 1987; Robinson, 1999; Straker & Pollock, 2008; Vandewater, Shim, & Caplovitz, 2004).

The first large scale studies, commissioned by the Payne Fund in 1933, reported that any effects of film viewing on children were mediated by a number of personal and environmental factors including the age of the child (younger children are more susceptible to persuasion), social status of the child and family (poorer children spent less time with media and more time either working outside of the home or doing housework) and gender (males reportedly were more influenced by violent media and females more influenced by sexual content)(Blumer, 1933; Blumer & Hauser, 1933). Later studies on radio, television, and video games support the idea of mediating variables, adding parenting style, disposition of the child, type of content, and length of exposure to the list of factors that impact the effect of media exposure on children (Eisenberg, 1936; Gordon, 1942; Shramm, Lyle & Parker, 1961; Wartella & Jennings, 2000; Villani, 2001). As the types of technology available to adolescents increase, and the amount of time adolescents spend using it increases, it becomes harder to isolate technology as the variable causing many of the feared effects, including obesity and aggression. In today's world, where adolescents in the United States have nearly universal access to technologies such as television and the internet, it is nearly impossible to compare groups of adolescents who use technology with those who do not.

The types of research that have accompanied each advancement in media and technology illustrate the notion that today's fears and concerns of the public, and parents in particular, are not new fears, but the same fears that have accompanied every new media form. As each new form emerges, fears related to the old form are minimized, and the cycle of research (level of exposure, content of exposure, and negative effects of exposure) begins anew. The fear is basically that of outside influence. The fear itself has not changed, only the method by which that influence enters children's lives.

The Lack of a Strength-Based Perspective

The overwhelming majority of research published on adolescent technology use and media consumption comes from a perspective of fear and concern, instead of a perspective of possibility and strength. This perspective is evident in the research questions, titles of the articles, and conclusions drawn from the data (see Blumer, 1933; Davis, 1911; Schramm, Lyle & Parker, 1961; Robinson, 1999; Straker & Pollock, 2008). Much of this research focuses on identifying potential dangers to kids (Ohannessian, 2009). Three main categories of danger that appear routinely (regardless of the technology or media type) are the risk of increased aggression resulting from viewing violent content, risk of health problems (including obesity, sleep deprivation, and vision impairment) related to engaging with technology and media, or resulting from displacing healthy activities with more sedentary technology based ones, and addiction or dependency on technology. A fourth category, exposure to sexually explicit material, is present but less prominent, and has been mostly restricted to measuring the level of exposure with the assumption that all exposure is sure to cause negative outcomes.

More recently there have been a handful of studies that attempt to determine if a positive impact of media use exists. Video games and computer games have been shown to enhance visual processing and cognition (Green & Bavelier, 2003; Green & Bavelier, 2007). Using online communication, such as email, instant messaging, and texting with people who are known to the adolescent, has recently been positively correlated with increased closeness and quality in these relationships, as reported by the adolescents (Blais, Craig, Peplar & Connolly, 2008; Valkenburg & Peter, 2007). One study found that playing video games and watching television was a protective factor for boys in relation to levels of anxiety and depression (though not for girls)(Ohannessian, 2009). The first major study to look for positive effects of media and

technology use was conducted in 2002 by Durkin and Barber, and found that adolescents who played video games were better adjusted than their non-playing counter-parts, with higher self esteem, lower rates of substance use, higher levels of school involvement and closer family relationships. It is possible that these types of studies, that analyze positive impacts, are less frequently funded or published based on prevailing public concern over children's safety and well-being.

Overall, many researchers have attempted to prove that a link exists between media and technology use and physical harm among children and adolescents, with little success. The public opinion is unwaveringly clear, that media and technology use displaces time that could be spent in physical activity, and is therefore detrimental to children's health. The fact is that there is absolutely no conclusive evidence that children are engaging in less physical activity since the introduction of technology and media. There is also no conclusive evidence to support the widely held belief that increased technology and media use lead to decreases in physical activity. The few studies that have found a significant relationship between weight and technology use have found very small effect sizes and utilized questionable methodology. The historical frequency of publications that outline negative impacts of technology use appears to be driven more by public opinion and sensationalized isolated incidents than by empirical evidence. Future research could incorporate a strengths-based perspective by including technology based data collection methods (online surveys, content analysis of social networking websites, etc.), exploration of possible benefits of technology use on social and cognitive development, and identification of protective factors that reduce any risk of possible negative consequences of technology use among adolescents.

The Lack of Methodological Rigor and Adolescent Voice

As previously stated, the overwhelming majority of research to date on adolescent technology and media use focuses on the potential negative impacts of use on specific aspects of adolescent development and well being, including increased aggression, negative health outcomes such as obesity and eating disorders, increased substance use, and increased risky sexual behavior. For example, Connolly, Casswell, Zhang and Silva interviewed 667 18-year-olds in New Zealand about their use of alcohol, attempting to determine the effects of viewing alcohol related television ads on current rates of alcohol use (1994). Although the researchers determined a statistically significant correlation between viewing beer commercials at age 15 and drinking beer at age 18, the study relied solely on 18-year-olds recall of viewing the commercials when they were 15 years old, or three years before the interviews. Relying on recall could have serious implications for the reliability and validity of the data and calls into question the accuracy of the findings. A shorter term study, with the measurement period following the exposure period more quickly, may increase the validity of the data.

Another example of poor rigor in the body of knowledge surrounding adolescent technology use is Anderson, Gentile and Buckley's literature review (2007), which stated that harmful effects of movies and violence in the media have been found since 1933. One example the researchers used to illustrate this point was the 1972 Surgeon General's testimony to Congress on television violence. The Surgeon General stated "televised violence, indeed, does have an adverse effect on certain members of society." (Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1972) Anderson, Gentile, and Buckley (2007) point to this as proof that violent media has a negative effect on children. There are two issues illustrated here. First, this research emphasizes expert opinion in the absence of conclusive data.

Second, the statement made is over-generalized, and used to support the author's statement that violent media increases aggression in children, which is far beyond the scope of the statement.

Researchers have struggled and continue to struggle with learning about children's actual activities while using the computer and the internet. One study asked children's opinions about internet sites, but asked the children to view pre-selected sites, which yields little information about the children's actual preferences (Kafai, Bates, Braxton, Childs, Ender, Lo, Martin, Rose, & Yarnall, 1999). Peter Williams used an unobtrusive fieldwork observation method to try to determine children's preference in computer use (1999). However, this study was carried out in a classroom setting, with the researcher "playing the part" of a classroom assistant. It is probable that children's computer and internet related behavior is quite different at home than at school, and also impacted by an adult viewing what they are doing. A U.S. Department of Education study collected data from 56,000 households on computer and internet use by children, but only interviewed one person per household, probably an adult in most cases (this information was not shared in the report) (DeBell & Chapman, 2001).

It is unclear if adolescents' own accounts of their technology use are not valued or not believed to be valid, but they are largely ignored in the past and current literature on adolescent technology use. As adolescents are the most frequent, and arguably the most knowledgeable users of technology, it appears to be a major gap in the literature when their voice in the study of their technology use is excluded. There are a few more recent efforts to capture the adolescent perspective (notably the work of Jackson, Yong, Kolenic, Fitzgerald, Harold, and Von Eye) which utilized surveys of adolescents themselves to explore adolescent technology use (2008). This avenue of inquiry needs further exploration in order to inform policy and practice.

Discussion

It is undisputed that adolescents are the most frequent users of information and communication technology, and the largest media consumer group. The rates of use have continually increased over the last one hundred years, probably because of the increase in the amount of media and technology available. As the amount of use and the variety of technologies have increased, so have the concerns over the risk for young users. As has been demonstrated previously in this paper, these fears are not new. Concern over the risk of harm caused by media consumption dates back to the invention of the radio and opening of silent movie houses. The public, and parents especially, fear that their children will begin to act more aggressively, be led into lives of crime, and suffer irreparable damage to their health and cognition if their use of technology surpasses some magical safe level that has yet to be determined. These fears seem to have intensified as the change from consumer media (radio, television and movies) to interactive technology (internet, cell phones, etc.) has occurred. Society thought that the old media types allowed children and adolescents to be exposed to undesirable material. New technology now allows children to interact with the world in new ways. These concerns are usually based on actual experiences (some children *have* fallen victim to online sexual predators), however these experiences are much rarer than believed, and are often overly sensationalized by the popular media.

Adolescents are not just the most prolific users of technology, they are also often the most knowledgeable users, especially within a family. Parents who are already worried about what trouble their kids can get into online have this fear magnified by their lack of knowledge on how to protect them. Studies that look at kids' risky behavior online have shown that most adolescents are safer online than the public hype would lead us to believe, and that they are

getting safer as time goes by (Patchin & Hinduja, 2010). This phenomenon, where adolescents are the “experts” and parents have less ability to provide guidance and support, may very well be a one generation occurrence. Whereas in previous generations, technology use was centrally located within the home (televisions and computers were often located in communal living spaces and shared by family members) today’s hardware is portable and dispersed throughout more private spaces, including bedrooms of adolescents. Parents were able to monitor and control use of these more stationary devices much more than they are able to control use of cell phones, tablets and laptops. The parents of future generations will have been born into a wired world, and therefore are likely to be much more capable of regulating and supporting their children’s technology use.

To be able to make impactful policy and practice decisions related to adolescents technology use, a change needs to occur in the types of research that are conducted. Most importantly, research needs to use methodology that allows adolescents to share their own opinions and experiences openly and honestly. Without the actual voice of adolescents, it is unclear how accurate the current knowledge is on the subject. Research that attempts to monitor children’s internet use, for example, tends to ignore the fact that adolescents have the knowledge to be quite secretive online if they choose to be (one easy way for them to do this is by having two profiles on a social networking website; one to which they allow parents and other adults access, and one that they reserve for peer interaction). Since adolescents are comfortable using technology for interaction, it is possible that by incorporating technology and technologically based means of communication into research methodologies the validity of the data may be increased substantially. Incorporating online surveys, and other technologically assisted research methodologies, may be the best way to observe adolescents in a naturalistic setting.

Research also needs to continue to follow the recent trend of focusing on potential benefits of technology use for adolescents. Technology is pervasive and nearly universal in the world today. Therefore, it is extremely unlikely that levels of use will decrease or be eliminated. Several past and current studies have identified mediating variables that reduce or eliminate negative impacts of technology use. Others have found protective factors and developmental benefits of use, including increased cognitive functioning and enhanced personal relationships. Using a strengths-based approach to research in this area will allow us to identify positive impacts of technology use and maximize them, as well as identify the actual risks faced by adolescents and mediating and protective factors to minimize those risks. As with all other areas of research, study in this area now needs to progress from an exploratory nature to an explanatory and evaluative one.

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CHAPTER 3: A QUESTION OF ACCESS: TECHNOLOGY AS A MEDIUM FOR
ADOLESCENT EXPLORATION AND INTERACTION

Abstract

Adolescents are among the most frequent users of the various types of technology, including computers, the internet, cell phones and mp3 players. Research up to this point has focused on the dangers of this use, with an emphasis on children's and adolescents' ability to access "adult" material and the need for regulation. Little research has focused on asking today's adolescents (members of the Net Generation, or those born after the introduction of the internet to public consumers) what they are actually using and for what purposes. This paper seeks to address these questions through semi-structured interviews of 128 middle school students in the Midwest. These interviews focused on the adolescents' own perceptions of their usage and the impact it has on their lives. Emphasis was placed on perceived benefits of technology use and adolescents' perceived ability to cope with potential dangers.

Introduction

Adolescence is a developmental stage often marked by increases in exploration and separation on the part of the child, and increased worry and concern for parents (Erikson, 1963; Geldard & Geldard, 2010). Adolescence is also a period marked by an increase in peer interaction and a growth in the intensity of peer relationships (Berscheid, 2003; Collins 1997; Mikami, Szewedo, Allen, Evans & Hare, 2010). Technology use hits all time highs during adolescence, showing a significant increase in use even from the high rates of use among younger children (Jackson, 2007). The rates of technology use among adolescents has recently increased as well. The rates of internet use among adolescents, for example, has grown from 74% in 2000 to 95% in 2013 (Madden, Lenhart, Duggan, Cortesi & Gasser, 2013). Unlike previous media advances that introduced new forms of consumption media, or media that only allows the user to be passive (radio, films, television), the most recent advances have introduced the world to interactive media, which allows the user to be an active participant in media exchange (Wartella & Jennings, 2000; Patchin & Hinduja, 2010).

Historically, research has focused on attempts to quantify technology use (Davis, 1911; Lundberg, Komarovsky & McNerny, 1934; Timmer, Eccles & O'Brien, 1985; Roberts, Focher & Rideout, 2005; Strasburger, Jordan & Donnerstein, 2010). The most recent evidence suggests that many adolescents are using technology for up to 7 hours per day (Strasburger, Jordan & Donnerstein, 2010), that more than 94% of adolescents use the internet, and more than half (63%) use it every day (Patchin & Hinduja, 2010, Lenhart, 2009). The current literature, however, fails to ask the adolescents themselves what activities they are engaging in and how these activities are impacting their development (Shifflet, 2013). It can be posited that since adolescents focus much of their attention on peer interaction and the exploration of the world

around them that they would utilize new forms of media for these purposes as well, such as social networking sites and mobile internet devices (tablets and smart phones).

Without an accurate understanding of the ways in which adolescents interact with technology, efforts to educate them about and protect them from possible dangers are minimized, and the ability to maximize potential benefits is diminished. Further research is necessary to determine the impact of recent increases in the amount of time adolescents spend using technology. Concerns over the negative impact of technology and media have included the risk of increased violent or sexual behavior in children, decreased cognitive ability, increased behavioral problems, decreased educational outcomes, and increased health risks, including obesity and heart disease resulting from more sedentary living (Davis, 1911; Mitchell, 1929; Blumer, 1933; Lundberg, Komarovsky, & McInerney, 1934; Eisenberg, 1936; Gordon, 1942; Schramm, Lyle, & Parker, 1961; Watkins, 1987; Robinson, 1999; Straker & Pollock, 2008; Vandewater, Shim, & Caplovitz, 2004). Research has continually shown that other factors in the child's life, including social status, age, and gender, mediated any negative effects (Blumer, 1933; Blumer & Hauser, 1933; Eisenberg, 1936; Gordon, 1942; Shramm, Lyle & Parker, 1961; Wartella & Jennings, 2000; Villani, 2001). Throughout this body of research, very little effort has been made to capture the voice of the adolescent, including their description of use patterns and their opinions on the impact it has on their lives. A more qualitative exploration may yield a much deeper understanding of the pervasiveness of technology in the lives of today's young people, and allow for the development of more accurate methods to explore future technological advances. This study focuses on the following research questions: 1) How do adolescents describe their use of technology to expand the world in which they live? 2) What types of

technology are they using? 3) What types of information and activities are they accessing with it? 4) What are the implications of use on their development?

Method

Sample

The sample for this study, which was funded by the National Science Foundation (Grant #HSD0527064 to L. Jackson, H. E. Fitzgerald, R. D. Harold, A. von Eye, and Y. Zhao), consisted of 128 eighth grade students in middle schools in the Midwest region of the United States. Students were selected for the qualitative portion of this project from a sample who previously participated in the quantitative, survey portion of the study. Students were given information about this qualitative study, including the types of questions they would be asked, the overall purpose of the study, and voluntary nature of their participation, and gave permission to be included. This study and the interview protocol were approved by the IRB at Michigan State University. Students came from one of four schools, two of which were in rural areas, one suburban and one urban school; 50.8% of the interviews occurred at the suburban school, 21.9% at rural school A, 15.6% at rural school B, and 11.7% at the urban school. Although the researchers had wondered if there would be a difference in use patterns between urban and rural schools, there were no significant differences between student reports in each of the schools. The sample proved adequate to thoroughly explore the topic, as exhaustive descriptions were obtained, and saturation achieved.

Design

Interviewees were asked for their permission to be recorded and all interviews were recorded using digital audio recorders. Interviews took place over a three-month time period. The focus of the interviews was to allow adolescents to share their own perceptions, experiences and insights with the researchers. Open ended interview questions from a semi-structured interview guide focused on the following areas:

- Use of technology
- Access to technology
- Comfort level using technology
- Concerns with technology
- Inter-relational aspects of technology use.

Demographics were also collected for each student, including age, gender, race, religion and family composition. This data was collected and analyzed to determine if any differences occurred in different demographic sub-groups of the sample.

Theoretical Framework

This qualitative study is guided by Bronfenbrenner's Ecological Model of Child Development. Using the framework of ecosystems gives rise to the notion that individuals and families are located within and interact with several levels of systems (Bronfenbrenner, 2001). This fits well for the study of adolescence, as teenage development takes place in the context of multiple social and institutional systems. Increasingly, these systems include "cyber environments." Bronfenbrenner (2001) describes the individual's environment as a nested framework that includes four types of systems, expanding in complexity and size: the microsystem - individual interactions with the immediate environment, the mesosystem - relationships between contexts, the exosystem - involving systems that impact development indirectly, and the macrosystem - relating to the larger culture, and the broader values and practices of society. This framework can be applied to many aspects of psychosocial inquiry and practice including the nature of communication, social support, peer relationships, and adolescent development. The ecological model of child development focuses on the experiences a child has within their environment (Bronfenbrenner, 2001). In this model, the subjective

experience of the environment is just as important as the objective properties of that environment (Bronfenbrenner, 2001). This is a helpful paradigm in examining the impact of technology use on adolescent development, since adolescents have such a high appreciation for and place such a high value on technology. The way adolescents subjectively experience their environment is equally as important as the objective experience.

Acknowledging that technology impacts how adolescents experience their environment, and seeking to understand the adolescent's own understanding of this impact can lead us to a greater understanding of how adolescents develop into young adults in this age of technology. Qualitative methods were used, as they allow participants to explore and describe their own experiences. The qualitative analysis in this study used a grounded approach to the data, expecting ideas, concepts, and theories to develop from the data. But perhaps even more importantly, the approach of this project reflects the interaction of induction, deduction, and verification, which maximizes the actual voices of the adolescents studied, and limits the influence of researcher bias (Strauss, 1987). Grounded theory relies on capturing the research participants' lives, thoughts and feelings through the telling of their stories. It demonstrates how concepts, issues, and hypotheses can be derived either from theory and/or from the data (Glaser & Straus, 1967). It also places the researcher within both the data collection and analysis, allowing the analysis to help shape the data collection methods that are utilized (Glaser & Straus, 1967).

Coding

The data were first divided into initial **theoretical classes** by question, driven by the research. As in all qualitative work, the participants then attached their own meanings to these classes. These meanings emerged by examining their answers, and a set of *categories* were

developed for each class. The *characteristics* of the particular categories and their *connecting themes* are a result of an interactive process between the researchers' initial assumptions and the meanings of the various classes and categories to the student participants (see Figure 1).

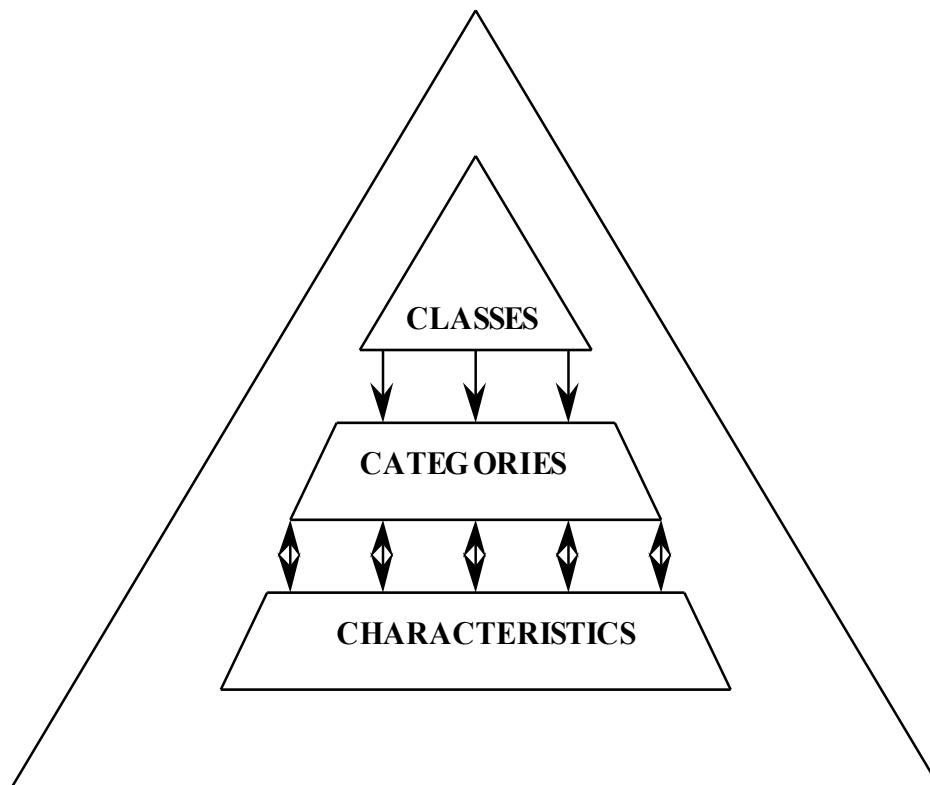


Figure 2. Coding frame: Classes are divided into categories that are described by characteristics. Characteristics are lists of items, linkages, and connecting themes (Harold, 2000). Individual questions were coded into independent classes. Examples of categories included: Access, Resource, Relationships, Self-Evaluation, and more. Characteristics were coded for each category.

A vast amount of data was collected through the interview process. Researchers randomly chose three interviews from the data and reviewed for emergent themes. Once the themes were identified, data was uploaded to NVivo 9.0 (QSR, 2009) qualitative analysis software, and researchers worked in pairs to identify quotes from the remaining data and assign them to the identified themes, in an effort to improve inter-rater reliability.

Analysis

Descriptive statistical content analysis was performed on the data using SPSS 15.0 software and Microsoft Excel 2007. Qualitative analyses were completed using NVivo 9.0 software (QSR, 2009). Validity and trustworthiness (Johnson, 1997; Marshall & Rossman, 2006) were addressed in several ways in this study. An audit trail was created, maintained, and centralized throughout the study process. This was a particularly key element toward the trustworthiness of this project, as four researchers needed access to the most updated and accurate study elements without jeopardizing the integrity of the data.

The study was designed for maximum data gathering from extensive researcher discussion and brainstorming during the building of the interview questionnaire. Extensive pre-planning created commitment and investment by all researchers to the purpose, rationale, and building of the study. Researchers invested time into processing and defining concepts and building consensus for the specific purpose of maximizing uniformity in the interview process. Each researcher piloted the interview instrument with a middle school student prior to study implementation, which offered the opportunity to assess the usefulness of each interview question and add clarity to questions, maintaining the language of the interview questionnaire at a fourth grade reading level.

Every researcher participated in the interview process, kept personal notes and reflections, and debriefed after each round of interviews. Each researcher did an independent coding of three transcribed interviews that was followed by extensive group discussion that led to the development of an initial coding frame. The first pass at coding was done in teams to train the researchers in the coding process and build and maintain coding consistency that led to a high level of confidence in the independent coding that followed. Data analysis was strengthened by researcher triangulation and the full participation of the four researchers (Johnson, 1997). The trustworthiness of this study rests in its significant sample size and the investment, cohesion, and consensus of multiple researchers/coders through the process of training and peer debriefing. Coding, analysis, and reporting utilized extensive direct quotation, a low inference descriptor method (Johnson, 1997). This method allows for the actual voices of the research participants to be the focus of the analysis and reduces the influence of bias in interpretation on the part of the researcher.

Results

Research participants were asked a series of questions related to their technology use in order to better understand their patterns of behavior. Adolescents were asked to identify what forms of technology hardware they used from a list of 10 popular choices. Subjects reported using all types of hardware listed, with TV (100%) and Computer (100%) being universally used. Subjects also reported using DVD players (99%), VCR (97%), Cell Phone (84%), Video Games (78%), and iPod/Mp3 player (76%).

Participants were also asked to report where they used each type of technology (in school, out of school at home or at a friend's home, or both). Participants most commonly

reported using technology in multiple locations. One exception was cell phone usage, which more commonly occurred out of school, due to regulations against such use while at school. When students reported using their cell phone at school it was often after school hours to contact parents, as stated by this student:

Like if I'm stuck at school I call my mom a lot, ask if I can stay after school, stuff like that.

Computers were the most common form of hardware to be reported as being used *at school only* (not at home or a friend's house), at 4.7%.

When asked what technology they used most, the most frequent answer was computer (27.3%) followed by iPod/MP3 Player (14.1%) and Cell Phone (10.2%). When asked what their favorite form of technology was, computer again was the top response (33.6%), followed by iPod/MP3 Player (17.2%), Cell Phone (16.4%), and Video Games (10.9%). Males were more likely to state that they used video games most frequently (14% for males, 0% for females) and females were more likely to report using cell phones most frequently (16.2% for females, 4% for males). Similar differences appeared in the favorite technologies of males and females.

Computers were reported as both the favorite type of technology and the most frequently used type. Television, however, was reported as one of the most frequently used types but not one of the favorite types, being surpassed by video games, cell phones and iPods. This indicates that factors other than preference play a role in the technology and media related behavior of adolescents. The main factors influencing how and when adolescents in this study used various forms of technology were rules imposed by parents and schools, (eg., no cell phones in class) and the purpose of the technology used. For example, online gaming allows adolescents to play games with people who are not in the same location, so they are often used when home without

friends being physically present. Adolescents rarely reported using online games with friends in the same physical location.

Students reported using multiple types of technology at home, at school, and at their friends' houses, but often reported different technology assisted activities in different locations. Rules at home and school was the reported reason for some of this variation, as was the purpose of the use. For example:

Because usually at home I am just going on [the computer] for fun and at school I am doing school work.

and

Yeah we have rules here [at school], we're not allowed to get on [social networking site] or look up things on the internet without permission, and [social networking site] is just completely blocked.

Some activities by their nature occur at specific locations. Many students discussed playing online games at home, with the biggest attraction being that they could play from home with people in many different locations. As one particularly enamored student stated:

Um, I can play with many people in the world because there's billions of people that play this game. My brother [name] plays it, so I can play with him. My um- I know four friends that play it, so I got a lot of friends that can play it too. Yeah, I call 'em up or something and see what they're doing, and say "I'm hopping on a while to this World of War Crafts." And they're like, "Oh, I'll see if I can get on," or something like that."

Accessing Information

Many of the adolescents in this study stated that one of the greatest benefits of technology was the ability to access information quickly and easily. In fact, 75% of adolescents interviewed, when asked to score how helpful technology was in helping them get information on a scale from 1 (not at all helpful) to 5 (extremely helpful), scored it at 4 or above. A common theme was that students used the internet and computer to assist them with schoolwork:

(Respondent): The internet is extensive and the amount of knowledge that's just easy to access.

(Interviewer): So what do you use the internet for?

(Respondent): Mainly school, and reports.

When asked what life would be like without technology, one adolescent responded:

I think it would be harder because, uh, I'd have to look through books to, to get information, whereas you can just type in, "I want this," and it will pop up right away whereas you have to walk through all the books to get [it].

Accessing Other People

Adolescents universally reported using technology to access other people. They reported using several different types of technology for this purpose, and most frequently listed friends and family as the people they access. The major draw for adolescents to this type of communication appears to be the ease with which they can stay in contact with others. Some examples:

You can just communicate with people. I like talking to my friends and, um, getting to know people. And it's easy to get a hold of my family.

Um, I can email em' so I can talk to them that way. I can instant-message them talking that way. I can call em' on the phone, so if they're really far away I can talk to them even if I can't drive to them to talk to em'.

I can stay connected to my friends at any time.

...I can talk to people and you can talk to your friends that live far away.

It's the only way I can pretty much talk to my dad, cause he's in Virginia, or overseas. He's in the Navy so he moves around a lot.

Um, like, if you're talking to somebody far away, like cause I had an exchange student from South Korea, I email her, and it's really cool that you can talk to somebody that far away.

Some adolescents reported that technology allowed them to communicate more frequently or at a more interactive level than face-to-face communication.

I'm really shy at school so I don't talk much, but if I can talk to my friends on the computer that's fine.

I feel more comfortable talking on IM sometimes than on the phone.

None of the respondents stated that they use technology to meet new people, but reported using technology to increase the quantity and quality of interactions with people they know “from the real world.” Many adolescents commented that using technology to talk with strangers was dangerous or undesirable, and not common. As one student reported:

Talking to people online is good. Well, sometimes it's bad, if you get on and like, talk with strangers who are way older than you.

Several students stated that meeting strangers online was not desirable, but none reported actually meeting new people online, and only a few reported that they knew a person who had. This may be an indication that adolescents have been sufficiently warned of the dangers of online predators, and are behaving in ways that protect them from these potential threats, or that they were giving the socially acceptable answer.

Accessing New Experiences

In addition to accessing people through the use of technology, a number of students discussed accessing experiences that they are not able to in the real world. Sometimes this was temporary and adolescents reported using simulation to partake in activities only until they could engage in them in real life.

(Respondent): I play sports games. I play golf.

(Interviewer): Do you play in place of doing it for real?

(Respondent): No, I do it for real too. It's just in the winter when I can't play golf outside.

Some students reported that they use simulation type video games to engage in activities that are similar to activities they enjoy in the real world, as this student who enjoyed horseback riding:

I used to, when I played computer games a lot, I used to have a horse jumping game, cause I've always wanted to jump.

Students reported being able to engage in simulations of activities that they would not be allowed or able to do in the physical world.

I do play like racecar games and stuff. Racecar games, like NASCAR and Hot Pursuit and stuff like that. Things I would never really do.

It feels kind of cool because uh, like if you wanted to go blow something

up or something, you can't do that in real life. And in the video game, it doesn't matter, nobody is gonna get mad at you.

...the only video game I've played in the longest time is an ATV game, but even then it's like, uh...and that's something I'd never do in real life, some of the things I do there are just crazy.

It appears that adolescents are accessing experiences through technology that they either do not have access to in the real world, or choose not to engage in outside of this technology. It can further be inferred that since they are choosing in which realm (virtual or real) to engage in these activities, that they are fully aware of the differences. No respondents reported gaining real world skills through virtual experiences.

Implications of Access

Many adolescents have concerns regarding the safety and potential risks that accompany technology assisted access. By far, the biggest concern or danger reported by adolescents in this study was accessing pornography. The adolescents were asked several questions that elicited responses pertaining to this topic, including “What concerns do you have about using technology?” and “Do you think there should be rules about what middle school kids can do on the computer?” Respondents were eager to warn others against the use of technology, mainly the internet, for accessing pornographic material, but did not report accessing this type of material themselves. This could indicate that they actually are not accessing it, or that they are not willing to admit to accessing it.

I do [think adolescents should be limited as to what they can access online], cause some look at nasty stuff that they're not supposed to be looking at.

They should limit like [social networking sites] and chat rooms and stuff. And any things they can look at like inappropriate pictures and things.

Don't let em get on like "messed up" websites, I don't do that, so...

A second major concern for the adolescents interviewed was online predators. Several students reported that parents and adolescents should be on the lookout for older strangers engaging them in chat rooms and on social networking sites. Many students spoke to the importance of limiting the personal information that is shared online, and expressed concern for friends and schoolmates

about the amount of information shared and the potential for predators to find them in real life.

(Interviewer): What ways are good to be safe, do you think?

(Respondent): Not put much information about yourself on the computer, yeah, and not talking to people you really don't know that are like, older than you.

And:

There's people who can hack onto [social networking site] and I'm afraid my friends might give away personal information.

And:

I don't have any concerns, cause I don't give out any of my information, but like a lot of my friends put way too much information on there. Yeah, like where they live and how old they are, and what their address – I'm like, nuh-uh.

Some activities and technology types, such as chat rooms, were viewed negatively due to the potential of encountering an online predator.

Chat rooms are out, cause like the chat rooms, you can be talking to someone who's like a criminal...

They should limit like [social networking site] and chat rooms and stuff. And any things they can look at like inappropriate pictures and things.

Although students reported concern over online predators, most felt that they had the maturity and knowledge to protect themselves from any threat, and that they didn't need much oversight from adults. They did voice the need for adult oversight for younger kids. Researchers discovered after data collection that one of the schools had held a school wide training on internet safety and online predators prior to the interviewers arriving at the school. It could be the case that although respondents were able to reiterate the warnings they had heard during this training, they had not identified themselves as being potential victims. Instead, most of the concern was for younger children. Adolescents often expressed that children younger than themselves should be protected from violence, mainly in the form of video games. Most reported that they were mature enough to understand the difference between the "pretend" violence in the video games and appropriate behavior in real life, but were worried about what exposure would mean for younger kids.

I think it'd be ok for like older people, but for like ten or twelve year olds, and nine year olds, it wouldn't be good cause they'd like go and and do – try and be like what the games are.

One worldly adolescent said, when asked about the necessity of rules:

I don't know, cause like um, for little kids yeah, but once you get to my age you've pretty much seen most of the stuff anyway, like if a movie's rated R cause somebody gets shot, but it's not like you're doing really sick stuff. Kids watch those movies anyway.

And another adolescent who was noticeably small in stature said:

Cause if you're really young you shouldn't play a game that has a lot of blood or, cause it's probably not good for some small, little kids to get interacted with that that early.

It is apparent that adolescents are aware of the concerns surrounding technology use, but are more likely to identify the potential victims of these dangers as younger children, or friends who participate in “riskier” activities online. None of the participants reported ever being in any actual danger due to their online behavior, or reported feeling that their online behavior was putting them in jeopardy.

Discussion

Adolescents today were born into a world of technology. They have no firsthand knowledge of life without the internet, and universally report using multiple forms of information technology in their daily lives. Adults have a universally different life experience, and view technology as a new media, not a constant presence in the world the way adolescents do. Because of this, it is important for parents, educators and policy makers to learn what adolescents are actually using, and in what ways they are using it.

The data presented here indicates that adolescents are using all types of technology, with a preference for the latest (newest) forms, and for the forms that allow communication. What forms of technology and the locations where these are used appears to be dictated by the purpose of the use, and rules and regulations imposed on their use. For example, adolescents reported using online video games at home, since the greatest benefit of these types of games is the ability to play with people who are not physically present. Adolescents also report using computers at school most frequently for school work and less frequently for accessing social networking sites or instant messaging, since these activities are banned or blocked at school. Students reported that their favorite type of technology is not necessarily the one they use most often, indicating that purpose and regulation play a more dramatic role in their technology use than preference.

Adolescents appear to greatly value the ability to use technology to access information, but reported mostly using this ability to assist them with school work. Other studies have shown that adolescents are accessing information related to health concerns and other topics, and although not directly asked about this, adolescents in this study did not report using the internet for this purpose. Adolescents in this study reported the main purpose of their technology use as connecting with friends and family. They did express concern about other adolescents

communicating with strangers and possibly being in danger, but none of the adolescents in this study reported using technology to meet new people or meeting in person anyone that they had met online. This could indicate, if taken at face value, that adolescents are engaging in safer online behaviors than adults fear. It also could indicate that students are unwilling to share their unsafe online behavior with adults, or that they don't realize that what they are doing is unsafe. As mentioned above, it was determined, after the conclusion of the interviews, that at least one school had offered a school-wide training on online danger and online predators.

Some students also reported learning about online dangers from a popular television show that filmed potential predators being arrested after attempting to make contact with children they had contact with online. Adolescents are aware of the potential dangers of technology use, but do not appear to view themselves as potential victims of these pitfalls, instead attributing these potential risks to younger children or friends who engage in online behaviors with more inherent risk, such as using chat rooms or posting personal information on social networking websites. Although it is unclear if adolescents are actually behaving in a safe manner online or are only reporting that they are, it is undeniable that they are aware of the potential dangers of meeting strangers online and of posting identifiable information on the internet.

The implications of this research may be most relevant for educators and parents, but is also important for Social Work practitioners and researchers. Social Work practitioners who work with adolescents and their families are going to need to have at least a cursory understanding of the types of technology adolescents are using to be able to understand the systems in which these clients interact. Adolescents may also be seeking to engage with helping professionals through digital mediums, and will gravitate towards those opportunities as they

become available. Social Workers need to ensure that they are part of this new form of treatment in order to provide optimal care and to reduce the use of less regulated forms of help.

Professional standards for using technology in social work practice were established in 2005 by The National Association of Social Workers (NASW) and the Association of Social Work Boards (ASWB) (NASW, 2005). However, with the rapid changes in technology now occurring, it is likely that these standards are in need of review and revision. Adolescents also have a greater access to information about their development, health, and mental health through use of the internet than they have in the past, requiring Social Workers to be aware of the resources and be able to discuss them with young clients.

Social Work researchers may be impacted by the upsurge in adolescent technology use in a couple of ways. First is the opportunity to explore this new area of inquiry, and to increase the knowledge base surrounding adolescent technology use, especially the potential benefits and risks. Secondly, researchers who wish to engage adolescents as research participants may want to consider technology assisted data collection methods to increase participation rates and data validity, mainly due to the comfort and ease with which adolescents interact with others using technology.

The pervasiveness of technology in the lives of adolescents creates a noticeable need for policy that protects them from danger, and also makes this task quite daunting. Limiting adolescent access to the internet and the potential threats to their safety may be unrealistic considering the plethora of ways they access the internet, including not only stationary devices like home computers, but also mobile technologies such as smart phones and tablets. As shown above, adolescents are accessing technology from many different locations, including home, school, friends' homes, and everywhere in between. Creating policies that limit this access would

need to be multi-faceted, and more strictly enforced than what is probable. Focusing policy on education, of adolescents, parents, teachers, and others, may be more influential at protecting adolescents from online dangers, including sexual predators and harmful information. The unique circumstances of this generation, where parents are less educated and knowledgeable about technology, is a temporary one. As the “Net Generation” matures into adulthood, they will be more equipped to support and monitor their children’s technology use. This must be taken into account when creating any policy and policy must be constantly updated to reflect the changing capabilities of the children and adults involved.

As this study demonstrates, technology use is nearly universal among American adolescents, and there is no indication that this use will diminish. Adolescents frequently see their technology use as a strength, and value what it contributes to their lives. Most adolescents have no desire or incentive to reduce their use of technology, or see any reason to in the future. It is imperative to Social Workers, parents, and anyone else working or interacting with adolescents to adopt a strengths-based, proactive approach to technology use in order to maximize the potential benefits and limit the potential dangers to adolescent safety and development.

Limitations

The nature of this study and the adolescent population studied presented some unique challenges and limitations. The qualitative nature of the study focused on documenting the adolescents' own interpretations of their experiences with technology. However without some form of observation it is impossible to determine the relationship between what adolescents reported doing online and what they are actually doing. This is further complicated by the fact that adolescents were asked to recall past behaviors as well as current attitudes, and it can be noted that recall often leads to inaccuracy. It is also possible that the adolescents in the study viewed the researchers as persons of authority, and therefore were inclined to provide socially desirable answers or omit information that they felt may have gotten them in trouble. Future research may benefit from having peer data collectors or utilizing another form of data collection that would be viewed as less intimidating to the study participants.

The current rates of innovation and introduction of new technologies also create a limitation when researching this topic. Some of the forms of technology and specific technologies used by adolescents in the study were replaced by newer, more "popular" ones, even before the study was completed. For example, MySpace was a commonly reported social networking site used by the adolescents in this study. Before the completion of the study, anecdotal information received by the researchers indicated that many adolescents were leaving MySpace for Facebook, another social networking site, which was previously only available to college students. The rapid nature of change in the currently available technologies makes study in this area very time sensitive.

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CHAPTER 4: TECH TALK: TECHNOLOGY ASSISTED COMMUNICATION AND THE NET GENERATION

Abstract

It has long been believed that face-to-face interaction is the preferred method of interaction as it supports the development of stronger relationships and social skills. However, data collected via semi-structured interviews with 128 eighth grade students in the Midwest, illustrate that adolescents believe that Technology Assisted Communication (TAC) not only does not inhibit, but in many ways strengthens, the development of relationships and social skills. Many subjects reported using TAC to assist with difficult interpersonal interactions, and some even stated that TAC was the preferred method of communication when dealing with a difficult situation, as it allowed them more time to think and respond as compared to face to face interactions. This paper looks at how adolescents balance virtual and face to face communication, and how technology can act as an aid in interpersonal interaction, including maintaining long distance relationships and assisting with difficult conversations and interactions. This manuscript also explores “tech-language” and the notion that adolescents are developing a new language, rich in tone and inflection, and discusses implications of these findings.

Introduction

Early adolescence (ages 10-14) is a time of tremendous growth and change (Steinberg, 2005). During this period adolescents strive to differentiate themselves from family and create their own unique identity (Erikson 1963, 1986; Geldard & Geldard, 2010). To do this, adolescents focus on developing peer relationships (Adams, Santo & Bukowski, 2011), and practicing social skills within groups of friends (Judd, 1967; Laursen, 1996; Fitton, Ahmedani, Harold & Shifflet, 2013). Today's adolescents are relying heavily on technology to facilitate these peer interactions and incorporating their online activities into their emerging personal identities.

Adolescents are now, and historically have always been, the first group to accept and incorporate new media and technology into their lives. This easy acceptance of new technologies has been viewed as a possible threat to young people, dating back to the turn of the twentieth century and the invention of the radio and introduction of films (Quigley & Blashke, 2003; Wartella & Jennings, 2000; Davis, 1911; Wartella & Jennings, 2000). As with television, film, and radio before it, the most recent advances in media and technology (computers, internet, and cell phones) have readily been adopted by adolescents. In fact, more than 94% of adolescents are now "online," or regular users of the internet, and more than half use it every day (Patchin & Hinduja, 2010, Lenhart, 2009, Madde, Lenhart, Duggan, Cortesi & Gasser, 2013). With the current proliferation of mobile internet devices and wi-fi access points, this use can be expected to increase even further. This transition to a "wired" or "wireless" world has undoubtedly had a tremendous impact on adolescents, as they are now the most proficient and frequent users of information or interactive technology (IT) (Bryant, Sanders, Jackson & Smallwood, 2006;

Mikami, et al, 2010; Lenhart, 2009; Lenhart, Rainie & Lewis, 2001; Lenhart, Madden & Hitlin, 2005; Seal-Wanner, 2007; Valkenburg & Peter, 2009).

Concerns over the negative impact of technology and media have historically included the risk of increased violent or sexual behavior in children, decreased cognitive ability, increased behavioral problems, decreased educational outcomes, and increased health risks, including obesity and heart disease resulting from more sedentary living (Davis, 1911; Mitchell, 1929; Blumer, 1933; Lundberg, Komarovsky, & McInerney, 1934; Eisenberg, 1936; Gordon, 1942; Schramm, Lyle, & Parker, 1961; Watkins, 1987; Robinson, 1999; Straker & Pollock, 2008; Vandewater, Shim, & Caplovitz, 2004). An additional concern with the more recent technological advances is that adolescents are not learning and practicing appropriate communication and interpersonal interaction skills, and are instead creating superficial relationships with others through the use of technology. The public opinion is that adolescents (as well as increasingly younger children) are more isolated than previous generations, and that they lack the ability to hold deep and meaningful conversations or to develop lasting and appropriate relationships (Nie, 2001). This notion, sometimes referred to as the “displacement hypothesis” (Kraut, et al, 1998), because it assumes that adolescents are displacing face to face interaction with friends, with virtual interaction with strangers, has only recently been challenged by the research community, with surprising results. Using online communication, such as email, instant messaging, and texting with people who are known to the adolescent, is positively correlated with increased closeness and quality in these relationships, as reported by the adolescents (Blais, Craig, Peplar & Connolly, 2007; Valkenburg & Peter, 2007). Research that actually incorporates the adolescent viewpoint into the methodology is rare, but increasing (see the work of Jackson, Yong, Kolenic, Fitzgerald, Harold, & Von Eye, 2008) but very necessary to

truly understand the breadth and depth of adolescents' technology assisted communication and how they are using it to enhance their relationships. Bronfenbrenner's Ecological Model of Child Development states that the interactions children have while growing up have major impacts on the identities they develop. It is therefore important for social workers to understand the types of interactions adolescents engage in, and how these interactions are impacted by emerging technologies. This paper focuses on the question of how technology is changing the ways that adolescents communicate and interact with people in their social environment?

Method

Sample and Design

This qualitative study was a part of a larger project funded by the National Science Foundation (Jackson, et al, 2008). The sample included 128 middle school (eighth grade) students who attended one of four Midwest middle schools; 50.8% of the interviews occurred at a suburban school, 21.9% at one rural school (A), 15.6% at another rural school (B), and 11.7% at an urban school. The only demographic difference between the schools was race. The urban school sample included students that were 51% white, 32% black, and 10% Hispanic. The three remaining school samples were all at least 95% white. Of the 128 students, 42% (n=54) were male and 58% (n=74) were female. Participant recruitment was ended after the receipt of exhaustive descriptions indicating saturation.

Interviews took place over a three-month time period. Interviewees consented to have their interviews recorded with digital audio recorders prior to the beginning of each interview, and were asked a series of questions using a semi-structured interview protocol that included types of technology used, preferences, concerns about technology use, and inter-relational aspects of technology use, and had been piloted by all the interviewers with non-subject middle school aged teens. Individual interviews lasted from 10-30 minutes, and took place at the adolescents' own school. All four interviewers were Master's or Doctoral level Social Workers, and trained in research methodology and qualitative interviewing. To understand the adolescents' own perceptions of the impact of technology on their development and daily lives, this qualitative, phenomenological, semi-structured interview was utilized also allowing interviewers to provide prompts and further explore topics of interest.

Coding

To code the qualitative data, theoretical classes were developed based on the questions included in the interview protocol. A small number of initial interviews were reviewed by each member of the research team individually, and then as a group, and used to develop a set of categories for each class. Categories were identified based on the prevalence and frequency with which they appeared in the data (each category chosen for further examination had to appear within the data collected from more than just a few respondents, although a minimum number of appearances was not established for inclusion), and the consensus among the researchers of the contribution the category made to understanding the phenomenon of adolescent technology use for communication and interpersonal interaction. This process, described as conceptual coding (Altheide, 1987) allowed each researcher to remain open to ideas presented by the adolescent and, as a group, to develop consistent categories for data analysis. The *characteristics* of the particular categories and their *connecting themes* are a result of an interactive process between the researchers' initial hypotheses and the meanings of the various classes and categories given by the student participants (Berg, 2007; Lofland & Lofland, 1994; Ahmedani, Harold, Fitton & Shifflet Gibson, 2010; Fitton, Harold, Ahmedani & Shifflet, 2012). This coding work resulted in a coding frame that allowed for each transcript to be coded, and also for text to be coded in multiple categories if it pertained to more than one theme (see Appendix A; Coding Categories Table).

Analysis

Descriptive statistical content analysis was performed on the data using SPSS 15.0 software and Microsoft Excel 2007. Qualitative analyses were completed using NVivo 9.0 software (QSR, 2009). Data analysis was guided by the framework of grounded theory (Glaser &

Straus, 1967). Grounded theory relies on capturing the research participants' lives, thoughts and feelings through the telling of their stories. It also places the researcher in both the data collection and analysis, resulting in the analysis helping to shape the data collection methods that are utilized (Glaser & Straus, 1967).

Validity and trustworthiness (Johnson, 1997; Marshall & Rossman, 2006) were addressed in several ways in this study. An audit trail was created, maintained, and centralized throughout the study process. This was a particularly key element toward the trustworthiness of this project, as four researchers needed access to the most updated and accurate study elements without jeopardizing the integrity of the data.

The study was designed for maximum data gathering from extensive researcher discussion and brainstorming during the building of the interview questionnaire. Extensive pre-planning created commitment and investment by all researchers to the purpose, rationale, and building of the study. Each researcher tested the interview instrument with a middle school aged student prior to study implementation to assess each interview question for clarity. Every researcher participated in the interview process, kept personal notes and reflections, and debriefed after each round of interviews. Data analysis was strengthened by researcher triangulation and the full participation of the four researchers (Johnson, 1997). The trustworthiness of this study rests in its significant sample size and the investment, cohesion, and consensus of multiple researchers/coders through the process of training and peer debriefing. Coding, analysis, and reporting utilized extensive direct quotation, a low inference descriptor method (Johnson, 1997). This method allows for the actual voices of the research participants to be the focus of the analysis and reduces the influence of bias on the part of the researcher.

Results

Technology Assisted Communication (TAC) and Adolescent Preferences

The first step in understanding how adolescents are using technology to communicate and develop/maintain relationships is to investigate what types of technologies they are using for these activities. Adolescents in this study were asked what types of technologies they used “for communication.” They reported using the computer (100%), e-mail (84%), cell phones (84%), instant messenger (73%), video games (including online games such as Xbox Live, etc)(84%), and social networking sites (59%) for communication purposes (It should be noted that at the time these data were collected in 2009, adolescents were just beginning to engage with Facebook, a now very popular social networking site among adolescents. It is assumed that the rates of social networking site use are now even higher). Also, some of these types of technology are used to communicate in several ways. For example, the computer is used for emails, instant messaging, and social networking sites, as well as for information gathering and production.

The form that TAC tends to take is highly dependent on the media/technology used. For example, cell phones are used for verbal communication and texting, while video games are used mostly for cooperative play and the accompanying communication which mainly focuses on game play. In addition to what types of technology they used, adolescents were also asked about their favorite technologies. Adolescents reported that their favorite technologies were the ones that allowed them to communicate with others. In fact, 70% reported that their favorite form of technology was one that could be used for communication (including cell phones, computers, the internet, social networking sites, instant messaging and texting). Adolescents were also asked what types of technology they used most frequently. Fifty-one percent of respondents said that

they most frequently use a form of technology that allows for communication (cell phones, computers, etc.) Television and mp3 players were also reported to be used most frequently, at 22% and 18%, respectively. Many students reported having the television or mp3 player running in the background while they were engaged in other activities, for example listening to music while texting with friends.

When asked to rate how helpful technology was in helping them communicate on a 1-5 Likert scale, with 5 being extremely helpful and 1 being not at all helpful, the median response was 4.27. The fact that adolescents so strongly like and use technology for communication is apparent, and since they are the most active users of new technologies, may account for the current popularity of social networking sites and interactive technologies such as text messaging and instant messaging.

Adolescents routinely report that technology increases the ease of communicating with others and allows them to communicate with others over great distances, in essence broadening their social circle and reducing or eliminating physical location as a barrier to communication and interaction. As one student who lived in a rural area stated:

And that's because, to communicate you have the internet, cell phone and all that, so basically you don't have to leave your house to communicate over long distances, it's just a lot easier.

This is true for people who live far away and for people who are temporarily away:

Yes because we can keep in touch, maybe when they're away or something, like in a different state.

I'm going away for two weeks and I'm not gonna be able to see any of my friends who I IM [instant message] all the time, that'll help us keep in touch and so that'll be a lot better.

Students reported appreciation for being able to maintain contact with others whom they would not be able to without technology. For example:

I had an exchange student from South Korea, I email her, and it's really cool that you can talk to somebody that far away.

Some students also reported being able to maintain communication with family members through TAC. This communication with family members included not only distant family, such as grandparents and cousins, but also members of the nuclear family, including absent parents:

Uh, it's the only way I can pretty much talk to my dad, cause he's in Virginia. Or overseas. Yeah, he's in the Navy, so he moves around a lot.

When asked what life without technology would be like, one adolescent responded:

Really boring, and I wouldn't talk to my mom, ever.

Students also discussed having interactions and relationships with more people through the use of technology:

Um, I guess it would be more isolated than it is now, and there wouldn't be any – as much communication outside of the family.

Adolescents also reported that they were able to multi-task in their communication through the use of technology:

Cause you can talk to more than one person at a time.

Or with this example about gaming:

Cause you can play it with a whole bunch of friends, and you can play with four people instead of two people like (other games)...

Cause there's so many things you can do on it, you can do your homework and talk to people at the same time.

Some respondents talked about specific modes of communication available to them through the use of technology, such as sharing pictures, websites, music, etc.

It'd be a lot different (if I didn't have technology) because I wouldn't be able to talk to my friends on the phone every day or text them or like, send them pictures online or email them. It'd probably be a lot different cause you'd be a lot more limited in what you could do...

Adolescents reported one of the strengths of TAC as the ability to communicate and interact more frequently with others, including their peers and family members.

Cause we get to talk more, like in school we only get five minutes between classes, that's enough to go to the bathroom, get our stuff and get to class, we don't really get to talk that much.

You can talk to 'em about more stuff, you can talk to 'em more. Without internet, cell phones and computers you wouldn't be able to talk to 'em as much.

I used to have Xbox live and I'd play with my friends, like my cousin lived in South Carolina, and we'd play Xbox live, we'd play on that and we'd talk to each other, and sometimes my friends come over and we play in the same room, and that's pretty much what we do. And then we go outside.

Respondents routinely spoke to the ease of using technology to communicate, and to the ability to communicate more regularly with more people. As adolescence is a developmental period marked by strong reliance and appreciation for peer interaction, it is easy to see why anything that affords more of this would be readily embraced by adolescents.

Tech Talk- Understanding Tone in Text

One of the most frequently voiced objections to adolescent technology use is that by relying so heavily on TAC, adolescents are not developing language skills, including the ability to understand tone and inflection (Nie, 2001; Nie, Hillygus & Erbring, 2002). It is assumed that without interpreting verbal communication along with other non-verbal cues (such as eye contact and body language) adolescents are missing a large part of what is included in communication. From the viewpoint of the adolescent, however, there is little difference between face to face communication, verbal communication that is not face to face (talking on the phone) and text communication (text messaging and instant messaging). Participants routinely classified all of these types of communication as “talking” and were often unable to rate one over another, even when pressed by the researchers. One example came from this student, who rated technology as extremely helpful with communication:

Because you can like talk to everybody on the computer and phone.

Another student, when asked if technology helped her to have better relationships with friends, said:

Yeah, cause we can talk more with instant message and stuff.

Adolescents appeared to be able to carry on conversations with as much tone and inflection as they do in face to face communication. Many of the activities and emotions we associate with face to face verbal communication (such as laughing and feeling “together”) were described as happening during TAC:

When asked why she liked text messaging, one female student responded:

Because we're having fun, like giggling or something like that.

And another student stated:

So we can talk more and we're not always apart.

One of the researchers reported an experience that informed this issue while having a text conversation with an adolescent outside of the study, but during the data collection phase. The researcher had recently purchased a new cell phone that autocorrected text messages (corrected spelling, spelled words out when an abbreviation was entered, etc.). The researcher sent a message asking a simple question to the son of a friend, a 14-year-old adolescent. The adolescent responded by asking if the researcher was mad about something. The researcher replied that she was not mad, and asked why he thought so. The adolescent initially stated “I don’t know, you just sound mad.” After further conversation it was discovered that the adolescent had interpreted

the fact that all of the words in the message were spelled out, instead of using “text shorthand,” as an indication that the researcher was angry. This interpretation was not accurate, yet indicates that adolescents may well be interpreting tone and inflection in text communication, and are doing so without thinking about it, as others do in face to face communication. Data collected support this idea, as adolescents routinely reported that there was little difference between text, audio, and face to face communication. It does, however, raise the question of how adolescents check out their assumptions of tone and meaning. Do they routinely ask friends about these assumptions as the adolescent did in the above example, to avoid miscommunication? Is this something that could be done as easily using IT as it can be done in person?

Balancing Face to Face and Virtual Communication

Adolescents reported many of the same activities using TAC as they did for face to face verbal communication, however, when asked directly if TAC helped them have better relationships, a few students reported that it did not help. TAC was more frequently viewed by adolescents as having a positive impact on their lives and a support in developing relationships, but not universally so. One student, who stated that he did not feel that TAC helped him have better relationships with friends, explained:

Nah, uh, physically being in the same room and talking would be better for it.

I mean I have a better relationship when I'm talking to them, physically talking to them, than I do when I'm on the internet.

It seems that although adolescents view TAC as “talking”, many still value face to face interactions over other forms. In fact, many students reported using TAC as a means to facilitate face to face communication (by making plans to meet, for example), or only using TAC when face to face interaction is not possible.

Like, computers, [for communication] for somebody I don't see every day, and email...

One student reported using technology to communicate mainly with people they didn't interact with face to face:

Yeah [I use technology to communicate] if it's somebody far away that you can't see every day.

One student discussed the benefits of using technology to plan and facilitate face to face interaction:

Like the phone, it would be harder to make plans and have people over for dinner, it would be hard to confirm plans.

We can communicate with 'em, tell each other what's going on, make plans, that's really it.

TAC as a Support for Interpersonal Communication

Some of the respondents indicated that TAC was the preferred method of communication in difficult situations, or that they saw the greatest benefit of TAC being the assistance it offered them in dealing with troubling situations where face to face communication would be difficult. These situations ranged from simple shyness to arguments with friends. Adolescents in this study frequently reported that they used TAC to talk to friends who they were having an argument with, or to clear up misunderstandings with friends when they could not engage with them face to face. Students did not report using technology to avoid difficult situations, but instead reported using it as an aid to work through them.

Because if something bad happened to me that day, then I could turn around and talk to them, or if we got in a fight I could call them or something.

Several students discussed being more comfortable using a form of technology for communication, or using one form over another:

Yeah because I'm like afraid of talking on the phone, I don't know why. I feel more comfortable talking on IM sometimes than on the phone.

[When asked how they felt while using technology]: *Happy if it's my friends I'm talking to, I'm really shy at school so I don't talk but if I can talk to my friends on the computer that's fine.*

Discussion

It is apparent from the data presented that adolescents are consistently and continually using technology to communicate with other people. They use TAC to interact with family and friends, both when face to face communication is not possible, and when it is, to enhance, or at least increase the frequency of interactions. Adolescents are using computers for instant messaging, emailing, and chatting, and cell phones and other mobile devices for verbal communication, texting, emailing, and video chatting. They report that this communication occurs overwhelmingly with people they know in the actual world, and that interaction with people that they only “know” virtually is rare and undesirable. Most, but not all, adolescents spoke highly of the ability to interact with friends and family through technology, and believed that it helped to enhance these existing relationships. It is important to note that this developmental period is marked by strong desires to connect with peers and develop individual identities separate from the immediate family (Erikson 1963, Geldard & Geldard 2010). Adolescents, who often view technology as a powerful tool in maintaining relationships with friends, will be drawn to technology in part due to their developmental stage and the importance of peers during this life phase.

A surprising finding of this study was the fact that adolescents are using technology to maintain and enhance relationships with family members as well as friends. Many students reported using technology to communicate with family members, and a few indicated that without technology, they would not have a means of communicating with family members, including parents with whom they do not live, such as the student who discussed being able to stay in contact with the father who was deployed in the military. Another said that she would not be able to communicate with her mother at all without the use of technology, due to the fact that

her mother lived several hours away. Because technology has historically been viewed as causing isolation from the family, it is important to note that in some situations it actually is being used to increase cohesion among families. Many students also reported using technology to communicate with parents who were at work or unavailable physically, and reported that this communication allowed their parents to “keep better tabs” on them while they were out of the home. One example that illustrates this is “checking in” with parents via text messaging while out with friends or attending after school activities.

Previous generations have viewed face to face communication as the preferred, if not only “real” form of communication. Members of the “Net Generation” in this study appeared to place a high value on face to face communication, but also found great merit in Technology Assisted Communication, in that it offers the opportunity to increase the frequency of interactions. Respondents also reported that in some situations, TAC was the *preferred* method of communication, as it offers them more time to formulate responses and consider others’ feelings and positions. Some respondents stated that the pressure of face to face communication in difficult circumstances (such as during an argument with a friend) could be alleviated by using email and text, and that TAC allowed them to take time to hear the concerns of others and really understand their feelings, as well as take time to craft responses that were not hurtful and brought the difficult situation to a satisfactory conclusion. No respondents discussed any issues with misinterpretation of text communication, which was surprising to the researchers. This may be another indication that adolescents are able to perceive nuances in text communication at a level higher than previously thought.

Data from this study also indicate that adolescents are able to, or are at least attempting to, perceive tone and inflection in text based communication. Adolescents did not report any

trouble in understanding text based communication, although the researchers did discover an example of misinterpretation between an adolescent and an adult during the course of the study. It may be the case that adults are less adept at interpreting text based communication than adolescents are, due mainly to the fact that adolescents are more frequent users of this type of communication, and have grown up using it in conjunction with face to face interaction. This phenomenon may be creating or widening a language gap that exists between adolescents and adults. When today's adolescents lament "parents just don't understand," they may be right.

Implications

The current levels of technology use for communication among adolescents have many possible implications for social work practice. Technology Assisted Communication (TAC) is allowing adolescents to interact with more people, more frequently, over greater geographic regions, thereby greatly expanding the social and familial networks of these youth. Social Work practitioners who work with adolescents need to adjust their views of the make-up of social networks to include those who interact with the adolescent client through technology. One example is including absentee parents in the family system if the adolescent has access to the parent through technology. Adolescents report using TAC to maintain and enhance interpersonal relationships, and to maintain friendships and family relationships over time and distance. It will become more prevalent in the adult population as well, as the “Net Generation” grows into adulthood. Social work professionals need to recognize and value these interactions as meaningful to the adolescent, and impactful to their development and well being.

Another impact on social work practitioners will be the increased desire for adolescents to interact and communicate with them using technology. As adolescents have reported that they often find it easier to use TAC than face to face communication for difficult situations or tension producing conversations, it is reasonable to assume that this will carry over into communications with social workers and other helping professionals. Not only will practitioners working with adolescents need to be able to accommodate these requests, in order to develop a professional client relationship, but agencies will need to develop policies to ensure that client confidentiality is maintained and appropriate training is available to practitioners. Professional standards aimed at providing guidance to social work practitioners, such as *the NASW and ASWB Standards for Technology and Social Work Practice* (NASW, 2005) will need to be reviewed and updated

frequently, in order to keep up with rapidly emerging new technologies and technology related activities.

It is also important for social workers to recognize the fact that adolescents place a high value on being able to access others much more frequently through the use of Technology Assisted Communication. Many adolescents in this study reported that they have better relationships when they are able to communicate with others more frequently. Social workers, who interact with adolescent clients through technology, at least in part, may be seen as more accessible by adolescent clients. Increasing the ease and frequency of communication with adolescent clients through TAC may enhance the trust adolescents place in helping professionals and allow the therapeutic relationship to develop more quickly. It will also force the profession to reexamine the issue of boundaries as TAC transcends some of the traditional time and space boundaries. This is an important challenge for the profession and for individual practitioners to tackle. It is also in stark contrast to the current model of many social work interventions and agency policies, which limit interaction to set appointment times and to face to face communication occurring within those times. The Social Work Profession needs to begin to revise these practices and policies to accommodate adolescents' preferences and behavior. If adolescents do not feel "connected" to professionals, they may turn to other sources of support and information available on the internet, which may or may not be helpful.

This study indicates some implications for social work research as well. In many cases adolescents prefer to use Technology Assisted Communication, and these preferences can easily be accommodated with currently available technologies. More research is needed to better understand the nuances and depth of this form of communication, and to better educate adults who interact with adolescents on how to effectively communicate with adolescents using these

new media. Research with adolescents will need to incorporate technology, both in conceptualization and in data collection. Adolescents in this study reported that they often prefer to use some form of technology when discussing topics that make them uncomfortable. Using this finding to inform research methods and data collection will yield higher levels of validity when conducting research with this population. Research and policy development will need to be a continuing process, as the current situation where adolescents are more frequent and capable users of technology, is unique to this generation, and can be expected to change dramatically over the next twenty years, as more tech savvy adolescents mature and become parents themselves.

There are two major implications of this research for social work educators. First, social work students need to be trained in how to incorporate technology into their practice. This may include best practices for communicating with clients via email and texting, applicable laws and policies regulating these forms of communication, and broadening the understanding of a client's social networks to include relationships that occur virtually, either partially or in total. Second, social work educators must begin to prepare for students that belong to the "Net Generation" by finding ways to include technology in teaching methods. As the adolescents of today begin to enter college, they will expect to use technology, including computers and the internet, to assist their learning. They also may expect to be able to communicate with educators through technology, including email, texting, message boards, etc. Social work educators who are well versed in these methods of communication will be able to establish better relationships with students and provide learning environments more suitable to these students.

Implications for social policy are far-reaching. Efforts to limit the amount of Technology Assisted Communication among adolescents may be misguided, as this behavior is nearly

universal within this population. With the recent increases in mobile technology, policies that rely on parents and/or educators to limit or monitor technology use are likely to be ineffective. The immense numbers of people using the internet make it very difficult to regulate users, or even to find users that may pose a threat to children and adolescents. Policies and programs focusing on educating adolescents on internet safety may prove to be more effective, especially if they incorporate peer educators and technology in the delivery methods. Adolescents are accustomed to gathering information from the internet, so this method of information delivery could be very effective with this population. Adolescents in this study also reported communicating frequently with peers through technology. Policies that allowed adolescents to use technology to learn from peers about safe technology use may be more readily utilized by adolescents.

Limitations

Several limitations presented themselves over the course of this study. First, data were collected in a relatively small geographical region of the Midwest. It would be important for future research to incorporate adolescents from a much larger geographic area, especially in light of the fact that adolescents in the study reported interacting with people from all over the world. Another limitation relates to the speed at which new technologies are presented. Some of the technologies discussed by the adolescents in this study have undoubtedly been determined to be “out of date” or replaced since the beginning of data collection. For example, adolescents are likely to have replaced watching movies on dvd with online movie streaming services such as Netflix. Research in the area of technology at this period in time is hard pressed to keep up with technological advancement.

As with all qualitative research using adolescent study participants, it is difficult or impossible to determine how the behaviors that are reported correlate with the actual behaviors of the study participants without some form of observational research accompanying it. It is possible that since adolescents in the study viewed the interviewers as authority figures, they may have provided socially acceptable answers, or withheld information that they feared would get them into trouble. Future research using data collection methods that allow adolescents to be more comfortable disclosing may yield better results. Nevertheless, the adolescents in this study provided valuable insights into IT usage and its impact on their lives. This glimpse into their patterns of communication via technology provides a beginning place to push forward social work research, practice, education, and policy initiatives.

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CHAPTER 5: CONCLUSIONS AND IMPLICATIONS

Summary of Manuscripts

The preceding chapters have presented the findings of a qualitative study that asked adolescent study participants to share their viewpoints on how they use information technology (IT) and how it impacts their lives. A qualitative method was chosen in order to gain a deeper understanding of the impacts adolescents view technology as having on their lives and development. Quantitative efforts may be able to show the frequency and pervasiveness of technology use among this population, but are not suited to uncover the subjective experience of this phenomenon. This study did attempt to gather quantitative data to determine the level of use among the population, in order to provide a framework in which to view the qualitative findings. The study used a grounded theory approach to give voice to the adolescents themselves on a topic that is pervasive in their lives, as well as one in which they are the “experts,” having higher rates of use and a greater comfort level than any other age group. The study uncovered several findings about adolescent technology use that can inform social work practice, education, policy, and future research. Chapter 2 reviews the available literature on adolescent technology use, and discusses the reoccurring fears surrounding technology use and media exposure, as well as the lack of a strengths based perspective in the literature. Chapter 3 focuses on what types of technology adolescents are using, for what purposes, and how they see this impacting their lives and development. Chapter 4 explores how adolescents are using technology to communicate and interact with others, and the impact technology assisted communication (TAC) has on their social networks and personal relationships.

Quantifying Technology Use Among Adolescents

Researchers became interested on the effects of media and technology exposure as far back as the turn of the twentieth century (Davis, 1911; Wartella & Jennings, 2000). The earliest studies focused on radio programs and silent movies, and by 1911, 62% of 11-14 year olds were seeing at least one movie per week (Davis, 1911). Lundberg, Komarovsky and McNerny found, in 1934, that adolescents were spending as much as 10 hours per week with movies and radio. During the 1970's and into the 1980's, the focus turned to television. A 1985 study found adolescents to be spending 14 hours per week watching television (Timmer, Eccles & O'Brien, 1985). As did the previous researchers, this research team, made up of four Master and Doctoral level social workers, attempted to quantify the amount of time adolescents spend with technology. One of the most surprising findings of the study was that adolescents are not able to categorize their time between tech time and tech-free time. Technology is all encompassing in the lives of today's adolescents. Many of the technology activities adolescents engage in are sporadic throughout their day, and many activities are engaged in simultaneously. Adolescents send and receive texts throughout their day, spend a few minutes at a time checking their social networking sites, and have an mp3 player streaming music into their ears as they do homework or ride the bus to school. Today's adolescents are not able to report how many hours they spend each day engaged with technology because they are *always* engaged, either actively or passively. Adolescents in this study reported high levels of comfort using technology, and high levels of ability and skill. They have embraced mobile technology (85% reported having a cell phone) and use it to stay in constant contact with others. Adolescents use technology all day, and as some reported, even have music playing through their devices as they sleep. This generation was born into a technology driven world, and continues to stay "plugged in."

Technology and the Ecosystem Model

This study was guided by Bronfenbrenner's Ecological Model of Child Development (2001), which states that individuals reside within and interact with a nested framework of systems. These systems increase in size and complexity, and include the microsystem, which includes individual interactions with the immediate environment, the mesosystem, which involves relationships between contexts, the exosystem, involving systems that impact development indirectly, and the macrosystem, which relates to the larger culture, and the broader values and practices of society (Bronfenbrenner, 2001). This study initially posited that information technology and media would be represented as a new and evolving system with which adolescents interact. Findings from the study demonstrate that not only can technology be mapped as a unique system of interaction for adolescents, but that it is also incorporated into each and every existing system within an adolescent's environment. On the micro level, adolescents reported interacting with immediate family and friends through technology. On the meso level, adolescents discussed a broad social network that included distant relatives and relationships that span great distances, interactions that would be greatly diminished or non-existent without the assistance of technology. Examples of technology impacting the exosystem include the many ways adolescents incorporate technology into their learning, both in and out of school. Technology was also found to be present within the macrosystem, as adolescents view technology as part of their culture, and a universal attribute of their lives. The adolescents in this study demonstrated that their interaction with and use of technology does not exist within a unique and closed system, but rather permeates each and every system within which they exist, i.e., it is both a system with which they interact, as well as a means they used to interact with every other system that impacts their lives. This increased interaction between systems may

represent a “breaking down” of the boundaries between these systems, replacing the pre-existing rigid lines between them with more blurred ones. Technology allows individuals to interact with higher order systems with greater frequency and intimacy, bringing some of the characteristics of micro-level interaction into the mezzo-, macro- and exo- level systems.

This study utilized adolescent development as a theoretical backdrop for exploring technology use and impact. Adolescence is a unique developmental period marked by a strong desire to develop and maintain peer relationships (Erikson, 1986). Any technology or medium that offers adolescents the ability to increase the intensity or frequency of interaction with peers is therefore seen as highly desirable, which explains the draw of information technology, and especially the appeal of social networking sites and communication technology. Likewise, the relationships and interactions that adolescents engage in, and their perceptions of those experiences, help to shape their forming identities. The adolescents included in this study can be categorized as “early adolescents,” a developmental period when many relationships are formed that continue to impact development into adulthood. As adolescents’ social networks expand, the number of potential influences also increases.

Technology also allows adolescents to explore information and ideas that are outside of their immediate “real world” social systems, including diverse political and religious views, and cultural norms. Today’s adolescent has the opportunity to learn about people and ideas very different from those of family and friends, and to incorporate those ideas into their own identity. Technology and media have provided glimpses of different lifestyles and ideas since silent movies and radio; however, the transition from consumer media (movies, television and radio) to interactive media (the internet) has allowed a user-driven form of exploration, where individuals can delve in to topics of interest more deeply than ever before. Adolescents can also “try on”

certain attributes of identity, and practice social skills and interaction styles, through participation in virtual environments (Second Life, chat rooms, etc.) and the creation of digital representations of their physical appearance (avatars). These new environments and activities offer a new arena for adolescents to learn about, practice and incorporate aspects of the world in to their own developing identities.

Technology Preferences and Usage

Study participants were asked about their preferred types of technology. They overwhelmingly reported preferring technology that allowed them to communicate with others, including computers and cell phones. Adolescents reportedly preferred cell phones to stationary devices like computers because it allowed them the flexibility to remain engaged with technology, and therefore other people, while they were moving throughout their day. Adolescents do not only see technology as a constant across time, but also across place. They accept, and expect, technology to be an integral and pervasive part of their lives.

Another goal of this study was to learn from the adolescents themselves who and/or what they were seeking with their IT use. One of the most common fears among the public is that adolescents are meeting dangerous strangers online, who were posing as other adolescents in order to gain access to unsuspecting youth. This fear has been exacerbated by the popular media, including the television show, “To Catch a Predator,” which set up sting operations to trap pedophiles trying to meet young people online. The results of this study illustrate that adolescents are very aware of the potential danger of meeting strangers online. They consistently reported that talking to people on the internet whom they did not know in real life was dangerous and undesirable. Limiting access of social networking profiles to only those known to the adolescent and avoiding chat rooms and other sites where interaction with strangers was probable were the most frequently reported pieces of advice among study participants. These findings indicate that adolescents are aware of the dangers, and are able to clearly repeat the warnings they have heard. What remains unknown is if the adolescents are actually heeding their own advice. None of the adolescents in this study reported ever meeting a person in real life that they met online. A few, however, did say that they knew someone who had. It is impossible to

determine if the sample for this study truly did not include any adolescents who ever began a relationship with a stranger online, or if the sample did contain adolescents who had engaged with strangers online, but gave socially desirable answers to the interviewers, who were all adults and likely viewed as authority figures. Because at this stage of development, adolescents often see themselves as invincible and above the risk of harm, it may be that although they are aware of the dangers, and reported them to the interviewers, they are not internalizing the warnings. It was the case that when asked about what rules should be applied for technology usage, the study participants uniformly thought that rules were needed for others, but not for themselves! Whatever the case, however, the adolescents in this study reported using technology to maintain and enhance existing relationships, not to develop new ones.

Interactions with Friends and Family

The researchers thought that adolescents would report using technology to interact with peers, given their age and stage of development. This was determined to be correct. However, a surprising finding was that they are also frequently using technology to maintain relationships with family, both at home and far away. Some of the most moving interviews were with adolescents who discussed only being able to maintain contact with an absentee parent through technology. Study participants also described maintaining relationships with grandparents, aunts, uncles, and cousins in different states through text, email, video chatting, and interactive video gaming. Many parents fear that adolescents are replacing time spent with family with time spent with technology. The reports of the adolescents in this study indicate that adolescents are using technology to be more engaged with family.

Strengths and Weaknesses of the Research Design

A major strength of this study was the use of Grounded Theory. This framework for data collection and analysis focuses on capturing the subjective experience and voice of the research participant, and allows theories to be developed from the data, instead of the data supporting previously identified theories (Glaser & Straus, 1967). This framework is appropriate for the study of adolescents and technology for a number of reasons. First and foremost is the fact that this area of research is relatively new, and theories attempting to explain adolescent technology use are in their infancy, at best. Because of the lack of existing theories to be tested, it makes sense to begin with data and develop those theories. Secondly, one of the identified gaps in the available literature on the subject is the lack of the adolescent perspective. As discussed in Chapter 2, little research to date has focused on how adolescents actually experience their own technology use and media exposure. This is an important aspect because, as stated in Bronfenbrenner's ecological model, an individual's perception of their environment is even more impactful to their development than the objective experience (Bronfenbrenner, 2001). A major strength of this research is the extent to which it allowed adolescents to describe and discuss their own technology use and the effects of that use.

This study used a relatively large sample of 128 middle school students. The sample included adolescents from four different schools in the Midwest, which represent different sectors of the population of the region, including urban, suburban, and rural areas. This allowed for comparison between region types. The size of the sample was adequate to achieve saturation, as was evidenced by the collection of exhaustive descriptions.

A weakness of this study is the potential impact of social desirability bias. It is possible that the adolescent subjects in this study viewed the interviewers (who were all adults) as

authority figures, and it is certain that they viewed them as adults and strangers. This may have caused the respondents to withhold certain pieces of information out of fear of consequences. The social desirability bias is especially important to be aware of when working with adolescents, due to their strong focus on identifying with peers and achieving a sense of belonging within peer groups, which is noted during this developmental period (Erikson, 1986). There could also have been a difficulty in using younger interviewers (post-18, but perhaps not yet perceived as “adults”). In this case, the possibility would exist of the desire to impress their “peers” with their technological prowess. In the end, it is important to just keep the factor of self-presentation in mind when considering the adolescents’ statements. Some teens were actually pleased to tell the researchers that in fact, they had circumvented their school’s barriers to accessing social networking sites while in the building, or that they were involved in gaming with others after their parents slept at night!

Another weakness of the study relates to the sample utilized. Participants in this study were drawn from a group of adolescents who had participated in a larger quantitative project funded by the same grant (Jackson, 2007). However, data were not matched between the quantitative and qualitative projects. This matching could have provided a deeper understanding of the topic, had it been possible. The sample was also entirely drawn from a relatively small geographic region in the Midwest. Sampling from a larger region or from several regions could provide a better understanding and higher generalizability. This shortcoming is somewhat offset by the fact that the adolescents included in the sample reported interacting with people from many different locations, both domestically, and somewhat less frequently, internationally. The fact that people from different geographical regions are engaging in the same activities as the adolescents in the study indicates the possible universality of many of the topics discussed.

A final weakness of this study relates to the data collected regarding online safety and protection from online predators. Researchers identified themes in the data collected from one of the schools that was extremely consistent from student to student, including some of the terms that students used (“online predator,” for example). It was discovered after data collection that this school had recently provided a school wide training on safe online behaviors. Because this information was not learned until after the data had been collected, it is impossible to determine the impact of the training on the data collected. It is possible that the adolescents interviewed at that school reported aspects of their behavior as more in line with the things they had learned in the training than they actually are. If the researchers had been aware of this training before collecting data, further exploration into the impact it had on the adolescents’ behavior could have taken place. Even so, the responses from students in this school were not significantly different from the students’ responses in the other schools. However, there was more consistency among student reports in this one school.

Implications for Social Work Practice

Technology use among adolescents, especially at the currently growing rates, has major implications for social work practice. Social workers must understand the impact technology is having on adolescents, particularly their dramatically expanded social networks. Adolescents in the past have had social networks that were limited to family, friends, school, and community. The internet, and many associated technologies, are allowing adolescents to become “global citizens” with social networks that can span many countries. It is also allowing individuals to maintain contact, and close emotional ties, with a much larger group of people than ever before. Although many adults believe that the relationships that adolescents engage in “online” are substantially different than those in the “real world,” the adolescents in this study reported that their “online” friends and their “real world” friends are the same people. Adolescents are maintaining relationships that would have ended in the past, when a friend moved away for example. They are also more connected with relatives (cousins were discussed frequently) who live far away. These examples all indicate that adolescents’ social networks are increasingly expanding. As is the case with “real world” social interaction, adolescents pride themselves on having large social networks and groups of friends online. It is possible, that since technology affords the opportunity for adolescents to develop heavily populated “friends lists” on social media sites, that those with relatively fewer friends could be viewed as less popular and become the object of social ridicule. However, because of the ability of adolescents to interact with and maintain relationships with others outside of their immediate geographical social networks, it is also possible that adolescents are using social media (social networking sites such as Facebook and Twitter, and virtual games/environments, such as The Sims and Second Life) as new means to increase the size of their social networks and become more “popular.” Social workers who

work with adolescents must take this into account, and not minimize the impacts of these relationships, in order to be effective with this population.

Adolescents in this study routinely reported using technology for communication. They use cell phones, computers, text messaging, email, and instant messaging to communicate with family and friends, and some even reported that their preferred method of communication in certain situations is technology based. This finding has major implications for social work practice with adolescents. It is reasonable to assume that some adolescents may be more comfortable discussing difficult topics with social workers and other helping professionals through a technology medium. Furthermore, if this is not made available to them, adolescents may seek help and support from other, more comfortable, sources, such as online chat rooms or informational websites. Social workers must be able to incorporate technology into their practice with adolescents in order to build rapport and facilitate communication. This means that not only must social workers become educated about and comfortable with using technology, they must also become versed in the laws and regulations related to that use. Professional standards, as the ones put forth by The National Association of Social Workers (NASW) and The Association of Social Work Boards (ASWB) must be continually reviewed and updated in order to ensure appropriate use of technology in social work practice (NASW, 2005).

Adolescents in this study reported that they frequently use technology to access information. They are comfortable using the internet, either from a computer or a mobile device (cell phone or tablet), to search for information and answers to questions. In fact, for many adolescents, the first instinct when a question arises is to “Google” it, or use a search engine to find the answer. This may impact social work practice in a couple of ways. First, adolescents may come in to helping relationships with much more information than adolescents of the past. It

can be assumed that adolescents will have searched out information relating to their particular trouble prior to meeting with a social worker for the first time. This information may be believed by the adolescents to be completely accurate or true, regardless of the actual merit of the information. Social workers will need to be prepared to handle adolescents who are much more informed (either accurately or otherwise) and be able to compete with other sources of information that adolescents have access to.

Implications for Social Work Education

Social work educators have an obligation to prepare social work students for the demands of practice in the field. As stated above, social workers will need to be prepared to engage adolescents in new ways. Educators will be instrumental in developing and teaching best practices for engaging clients utilizing technology and understanding how technology impacts development. For example, an understanding of technology, and the expanded social networks that it brings, will need to be incorporated into Human Behavior in the Social Environment (HBSE) course offerings. As the title indicates, we will need to help students expand their understanding of what constitutes the social environment of today's adolescent. The above discussion about Bronfenbrenner's theory and how it can be applied to our understanding of IT and social systems will be an important addition here (Ahmedani, Harold, Fitton & Shifflet Gibson, 2009). Policy courses will need to address issues of access to technology, regulation of technology, and technology impacts on advocacy, including new areas for advocacy and the uses of social media and technology assisted communication in advocacy efforts. Practice and field courses will provide further avenues of learning about technology, and exploration into incorporating technology into practice and evaluating best practices in this area.

Social work educators must not only begin to incorporate technology in to what they teach, but also how they teach. The "Net Generation" will be entering college soon, and will expect to use technology in their learning and interaction with instructors. Some of this technology has already been implemented, including email communication between students and instructors, distance learning course offerings, and incorporating assignments that require technology, such as power point presentations. Virtual office hours, Skype conferencing, and texting are other ways in which faculty have and will expand their contacts with students.

Including new and emerging technologies in social work education will attract future students, and allow them to utilize their skills in their pursuit of a social work degree and career as they will be more prepared to meet their client systems where they are at – a primary adage in social work..

Implications for Policy

Policies related to technology tend to focus on either ensuring access to technology, such as federal funding for computers and internet access for public libraries and schools, or protecting individuals from harm, including HIPPA laws and identity theft protection policies. Many of the policies that fall under the protection category aim to protect children from exposure to unwanted materials or people. It is desirable to protect children from damaging content and dangerous people, but the findings of this study indicate that attempts at protecting them by limiting the access they have to technology, especially the internet, are futile. Adolescents in this study reported that they access technology and the internet from many locations and throughout their day. Policies that seek to limit access at schools are easily circumvented through the use of mirror websites (which allow access to websites that are blocked by administrators). Also, limiting what adolescents can access at school has little impact on what they access overall, as much of their access occurs out of school. Guiding policy development with the idea that parents are responsible for limiting access leads to ineffective policies as well, since many adolescents are more knowledgeable about technology than their parents, creating a situation where parents are ill equipped to monitor and support their child's technology use. The increase in mobile technology makes attempts to limit access even more futile, as technology use now occurs all over, and not in specific locations.

As noted earlier, The National Association of Social Workers (NASW) and the Association of Social Work Boards (ASWB) published a set of standards for incorporating technology into social work practice in 2005 (NASW, 2005). These standards seek to improve the quality of technology based services provided by social workers and to provide guidance to social work practitioners in regards to incorporating technology into their practice and

monitoring and evaluating it. This publication is an important step towards providing uniform standards for the inclusion of technology into social work practice. However, the changes that have occurred in technology since it's publication indicate that standards need to be reviewed and published with greater frequency to ensure that new technologies are included and newly emerging data and understandings are influential.

Results of this study indicate that providing education to adolescents and parents may be more effective in reducing harm related to technology use than creating policies that aim to limit access. Adolescents reported using the internet to find information, so it may be effective to provide information about online safety through the internet as well. Providing resources online for adolescents to learn about internet safety, report any problems, and seek advice and support could provide a more effective means to protecting adolescents from online dangers, i.e., engaging them as partners in this process rather than just as recipients of a policy's rules. A further implication is related to the developmental stage of adolescence. Adolescents seek out interaction with other adolescents. Using peer educators and support would be attractive to adolescents and should be considered in future policy development.

Areas and Implications for Future Research

One interesting finding in this study that needs further research is that adolescents are able to perceive tone in text communication. Adolescents in this study routinely failed to distinguish between verbal communication, texting, online chatting, and any other form of communication. They referred to all of these forms as “talking,” and even mentioned other aspects of communication normally thought of as only occurring in face to face communication, including “laughing together” and “not being alone.” Some adolescents reported preferring face to face interactions, and some reported preferring technology assisted interaction (at least in some circumstances). What did not surface throughout the study was any adolescent who viewed texting, emailing, and online chatting as a less full bodied form of communication. Adolescents are not only using Technology Assisted Communication, they are developing a language rich in tone and inflection, with words and symbols that are universally understood, at least among adolescents. Future research that further explores this phenomenon could lead to a greater understanding of the ways adolescents are communicating and provide insight into increasing the quality of interaction between adolescents and adults.

Results of this study may also be able to provide guidance on incorporating technology into research methodology, including sample recruitment and data collection. Adolescents frequently reported that they feel comfortable discussing difficult topics through technology based mediums. This could easily be incorporated into research with this population to increase participation in research and to offer data collection methods that adolescents find comfortable. A number of different biases may be lessened or eliminated by using technology based methods with adolescent research subjects, including social desirability bias. Utilizing web based surveys, video conference focus groups, and message boards may allow adolescents to share

openly, providing the opportunity to collect more valid and reliable data. Adolescents may be more inclined to participate in studies that utilize technology with which they are comfortable, increasing the potential pool of subjects. Also, technology based data collection methods can reach more individuals with lower costs, allowing studies to utilize larger samples. Findings from this study indicate that incorporating technology into research studies focused on adolescents could greatly increase the quality and utility of those studies.

Future research will need to continue to try to understand the influence of this new interactive technology and the pervasive experience of technology on the development of adolescents. Adolescents in this study routinely claimed to have high levels of competency with using technology (more than 70% reported that they are as good as or better than their friends at using technology), however, it must be the case that some adolescents have lower levels of competency. Research is needed to understand what developmental impacts technological competency may have on individuals. Original fears revolved around adolescents becoming isolated by replacing personal interaction with technology based activities, seem to be unfounded. The rates of use reported by the adolescents in this study indicate that the opposite may be true, and that adolescents who are not adept at using technology may be more isolated than their tech savvy peers.

Although there are a number of areas of strength that need further exploration, there are also areas of concern that need attention, and that were not the focus of this particular work. Cyber-bullying, internet addiction, online sexual predators, and the growing obesity epidemic (e.g., see Lenhart, 2007; Greydanus & Greydanus, 2012; Jones, Mitchell & Finkelhor, 2012; Mitchell, Rodriguez, Schmitz & Adrain-McGovern, 2012) are all real issues that demand continuing research that focuses on the safety and healthy development of children and

adolescents. Maximizing the safety of adolescents online and reducing the risks of harm through informed policy and practice decisions should be a driving force behind future research, but not at the expense of research that identifies strengths and potential benefits of technology use.

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