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A DIFFERENT DIGITAL DIVIDE: A MIXED-METHOD EXPLORATION OF
TEACHER AND STUDENT USE OF HYPERLINKED MULTIMEDIA IN
TEACHING AND LEARNING

A DISSERTATION

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in partial fulfillment of the requirements for the

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By

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A DIFFERENT DIGITAL DIVIDE: A MIXED-METHOD
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ABSTRACT

What are the differences, if any, in the way teachers utilize the hyperlink to teach and students utilize the hyperlink to learn? This was the focus of the mixed method study of student and teacher use of the Internet. This preliminary study utilized the sequential – exploratory mixed method that included phenomenological reduction for the qualitative portion and surveys of teachers and students for the quantitative portion. This study begins the exploration of the educational use of the innovation associated with multimedia hyperlinks.

The phenomenological reduction of interview data from four experts yielded six thematic areas of concentration. The six themes included autonomy, constructed experience, personal experience, implementation issues, mindset and social issues. These six areas became the areas of focus for the online survey of teachers and students.

The survey consisted of 48 items clustered around the six themes. Teachers were recruited from two southwestern urban districts. Ten teachers and their classes completed the surveys. The class average for each student group was matched to the teacher score on the survey with matched items. The teachers were able to recruit 128 students.

The results of the phenomenological reduction and the quantitative measures indicate that there are differences. The perceptions of the experts suggested that students need teacher guidance to utilize hyperlinks effectively. The paired samples *t* test indicated that, though there are differences, the only

significant difference for this investigation is in the constructed experience thematic area. The results of the paired sample t test yielded a significance of .021 for the constructed experience sub-scale.

The results indicate that the mindset and approach of teachers is central to their approach and utilization of the innovation. Teachers are needed to provide the guidance to students as they develop their own mindsets for the use of the Internet. It is recommended that teachers investigate their beliefs and behaviors as well as those of their students in an action research role. The data derived from the action research could aid in the decision making of teachers in relation to the guidance needed by students.

Another recommendation is that this initial study be reassessed and revised to improve the quality and confidence in the results. Revisions might include rewriting survey items to increase reliability. Changing procedures to increase sample size is also recommended. The results serve to illuminate the differences that exist between students and teachers in the use of the hyperlink in teaching and learning.

CHAPTER 1

A DIFFERENT DIGITAL DIVIDE

Introduction

This investigation of teaching and learning focuses on the role of a single innovation utilized for the last decade by both teachers and students. This innovation has profoundly affected the way people everywhere communicate, and it is most responsible for shrinking the world to bite-sized pieces. The innovation connects the voiceless to the mainstream. It creates networks of knowledge not possible before the existence of the innovation. The innovation is taken for granted, almost ignored because of its ubiquitous nature. The innovation is hyperlinked multimedia. This dissertation will explore the use of hyperlinked multimedia by teachers and students in an effort to identify the existence of a gap in approach between the ways students use this fundamental aspect of modern networked computing and the way teachers do.

Chapter one will include five different sections—Background, Need for the Study, Research Question, and Definitions. The chapter will conclude with a summary section. The Background will review technology's role in education, the differing approaches to utilizing technology for instructional practice, and the role hyperlinked multimedia plays in teaching and learning. The Need for the Study will illustrate the necessity for teachers to remain relevant and connected to the world of their students. The Research Question section will introduce the guiding question and methods for investigating that question. The Definitions

section will list the key terms of the study and provide working definitions for those terms.

Background

Technology has always played a key role in education. Postman cited a famous example of differing opinions of the value of technology. The differing opinions were those of Socrates and Plato. In *Phaedrus*, Plato quotes Socrates as saying:

And in this instance, you who are the father of letters, from a paternal love of your own children have been led to attribute to them a power opposite to that which they in fact possess. For this discovery of yours will create forgetfulness in the minds of those who learn to use it; they will not exercise their memories, but, trusting in external, foreign marks [graphes], they will not bring things to remembrance from within themselves. You have discovered a remedy [pharmakon] not for memory, but for reminding. You offer your students the appearance of wisdom, not true wisdom. They will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality. (2005)

Postman (1992) returns to this discourse again and again in his book *Technopoly*. He approaches the metaphor from the point of view that innovation is not always good, and that with any innovation something is lost for whatever is

gained. In his cultural critique of the rise of technology, he sees the rise of scientism as the new mythology and the total domination of technology over culture as the mechanism robbing us of our soul.

Technology is now a very controversial concept in education. It has become a political tug-o-war with proponents on one side pushing for more funding and critics on the other advocating less funding. Cuban (2001) is one of the most cited and outspoken critics of the current use of educational technology. In his book *Oversold and Underused: Computers in the Classroom*, his thesis is plainly evident in the title. Although he is profoundly critical of the exorbitant cost of computers and infrastructure to support them, he is most critical of trivial or flippant utilization of computers on the part of the teacher.

Another critic receiving much recognition is Oppenheimer (2003) who wrote *Flickering Minds*. The main premise is that technology is yet another quick fix for education and yet his examples, like the examples of Cuban, span the exceptional to the trivial. In fact in his conclusion, Oppenheimer states:

It will be tempting to read these stories...as a dismissal of classroom technology.... To do so would be off the mark—and unfair to our schools. If any generalization could be made, it would be that technology is used too intensely in the younger grades and not intensely enough—in the proper areas—in the upper grades. (p. 393)

In stating that he actually takes on the role of a proponent of technology, and yet because of this book, at least one child advocacy group, The Alliance for

Childhood, has called for a moratorium on the purchase of computers for early elementary aged children. Just like Cuban, throughout the book, Oppenheimer makes lashing arguments against technology in schools while showcasing how integral it is to our society and at every argument, showcasing the fact that what we really have is a crisis of ideology. It is not the tools that matter most it is how the tools are used. The critics and the proponents agree on that much.

Some educators embrace the innovation. One writer narrowed the debate to a fundamental level—ideology. Willis (2003), in his article for the compilation by Johnson and Maddux (2003) called *Technology in Education: A Twenty Year Retrospective* made compelling arguments for the concept that ideology of the user is a key component to understanding usage. The debate is not about whether or not computers are effective. The debate is about the ideology of the teachers. His heading for that section of the article says “It is ideology, not research, that drives most positive and negative critiques [of computers in education]” (p. 21). Critics often focus on the amount of money spent on technology while other programs go unfunded even though in their opinion there is a serious lack of evidence produced by proponents as to the effectiveness of technology (Armstrong and Casement, 2000). Willis comes to the following conclusion:

In the [past] 20 years...most of us have assumed that empirical research is an important, even critical, aspect of advancement and influence. A careful study...suggests that ideology not research, is most

powerful influence on both whether and how computers are used in education. (p. 31)

That ideology line is a fine line to walk. Critics can be nothing more than tired, scared old teachers not wanting to deal with “the next new thing” as Ian Jukes puts it (2000). Proponents could be nothing more than sales people advocating the same new thing after abandoning last year’s new thing. Instead of an ideological stance, these positions represent a personality trait masquerading as ideals. Teachers sincerely concerned with abandoning tried and true methods for the novelty of change are living by ideals. Teachers sincerely concerned with remaining relevant to students’ progress and authenticity are living by ideals.

Need for the Study

The role of hyperlinked multimedia in teaching and learning is an invisible element in a struggle of ideals in education. Tim Berners-Lee the creator of HTML and the inventor of the hyperlink, created this unique attribute in a computer programming language that truly changed the world. It is the little line of text invented by Berners-Lee that allows the author of a web page to connect text to any other text in that document or any other document available on the Internet. In his work at CERN, European Organization for Nuclear Research, he was trying to connect researchers to research available as digital text. This leap in functionality allowed researchers to access information that was previously locked into static text on paper (Wikipedia, *HTML*, 2005).

Friedman, in his book *The World is Flat*, credits Berners-Lee with world flattening force number two. According to Friedman, numerous forces are leveling the world as a stage for economic, political and social endeavors. In his estimation, the Internet and common access to computers “enabled more people to communicate and interact with more other people anywhere on the planet than ever before” (p.76). This collaboration drives other flattening forces changing and directing our world.

These multimedia hyperlinks became responsible for the metaphor of network interconnectedness we now call the World Wide Web. Educational technology proponents and critics alike would be caught in the web of promotion or caution while society was literally transformed in a decade by this innovation. The hyperlink represents the next evolution of human communication from a textual knowledge society where knowledge is tightly guarded and controlled by intellectual elite to a hyperlinked knowledge society where any and all ideas are freely disseminated.

The importance of studying this innovation’s effect on teaching and learning rests not only in establishing the existence of the gap, but also in acknowledging the change in the medium. That acknowledgement could inform current educational practice in ways that would prevent the classroom educator from marginalizing (either intentionally or unintentionally) hyperlinked multimedia as a teaching tool. The results of this study serve to guide

professional development, create awareness of student engagement, and provide insight to methods and media.

In *NetSavvy*, Jukes, Dosaj and MacDonald (2000) make a case for integrating information skills into the classroom and redesigning literacy to include information literacy. They cite the changing world that is moving on without public education. Their stance is that as the world embraces information technology, public education continues to operate under the industrial age model. “Success in Industrial Age schools and factories was based primarily on knowing facts. But in a rapidly changing world, facts can soon become irrelevant, outdated and just plain wrong” (p. 9).

This stance is supported by the Pew Internet in American Life Project. In a qualitative study involving 136 students aged 11 to 19 years who use the Internet, the researchers found that “Many schools and teachers have not yet recognized—much less responded to—the new ways students communicate and access information over the Internet” (Levin, Arafeh, Lenart & Lee, 2002, p. iii). Although the study only collects student perceptions, the evidence suggests there is disconnect between students’ use of the Internet and schools’ implementation of hyperlinked multimedia.

Teachers need to take the lead in providing instruction for a different set of skills for knowledge acquisition in this new information society. Teaching the students for their future and not the educational traditions is imperative as the

information technology shrinks the world and requires a different skill set than the industrial skill set of the past.

Research Question

To remain relevant, educators need to be aware of the power of this new medium, hyperlinked multimedia. The evidence that teachers are willing can be found in the rush to complete professional development. Most districts consistently offer technology training as part of a comprehensive technology implementation plan. Many districts require “certifications” from the teachers as part of those plans and offer training to accomplish that. Just learning about the applications and uses of computer does not always translate to effective use in the classroom. The multimedia hyperlink represents a truly participatory, democratic learning and teaching tool in that it is pervasive, intellectually accessible, and represents the widest possible variety of views on any and every topic.

Print has been the dominant medium for almost half a millennium. The multimedia hyperlink represents an evolutionary leap for print and a shift in the medium turning expert print users into novices with hyperlinked multimedia. Despite efforts to investigate the use of the Internet as a teaching and learning tool like the Pew Internet in American Life research, no research exists that explores the underlying structures and how these two groups of people interact with those structures.

This initial study focuses on understanding the fundamental structures that are taken for granted in other research and the different approaches that students

and teacher use. The hypothesis of this dissertation is that hyperlinked media is perceived and utilized differently by teachers and students creating a gap between traditional educational practice and the students' independent learning. This hypothesis leads to the research question that guided the investigation of the topic. What are the differences, if any, between the way high school students utilize Internet hyperlinks to learn and the way high school teachers utilize Internet hyperlinks to teach?

Definitions

Some terms recur throughout the text and having an understanding of precise definition reduces confusion and misleading assumptions. The following list is submitted in the spirit of clarity:

Hyperlinked Multimedia: Various formats of media including text documents, images, sounds and full motion video (live and recorded) located on the "World Wide Web" that are interconnected by hyperlinks.

Hypertext: In computing, hypertext is a user interface paradigm for displaying documents which branch or diverge upon the request of the user. Hypertext is a way of organizing material that attempts to overcome the inherent limitations of traditional text and in particular its linearity. The prefix hyper- (greek term for over or beyond) signifies the overcoming of such constraints. The most frequently discussed form of hypertext document contains automated cross-references to other documents called hyperlinks. Selecting a hyperlink causes the computer to load and display the linked document (Wikipedia, 2006).

Media: The etymologically plural form *media* is often used as a singular to refer to a particular means of communication, as in *The Internet is the most exciting new media since television*. Many people regard this usage as incorrect, preferring *medium* in such contexts (American Heritage Dictionary, 2006).

Internet: The Internet is the worldwide, publicly accessible network of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP). It is a network of networks that consists of millions of smaller domestic, academic, business, and government networks, which together carry various information and services, such as electronic mail, online chat, file transfer, and the interlinked Web pages and other documents of the World Wide Web (Wikipedia, 2006).

Hyperlinks: A hyperlink (often referred to as simply a link), is a reference or navigation element in a document to another section of the same document, another document, or a specified section of another document, that automatically brings the referred information to the user when the navigation element is selected by the user. As such it is similar to a citation in literature, but with the distinction of automatic instant access. Combined with a data network and suitable access protocol, a computer can be instructed to fetch the resource referenced (Wikipedia, 2006).

Web Browser: a software application that enables a user to display and interact with text, images, and other information typically located on a web page at a website on the World Wide Web or a local area network. Text and images on

a web page can contain hyperlinks to other web pages at the same or different websites. Web browsers allow a user to quickly and easily access information provided on many web pages at many websites by traversing these links (Wikipedia, 2006).

Summary

Technology has been a controversy in education for as long as education has existed. Innovations have come and gone, and with them a host of proponents and critics have also come and gone. One recent innovation is the multimedia hyperlink. It has quietly caused a metamorphosis in media by making it accessible to individuals independent of any other guidance or instruction.

Critics of educational technology in general urge caution and faithfulness to traditional media. Proponents consistently promote the benefits of technology and particularly the Internet without fully realizing the hyperlink has changed the media on the Internet into a new kind of media that is utilized differently by a new generation of experts.

The hypothesis of this dissertation is that hyperlinked media is perceived and utilized differently by teachers and students creating a gap between current traditional educational practice and the students' independent learning. This hypothesis leads to the research question that guided the investigation of the topic. What are the differences between the way students utilize the Internet to learn and the way teachers utilize the Internet to teach if any?

The identification of a teaching and learning gap informs the profession. Teachers need relevant professional development to guide them in the effective use of the hyperlink as a teaching tool. Teachers also need to be aware of the ideological components and the fact that the hyperlink represents an evolution in the collection, dissemination and utilization of information.

CHAPTER 2

LITERATURE REVIEW

Introduction

The question of who should learn and how they should be taught is at the heart of the history of technology in education. Technology, in its broadest sense, simply means tools. So, for as long as there has been education in any form, there have been tools to get it accomplished, and for as long as there have been tools, there have been disagreements about abandoning old tools for new tools. The introduction of computer technology has augmented this disagreement. The literature in the field reveals that utilizing technology in teaching and learning accompanies a menu of issues including the promises of proponents, the crisis of ideology being overshadowed by technical feat, and a persistent view to the future that propels the need for progress.

When considering the history of technology in education, the literature revealed that most considered the modern age and specifically the effects of the microcomputers. To them technology was the *American Heritage Dictionary* definition: “Electronic or digital products and systems considered as a group.” (2005) This literature review concentrates on this aspect, while recognizing that technology has a much broader meaning.

Focusing on the idea of the computer as the innovation, many writers and thinkers have differing views on the helpfulness of the computer. The camps can be divided into two groups. The first are referred to as proponents and the other

as critics. Both groups have developed a huge body of literature, but the literature dealing with the history of computers in education is relatively small.

20 Year Retrospective

One very helpful work, *Technology in Education: a Twenty-Year Retrospective*, done by the writers and editors of a journal called *Computers in Education*. The book presents numerous articles written by numerous contributors through the history of the journal. All these writers are proponents, but with a critical eye. Progress is the recurring theme in the articles, but with realization that there are promises not realized from technology in education. The book was written relatively recently in 2003. Although that time frame is notoriously old in the world of technology, in educational theory, which is the heart of the investigation, it is very fresh. The review shows that technology is fraught with problems of promises made and promises broken.

The most coherent discussion of the lack of technology dreams realized was written by Willis (2003) in “Instructional Technology in schools: Are we there yet?” In this article, Willis points out that some promises of the computer for education have come true. When most people saw computers as a domain for programmers and electronics enthusiasts, educational proponents were predicting that students would be using them, and they were right. Willis cites the numerous computer courses as evidence. Proponents also predicted that computers would eventually be used cross curricular and not just in isolated programming classes.

Application expertise like word processing has surpassed programming expertise as predicted.

Willis says in the article “virtually every communication technology that has become popular over the last one hundred years has been touted as technology that will revolutionize education” (p. 15). He is illustrating from a common sense point of view that technology in education is not living up to all its promises. Particularly compelling is his citation of a quote attributed to Edison who predicted film would replace textbooks. (Oppenheimer, 1997 in Willis)

Even the computer is not about to replace textbooks and Willis believes that it is because the huge amount of literature generated about technology in education ignores the basic substance of the debate. He cites meta-analyses by Koki and Chang and another by Kulik in the field of educational technology. All of these researchers, the meta-analyzers and the original researchers, are trying to demonstrate the effectiveness of technology in education. Willis believes they are missing the point.

The debate is not about whether or not computers are effective. The debate is about the ideology of the teachers. His heading for that section of the article says “It is ideology, not research that drives most positive and negative critiques [of computers in education]” (p. 20). He cites Armstrong and Casement who wrote a critique of the amount of money spent on computer technology in schools but only critique the lack of evidence or problems with the evidence produced by proponents. They included no real research findings of their own to

“prove” that technology is, as the subtitle to their book suggests, putting our children’s education at risk and most of their arguments center on ideological approaches like hands-on experiences verses seat work and rote memorization. Upon close inspection, most of their arguments are against drill and practice type applications that teachers for the most part don’t utilize for “hours a day” as Armstrong and Casement suggest (p. 5).

The background section of chapter one noted, “A careful study...suggests that ideology not research is most powerful influence on both whether and how computers are used in education” (p. 31). Willis concludes that empirical research is important, but only in the context of the operational belief systems of the individual teachers. If drill and practice, paper or computer based, is the mode of operation for a teacher, all the empirical research on student engagement and hands-on experiences are moot. Methods are driven by beliefs.

One of the editors of the book, Maddux, provides a different view of the debate. In his opinion, research is the problem. He doesn’t believe there is a satisfactory body of research that has practical impact on practice. In his article he lays out how improving research would improve the impact of technology in education.

One facet pointed out in the article is that stakeholders in the use of educational technology do not base decisions on sound research. His reasoning is that these stakeholders tend to jump on “bandwagons” of new developments rather than adopting technology to address specific needs.

He is very specific when describing what produced this current state of affairs by characterizing the last 20 years of research done in the field. He divided the research into three periods. He placed stage one in the nineteen seventies, and characterized the research as “crude.” He concluded that “stage one research and practice were distinguished by a strong, unstated assumption *that mere exposure to computers would result in general educational benefits*” (p. 39).

Stage two started in the mid nineteen eighties. The research in his opinion had improved but, was still simplistic. It ignored teacher and learner variables and focused on exposure. The problem being that research hypotheses were too limited to be practical, or unable to prove what they hypothesized.

In 1993, Maddux predicted there would be a third stage that would focus on specific applications in the context of learner/treatment interactions. This stage never arrived, and to Maddux the culprit was the rush to embrace qualitative methods to the exclusion of any other. His solution to this problem is to increase the requirements for research methods in pre-service teacher programs.

More fundamentally, he would like to see a change in the attitude toward research in general. He states that there is an “artificial dichotomy” of methods and theories. Research generates the theories that are impractical and esoteric. Methods produce concrete materials to use in the classroom. “It is probably inevitable that research will be seen as irrelevant when undue emphasis is placed on producing an attractive bulletin board” (p. 38).

Although both these articles take to very different positions on the debate of educational technology and both are what I consider proponents, both illustrate the history of technology in education. Both show that with the advent of the microcomputer came the focus of schools on programming them. This focus quickly shifted to application use, and the integration began. Both point out that the potential for technology in education is yet to be realized. These issues have been primary to technology in education.

The Textbook on Educational Technology

Another source that seemed less useful basically because of its sheer bulk was a comprehensive work produced by Saettler (1990) called *The Evolution of American Educational Technology*. I concentrated on the section that addressed educational technology in the 1980's.

The first chapter in that section of the book reviewed the implementation of information resources and their actual and potential use in the classroom. The next chapter identified the research opportunities in the field and reviewed examples. The next chapter focused on the professional organization primarily with a call for certification programs. The final chapter in the section enumerated the state-of-the-art educational technology and explored future prospects.

This listing of the chapter contents highlights the qualities of the book that caused it to be of less use for this investigation than the Johnson and Maddux compilation. The Saettler book is written in a text book, "series of events" approach that reads like a history book, which is the main goal of its existence.

All the information about the progression from vacuum tubes to microchips is interesting, but unrelated to my thesis. Even so, there are portions of the work that required its inclusion in this paper.

First of all, the author consistently includes a section on the conceptual implications of the technology. The entire section begins with the distinction of information technology from educational technology. Information technology is much broader, but since not much information technology has escaped the notice of educators, many try to apply all of it to education. That is how the “technology for technology’s sake” mentality developed, which is a very important notion to note.

This notion made a significant manifestation in educators seeking to utilize the computer as a teacher, and in the positivistic approach of computer proponents in general. Computer Aided Instruction (CAI) was very prominent in the early utilizations of computer technology. These manifestations continued into the 1980’s as “drill-and-practice” applications. “Unfortunately, most of the drill-and-practice programs available were ‘poorly conceived, limited in their effectiveness, and uninteresting to students’” (p. 458). The promise of technology was being tarnished by the application of technology.

Saettler cites a new evolution taking shape at that time. A class of tools was being developed to address learning and problem solving by providing tools to students to construct meaning using the computer as a tool. This tool “enables the user to access text and graphics in a fashion permitting exploration in a

sequence which makes most sense in terms of the user's knowledge base" (p. 459). The fact that educators pioneered the use of the "hypermedia" (hyperlink) is central to my investigation, but notice the focus on technical feat. The author cites the use of laserdisc, CD-ROM readers and other devices that could be connected and used together by the program. The Internet has made all of those technical applications obsolete for student use.

Another intriguing section was on the apparent failure of educational technology to innovate education. Saettler (1990) extensively cites Cuban and Cohen as constructive critics of educational technology. One idea that seems consistent with other writers on the subject is the resilience of the traditional system of education. He summarizes Cohen's writing this way:

Cohen notes that "mass education institutions are likely to select those technology applications that fit established practices of teaching and learning." He observes that technology does not cause educational change but only enables it. The mere existence of tools, he says, is not sufficient to assure their adoption and use. (p. 470)

Critics of Educational Technology

Critics of educational utilization of technology have insight to contribute to the discussion. One of those critics is Postman (1992). Although he considers himself a cultural critic, education is one facet of culture that he cites in his critique. In his book *Technopoly*, Postman posits technology as a destroyer of

culture. Chapter one eluded to his discourse on the “Judgment of Thamus.” Thamus lamented the invention of writing, accusing it of replacing memory and wisdom with vague facsimiles lacking the power of the true elements. He consistently speaks of winners and losers throughout the book. “When media make war against each other, it is a case of world-views in collision” (1992, p. 16).

Postman sets up education as one of the worlds caught in the collision. Postman’s insights precede the wide-spread use of computers in education, but the television serves as an example of technological advancement that produces a new world view in collision with the print based educational system much as the automobile replaced the blacksmith. Although theoretically it sounds fair, the ability of television to educate has fallen far short of expectations. Milton Minow’s quite famous quote still rings true today. “Television...is a vast wasteland” (Wikipedia, 2006). McLuhan has a cartoon in his book, *Medium is the Massage*, where a man is talking to a woman and says “when you consider television’s awesome power to educate, aren’t you thankful it doesn’t” (1967).

This could be true of any technological advancement in education. As was noted earlier, technology has not always lived up to the expectations and mainly because the ideologies are in conflict. In Postman’s view there have to be winners and losers, and hence the value of critical theorists. Anyone who utilizes educational technology needs to be aware of what he is replacing. The Internet replaces bounded, expert selected content with any and all voices on a subject.

Ignoring these consequences causes educators to ignore teaching the critical thinking skills that are necessary to making effective use of this information. Not using these technologies ignores the open, democratic exchange of information that characterizes information exchange on the Internet.

Cuban (2001) is one of the most cited and outspoken critics of the current use of educational technology. In his book *Oversold and Underused: Computers in the Classroom*; his thesis is plainly evident in the title. Although he is profoundly critical of the exorbitant cost of computers and infrastructure to support them, he is most critical of trivial or flippant utilization of computers on the part of the teacher.

He likens it to the “Star Wars” Strategic Defense Initiative which he cites as never successfully testing a system. “What ties together the ‘Star Wars’ and computers in schools is the powerful belief that new technologies can solve any and every problem, even if the machinery has yet to be invented and successfully used” (p. 193). This chicken/egg argument leads to the question “toward what ends?” and implies the loss of everything from class size to teacher salary to endlessly ballooning technology budgets.

Another critic receiving much recognition is Oppenheimer (2003) who wrote *Flickering Minds*. The main premise is that technology is yet another quick fix for education and yet his examples like the examples of Cuban span the exceptional to the trivial. In fact in his conclusion, Oppenheimer states:

It will be tempting to read these stories...as a dismissal of classroom technology.... To do so would be off the mark—and unfair to our schools. If any generalization could be made, it would be that technology is used too intensely in the younger grades and not intensely enough—in the proper areas—in the upper grades. (p. 393)

In stating that he actually takes on the role of a proponent of technology, and yet because of this book, at least one child advocacy group, The Alliance for Childhood, has called for a moratorium on the purchase of computers for early elementary aged children (2005). Just like Cuban, throughout the book, Oppenheimer makes lashing arguments against technology in schools while showcasing how integral it is to our society and at every argument, showcasing the fact that what we really have is a crisis of ideology.

Good teachers use technology well. Oppenheimer started the book with that notion. In the introduction, he cites Blair High School in Maryland. The tenth grade civics class utilized the Internet to research the 1998 congressional elections. In the end, they predicted the outcomes of the races more accurately than the pollsters. One such pollster summed it up this way:

How could so many of us who follow politics not have heard the Democratic freight train rounding the political bend? Ingraham wondered. Probably because we were talking to politicians and to each other instead of listening to voters. (p. xii)

It is not the tools that matter most it is how the tools are used. The critics and the proponents agree on that much.

The literature covering the history of technology in education, whether it is from critics or proponents, is preoccupied with the effectiveness of the innovations. Proponents are desperate to “prove” how much the innovations will improve teaching or learning. The critics are just as hesitant to abandon tried and true methods for technically challenging and unsure methods. Ideology plays a central role as pointed out by Willis. Technology that enables constructivist approaches will always be criticized by conservative behaviorists, whether they are proponents of technology or not.

To compound the issue, technology is a moving target. The only constant in the past 20 years has been the prediction of Gordon Moore who predicted that capability would double every two years or so. This prediction has generated a lineage of ever more complex and wonderful technological advancements. The speed of which has left heads spinning, particularly in the classroom. The tyranny of progress has caused educators to stand by hoping that with time it would simply pass. The literature consistently reveals that technology is here to stay (Maddux, 2003).

Recent Research

Researchers are exploring the idea that students approach the use of technology in learning differently. The Pew Internet and American Life Project has surveyed and interviewed Internet users from around the nation since 2000

and continue to do so. In one report, data from telephones surveys in 2005 concluded that 68% of all teens access the Internet from school (Hitlin & Rainie, 2005).

In a qualitative study of students who say they go online at school, researchers investigated why they do. Levin and Arafeh reported that these students use the Internet for many of school related reasons (2002). Students also reported differences in their desired use and the assigned use by teachers.

While students relate examples of both engaging and poor instructional uses of the Internet assigned by their teachers, students say that the not-so-engaging uses are the more typical of their assignments. Students repeatedly told us that the quality of their Internet-based assignments was poor and uninspiring. They want to be assigned more—and more engaging—Internet activities that are relevant to their lives. Indeed, many students assert that this would significantly improve their attitude toward school and learning.

Although this evidence supports the idea of a gap in teacher Internet use and student desire for Internet use, the evidence is one-sided. The teacher perspective is missing. It is interesting to note the uses students cite and how those uses match up with traditional classroom work. For instance, using the Internet as a digital locker or backpack is innovative, but related to paper based work. The students desire for more engaging is just that – a desire. They lack the formal knowledge to recognize what would be more engaging. Although the

literature generated by the Pew Internet and American Life Project is powerful and well done, a need exists for the exploration to include the teacher perspective.

CHAPTER 3

METHODOLOGY

Introduction

This study examined the phenomenon of hyperlink usage in teaching and learning among teachers and students in a southwestern urban high school setting. The hyperlink is generally taken for granted. As little thought is given to the behind the scenes workings of clicking a link as is given to dialing a phone number. It seems like magic. A person can use a mouse pointer to open the world simply by pointing and clicking. Although this phenomenon is technically sophisticated at the networking level, there is also a complexity to utilization of the phenomenon by the end users that plays a role in the way people learn new information. This complexity presents itself in the following question: What are the differences between the way teachers utilize the hyperlink to teach and the way students utilize the hyperlink to learn, if any?

There was a two-fold purpose of this initial study. The first purpose was to explore and generate themes about the usage of the Internet by teachers and students using phenomenological reduction. Then, based on these themes, the second phase was to develop an instrument and survey actual teachers and students about usage of the Internet. The rationale for utilizing both qualitative and quantitative data was that a useful survey instrument that generated evidence suggestive of answers to the research question could best be developed based on

preliminary exploration of the phenomenon. This approach is cited by Creswell (2003) as being a sequential, exploratory design.

This type of design could be questioned because of the particular methods chosen. The phenomenological method utilized requires “bracketing” or the removal of any preconceived notions about the phenomenon. The quantitative portion grows from a hypothesis, which is a preconceived notion. This type of incompatibility is a risk and common criticism for this type of mixed method research.

These methods were utilized anyway for two main reasons. First of all, bracketing is recognized by Moustakas and others as a mental exercise as all people come to any investigation with preconceived ideas. It is a part of being a human. Moustakas says “The challenge of the Epoche is to be transparent to ourselves, to allow whatever is before us in consciousness to disclose itself so that we may see it with new eyes in a naïve and completely open manner” (p. 86). Consequently it is mental discipline rather than ignorance that is key in dealing with preconceptions.

The second factor was the amount of time involved in the process. The transcription of the interview data was labor intensive. The process of reviewing the sound files and creating text files was arduous and mind-numbing. There was not room for contemplation or relational thinking in that process. The text was as true to the actual responses as possible. That factor coupled with the timing of the process as a whole contributed to bracketing the data.

The study followed this timeline of events:

June 12, 2006 IRB submitted for qualitative phase

July 6, 2006 Interview with Bernie Dodge

July 7, 2006 Interview with Ian Jukes

September 14, 2006 Interview with Pete MacKay

October 4, 2006 Interview with Vicki Dimock

December, 2006 Completed phenomenological reduction analysis

December, 2006 Developed survey instrument

December, 2006 Submitted IRB quantitative phase application

January, 2007 Piloted survey instrument with college students

January, 2007 Revised survey instrument based on item analysis

February 2007 Recruited survey participants

March 2007 Conducted survey

April 2007 Data analysis and reporting

The qualitative phase of the investigation focused on the accumulation of perception data from educational technology experts. The thematic element results of that phase were utilized to develop a matched pair of survey instruments for teachers and students. The goal of the surveys were to explore thematic structures and identify relationships to themes in the qualitative phase by gathering quantitative data and statistically reducing them to allow those structures to surface and provide insight to the research question.

This chapter describes the methods utilized to conduct the study. It is divided into six sections. The first section is the description of the qualitative population and sample. The second section describes the interview protocol. The third section describes the data analysis of the qualitative interview data. The fourth section describes the survey population and sample. The fifth and sixth sections complete the descriptions of the quantitative portions presenting the survey protocol and methods of analysis of the survey data.

Qualitative Interview Sampling

Four individuals chosen for the interviews fit the following criteria: 1) each one is considered an expert in the educational technology community; 2) each one has considerable classroom teaching experience; 3) each one is a proponent of educational technology in general and Internet usage in particular; 4) each one has made a significant contribution to the global dialog on educational technology.

Bernard Dodge, a professor at San Diego State University developed one of the most replicated educational tools to surface in the past 20 years. He and Tom March developed an approach called WebQuesting that incorporated the tenants of inquiry learning with student use of hyperlinked multimedia resources. He has written and spoken about this innovation and educational technology in general. In addition to the website at San Diego State University, he maintains his own web log (Blog) which is subscribed to by thousands of people.

Ian Jukes, has been a teacher, administrator, college professor and lecturer, and has presented an engaging and thoughtful message about the use of technology in education. He has authored several books including *Net Savvy* (2000) and *Windows on the Future: Education in the age of Technology* (2001). Ian is a popular choice for presenting at conferences. As a member of the Thornburg Institute, he has spoken on educational technology all over the world. His Blog, The Committed Sardine, is a popular choice among educational technologists.

Peter McKay is a teacher, staff developer and educational technologist. He compiles a list of educational websites for teachers all over the world who subscribe to his “TeacherList” email list service. World wide, thousands of teachers subscribe to the list and receive daily updates. Each update has the rationale for inclusion and a link to the site. McKay often shares his own experiences or experiences considered successful by his readership. Any unique utilization of the Internet for authentic or collaborative learning is showcased in the TeacherList.

Vicki Dimock has served as a program director for the Southwest Educational Development Laboratory (SEDL) for the last nine years. In her capacity as program director, she has actively promoted the integration of the Internet into education. As a classroom teacher, she practiced the techniques she now promotes through SEDL. She has presented at conference and authored

papers as well as web pages promoting the use of the Internet as an instructional tool.

Interview Protocol

The text of the protocol (see Appendix A) followed in the interview portion of the study. Note that a concept map exercise was employed before the actual questioning of the participant. This exercise was not meant to produce another data source, although anything interesting in the concept map could contribute to the overall collection of themes; the exercise was meant to prime the thinking of the participant and provide a starting point for the discussion.

Moustakas Method of Phenomenological Reduction

Moustakas states in his book *Phenomenological Research Methods* “Each angle of perception adds something to one’s knowing of the horizons of a phenomenon” (1994, p. 91). The process includes the necessity for the researcher to bracket himself from the research to ensure that all the experiences related are given equal attention. The researcher can’t just “listen” or attend to what matters most to him.

The next step in Moustakas method of phenomenological reduction was horizontalizing (1994). This step involved the researcher immersing himself in the textural experience by reading and re-reading the transcripts. Every textural element was considered before codes were assigned in an effort to identify invariant constituents. Invariant constituent labels were applied to thematic

groups of textural codes. These invariant constituents became the factors for investigation in the quantitative survey research.

The reduction of the phenomenon was continued in the individual textural descriptions. Moustakas refers to the individual textural descriptions as “an integration, descriptively, of the invariant textural constituents and themes of each research participant” (p. 180). Each of the individual textural descriptions becomes a part of the qualitative results, but only as a means to an end.

The next step in obtaining the results of the qualitative study is the composite textural description. This is the “integration of all the individual textural descriptions into a group or universal textural description” (p. 180). It is evident at this point that the goal of this method is to systematically reduce the interviews to gain understanding of the phenomenon, which matches the goal of this research.

After the composite textural description was obtained, a composite structural description was written utilizing what Moustakas called Imaginative Variation (1994). The process was to vary the possible meanings and the perspectives of the interviews to construct a list of structural elements. Then the universal qualities of the elements were employed as thematic elements to create the structural description.

The final step and the end of the results is the synthesis of the composite textural description and the composite structural description. Moustakas refers to

the synthesis as the “essences” of the experience, in this case learning from utilization of the hyperlink (1994).

Survey Method

This survey was conducted in southwestern urban high school classroom settings in two school districts. The survey sample was drawn from a convenient sample of volunteers solicited by email. The email went to members of a state technology organization for educators from the urban area in southwestern urban school setting. Choosing technology using teachers is the rationale for this sample. It is most likely that members of the State technology organization for educators are technology promoters and most likely utilize the Internet especially the hyperlink, in their teaching. These teachers were also encouraged to identify other technology using teachers from the same two urban districts that might be interested in participating in the study. The rationale was that students had more than one Internet using teacher and the surveys for the students could be matched to those teachers as well.

This created a snowball effect that increased the size of the sample. Surveying a sample of students from their classes was more likely to yield responses from students making use of technology to learn. One major assumption of the study is that if promoters of the hyperlink utilize technology differently than students, other teachers are as well if they even use the technology to teach.

Sample

According to Lomax (2001) power in statistics indicates the probability of rejecting the null hypothesis when the null hypothesis is really false or in other words the probability that we correctly made the decision to reject the null. This would be important to this study because if we detect that there is indeed no statistical difference between the match pairs, power would indicate the probability the decision is a good one.

Lomax cites sample size is one of the determinants of power in a study that is under the researcher's control. There are four other factors that contribute to power in a study. Power can also be increased by a less stringent alpha (α). The Alpha for this study was set at .05 as is most social science research, so adjusting the alpha to .10 can increase power, but reduce the ability of the research to be generalized back to the population and is generally unacceptable for a research result. Even though this study explored the thematic elements and was never intended to generalize to a population, the alpha for this initial attempt maintained the rigor of the study.

Another factor is the kind of test being conducted. This study sought to determine the difference, not the amount of difference above and below, consequently the test utilized was two-tailed. For instance, if the question revolved around how much difference there was between students and teachers, a one tailed or directional test would have been necessary to determine if there was a difference whether it was more or less. The research question for this study

simply searches for a difference. Thus no additional power could be gained from this factor.

Because of these considerations and the other factors outside the control of the researcher like size of the population standard deviation and the difference between the true population mean and the hypothesized mean, a larger sample size was required to gain power for the study. The samples in this study will be tested as paired matches, as will be discussed in the analysis section. Lomax (2001) indicates that statistical power measures are applied by the researcher following a study and analysis to determine the power (p.111). In this study, power becomes an indicator of the reliability of the data, but it was an ad hoc test rather than a priori. Factors beyond the control of the researcher and the goal of the data collection to initially explore themes rather than generalize back to a population prevented the test from rendering the data null and useless.

Another major concern for this sample is the possible violation of the independence assumption. Since the student samples came from the same class, the chance of committing a Type I or II error increases. To control for this, the unit of measurement at the student level was the class and not the individual student. The class mean for each item was paired with the score for each teacher on the same item. This paired sample t test for each item allowed for easy identification of areas where the teachers differ from the students.

Survey Construction

Survey items were developed based on qualitative data by creating several items for each of the six thematic elements. During the pilot phase of the development item analysis was performed to ensure reliability of the items. Although the teacher items were worded from a teacher's perspective, they were identical to the student item as is evident in Appendix B.

As was described in the qualitative section in the Moustakas method of phenomenological reduction, one of the products is a set of themes or invariant constituents. Since the items for the survey were derived from these themes rather than any of the other data in the qualitative results, it is necessary to describe the rationale for using those particular results rather than the final product of the qualitative examination.

The first reason is related to how Creswell (2003) describes the strategies for using mixed methods and specifically the sequential exploratory model adopted for this investigation. "This model is especially advantageous when a researcher is building a new instrument" (p. 216). Since this is an initial study, a new instrument was necessary. The goal of the instrument was to "expand on the qualitative findings" (p. 216).

Although a synthesis of the composite structural and composite textural descriptions is the final data set in the qualitative phase, the whole process is designed to be a reduction. The final result, which is the synthesis of the descriptions, contains broad, universal themes that generate discussion, do not

generate the details needed to construct survey items. The themes seemed to be a fair middle ground for constructing survey items informed by the quantitative study. It might sound cliché, but the final data of the qualitative study is a 30,000 foot view of the phenomenon. If the instrument construction was going to explore that phenomenon a little closer vantage point was needed. The invariant constituents provided that vantage point and are still a valid set of data from the experiences of the experts rather than just the experiences of the principle investigator.

The invariant constituents identified in the first phase of this study provided fertile ground for developing the instrument to explore the themes identified by the experts. The point of this portion of the study was to utilize quantitative methods to magnify the thoughts and opinions of a larger number of people so that the textures of the phenomenon are more distinct and differences more readily visible.

The original idea for the survey was to write 10 items per theme. Then the idea changed to have the number of items more representative of the number of codes under that theme. That approach became the final approach for the construction of the final survey. Although the original observations were done by color coding the themes and basing the emphasis on the general impression, numbers are used in table 4 to substitute for the color coded approach.

Theoretical concerns weighed in as well. Since a major consideration for the research is teaching and learning, the constructed and personal experience

categories needed more items. The literature connection indicated that the ideology of the users was important; consequently the mindset category has the most items of all. Table 1 depicts the number of questions finally selected following the pilot and the number of sub-themes and codes related to that theme.

Table 1

Relation of Theme to Survey Construction

Theme	Number of Survey Items	Number of Sub-themes	Number of Codes
Autonomy	4	2	24
Constructed Experience	6	2	35
Personal Experience	10	11	119
Implementation Issues	4	5	86
Mindset	11	7	64
Social Issues	5	2	34

It is hoped that the exploration of the phenomenon at this intermediate level will reveal and expand the textures identified in the qualitative findings. Exploring the themes is the main goal, but the exploration of the themes will also allow for the instrument to be developed and reveal where it could be improved beginning a cycle of revision and improvement. A more meticulous exploration

will yield more fertile information for making recommendation about any differences, if indeed they exist, between teachers and students.

The survey was constructed using an online survey service under the brand name Question Pro. This service allowed the creator of the survey to write the items, choose from a variety of response types including Likert style scales as was appropriate for this study. Once the survey was constructed, it was saved in a password protected website. Participants in the study simply followed a link from the email or setup by the administrator of the survey. Once they clicked the link, they were presented with the questions. The responses were stored on the web server and downloaded as MS Excel spreadsheets later for analysis using SPSS.

Survey Pilot

Once the themes were derived in the qualitative portion of the study, questions were drafted for each of the themes utilizing the sub-themes and codes as base ideas for the questions. A list of 69 questions was created in *Question Pro*, the online survey instrument. These questions along with six demographic questions made up the pilot questionnaire.

The pilot was conducted with a class of masters level students in an “Introduction to Research” course at a southwestern university. There were 17 total participants. Two volunteered to serve as the teacher for two groups. The “teachers” conducted the survey just as if they were going to administer it in their classroom to test the written instructions. Three individuals chose not to participate or complete the survey. Other than a minor issue of confusion over the

teacher number the survey proceeded smoothly and more quickly than anticipated. Obviously an example of the teacher email that was developed for the actual survey should have been used in the pilot. The teacher email contains a teacher number for the teachers to share with the students.

Upon the completion of the pilot, the results were analyzed using SPSS. The scale reliability measure indicated that all the items were $> .85$ and $< .868$ on Cronbach's Alpha if the item was deleted. The overall Cronbach's Alpha correlation for the instrument was pilot .888. Since the entire instrument is designed to investigate the differences between teachers and students on their use of the Internet, all 69 items were treated as a scale. Since the number of items needed to be reduced, the themes were treated as sub-scales in order to detect items that didn't perform as reliably as the entire scale did.

Although not all the sub-scales produced results like the all item test, four of the six sub-scales produced Cronbach's Alpha correlations of $> .700$ as is described in table 2. The social issues theme only contained five items; consequently eliminating items was not practical. The implementation issue theme items all performed so poorly so that most of the items were thrown out. Upon closer inspection, the clarity of the items and the wording needed improvement. Four of the items were kept based on clarity and relevance of the information possibly generated.

Table 2

Item Reliability by Theme

Theme	Cronbach's Alpha Correlation
Autonomy	.715
Constructed Experience	.740
Experiences	.777
Implementation Issues	.497
Mindset	.866
Social issues	.212

The goal of the pilot was to develop some evidence that the items created for the teacher and the student surveys were valid and reliable. The statistical tests utilized indicated that for the group used, the answers to the items didn't vary too greatly for most of the items. Since that was the case it could be reasonable assumed that the groups surveyed could understand the items in a manner consistent with what the researcher intended.

Since the items as a whole performed considerably well, confidence in the items was high. The instrument was reduced to 40 items to measure the thematic elements to ensure that the instrument could be administered in the predictable manner described to participants. The statistical measures simply provided a starting point and a rationale for eliminating items. Some of the most poorly performing items could not be eliminated because there simply weren't enough to

cover that theme, and as a future reference point, that particular thematic element needs to be explored in a deeper, richer way.

Analysis of Survey Data

In an effort to explore the results of the qualitative investigation, the survey data were analyzed by a paired samples t test. This statistical method simply analyzes the difference between the two groups as was hypothesized. The teacher scores were paired with the class average for each item. This method was chosen so that the differences between the teachers and the students would become evident to explore thematic structures and identify relationships to themes in the qualitative phase.

Summary

This initial study explored the phenomenon of hyperlink usage in teaching and learning. Phenomenological reduction provided the vehicle for identifying the complexity of the utilization by teachers and students. The investigation was designed to begin answering the question: what are the differences between the way teachers utilize the hyperlink to teach and the way students use the hyperlink to learn, if any?

Although many studies of student or teacher Internet usage exist, this study began comparing the usage to determine whether or not a gap exists. Identifying the thematic structures and exploring those structures utilizing quantitative methods is crucial in the initial attempts at gaining insight into the phenomenon of hyperlink usage. These results generate information, but more

importantly more questions that will lead to a deeper, richer understanding as those ideas are investigated.

CHAPTER 4

RESULTS AND DISCUSSION

Introduction

This chapter deals with the results of both phases of the study. Both phases of the study explored whether or not there was a difference between the way teachers utilized the hyperlink to teach and the way students utilized the hyperlink to learn. The first section describes the results of the interviews and the thematic elements that were used to develop the survey items. A textural description is also provided as the culminating results of the phenomenological portion of the study. The second section contains the results of the statistical analysis of the surveys will be discussed as well. The results will be explored in order to begin describing to what extent differences exist between the way teachers utilize hyperlinks to teach and the way students utilize hyperlinks to learn.

Phenomenological Reduction

The results of the interviews were derived from the process described in the previous chapter. As described in chapter three, bracketing was necessary to eliminate as much bias as possible. The next step after bracketing was textual immersion. A distinct set of themes was developed from the horizontalization of the text. The final step was to develop a single textural description of the experiences of the experts. The model for the phenomenological reduction

method employed henceforth referred to as the Moustakas model is cited in Appendix D as a review of information from Chapter three.

Background

As was discussed in chapter three, the expert interviews were planned to obtain a specific point of view. All the experts were selected based on the specific criteria outlined in chapter three. The four were or had been classroom teachers, writers and thinkers on educational technology and contributors to the ongoing global discussion of the role of educational technology and especially the Internet as a teaching and learning tool.

Although the memory of the actual interviews became less intense over time, each of the interviews was transcribed in roughly the same time frame. According to Moustakas, the researcher needs to practice what is called “Epoche” which is the first step in phenomenological reduction where the researcher sees things as they are without preconception or judgments (p. 90).

Researchers achieve Epoche through “bracketing” the phenomenon or topic which Moustakas describes as focus on the topic of study as necessary to develop the invariant constituents (p. 97). Although there is a sense in which Epoche seems impossible and ethereal, certain objectivity is possible and desirable in this portion of the research. A worker mentality takes over where conscious effort to see everything as new takes away expectations or preconceived notions about the experience. Switching from the experience

memories to the text of the experience was the first reduction. Transcripts were shelved for several weeks each before the textural immersion was attempted.

The interview with Bernie Dodge and Ian Jukes occurred at The National Educational Computing Conference (NECC) in July of 2006, so they were the first interviews to be analyzed. Pete McKay and Vicki Dimock were interviewed by conference call which made obtaining quality recordings extremely difficult, but caused a great amount of review of the recordings to get accurate transcripts. These technical difficulties combined for a positive bracketing effect. The metaphor of not seeing the forest for the trees became very appropriate in the process of transcription.

The interviews at NECC were exciting since both experts were presenters at the conference. The interview with Dr. Dodge was arranged for a late afternoon in a commons area at the San Diego Convention Center. It was an open, bright and airy area with many people gathered around the round tables scattered throughout the enormous space. This created a steady buzz, which coupled with Dr. Dodge's soft spoken manner, gave cause for concern as to the quality of the recording, but all was well.

Ian Jukes was interviewed the next day right after his presentation that was video recorded and broadcast over the Web. His interview took place in a meeting room reserved for the traditional media. The room monitor almost denied us access, but allowed it when he found out it was an interview. The room was quieter than the hall and Ian was tired from the previous presentation. In

spite of his fatigue, he answered all the questions with thought and flare as is his custom. There was one brief interruption as a colleague came to borrow my laptop, and spoke to Ian for a few minutes. Otherwise the session went smoothly.

Pete McKay delivered his interview via Internet Telephony utilizing a program called Skype. He arranged to call me one night around 9:00 pm. I was in my study and he was at his home in Canada. These conditions led to a relaxed atmosphere and casual conversation. The audio quality was a little less than ideal, but still very workable. One of the main benefits for the project in general was to hear another educator describe many of the same questions and concerns based on the current system that suffers many of the same challenges despite the difference in governments.

Vicki Dimock was interviewed by traditional telephone. We spoke one afternoon while both of us were in the office. The atmosphere was similar to the McKay interview, only a little more formal. The discussion was conversational, but business-like. The interview took the least amount of time, but Dr. Dimock had very insightful and thoughtfully considered remarks. In each case, the interviewee commented on the uniqueness of the topic, actually wondering in many cases if a dissertation could be written on the topic. Vicki like all the others came to the conclusion that thinking about the hyperlink as a separate element was valuable. Most of that conversation took place after the recording had stopped and we were closing the conversation.

Each interview began with the interviewee filling out a concept map with the hyperlink as the central idea. This exercise did not yield any coded data, but did serve to prime the attention of the interviewee and provide a warm up for the conversation. Many of the comments about the hyperlink as an element worthy of studying came during that exercise.

Once the interviews were transcribed and coded. The initial pass through the transcripts yielded 363 elements from the text. The next pass through the text reduced those elements to 30 sub-themes. The final pass through developed six thematic elements. These elements or invariant constituents according to the Moustakas (1995) model became the themes investigated further in the quantitative portion. Table 3 illustrates how these themes were derived.

Table 3

Theme Derivation

Theme (6)	Sub-themes (30)	Illustration of Codes (363)
Autonomy	Personal control	User defined information path
	Serendipitous learning	Consumer-like approach to learning
Constructed Experience	Teaching	Thinking skills
	Training	Teachers need information skills
Experience	Altered experience	Web based learning
	Learning	Technology creates problem solvers

Theme (6)	Sub-themes (30)	Illustration of Codes (363)
Implementation Issues	Meeting needs	Personal therapeutic use
	Student engagement	Students embrace innovation
	Safety	No internal filters
	Transformational	Technology immersion transforms usage
	Quality	Quality of product important
	Pitfalls	Information glut
	Multi-tasking	Multi-tasking native to youth
	Fringe influence	Outside influences on technology
	Essential skill	Necessity for day to day business
	Antecedent mode	Traditional media less convenient
	Adoption	Early adopter
	Innovation	Convergence and miniaturization
	Institutional blocks	Lack of institutional understanding
	Internet fundamentals	Non-linearity important
Mindset	Beliefs	The art of constructivist teaching
	Convenience	Immediacy of information access
	Avoidance	Teachers fabricate excuses to avoid usage
	Pseudo-innovation	Traditional methods with a technology spin
	Pseudo-expertise	Posthole knowledge

Theme (6)	Sub-themes (30)	Illustration of Codes (363)
Societal Issues	Professionalism	Professional trust
	Non-use	Lack of Internet in schools
	Motivation	Motivated students alter teacher perception
	Social networks	Computers replacing human relations
	Social control	Institutional fear

Textural Descriptions

Moustakas (1995) defines these elements as “organizing horizons and themes into coherent textural descriptions of the phenomenon” (p. 97). This step in the process yields more reduction of the phenomenon. Since, like invariant constituents, these data are results of the researcher’s efforts rather than the efforts of the experts, no identity will be associated with the descriptions. The order is random and the names have been removed as have any other identifying characteristics. The entire section of textural descriptions is concluded with a composite textural description that synthesizes all the textural descriptions into a single description, further reducing the phenomenon.

Individual Textural Description: Expert one

This expert sees the hyperlink in education as a tool of convenience. This convenience has altered the experiences of the young, who interact with this medium in different ways. The expert refers to their social networking, for

instance, as a kind of “hive mind” that is different than the experience of older users. The expert sees these innovations as wonders and transformative. Ubiquitous access leads to ubiquitous knowledge, what the expert referred to as “filling in chinks in our ignorance.” The expert sees the adoption of this medium as a function of the user’s belief system. Although the expert voices concerns over the safety of young users of the medium, the expert is more concerned with the lack of guidance to a wider and richer experience as young people left to their own devices gain “posthole” knowledge on a limited range of subject of personal interest. This expert spoke of the need for teachers who are competent in the use of the Internet because of what the expert called a “more subtle misuse of the Internet. That is to be so impressed with being able to find anything that you lose sight of having the kids do something with all the information – to get rich and deep and to really get lost in the complexity of things and then to wrestle your way out of it.” The student’s ability to do that is a direct result of constructed experiences by a knowledgeable teacher.

Individual Textural Description: Expert two

The second expert had a wide variety of experiences as a pioneering teacher in the area of educational technology that lead to numerous opportunities to teach other teachers about technology. This expert still sees professional development as the biggest need and the key to successful utilization. The expert also sees the personal empowerment the hyperlink provides by allowing the user

to follow personal information paths. In addition to that quality, the expert also identified the utility of “following the path of other learners and sometimes you get to go somewhere and see where other people have the way that they thought about organizing information” which is a way to share thought processes. The interconnectedness of people, ideas, and information leads to collaboration previously not possible with linear information systems. This interconnectedness leads to innovation, but with innovation comes implementation issues as safety issues become a concern and technology is required to manage the technology, and teacher attention is required to monitor student collaboration. In order to avoid such issues school administrators “just shut everything down” out of a traditional mindset that seeks to control a medium that extends beyond the traditional control structures to the point that teachers and administrators fabricate excuses to avoid the innovations. The expert believes that teaching appropriate use of these innovations is the only approach that will work.

Individual Textural Description: Expert three

The third expert possesses a mindset shaped by the expert’s experiences related to current classroom practices. A year spent outside the classroom as a teacher trainer influenced that mindset through teaching other teachers about technology. The expert recognized that the expert was “really discouraged by the phenomena of taking our kids into computer labs and treating them like arcades... go play for an hour and the teachers didn’t really have to do anything.” These

interactions with other teachers led to the promotion and adoption of techniques that included the use of technology. The expert noted that the use of technology has taken on several iterations and is influenced by social or implementation issues like high stakes testing. A hallmark of the expert's career has been to help teachers become more effective and efficient with the technology. The expert trained teachers in the "mundane, not mundane but very concrete like a newsletter...to think about the possibilities of the Internet." The use of the Internet goes beyond an academic exercise for this participant. One of the expert's classes experienced social activism by helping restore photographs for individuals whose personal photos were damaged in the 2005 hurricane Katrina. Even though the event was thousands of miles away, the expert's students experienced a very specific aspect. Implementation issues can hamper efforts to utilize hyperlinked methods. This expert cited institutional fear and student safety as common characteristics associated with attempting to utilize this innovation.

Individual Textural Description: Expert four

The fourth expert's experiences centered on the innovations afforded by the hyperlink in education and the transformative power those innovations provide for learning. The expert indicated the motivation for innovation was "transcendence." Moving beyond the expert's reach and helping the young to do the same. Through the expert's own voracious reading habits, the expert made him/herself familiar with the best thinkers and latest research on education and

technology. The expert sees the need to develop new skills to attempt this reach. The expert calls the Internet a “collaboratorium” where the users are plugged into information and into each other. To be safe and engaged in this medium, users need to possess thinking skills and “internal filters” are more important than Internet filters. Technology impacts the young and alters their experience and expectation by actually altering the way the minds of the young operate. Education has to focus on the “headware” of students rather than on the hardware of classrooms. Educators have to understand how to guide students in using information. Schools are more interested in controlling populations and what they do rather than teaching core values that would teach the kids to control themselves. Teachers need training and support in making learning rich and relevant for the young mind. Technology is constantly changing and advancing to strange and unbelievable levels creating a great need for a “new school vision” that makes the child the focus with authentic and meaningful tasks completed with authentic and meaningful methods that include technology.

Composite Textural Description

The hyperlink as a concept gave each of the interview participants pause when asked to consider it. There are so many factors associated with that particular component that it seemed as abstract and atomic to think of it on that level. Each one identified similar factors. The hyperlink as an innovation meant that factors like immediacy of access, the transformative nature of the hyperlink,

the changing society that uses the Internet, the collaborative nature of the medium that leads to the concerns for safety and concerns for educational institutions and practitioners that use or misuse the innovation and guide the youth in its use.

Immediacy of access and the convenience factor that could be confused with luxury is a concept that rings true in all the interviews. This speed and convenience has transformed the way people utilize information. All the participants had examples of their own children or students in their classes that think and act differently than older people in relation to the information around them. This transformative nature of the hyperlink is central to the innovative use and concerns of the participants.

The transformative nature of the hyperlink is a factor in the changing nature of society. Widespread access and usage of a variety of tools to access information at a variety of times is altering the expectations of users. This level of access is no longer seen as a luxury or a privilege. The scale of exposure and influence has transformed the scale of collaboration. This collaborative nature of the medium can take a variety of iterations. Anything from social activism to a completely new concept of teaching and learning is a result of that collaboration. The common factor is the difference in the set of skills to help students gain success in that collaborative environment and it is not as simple as just teaching those skills. There are serious institutional concerns that interact to complicate the role of the teacher in the use of this innovation.

Safety of the students who use hyperlinks in a collaborative manner was a main institutional concern for each of the experts. Although each of the experts addressed a different aspect of the safety concern, each also had a strategy and called for calm, rational approaches that did not take radical steps that eliminated the innovation all together. In addition to the institutional reaction of the educational establishment, the experts voiced concern with teachers that ignore or misuse the innovation. The full potential of the innovation to affect the learning of students is not going to be realized without the thoughtful and knowledgeable guidance of teachers.

Imaginative Variations

Imaginative variation seems to be one of the more subjective elements of phenomenological reduction, almost like a mystical or spiritual element of the process. In actuality, it is an attempt to find yet one more perspective of the phenomenon. Thinking formally about other viewpoints is extremely valuable. Human nature is to protect and promote personal stance. This step requires the researcher to adopt another viewpoint. Following the imaginative variation, a composite structural description is constructed. This construct further reduces these aspects of the phenomenon. The final step in the phenomenological reduction is to compose a synthesis of the composite textural description and the composite structural description.

Meaning and Perspective Variation

The viewpoint of the critics provides a useful way to imaginatively vary the experiences of the experts in order to discover more underlying elements. The particular viewpoint adopted is the basic concern that significant sacrifices must be made to utilize the innovation and that the innovation takes on a life of its own designed to entrench and perpetuate the innovation at the expense of other valuable elements of society.

Although this exercise does not provide an actual perspective of a critic of educational technology, it does utilize documented viewpoints of critics like Cuban and Postman to identify universal themes. The universal themes rather than perspective understanding are the ultimate goal of this endeavor. Table 4 is a list of structural elements identified in a free fantasy imaginative variation of the themes.

Table 4

Imaginative Variation of Themes

Thematic Element	Critic Viewpoint	Structural Element
Autonomy	Illusion of Autonomy	Control
Constructed Experience	Constructed Distraction	Values
Personal Experience	Banal Appetites	Character
Implementation Issues	Self Perpetuation	Change
Mindset	Entrenchment	World View
Social Issues	Isolation	Interaction

The free fantasy variation yields results that although completely qualitative, are descriptive and a further reduction of the experience of the hyperlink in education. The autonomy of the user identified by the experts would be questioned by critics. They would assert that the innovation was constructed in such a way as to give the user an illusion that they are in control while, by its very nature, it controls the user.

Experts speak of the need for constructed experiences, while critics would assert that the construction of experiences by proponents would distract from other media and methods to promote the hyperlink as a media and method. The experts spoke of personal experiences that grew from the grass roots level of the users. Some critics would question those experiences as nothing more than a mass of the lowest common denominator of appetites.

Experts identified a variety of implementation issues that the critics would identify as the innovation perpetuating itself through the proponents. The element identified as mindset is a group of beliefs identified by the experts that critics might identify as the beliefs of the proponents struggling with any other beliefs to entrench the use of the hyperlink as the only belief. What the experts saw as collaboration and communication, critics consider further evidence of isolation of humans from each other and mechanical collaboration.

The structural elements that reveal themselves in this mock debate illustrate the larger issues with no right or wrong answers, simply elements of concern to most humans. Most people want to know that they are in control of their own life. Their values guide their decisions and develop their character as they act and react in relation to those decisions. Change for anyone is a challenge – a challenge to those decisions and values that have developed over time. When the change is big enough it challenges the very world view and belief system of an individual. The world view allows a person to identify and define the grand philosophical elements of life like love and hate, Truth and lies, even the very sense of self and self identification. The world view is the set of rules that guide the interaction between people. Those interactions are a reflection of the core of an individual.

The Composite Structural Description

The structures underlying the experience revolve around the universal themes of life. Core values guide interactions with others and over time develops

the world view of a person based on the results of those interactions. The world view and core values of a person make up their character. The character of a person determines how the person deals with changes in life that affects those values and the control exerted to embrace or reject that change. The greatest effort is exerted to control those core values that are most important to maintain to the person exerting the effort to control them.

Synthesis of the Composite and Textural Descriptions

The basic and universal experiences of utilizing the hyperlink in teaching and learning seems to be centered on the ability of the student to control his or her own experience while the teachers guide those experiences through meaningful constructs that help students internalize the skill set necessary to make meaningful use of the Internet for learning in the current societal context, including the core values of that society. How the teacher approaches this construction is a direct result of his or her own internal belief system. The learner needs skills and processes to negotiate the discrepancies between their personal world view and the prevailing world view of the society. The hyperlink represents an unprecedented opportunity to connect with the thoughts and wisdom of others, but it also represents an opportunity just as likely to lose self empowerment in a morass of confusion and the banal redundancy of self gratification. These drawbacks are augmented by the poor or non-existent implementations of the teachers that leave the students to develop narrow, simplistic world views or worse to the mercy of the most objectionable world views that actually threaten

the physical safety of the student. One result of these very real threats is that the social structure responsible for protecting the student to limit the access that they control and ignores the fact that this access is pervasive throughout our society. The net effect is that the hyperlink is being under-utilized as a tool for teaching.

Quantitative Phase of the Study

Introduction

The quantitative phase of the study serves to explore the qualities uncovered in the qualitative portion of the study. It is much like taking a magnifying glass and focusing on specific portions of the phenomenological reduction. By seeking the opinions of a sample of the population on the invariant constituents identified by the experts, the research magnifies those qualities allowing for better measurement. This approach has the potential to measure significant differences between teacher and students in relation to the phenomenon and begin to answer the question: What are the differences between the way teachers utilize the hyperlink to teach and the way students utilize the hyperlink to learn, if any?

This section will include a description of the survey procedures and results. The participant recruitment procedures are included first. The characteristics of the sample and the demographics of the school communities are presented next. Finally the results of the survey and analysis are presented at the end of the chapter.

As discussed in chapter three, a matched pair of surveys was constructed. The items clustered around the significant themes with more items devoted to the themes that received the most attention from the experts. The goal of the surveys was to quantify and magnify textures of the phenomenon by exploring the thoughts and opinions of teachers and students

Participant Recruitment

Before letters were emailed to possible participants, the list of initial contacts was obtained from the regional educational technology professional organization. The list was actually the registration information from a recent conference. This information provided confidence that the initial contacts were technology using teachers. At least they possessed enough interest to attend a conference. The drawback was that not all were high school teachers and not all were classroom teachers. This resulted in a large number of referrals.

When all contacts were completed, the recruitment letter was emailed to 395 individuals total following all referrals from initial contacts. In addition to the recruitment email, a second email was sent to potential participants to ensure that contact was not blocked by filters or email spam blockers. The total number of teachers that volunteered to participate and finally completed was 16 teachers and their classes. Of those 16 teachers 10 actually completed the survey.

Although a larger sample would be preferable, the cases studied will provide for a comparison and achieve the goals of the study in this initial version.

There are many factors that influenced this low return rate including decisions that could have been more productive to the sample. Tenth grade is a testing year and although all subject area teachers were contacted, few core subject teachers responded. The self concept of the teachers themselves might have come into play. Many of the contacts were by referral from other educators. Although others see the teacher as a technology using teacher, if the teacher feels like a novice, they would be less inclined to participate. Hindsight shows that more careful attention to the snowballing aspect of the sample would have yielded more teachers. Only one teacher was matched to the surveys of her students taken in another class. The other notable factor is the amount of paperwork required by federal regulations to protect human research participants. The institutional liability for not following those regulations to the exact letter of the law is considerable. The protocol contained procedures that deterred busy teachers from participating. In any case the total sample rate of teachers was four percent.

There are several drawbacks to this low return rate. First and foremost it brings into question the results as valid and reliable. Although the goal of the validity and reliability is to be able to generalize to a larger population, it still casts a shadow of questionability. The rationale for continuing the study was that the goal of these statistical measures was to explore and not generalize. In fact, that this was an initial study where development of the themes and measures intended to explore those themes was equally important.

Characteristics of the Sample

This initial study focused on a convenient sample from eight southwestern urban high schools in the same general metropolitan area but from two different school districts. Two of the high schools were traditional high schools with grades nine through twelve. Three of the high schools contained only grades 10 through 12. One of the schools was a grade six through twelve school of choice. Two schools were alternative settings. Demographic information for the schools came from www.schoolreportcard.org and contained results for the 2005 school year.

One school would not be considered urban. Although most of the district would be urban, this school fits the suburban profile better. Very little poverty and a student body that excels at almost everything they try. The API score is an indicator of student achievement under the No Child Left Behind Act with scores that range from 0 to 1500 with 1500 representing a perfect score. The index is derived from state testing scores, attendance rates, ACT scores and graduation rates among others. The report shows that the school has less than 25% free and reduced lunch participation, an indicator of poverty. The report also shows that 64% of the students are white, 18% are black and 15% of the students are Native American. The ACT participation rate was 74% and the average score on the ACT was 21. The school is situated on the affluent outskirts of the metropolitan area.

In order to set the other end of the spectrum, the next school described will be the school situated in what would commonly be referred to as the inner city. The race of the majority is Hispanic at 54%, while Whites make up 21% and Blacks make up 18% of the school population. Poverty is indicated by the percentage of students participating in the free and reduced lunch program which is almost 90% of the population. The ACT participation rate is 43% with an average score just under 17.

The third school described is a school of choice that requires students to apply for admittance and has two programs for which the students apply. The first program is a rigorous curriculum for advanced studies. The second program is for the fine arts. Less than 25% of the school's students participate in the free and reduced lunch program. The White population is 62%, while the Black population is 18%, and the Asian population is 10%. The student participation in the ACT was 92% and the average score was 24.

The fourth and fifth schools represent the middle of the spectrum. The fourth school has a free and reduced lunch participation eligibility rate of over 30%. The White population makes up 52% of the school, while the Black population is the next largest with 35% of the students. Native Americans are the next largest with 8%. This school's participation in the ACT was 58% and the average score was 19.

The fifth school is quite similar with 48% White students, 31% Black and 14% Native American. The school has 40% of its students eligible for free and

reduced lunch participation. The ACT participation rate was 34% and the average score was 21.

The alternative school was not represented on the report card web site. Students are referred to those programs or apply for seats in the programs for an alternative learning situation. In many cases the class sizes are smaller and the student to teacher ratio is much smaller. By including the alternative programs in the survey recruitment it was hoped that students with alternative learning styles would also contribute to the overall sample even though there is no possible way to identify their results from any of the other results.

Every effort was made to ensure that the sample represented a wide spectrum of student and teacher demographics. The sample contains students from poverty as well as affluent students. The races are well represented as were the various academic levels of achievement. Obtaining this kind of cross section in the sample aligns with the comments made by the experts. They were specifically asked about the average student and often spoke in terms of the average student.

Survey Results

A group of 10 teachers participated in the study. From those classrooms, 128 students completed the survey. The students ranged in age from 14 years to 18 years and attend urban high schools in a southwestern state. Almost 65% of the students were 16 or 17 years old and almost 75% were in tenth or eleventh grade. When asked if they had a computer at home, 86% responded in the

affirmative. According to the survey, 36% of the students spend between one and two hours per day on the Internet. Not surprisingly home (32.9%) and school (34.8%) were selected most as the locations for accessing the Internet. A friend's home was a not too distant third with that location representing 20% of the total selections of all locations. There were 316 selections made from among the five locations. Students were allowed to check all that applied. When asked what they access the Internet for, the most often selected reason was information search at 25.6% with email running a close second at 22.4%. Social networking was third with 88 out of 465 total selections or right at 19% of the total selections made. Finally a large majority (67%) of the students did not know what a wiki was and only 22% knew what it was, but had never contributed to one. Only 10% had contributed to a wiki.

The teachers who participated were also surveyed. Most of the teachers (66%) have taught between one and ten years. One teacher has taught between 11 and 15 years and two teachers have taught more than 20 years. In relation to how much they use technology with their curriculum, 89% reported that they use technology all the time, while one teacher felt he or she was a medium technology user. When asked if they had a computer at home, 100% responded in the affirmative. According to the survey, 78% of the teachers spend between one and two hours per day on the Internet. Not surprisingly home and work combined for 68% of the location selections out of 25 total selections. When asked what they access the Internet for, email and information search tied with 33% of the total

selections each. In fact, all teachers chose both. Social networking was third with three out of 27 total selections or right at 11% of the total selections made.

Finally five (56%) of the teachers did know what a wiki was, but had never contributed to one. Only one had contributed to a wiki, and three did not know what it was.

Since one of the goals of the quantitative measures is to explore the means of the teacher responses and the student responses, table 5 shows the means for the students and for the teachers by item. This allows the reader to see where the differences are and which direction. The items are in the appendix and the numbers refer to the question number. Remember the averages for the students are from the raw data. To maintain the independence assumption, class averages were utilized in the paired t test. This table is a starting point for the exploration and magnification of the student and teacher responses on the matched items.

Table 5

Item Average by student and teacher

Question Number	Student Mean	Teacher Mean
9	3.86	2.30
10	3.43	3.40
11	3.25	3.40
12	3.29	2.70
13	2.81	1.90
14	2.42	1.22
15	2.60	2.20
16 ^a	3.24	1.00
17 ^a	2.48	2.00
18 ^a	2.99	2.40
19	5.25	4.20
20	4.14	4.67

Question Number	Student Mean	Teacher Mean
21	2.37	2.20
22	5.38	6.10
23	3.98	4.40
24	4.01	4.78
25	2.12	1.80
26	4.88	2.90
27	3.47	2.70
28	3.17	2.60
29	4.65	2.10
30	2.81	2.10
31	3.94	4.70
32	4.67	4.40
33	2.94	3.40
34	4.37	3.40

Question Number	Student Mean	Teacher Mean
35	3.03	4.50
36	2.95	4.20
37	2.50	2.90
38	2.11	1.80
39	2.69	2.70
40	5.94	6.40
41	2.65	2.60
42	3.40	3.80
43	2.17	2.70
44	1.81	1.50
45	1.61	1.20
46	3.28	5.00
47	4.95	5.30
48	5.22	4.80

^aThis item was phrased as a negative example so responses were recoded.

A paired samples t test was conducted on each paired sample using SPSS.

The goal of the test is to detect a significant difference (a priori $\alpha = .05$) between the means. A pair was made from the class average for each item and the teacher score for the same item. Once demographics were removed there were 40 items to pair. Table 6 shows the results of the paired t test for all 10 matched pairs.

Table 6

Paired Samples t Test for all items

Scale	Sample	t	df	Sig. (2-tailed)
All Items	Teacher - Student	-.985	9	.351

In order to magnify the differences to explore the themes, scales for each of the thematic elements was created and a paired samples t test was performed for each of the scales. The results are depicted in Table 7.

Table 7

Paired Samples t Test by Thematic Scale

Scale	Sample	t	df	Sig. (2-tailed)
Autonomy	Teacher - Student	-1.103	9	.299
Constructed experience	Teacher - Student	-2.796	9	.021
Experiences	Teacher - Student	-1.423	9	.189
Implementation Issues	Teacher - Student	-1.724	9	.119
Mindset	Teacher - Student	.861	9	.411
Social Issues	Teacher - Student	.742	9	.477

CHAPTER 5

FINDINGS AND RECOMMENDATIONS

Introduction

This investigation represents a tremendous learning experience. Designing and implementing a study is a lofty and idealistic endeavor coupled with hard work and real world hardships. Anyone who engages in this process learns more than just the answer to the question they pose. In the beginning this study was initial thoughts about approaching a particular innovation that most people take for granted and examining it as a phenomenon. The results do more than just answer the question, which happens to be *yes* there is a difference between the way teachers utilize hyperlinks to teach and the way students utilize hyperlinks to learn. The process of deriving the results suggests more questions and better ideas about how to explore this phenomenon by expanding and modifying the approach. That is the epitome of inquiry.

The mixed methods utilized in this study reveal aspects of the hyperlink that informs the way teachers and students utilize this phenomenon in teaching and learning. The phenomenological reduction was designed to find thematic elements and explore those elements. The quantitative phase was also designed to explore those same elements through the lens of statistics. The statistics used were never intended to generalize back to a larger population, but magnify through mathematics, the differences already suggested by the experts.

This chapter provides a summary of the findings of the qualitative portion of the study. Then connections of those findings to the literature help with the explication. The quantitative results are summarized and discussed in the next section and the chapter is concluded with the recommendations and suggestions for next steps.

Summary of qualitative findings

Although the qualitative findings yielded the thematic elements later utilized for the quantitative survey, the complete analysis provides insight into the phenomenon from the expert viewpoint. All four individuals contributed unique perspectives within distinct thematic groupings, yet all four felt strongly that there was indeed a difference in the way teachers utilize the hyperlink to teach and the way students utilize the hyperlink to learn. The themes of autonomy, constructed experiences, personal experiences, mindset, implementation issues and social networks stood out the most.

Many of the ideas discussed have a dichotomy of costs and benefits. The experts are not only aware of this dichotomy, they are constantly weighing the costs against the benefits. One suggested that waiting for any innovation to prove itself is always prudent. Another suggested that taking time to just be alone and unplugged was crucial to understanding and manipulating these tools rather than being manipulated by them.

The thematic groupings served as an organizational tool for each of the textural descriptions that were merged into the composite textural description.

That description provided the insight that convenience is more than a luxury; it is a necessity and should be perceived as immediacy of access. Another result from the sub-themes revealed that hyperlinked multimedia has a transformative effect. Although most people attribute the transformation to the Internet in general it is actually the World Wide Web and the ability to locate resources throughout the Internet network that is transforming the way people think about information and use it. This transformation is also causing people, even proponents, to question the safety of individuals, especially the young in relation to the unprecedented amount of exposure.

Imaginative variation revealed more underlying structures especially those universal structures that might shed light on the global usage of this resource. Core values played a prominent role in the structural description. Everything seemed to keep coming back to that concept. Not only what a person thinks or believes, but how those thoughts and beliefs play themselves out in their character plays a role in how the hyperlink is used and the effect it has on society.

The conclusion of the reduction was a synthesis of the composite and textural descriptions. The heart of that synthesis is the dichotomy of unprecedented access to not only text and other media, but also to the thoughts and feelings of other people and the social skill and responsibility to interact ethically with those media, thoughts and feelings. The results indicate that while students are embracing those aspects of the hyperlink and perhaps even altering their perception of the world based on those aspects, teachers approach them with

more caution for well founded reasons. The end result, however, is the subtle and unintentional misuse of the hyperlink that minimizes its role or utilizes it to support the traditional status quo. That usage leaves students to utilize the hyperlink on their own, developing skills that might be effective but don't allow them to reach their full potential.

The theme of the control dichotomy seems very significant as well. Teachers and schools want to control how the students utilize hyperlinks from a sense of protection of students, but the ability to control the student's use stops at the school doors. Consequently, the draconian measures adopted by many schools invite the derision of the students and prevents teachers from interacting in a meaningful way with the innovation. Rather than relegating that control to other sectors of the society, schools need to recognize the lack of control they really have and direct efforts into developing strategies to teach students to internalize appropriate and ethical information usage, which is not a concept that is foreign to schools.

In the final analysis of the qualitative results, the internalizing of information is the main difference between the teachers and the students. The experts spoke of "internal filters" for information and "posthole" knowledge developing at the mercy of the search results list with millions of entries. Ultimately the issue is how do we internalize the information flowing to us from so many sources and effectively filter what is important and necessary for our

success. The experts agree that this is not an intrinsic or instinctual skill.

Knowledgeable teachers develop these skills in their students.

Qualitative Connections to the literature

The connections to the literature are very much predictable because it was the literature that led to the construction of the survey instrument. Although critics and proponents alike contributed concepts and ideas to the phenomenological investigation, expert proponents were interviewed. Consequently in an effort to balance the analysis, one proponent and two critics will be used to connect the results of the phenomenological reduction to the thoughts prevalent in the discussion. Willis (2003) is the lone proponent, while Cuban (2001), will provide some connections. The bulk of the discussion will focus on Postman (1992) and the big picture thoughts that are at the heart of the results.

Willis (2003) illuminated the need for the discussion to shift from promoting computerized education or promoting caution about bringing technology to the classroom to talking about how teachers approach teaching and learning and identifying those tools needed to be successful with that approach. Those who write about technology in education follow one of those two approaches in most cases. The promoters are cast as enthusiasts as if it were some kind of hobby rather than a serious approach to teaching. The cautionary are cast as luddites falling behind the times. Sometimes, society understands and work with these types of stereotypes which keeps things simplified.

Of course the truth is somewhere in between, and Willis' terms are a little more accurate, though still dichotomous. He refers to the "progressive" ideology as competing with the "conservative" ideology (p. 23), and concludes the article with the idea that critical theory plays a role as well (p. 27). He identifies these as the "three ideological families" that contribute philosophy and influence the education and its use of technology (p. 30).

The results of the phenomenological reduction indicate that teacher concerns and values play a large role in how they approach the use of this innovation. On the conservative side experts have witnessed teachers approaching the innovation with caution for a variety of reasons. This cautious approach even resulted in avoidance to the point one expert related an experience where a teacher had fabricated excuses for non-use. Implementation issues were at the heart of that, but a great example of how this caution comes about.

According to the experts the teachers approach the innovation with traditional methods in mind. The innovation is not suited well to the methods they would like to use, so more caution is the result. These factors point to the advice of all the experts, proponents and of the critics as well. Teacher professional development and meaningful mentoring is a necessity and critical for successful implementation of the hyperlink as a learning tool.

Cuban (2001) dispels the notion that all schools need to do is spend money to fill classrooms with computers. Cuban cites two factors that relate to what the experts reported. In Cuban's investigations he discovered that computers are

designed to work the way teachers teach. The experts cited the non-linearity of the hyperlink and the transformational use as being key to the use of the innovation. Consequently, the other factor, lack of institutional support, is magnified by the teacher's use. Several of the experts discussed the traditional use being forced into the hyperlinked realm turning the Internet into a big dictionary or library. Institutional support to match institutional expectations is necessary to impact this aspect of implementation.

Before a school community can determine those expectations, the community has to understand how its ideology will develop in the technology arena. Postman (1992) argued that "new technologies compete with old ones—for time, for attention, for money, for prestige, but mostly for dominance of their world view" (p.16). The experts noted that the pervasive nature of the innovation was important for educators to understand. In the current educational environment of standards based achievement and high stakes testing, schools could easily adopt test performance as their sole ideology. One expert spoke of the revival of drill and practice computer programs that apparently had all but disappeared in the opinion of this expert. The resurgence was attributed to the high stakes testing and the content focused climate.

Postman would argue that this is an example of technology exerting its dominance over education, that it is the process of "technopoly" or the deterioration of culture at the hand of technology (p. 20). His cure for this matches the exhortations of the experts. They were afraid of the shallow,

superficial knowledge produced by test driven teaching that misuses or trivializes the hyperlink. Several of them related examples and all look for a real transformation when students are allowed to discover knowledge as Postman suggests.

In consideration of the disintegrative power of Technopoly, perhaps the most important contribution schools can make to the education of our youth is to give them a sense of coherence in their studies, a sense of purpose, meaning and interconnectedness in what they learn. (p. 185)

What Postman would not agree with is the idea that technology is really neutral in this debate and the ideology of the teachers and administrators plays a much larger role. He would argue that the classroom teacher is not given much choice, that technology is thrust upon them. While that is true to a certain extent, teachers and building administrators have the ultimate power in this arena. If they don't support an innovation it will wither. Teachers might be the most successful professionals at resisting change and continuing to operate.

The hyperlink, unlike other programmed, passive technology, is the ideal innovation for accomplishing this interconnectedness. That is what the hyperlink does. The hyperlink removes the barriers of space and time providing for coherence. Having multiple viewpoints laid out side by side is another benefit of the innovation. All the good things about this innovation, though, are moot. The experts stress that it takes a guide willing to teach students to think and explore.

Summary of Quantitative Findings

The answer to the research question is yes, but from a statistical viewpoint, the difference is not significant when the survey is taken as a total scale. This finding is in and of itself interesting since the prevailing assumption among educators is that students are much different users of the Internet when compared to teachers. This finding dispels that myth and supports the idea that teachers and students are not as different as educators think they are. There may be various reasons the difference is not significant statistically, and some of those will be discussed in an effort to explore the themes.

As the results show, when the themes are treated as scales and there is only one significant difference. In an effort to explore that difference, table 8 shows the means for teachers and students and the differences in those means. The table is organized by the qualities addressed by the items.

Table 8

Qualities Examined in Constructed Experience Theme by Mean Difference

Quality	Teacher Mean	Student Mean	Mean Difference
Use Connected to Curriculum (negative phrased item 16)	1	3.24	-2.24
Teacher knowledge (item 14)	1.22	2.42	-1.2
Planning (item 13)	1.9	2.81	-0.91
Real world connection (negative phrased item 18)	2.4	2.99	-0.59
Teacher awareness (negative phrased item 17)	2	2.48	-0.48
Engaging use (item 15)	2.2	2.6	-0.4

These items explored the shared context of the classroom so the interest factor increases as the results indicate a significant difference between the way the teachers intend to utilize the hyperlink and the ways the students perceive that use. The negatively phrased item was designed to address the connection of the hyperlink usage to the curriculum. When class work is seen as busy work,

students see no relevance or connection of the work to the learning goals in the classroom.

Also notable is the fact that there was no variance between the teachers. This indicates that 0 out of 10 teachers responded that they use the innovation for busy work. Although it should not be surprising that 10 teachers would not admit to assigning busy work, the idea of using the Internet for busy work is a different proposition. Most of the time teachers have to take a class to a location or bring in mobile laptop labs, making other busy work options much more appealing.

In the spirit of exploration, one finding seems as interesting as the significant finding on the curriculum connection. That is the similarity of means on the engaging use item. This supports the idea that teachers are seeing students more engaged with the material when the Internet is used. This matches up with the data on item 33 where students mostly agree that the Internet is more engaging. Item 42 indicates that students are more or less neutral about their preference for using the Internet. On item 12 students report less learning from following hyperlinks than teachers. These data taken together would support the notion that students like to get on the Internet, but experiences have not yet been successful enough to develop a preference or even register as learning in the mind of the students.

Quantitative Connections to the Literature

The prevailing assumption is that teachers and students are not making the hyperlink work in learning. All the critics including Postman (1992), Cuban

(2001) and Oppenheimer (2003) state in one way or another that placing a computer in the hands of a student does not produce learning yet they point to statistic after statistic that shows educators and schools doing just that. The significant result of the survey data highlights that fact. Although this preliminary foray into this investigation needs more and better data, these data indicate that what is happening in the classroom is perceived differently by students and teachers.

Recommendations

Recommendations for further investigation of these ideas fall into two categories. First there is the necessity to continue the investigation on a formal level with improved protocols. Second is the action that could be carried out right away by teachers. The qualitative findings strongly support the role of an engaged teacher in the guidance of young people as they utilize this innovation. Before teachers attempt that guidance, they need to examine their personal belief systems and find a balance that will enable them to become those guides that students need.

The formal improvement of the methods utilized to investigate this phenomenon would be worth while pursuing. The mixed method used could be strengthened with a better sample and by revising the items used in the survey to make them more reliable. Reliability measures run on the teacher and on the student survey show that the instrument as a whole was reliable. Table 9 summarizes the reliability statistics for the student survey which shows a wide

variety of alpha levels, but the alpha for the survey as a whole is strong. If, however, sub-themes are going to be utilized as substance for entire surveys, more and more reliable items will need to be developed.

Table 9

Reliability Statistics for Student Survey

Scale	Cronbach's Alpha
Autonomy	.622
Constructed Experience	.186
Personal Experience	.633
Implementation Issues	.456
Mindset	.733
Social Issues	.609
Entire Survey	.848

The results for the teacher's survey showed the same kind of variation in the level of alpha. Even though only the constructed experience theme and the mindset theme attained the $< .700$ level, the survey as a whole was $< .700$ as shown in table 10.

Table 10

Reliability Statistics for Teacher Survey

Scale	Cronbach's Alpha
Autonomy	.514
Constructed Experience	.703
Personal Experience	.318
Implementation Issues	.347
Mindset	.903
Social Issues	.659
Entire Survey	.823

One improvement needed is a set of items for each scale that show acceptable reliability. One approach may be to develop entire surveys just on one scale like mindset. This scale performed acceptably on each of the surveys. Modeling wording and structure on those items but identifying qualities of the other themes might prove helpful in producing similar reliability results for the other subscales. The constructed experience theme could improve reliability and should to verify the results found in this study.

One possible variation of the study could be to alter the definition of the term “expert” to include students. Although students might not be expert with the methods and theories of teaching, they could have a significant level of expertise in learning. Developing criteria to identify and interview those individuals might

lead to an entirely different set of thematic elements more closely related to the learning perspective than the teaching perspective.

Another recommendation could be to change the methods used to study these same concepts. A case study seems to fit the situation and would illustrate how to study this phenomenon in a particular type of setting. Another approach that seems well advised is a grounded theory approach to strictly identify theoretical constructs related to the themes. Whereas the phenomenological reduction served well in this study, grounded theory would produce additional rigor to the investigation and generate new theory to illuminate or dispel the structures identified so far.

In the other category of more immediate strategies, the qualitative and quantitative findings suggest that teachers need to increase their awareness. Although professional development and life-long learning are always needed, the awareness needed by teachers will not be learned from a workshop. Many teachers depend on being unconsciously skilled and using intuition to recognize these differences in their students. The issue is when taking the findings of the quantitative and the qualitative together, the pattern of teacher behaviors diverging from student behaviors in the classroom begins to emerge.

Not only should current teachers engage in professional development to develop skills to influence and guide students, pre-service teachers should be trained as well. Although many pre-service teacher programs require technology course work, many times this course work is focused on the applications and

completely ignores the thematic elements identified in this study. Teachers need to be prepared for how students actually utilize hyperlinks in their lives and for how school districts typically treat those same links that the students access outside the district network.

Teachers need to realize the role their own beliefs play in those behaviors. Individuals could investigate themselves to determine where they are ideologically. Willis (2000) includes a table with a wide spectrum of ideologies in his article. A teacher's self knowledge in that area is a good start, but the most effective awareness will be when the teacher understands how each and every one of his or her students utilizes the Internet as a learning tool. This knowledge allows the teachers to approach two specific areas in the instructional program of his or her students.

First the teacher can identify any gaps in the student experience or in his or her own experiences. Technology is changing at an incredible rate, and staying up with all the innovations, especially on the Internet, is a challenge. The hyperlink is no exception. Just when it seems like nothing new could be done with it, someone finds a new situation in which to apply it. In order to stay relevant and keep the students relevant, teachers need to utilize things like wiki and blogs in learning context and not just for the sake of the technical skill.

This kind of innovation is just what will address the concerns of the critics. The hyperlink embodies what is best about the technology. It democratizes the technology and frees it from technopoly. Instead of draining the

soul from the culture, it makes not only that culture, but many others accessible as well. It creates the dialog and allows it to be modified while maintaining all versions for reference. It contains all aspects of thoughts. This leads to the second aspect identifying areas of guidance for students.

Since the hyperlink can take students to any thought and illustrate it and provide step by step instructions for making the thought a reality, students need guidance in their use of the innovation. Teacher's awareness of these aspects of the Internet is only the beginning. Teachers can utilize tools on the Internet to investigate the thoughts and behaviors of their own students. Although it is out of the purview of this dissertation, a practical approach would be to have teachers collect the data and analyze it themselves.

Some researchers would refer to this as "Participatory Action Research" (Wikipedia, 2007). Although there is an entire process and multiple levels of involvement in the practice of action research, it might be a teacher simply giving a survey to his or her students and examining the results to assess what guidance is necessary. The alternative is relying on the unconsciously skilled assessments made by teachers every day. These gut feelings might be on the mark, but they could be slightly off as the results of this survey suggest.

Summary

The goal of this dissertation was to investigate the effect of the innovation of the hyperlink in education. The results indicate that not only does the hyperlink impact teaching and learning, it will continue to do so in increasing

measures. Data collected in qualitative procedures and in quantitative procedures both support the idea that students utilize the innovation, but need a knowledgeable teacher aware of the nuances of the innovation to guide them to the most effective and productive use of the innovation. This guidance is less of a skill building initiative and more of an awareness building initiative.

The use of the Internet in schools is fraught with ethical and safety issues as well as implementation issues that cause school personnel to become reactionary. The data gathered in this investigation suggest that over control by the school districts will push the student use outside the school walls and into unguided territory. Teachers will be unable to provide guidance when district policy locks them out of the part of the Internet the students are using on their home machines.

Some school personnel would put that problem on the shoulders of the parents. The problems encountered on the Internet are symptoms of greater need of the very society that produced the problems. Postman (1992) believes it is education that can address these needs. What he suggests “is not child-centered, not-training centered, not skill-centered, not even problem-centered. It is idea-centered and coherence-centered” (p. 188).

Teachers must promote the big ideas or the “assent of humanity” (Postman, 1992, p. 187). The hyperlink provides a venue for that discussion. It provides a vehicle to explore history without the confines of the prejudices or agendas of a text book company. It allows for the investigation of ideas and

thoughts in levels never before possible across ages and through the viewpoints of dozens rather than a few. What teachers have to understand is what is lost in that bargain. Editorial filter is one casualty and of course the risk that an alien socially unacceptable viewpoint might be adopted.

In conclusion, teachers are more necessary than ever in the hyperlinked environment. If we abandon our youth to the unguided avenues of the Internet, our society will pay in superficiality, banality and narrow, meaningless pockets of subject expertise. Most of us would agree that definition describes our world already, but that assumption is unfounded. It sounds like another study for another time.

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APPENDIX A:
EXPERT INTERVIEW PROTOCOL

Interviewee: _____

Interviewer: _____

Survey Section Used:

_____ A: Interviewee Background

_____ B: Institutional Perspective

_____ C: Personal use of the Internet

_____ D: Personal recognition of changes in learning style

_____ E: Impact of the hyperlink on Teaching and Learning

Other Topics Discussed: _____

Documents Obtained: _____

Post Interview Comments or Leads:

Effects of the hyperlink on Teaching and Learning

Introductory Protocol

To facilitate our note-taking, I would like to record our conversations today with this digital recording device and saved in an encrypted computer file. Please sign the release form. For your information, only committee members and I will be privy to the recordings which will be eventually destroyed after they are transcribed. In addition, you must sign a form devised to meet our human subject requirements. Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) I do not intend to inflict any harm. Thank you for agreeing to participate.

I have planned this interview to last no longer than one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning.

Introduction

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about teaching, learning, and technology based on your nationally recognized writings and speeches on the subject. My research project as a whole focuses on the effects of the Internet on teaching and learning activity, with particular interest in identifying the extent of the effects on students and teachers. Our study does not aim to evaluate your positions or experiences. Rather, I am trying to learn more about teaching and learning, and hopefully learn how to improve the educational use of technology.

The first thing I would like for you to do is create a concept map on this page [concept map document]. The central concept is educational use of the hyperlink. Just put down as many interconnected concepts as you can in the next five or so minutes.

A. Interviewee Background

How long have you been writing and speaking about educational technology?

How did you get involved?

What motivates you to use innovative techniques in your teaching?

B. Institutional Perspective

Do you think schools utilize the Internet appropriately for teaching and learning?

How is the average teacher using the Internet as a teaching tool?

Probes: Is it working – why or why not?

C. Personal use of the Internet

Do you use the Internet everyday?

Why?

Probes: is it easier or faster? What makes it better than more traditional means?

D. Personal recognition of changes in learning style

Do you think the Internet has changed the way you learn?

What quality does the Internet provide you that accommodate your personal learning style?

How?

E. Impact of the hyperlink on Teaching and Learning

Do you think the hyperlink has impacted the average student?

Probes: if yes, how? If no, Why not?

How should the ideal student use the Internet?

Do you think the hyperlink has impacted the average teacher?

Probes: if yes, how? If no, Why not?

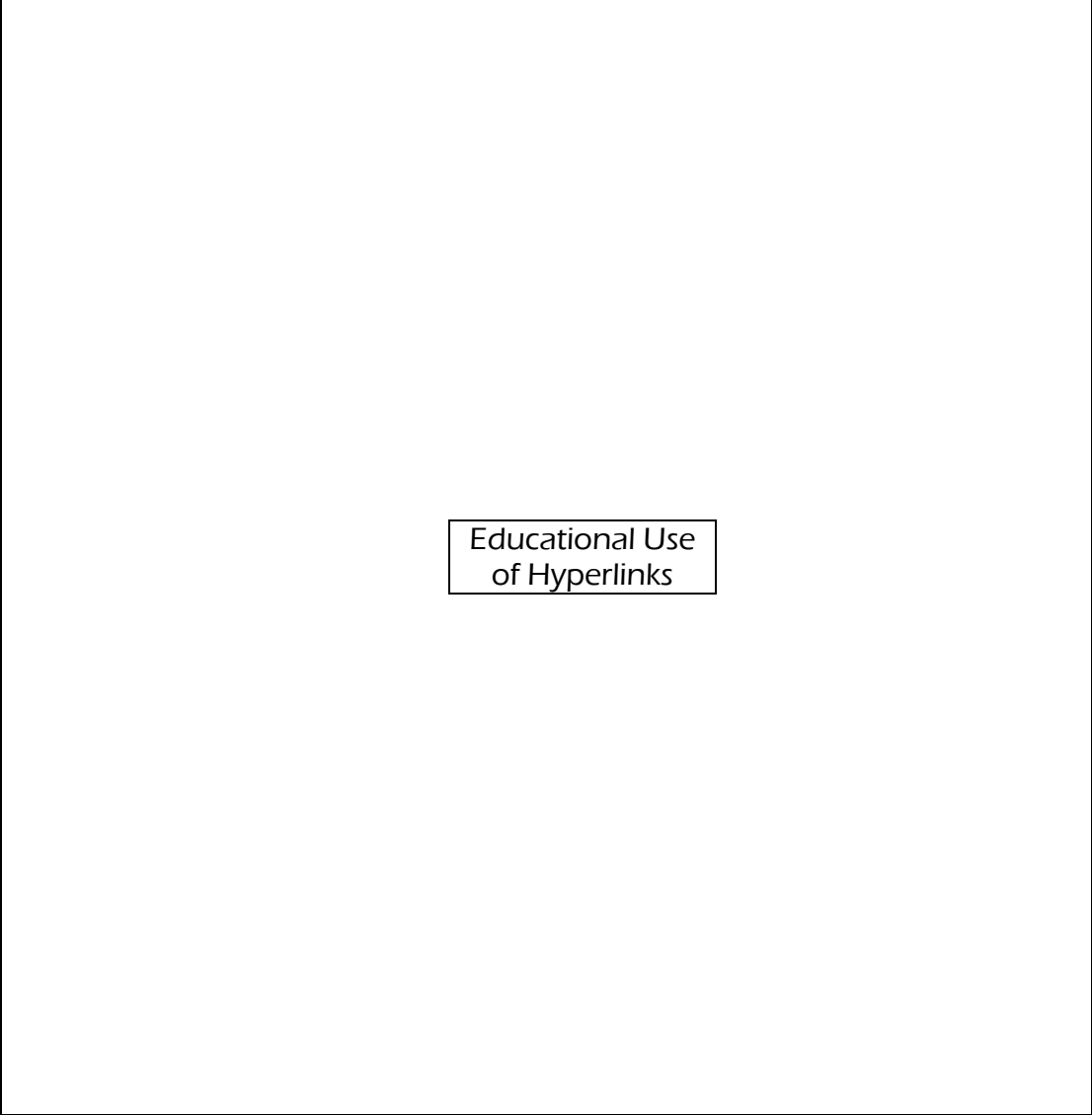
How should an ideal teacher use the Internet?

Do you have any insights about the hyperlink as an educational tool that my questions haven't touched on?

Post Interview Comments and/or Observations:

Educational Use of the Hyperlink Concept Map

Concept maps help develop logical thinking because they reveal connections and help you see how individual ideas make up a larger whole. We will be using it to help explore the idea of the hyperlink which is a very simplistic technology, but has complex effects. You can make the maps simple or complex, linear, branched, radiating, or cross-linked. Simply write down as many concepts as you can that are interrelated and use a link to illustrate that relationship.



Educational Use
of Hyperlinks

APPENDX B:
STUDENT SURVEY INSTRUMENT

1. Enter the Teacher number below

2. How old are you?

☐

14

☐

15

☐

16

☐

17

☐

18

3. What grade are you in?

☐

10th

☐

11th

☐

12th

4. Do you have a computer at home?

Yes ☐

No ☐

5. In general How many hours a day do you spend on the Internet?

☐

less than 1

☐

1 to 2

☐

3 to 4

☐

5 to 6

☐

7 to 8

☐

9 to 10

☐

more than 10

6. Check all that apply.

Where do you access the Internet?

☐

Home

☐

School

☐

Work

☐

A friend's home

☐

Other

7. Check all that apply.

What do you use the Internet for?

☐

Information search (Google, Yahoo, etc.)

☐

Email (Yahoo mail, Gmail, Hotmail, etc.)

☐

Instant Messaging (AIM, Yahoo Instant Messenger, ICQ, etc)

☐

Communication (Skype, Yahoo Messenger, etc)

☐

Social Networking (Facebook, Myspace.com, etc)

8.

Have you ever contributed to a wiki web site?

☐

Yes

☐

No

☐

Don't know what that is?

This series of statements asks you to tell how much you agree or disagree with the statement. The circle next to "Agree" means you couldn't agree more. The circles between "Agree" and "Neutral" means your opinions are somewhere in between as do the circles between "Neutral" and "Disagree." Clicking the circle next to "Disagree" means you couldn't disagree more.

9. I like to click links to find out more about some things I see on the web.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

10. I learn more from the Internet than I do from textbooks or classes.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

11. The answers I find on the Internet match the answers my teachers are looking for.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

12. I learn a lot of things I didn't intend to learn by following links.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

13. Thinking of the teacher that uses the Internet most often with my class, he or she seems really prepared like he or she planned to use the Internet with us.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

14. Thinking of the teacher that uses the Internet most often with my class, he or she seems to know what they are doing with the Internet.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

15. Thinking of the teacher that uses the Internet most often with my class, he or she does a good job of using the Internet in interesting ways that really help me learn.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

16. Thinking of the teacher that uses the Internet most often with my class, he or she seems to only use the Internet to give us busy work or kill time.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

17. Thinking of the teacher that uses the Internet most often with my class, he or she seems to just do it to make us happy and doesn't really know what we are doing.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

18. Thinking of the teacher that uses the Internet most often with my class, his or her assignments don't teach me anything about using information in the real world.

Agree ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

This series of statements asks you to tell how often you do these things on the Internet. The circle next to "Often" means this happens most of the time when you get on the Internet. The circles between "Often" and "Sometimes" mean how often these things happen is somewhere in between as do the circles between "Sometimes" and "Never." Clicking the circle next to "Never" means that particular thing never happens to you when you are on the Internet.

19.
I feel like clicking a hyperlink is like traveling to a different place or time.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
20.
I write things and put them on the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
21.
When I need to learn something outside of school, I think of the Internet first.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
22.
I use things I got in an Instant Message for school work.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
23.
I feel like I learn more on my own from the Internet than I do from school.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
24.
I have a personalized flow of information from the Internet coming to me.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
25.
I feel safe in the way I use the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
26.
I am worried about the safety of one or more of my friends because of how they use the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
27.
I encourage teachers to use the Internet in the classroom.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
28.
Teachers and students who use the Internet are more successful.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never

This series of statements asks you to tell how much you agree or disagree with the statement. The circle next to "Agree" means you couldn't agree more. The circles between "Agree" and "Neutral" means your opinions are somewhere in between as do the circles between "Neutral" and "Disagree." Clicking the circle next to "Disagree" means you couldn't disagree more.

29.

My teachers avoid using the Internet because they don't know how to use it.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

30.

I think my teachers would approve of what we could learn on the Internet if they knew more about it.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

31.

The Internet is just part of life, except at school.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

32.

Using technology is always a trade off. You have to give something up to use it.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

33.

I am more likely to be excited about a lesson when I know the Internet is going to be used.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

34.

My teachers think I am an Internet expert, but I don't know more than most people.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

35.

If I knew more I could do a lot more for personal learning using the Internet.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

36.

The Internet is better than books because it is more current.

Agree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Disagree

37.
The Internet is better than books because I can find answers faster.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
38.
The convenience of the Internet is very important to me.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
39.
Since I access more information more often I learn more.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
40.
I have written in a wiki for school work.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
41.
Teachers should use the Internet more because it is getting easier and easier to use.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
42.
I would rather keep trying the Internet even if it isn't working right rather than get out a book to find some information.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
43.
The Internet is just more fun than books.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
44.
Schools are nervous about what students do on the Internet.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
45.
Schools want to control student use of the Internet.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
46.
The Internet is a big part of my social life.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
47.
I have as many Internet friends as I do school friends (not counting the ones that are both).
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
48.
I have Internet friends that I turn to for information when I have a problem.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree

APPENDIX C:
TEACHER SURVEY INSTRUMENT

1. Enter the Teacher number below

2. How many years have you taught?

☐ Less than 5

☐ 5-10

☐ 11-15

☐ 16-20

☐ More than 20

3. Rate your level of technology use in the curriculum.

☐ High, I use technology all the time.

☐ Medium, I can and do use technology.

☐ Low, I have a fear of technology

4. Do you have a computer at home?

Yes ☐

No ☐

5. In general How many hours a day do you spend on the Internet?

☐ less than 1

☐ 1 to 2

☐ 3 to 4

☐ 5 to 6

☐ 7 to 8

☐ 9 to 10

☐ more than 10

6. Check all that apply.

Where do you access the Internet?

☐ Home

☐ School

☐ Work

☐ A friend's home

☐ Other _____

7. Check all that apply.

What do you use the Internet for?

☐ Information search (Google, Yahoo, etc.)

☐ Email (Yahoo mail, Gmail, Hotmail, etc.)

☐ Instant Messaging (AIM, Yahoo Instant Messenger, ICQ, etc)

☐ Communication (Skype, Yahoo Messenger, etc)

☐ Social Networking (Facebook, Myspace.com, etc)

☐ Other

8.

Have you ever contributed to a wiki web site?

☐ Yes

☐ No

☐ Don't know what that is.

This series of statements asks you to tell how much you agree or disagree with the statement. The circle next to "Agree" means you couldn't agree more. The circles between "Agree" and "Neutral" means your opinions are somewhere in between as do the circles between "Neutral" and "Disagree." Clicking the circle next to "Disagree" means you couldn't disagree more.

9. I like to click links to find out more about some things I see on the web.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

10. I learn more from the Internet than I do from textbooks or classes.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

11. The answers students find on the Internet match the answers I am looking for.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

12. I learn a lot of things I didn't intend to learn by following links.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

13. I really prepare well and have a good plan when using the Internet with students.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

14. More often than not, I know what I am doing when using the Internet with students.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

15. I feel like I do a good job of using the Internet in interesting ways that really help students learn.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

16. I only use the Internet to give students busy work or kill time.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

17. I let students use the Internet just to make them happy and don't really understand what they are doing.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

18. My assignments using the Internet aren't intended to teach students anything about using information in the real world.

Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

This series of statements asks you to tell how often you do these things on the Internet. The circle next to "Often" means this happens most of the time when you get on the Internet. The circles between "Often" and "Sometimes" mean how often these things happen is somewhere in between as do the circles between "Sometimes" and "Never." Clicking the circle next to "Never" means that particular thing never happens to you when you are on the Internet.

19.
I feel like clicking a hyperlink is like traveling to a different place or time.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
20.
I write things and put them on the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
21.
When I need to learn something, I think of the Internet first.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
22.
I use things I got in an Instant Message for work.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
23.
I feel like students learn more on their own from the Internet than they do from school.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
24.
I have a personalized flow of information from the Internet coming to me.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
25.
I feel safe in the way I use the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
26.
I am worried about the safety of one or more of my students because of how they use the Internet.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
27.
I encourage teachers to use the Internet in the classroom.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never
28.
Teachers and students who use the Internet are more successful.
- Often ☐ ☐ ☐ Sometimes ☐ ☐ ☐ Never

This series of statements asks you to tell how much you agree or disagree with the statement. The circle next to "Agree" means you couldn't agree more. The circles between "Agree" and "Neutral" means your opinions are somewhere in between as do the circles between "Neutral" and "Disagree." Clicking the circle next to "Disagree" means you couldn't disagree more.

29. Teachers avoid using the Internet because they don't know how to use it.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
30. I think teachers would approve of what students could learn on the Internet if they knew more about it.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
31. The Internet is just part of life, except at school.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
32. Using technology is always a trade off. You have to give something up to use it.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
33. I am more likely to be excited about a lesson when I know the Internet is going to be used.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
34. Most students are Internet experts.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
35. If I knew more I could do a lot more for personal learning using the Internet.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
36. The Internet is better than books because it is more current.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree
37. The Internet is better than books because I can find answers faster.
- Agree ☐ ☐ ☐ ☐ Neutral ☐ ☐ ☐ Disagree

38.
The convenience of the Internet is very important to me.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
39.
Since I access more information more often I learn more.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
40.
I have written in a wiki to accomplish something at work.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
41.
Teachers should use the Internet more because it is getting easier and easier to use.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
42.
I would rather keep trying the Internet even if it isn't working right rather than get out a book to find some information.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
43.
The Internet is just more fun than books.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
- Schools are nervous about what students do on the Internet.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
45.
Schools want to control student use of the Internet.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
46.
The Internet is a big part of my social life.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
47.
I have as many Internet acquaintances as I do traditional acquaintances.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree
48.
I have Internet friends that I turn to for information when I have a problem.
- Agree ☐ ☐ ☐ ☒ Neutral ☐ ☐ ☐ Disagree

APPENDIX D:

MOUSTAKAS' PHENOMENOLOGY METHOD (1995)

1. Epoche: setting aside prejudgments and opening the interview text with an unbiased, receptive presence.
2. Phenomenological reduction:
 - a. Bracketing the topic or question
 - b. Horizontalization: every element has equal value
 - c. Delimited horizons or Meanings: horizons that stand out as invariant qualities of the experience.
 - d. Invariant Qualities or Themes: Non-repetitive, non-overlapping invariant qualities clustered into themes.
 - e. Individual textural descriptions: an integration, descriptively, of the invariant textural constituents and themes of each research participant.
 - f. Composite textural description: an integration of all the individual textural descriptions into a group or universal textural description.
3. Imaginative variation:
 - a. Vary possible meanings
 - b. Vary perspectives
 - c. Free fantasy variation
 - d. Construct a list of structural qualities of the experience
 - e. Employ universal structures as themes

f. Create a composite structural description

4. Synthesis of textural and structural descriptions: Intuitively-reflectively integrate the composite textural and composite structural descriptions to develop a synthesis of meanings and essences of the phenomenon or experience.