A STUDY OF OKLAHOMA CAREER AND TECHNOLOGY CENTER ADMINISTRATORS REGARDING PERCEIVED CHALLENGES AND RECOMMENDED SOLUTIONS OF UTILIZING AND MAINTAINING INTERNET IN INSTRUCTIONAL PROGRAMS

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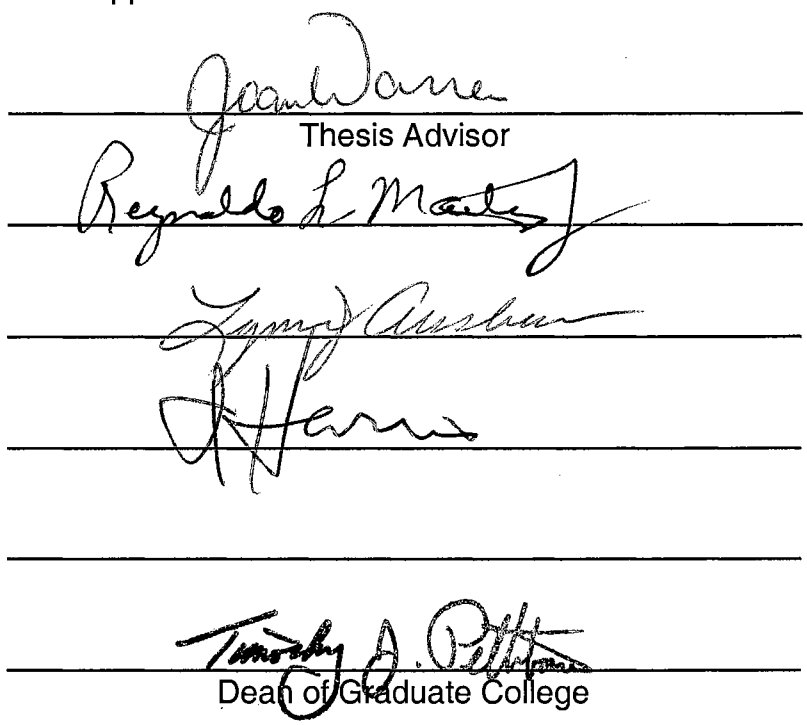

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CHAPTER I

Introduction to the Study

Background of the Problem

"We know, purely and simply, that every single child must have access to a computer, must understand it, must have access to good software and good teachers and to the Internet, so that every person will have the opportunity to make the most of his or her own life. Our ... challenge is to provide Americans with the educational opportunities we'll all need for [the 21st] century. In our schools, every classroom in American must be connected to the information superhighway with computers and good software and well-trained teachers. We are working with the telecommunications industry, educators, and parents to connect ... every classroom and every library in the entire United States by the year 2000. I ask Congress to support this educational technology initiative so that we can make sure this national partnership succeeds." President William Jefferson Clinton, State of the Union Address, January 23, 1996 (U.S. Department of Education [USDOE], *1996;* Pelavin Research Institute, 1997).

On February 15, 1996, President Clinton and Vice President Gore announced the Technology Literacy Challenge, envisioning a 21st century where all students benefit from the use of educational technology. The challenge was placed before the nation as a whole, with responsibility for its accomplishment shared by local communities, states, the private sector, educators, parents, the federal government, and others. Four concrete goals were established as a foundation to define the task before the nation.

- All teachers in the nation will have the training and support they need to help students learn using computers and the information superhighway.
- All teachers and students will have modern multimedia computers in their classrooms.
- Every classroom will be connected to the information superhighway.
- Effective software and online learning resources will be an integral part of every school's curriculum (Glennan, and Melmed, 1996; USDOE, 1996).

"The 21st century is America's for the taking--if we are bold enough and strong enough and confident enough to go forward together. We will make the best of this new technology together. We will educate our children with it, improve our businesses with it, make our government more democratic with it, and build a brighter, freer, more prosperous future with it. That is the American way." President W. J. "Bill" Clinton (USDOE, 1996).

The role of the federal government was viewed by the president to be one of leadership with support of targeted funding to be made available to support activities initiated by states and local communities which would contribute the greatest efforts and play the largest roles in meeting the technological goals that had been established. Each state would face challenges of massive proportions to effectively reprioritize existing funding and encourage new private sector contributions within local communities to adequately fund the demands of meeting the national educational goals that had been established by year 2000 (USDOE, 1996).

> "New Technologies can be an incredible tool of empowerment in schools, homes, businesses, community centers and every other part of our civic life. ... Imagine if computers and Internet connections were as common in every community as telephones are today; if all teachers had the skills to open student's eyes and minds to possibilities of new technologies; if every small business in every rural town could join worldwide markets once reserved for the most powerful corporations - just imagine what America could be." President Clinton (The White House Office of the Press Secretary, 2000, p. 5)

President Clinton's challenge called for the placement of high quality computers, one for every five students, in all American schools by the year 2000. These computers were to be capable of running high-quality software and have access to the information superhighway (Internet). Reaching this goal established by the

President will require a concerted effort by local and state governments assisted by collaborations with business and industry (USDOE, 1996).

Since that time, tremendous progress has occurred toward achieving those goals. The National Center for Education Statistics (NCES) reports, for example, that in 1994, only 35% of public elementary and secondary schools, and 3% of all instructional rooms, (e.g., classrooms, labs, and media centers), had access to the Internet (NCES, 2001; Glennan, and Melmed, 1996; USDOE, 1996). By the fall of 2000, 98% of public schools and 77% of instructional rooms have access to the Internet. The ratio of students to instructional computers in public schools decreased to 5 to 1, the ratio that "many experts consider ... a reasonable level for the effective use of computers within the schools" (President's Committee of Advisors on Science and Technology 1997, p.14).

Technology Counts '99 Survey the third of Education Week's annual reports on education technology, suggests that boxes, and wires are still an issue for even the wealthiest schools. When the survey was conducted in 1998, more than half the nation's classrooms were connected to the Web (Internet) and the schools had an average of one instructional computer for every 5.7 students. The Oklahoma student to computer ratio was one instructional computer for every 7.27 students (Trotter, 1998). By the fall of 2001, the national student to instructional computer ratio was reported as one computer to every 4.2 students. Oklahoma reported one instructional computer to every 4.0 students (Technology Counts 2002).

Once equipment is in place, there is no escaping the issues of what to put on those computers. Educators are recognizing that they need to focus on what assortment of computer-based learning resources should be utilized in the classroom. Various related issues continue to surface as well as generate various additional questions. These questions include: How to judge the quality of software and Web sites? How to locate content appropriate materials? How should content appropriate materials be integrated into the curriculum? Are there funds for equipment and supporting curriculum resources? Are policies and procedures in place? Will there be adequate supporting instructor training available?

Statement of the Problem

The problem was that there is not a current information base for addressing specific challenges that Oklahoma career and technology center (OCTC) administrators encounter in managing all the diverse aspects of utilizing and maintaining Internet access to the multitude of programs provided by career and technology centers across Oklahoma. Therefore, it would be advantageous to the management process for administrators to have recent and relevant information.

Purpose of the Study

The purpose of this study was to create a current information base of challenges experienced by administrators of Oklahoma career and technology centers of utilizing and maintaining the Internet in the instructional programs and their suggested solutions to those identified challenges.

Research Questions

The research questions guiding this study were:

1. What are the perceived challenges Oklahoma career and technology center administrators identify when utilizing the Internet in career and technology instructional programs?
2. What are the perceived challenges Oklahoma career and technology administrators identify for maintaining the Internet in career and technology instructional programs?
3. What recommended solutions do Oklahoma career and technology center administrators provide for the perceived challenges identified regarding utilizing and maintaining the Internet in career and technology instructional programs?

Assumptions

The course of this study was guided by the following assumptions:

1. The respondents completed the survey instrument honestly and objectively.
2. The respondents possessed sufficient knowledge to complete the survey instrument adequately.
3. The respondents had access to a computer with Internet connections and possessed adequate skill and knowledge to utilize both.
4. The data collected were accurate.

Limitations

The following may have generalized the results of this research study:

1. The population of this study was limited to superintendents and assistant superintendents of Oklahoma career and technology center districts.
2. The survey instrument was distributed and responses were collected by means of the Internet. Computer and Internet accessibility and compatibility may have varied, as well as willingness to complete an online survey may have varied greatly among the respondents.

Definition of Terms

The following definitions are provided for the purpose of assisting the reader in the understanding terms and concepts used within the study.

Acceptable Use Policy: An acceptable use policy (AUP) is a policy that a user agrees to follow in order to be provided with access to a network or to the Internet. It is common practice for many businesses and educational facilities to require that employees or students sign an acceptable use policy before being granted a network ID (Whatis?com, 2002).

Administrator(s): Superintendent and/or assistant superintendent of an Oklahoma career and technology center district.

ARPANET: The precursor to the Internet. Developed in the late 60s and early 70s by the U.S. Department of Defense as an experiment in the wide-area-networking to connect computers that were each running different systems so people at one location could use computing resources from another location (Enzer, 2002).

Bandwidth: How much information you can send through a connection. Usually measured in bits-per-second. A full page of English text is about 16,000 bits. A fast modem can move about 57,000 bits in one second. Full-motion full screen video would require roughly 10,000,000 bits-per-second, depending on compression (Enzer, 2002).

Bit: A single digit number in base-2, in other words, either a 1 or a zero. The smallest unit of computerized data. Bandwidth is usually measured in bits-per-second (Enzer, 2002).

Browser: A *Client* program (software) that is used to look at various kinds of Internet resources (Enzer, 2002).

Career and Technology Center: A public or nonprofit technical institution or career and technical school used exclusively or principally for the provision of career and technical education to individuals enrolled in a high school for a half-day or who have completed or left secondary school and who are available for study in preparation for entering the labor market or continuing their education (Oklahoma Department of Career and Technology Education, 2002).

E-mail: (Electronic Mail) Messages, usually text, sent from one person to another via computer. E-mail can also be sent automatically to a large number of addresses (Enzer, 2002).

Firewall: A combination of hardware and software that separates a Network into two or more parts for security purposes (Enzer, 2002).

HyperText Transfer Protocol (http://): HTTP is the protocol for moving hypertext files across the Internet. It requires a HTTP client program on one end, and a HTTP server program on the other end. HTTP is the most important protocol used in the World Wide Web (Enzer, 2002, TechWeb, 2002).

HyperText Markup Language (html): The coding language used to create hypertext documents for use on the World Wide Web. HTML looks a lot like old-fashioned typesetting code, where you surround a block of text with codes that

indicate how it should appear. The "hyper" in hypertext comes from the fact that in HTML you can specify that a block of text, or an image, be linked to another file on the Internet. HTML files are viewed using a "Web Browser" (Enzer, 2002, TechWeb, 2002).

Internet: (a) "Internet" refers to the global information system that -- (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein" (Cerf, Clark, Kahn, Kleinrock, Leiner, Lynch, Poster, & Roberts, 2000).

(b) "A worldwide collection of computer networks connected by high speed telephone lines and satellite links that serves as a conduit for the transfer of information in the form of text, images, audio, and visual" (Tripathi, 1998, p. 1).

Intranet: A private network inside a company or organization that uses the same kinds of software that you would find on the public Internet, but that is only for internal use (Enzer, 2002).

Information Superhighway: National Information Infrastructure (NII), or information superhighway, is an extensive, seamless web of computers and communication networks that makes available vast amounts of information

contained in databases held by libraries, universities, government agencies, commercial businesses, and many other types of organizations. Eventually, the NII will integrate telephone systems, cable systems, broadcast and radio stations, and satellite systems (Enzer, 2002).

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Network: An interconnected group or system. The Internet is a network of computers (TfAA, 2002).

Packet Switching: The method used to move data around on the Internet. In packet switching, all the data coming out of a machine is broken up into chunks, each chunk has the address of where it came from and where it is going. This enables chunks of data from many different sources to co-mingle on the same lines, and be sorted and directed along different routes by special machines along the way. This allows many people to use the same lines at the same time (Enzer, 2002).

Server: A computer, a software package, which provides a specific kind of service to client software running on other computers. The term can refer to a particular piece of software, such as a WWW server, or to the machine on which the software is running (Enzer, 2002).

T-1: A leased-line connection capable of carrying data at 1,544,000 bits-per second. At maximum theoretical capacity, a T-1 line could move a megabyte in less than 10 seconds. That is still not fast enough for full-screen, full-motion video, for which you need at least 10,000,000 bits-per-second. T-1 lines are commonly used to connect large LANs to the Internet (Enzer, 2002).

T-3. A leased-line connection capable of carrying data at 44,736,000 bits-per-second. This is more than enough to do full-screen, full-motion video (Enzer, 2002).

Technology: 1. Human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. 2. The innovation, change, or modification of the natural environment to satisfy perceived human needs and wants (*"Standards for Technology Literacy"*, 2000).

TCP/IP: (Transmission Control Protocol/Internet Protocol) the suite of protocols that defines the Internet. Originally designed for the UNIX operating system, TCP/IP software is now included with every major kind of computer operating system. To be truly on the Internet, a computer must have TCP/IP software (Enzer, 2002).

Uniform Resource Locator (URL): is the address that defines the route to a file on the Web or any other Internet facility. The term URL is synonymous with URI. URI has replaced URL in technical specifications. Uniform Resource Identifier (URI) is an address for a file (resource) available on the Internet. The first part of a URI is called the "scheme". The most well known scheme is http,

but there are many others. Each URI scheme has its own format for how a URI should appear, (e.g., http://www.matisse.net/files/glossary.html) (Enzer, 2002, Whatis?com, 2002, TechWeb, 2002).

World Wide Web (WWW): WWW has two major meanings: 1. Loosely used: the whole constellation of resources that can be assessed using Gopher, FTP, HTTP, telnet, USENET, WAIS and some other tools. 2. The universe of hypertext servers (HTTP servers), which are the servers that allow text, graphics, sound files, etc., to be mixed together (Enzer, 2002).

Summary

Chapter I introduced this researchers' study by presenting the background of the problem, a statement of the problem, the purpose of the study, research questions, assumptions, limitations and definition of terms. Chapter II provides a review of a variety of literature relevant to this study. Chapter III details the study's procedures, while Chapter IV addresses data analysis and presents findings. Conclusions and recommendations are provided in Chapter V.

CHAPTER II

Review of Literature

Introduction

"The Internet is perhaps the most transformative technology in history, reshaping business, media, entertainment, and society in astonishing ways" (The Web-Based Education Commission, 2000a, p. 1). The Internet is a powerful communication source producing far-reaching change. With a global span transmitting in almost real-time speed, it is used by an estimated 377 million individuals, of which only half are in the United States. The Internet is creating opportunities for greater numbers of individuals to access knowledge and learn in new and different ways. It is providing a tool by which learning opportunities are delivered to the learner rather than the learner going to the learning opportunity. The Internet has the capacity to connect people, communities, and resources. Time frames and locations for learning become limitless. It can add graphics, sound, video, and interaction to the learning experience, which provides a multitude of learning paths and opportunities (The Web-Based Education Commission, 2000a).

The Web is a medium that today's youth was born into and is accustomed to utilizing (The Web-Based Education Commission, 2000a; Ruskoff, 1996). Tapscott (1998) labeled the estimated 88 million children born between 1977 and 1999 the Net Generation. The Net Generation is the first generation for which the computer is an everyday component of their lives and who regularly use the Internet to communicate, to learn and even as a source of entertainment. This generation of Internet users has become interactive participants, rather than the passive television observers of previous generations. "We have never had the means of connecting so many people with so powerful a set of tools" (Gilster, 1997, p. ix). Instead of the "tune-out" and "turn-on" of the previous generations, today's generation "log-on" or "log-off." A world of information with new trends and technologies is available to these Internet users with each click of a computer mouse (Cahoon, 1998).

"The web is really not a new technology, but a new way of communicating. It offers tremendous potential to help young people learn in a student centered environment much faster and more conveniently" (The Web-Based Education Commission, 2000b, ¶ 2). Significant educational benefits may be gained using the Internet. Many of which include: expanded and exciting links of knowledge to teachers and students, creating student centered learning, providing the opportunity to focus learning experiences on the strengths of each individual learner, providing flexibility of time, location, and variety of learning options, as well as establishing lifelong learning as a reality for all individuals (Pool, Blanchard, & Hale, 1995; Brown, 2000). However, distinct barriers that

limit the benefit of the Internet in the educational process also exist. Included but not limited to be access to broadband connectivity, adequate hardware and/or software, appropriately trained teachers, censorship and quality control within the learning environment, and adequate funding to support the continued use of the Internet in the learning process (Murphy, 1995).

Internet is a common term in today's world. It does not matter what we do; whether one is an educator, entertainer, industry professional, government regulator, politician, professional athlete, or layperson, all have the potential to experience the effects and benefits of the Internet. The Internet has the potential to influence how individuals are entertained, communicate, conduct everyday business activities, and acquire new knowledge (The Web-Based Education Commission, 2000b).

Paul Gullickson (2000) wrote in T.H.E. Journal that nearly every aspect of our culture has experienced some impact from the Internet -- from how we communicate with family and friends, to how we conduct daily business affairs, to how we shop and all other things in between. Education has encountered multiple influences as well. The majority of individuals in our technologically focused world will access the Internet at least once each day. It has revolutionized computers and communication to a greater degree than any previous invention. The Internet represents one of the most successful collaborations of research and development (Cerf, Clark, et al., 2000). "The two great equalizers in life are the Internet and Education", John Chambers (Cisco Systems, Inc., 2002a, ¶ 1).

Before exploring the impact that educational administrators encounter as a result of the Internet, it might be best to first review some basic information, such as: What is it the Internet? Who created and/or founded it, and what is some of its history? How is it accessed? Does it have an impact on economy and labor market? What is the educational impact?

The Internet

The Federal Networking Council (FNC) passed a resolution in October 1995 defining the term Internet.

> "RESOULUTION: The FNC agrees that the following language reflects our definition of the term "Internet". "Internet" refers to the global information system that -- (i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein." (Cerf, Clark, et al., 2000).

The Internet is typically described by most to be a worldwide collection of computer networks, cooperating with each other to exchange data using a common software standard. Users share information in various forms.

Depending upon size, scope and design of the Internet connection users may connect easily via personal computers and local telephone lines; exchange electronic mail through individual mail accounts; post information for easy access and retrieval; and access multimedia (e.g., sound, video, graphic images, etc.) information for worldwide locations. It is a network of networks. Various governing boards work together to establish use policies and standards. However, there are limited rules and regulations for the Internet, and there is no central authority (Cerf, Clark, et al., 2000; Lanning, 1999; Laudon, & Laudon, 1999; Wagner, 1997; Roy, 1996).

Internet History

During the 1990s, former Vice President Al Gore was reported as having credited himself as the creator of the Internet and/or the "Information Superhighway". Although that is not accurate, many of the initial scientists recognized with the initial development process give Gore much credit for his early enduring support which helped launch the growth and development of the Internet into how we know it today - a network of networks spanning globally across the world. History shows where that Gore, still a senator in his home state of Tennessee, authored § 2594, *Supercomputer Network Study,* an Act of 1986. As a member of the US House of Representatives, he coined the phrase "Information Superhighway" as a descriptor of the Internet and World Wide Web. The actual creator(s) of the Internet are documented to be Robert Kahn and

Vinton Cerf. However, they were not very independent in the creation process of the contributions of many other individuals that embarked on this development process many years before (Gromov, n.d.; Kahn, & Cerf, n.d.).

The Internet that is widely utilized in today's globalized world, evolved from America's need to have an efficient communication system that could survive a nuclear war. In 1957 after the Soviet Union's launch of Sputnik, President Dwight D. Eisenhower created the Advanced Research Project Agency (ARPA). President Eisenhower believed that the US government was in enormous need of intensive research specifically focused toward scientific and military efforts. The ARPA developed the first successful satellite and several years later, began to focus its' efforts toward computer networking and communications (Friedman, 2000; Ruthfield, 1993; Howe, 2001).

Early In the 1960's, the government, and military officials recognized that a centralized communication system would be vulnerable to enemy attack. The RAND Corporation, the military's think tank, after concerted study submitted a proposal that the nation should have a decentralized, blast proof, packet-switching communication network. Such a network would have no central authority and would have the ability to surpass its own flaws and irregularities. All the nodes of the system should be equal in status, and be capable of originating, transmitting, and receiving messages. The messages should be divided into packets with separate addresses. Each packet would originate at a specific source node and end at another specific source node. The particular route that a packet followed would be irrelevant; only final results would be significant.

In 1962, Dr. J. C. R. Licklider was appointed to head the ARPA. Licklider envisioned interactive computer connections for exchanging military defense-related information with defense contractors and researchers. He proposed a computer networking system that would allow communication to occur around the world (Cerf, Clark, et al., 2000; Gromov, n.d.; Zakon, 2002).

The original computer network, known then as ARPANET, (Advanced Research Project Agency Network), was first connected in 1969. Researchers of the Stanford Research Institute, the University of California Los Angeles (UCLA), the University of California Santa Barbara (UC Santa Barbara), and the University of Utah connected to form the first hosts of the ARPANET. It was developed based on the packet-switching network technology, which allowed the system to work like a telephone networks multiple linked system rather than as a dependent single mainframe system. Scientists Robert Kahn, of Bolt Beranek and Newman (BB&N), and Vinton Cerf, Stanford University, developed this network technology which laid the foundation that lead to the Internet explosion (Cerf, Clark, et al., 2000; Gromov, n.d.; Zakon, 2002).

A radio network was established in 1970 with the ALOHANET at the University of Hawaii. By 1971, more than 20 terminal sites had connected in a variety of locations. The ARPNET went international 1973 with connections at the University of London, England and the Royal Radar Establishment in Norway. A technology revolution was truly being experienced as more and more sites continued to connect to the ARPANET (Ruthfield, 1993; Gromov, n.d.; Segaller, 1998).

Excitement grew with the networking capabilities when E-mail became an option in 1972. Ray Tomlinson, a programmer with BB&N, created a file transfer program that allowed individuals to send messages between two computers. It was Tomlinson that chose the "@" symbol to connect the computer user with a computer location (Howe, 2001; Friedman, 2000; Segaller, 1998; Gromov, n.d.).

During the 70s and 80s, the Internet continued to grow and mature. Researchers and scientists continued to develop improved equipment and programs that would provide services that are more sophisticated to greater numbers and at farther distances. Bob Kahn at BB&N created the Transmission Control Protocol/Internet Protocol in the mid-70s. In the early 1980s, additional networks grew into existence. Computer Science Network (CSnet) was originally funded by the National Science Foundation to "provide networking for university, industry, and government computer science research groups" (Cerf, 2000, p. 5). The Because It's Time Network (BITNET) began at the City University of New York. BITNET provided electronic mail and listserv servers as a means of distributing information. BITNET and CSnet merged in 1987 forming the Corporation for Research and Educational Networking (Cerf, 2000).

Between 1985 and 1989, the United States National Science Foundation's Office for Advanced Scientific Computing with the assistance of the National Aeronautics and Space Administration and the US Department of Energy were instrumental in developing a supercomputer network called NSFnet. NSFnet established five mega-computing centers to deliver power and accessibility to all

participating networks. The NSFnet provides a major communication service for the Internet today (Cerf, 2000).

By 1989, ARPANET, the original network, was no longer in existence. It had given rise to technology that had far surpassed its capabilities (Howe, 2001; Segaller, 1998; Ruthfield, 1993). The US government moved away from network management by 1992, at which time commercial expansion began to grow immensely. There was an incredible explosion of the Internet at this point (*"PBS LIFE"*, n.d.). "The internet system began to integrate support for other protocol suites into its basic networking fabric" (Cerf, 2000, p. 2).

Internet Access

Today's Internet is a widespread information infrastructure containing multimedia hyperlinked databases that span the globe. The Internet is the core of the World Wide Web (WWW). The Web is a huge collection of hyperlinks which access databases containing all forms of communication including text, audio, video, clipart, various forms of graphics, animation, etc. (Ford-Livene, n.d.; *"How The Web"*, n.d.; Thornburg, 1997; Lanning, 1999; Wagner, 1997). The process of developing software that would establish addresses, link and transfer multimedia data over the Internet was finalized in 1991 by Tim Berners-Lee, an English software engineer, from Geneva, Switzerland (Segaller, 1998; Friedman, 2000). Each link address contained a uniform resource locator (URL) codes that identify website and page of information; the hypertext transfer protocol (http://)

the address between websites and users computers; hypertext markup language (HTML) the computer language used to create web pages. It can be credited for establishing universal access with virtually unlimited information with extreme ease of use ("*How The Web*", n.d.). A combination of the URL, HTTP, and HTML create a system of links by which users may quickly and easily access information regardless of the server's location, even if it is on the other side of the world (Segaller, 1998; Friedman, 2000).

Economic and Labor Market Impact

As the 20th century approached the end, the economic base of our nation shifted from industry to information. The Information Age characterizes a society in which there is a widespread use and adoption of information and communications technologies. The many changes produced by the Information Age changed the ways in which individuals learned, worked, communicated, acquired basic health care, and even lived their day-to-day lives (Meares, & Sargent, Jr., 1999). Already, we are approaching even another era, that being the Communication Age. The focus during the 21st century is the growth and access to information through computing with telecommunications. The Web has enabled interactive information communication to the farthest reaches of the globe. Technology will become extraordinarily more powerful and increasingly accessible. Goods and services will be instantaneously accessible. The

Communication Age is projected to change access of information, goods, and services so to bypass all traditional modes and channels (Thornburg, n.d.).

"We are living in a new economy-powered by technology, fueled by information, and driven by knowledge. The influence of technology will go beyond new equipment and faster communications, as work and skills will be redefined and reorganized" (US Department of Labor [USDOL], 1999). Technology is credited with having been the primary contributor to the Nation's long-term economic growth since as far back as World War II. Information Technology (IT) is reported to be the greatest enabling technology of the world today. IT has been reported to be changing the way individuals live and work and even to have transformed the economy as a whole (Meares, & Sargent, Jr., 1999; Lemke, 2000).

In 1998, Federal Reserve chairperson Alan Greenspan stated to a business audience in North Carolina, "The United States is currently confronting what can best be described as another industrial revolution. The rapid acceleration of computer and telecommunications technologies is a major reason for the appreciable increase in our productivity in this expansion, and is likely to continue to be a significant force in expanding standards of living into the twenty-first century" (Greenspan, 1998).

"The current and future health of America's 21st Century Economy depends directly on how broadly and deeply Americans reach a new level of literacy--'21st Century Literacy'--that includes strong academic skills, thinking, reasoning, teamwork skills, and proficiency in using technology" (National

Alliance of Business, 2000, p.). "The information technology industry is advancing at a whirlwind pace; with product cycles and time-to-market periods shortening, and demands for continued innovation and productivity growing with each passing day. What we will offer next year has not been invented today. In this environment, you either get the right worker who can do the job and keep you ahead of the rest or you can call it a day." (Alvares, 1998, p. 9).

"The ability to move information, people, and products, will decide a community's role in the international marketplace and determine whether its economy succeeds or fails" (*"Mayors"*, 1997, p. 3). "The Internet is making the economy a community without borders" (Whinston, Barua, Shutter, Wilson, & Pinnell, 2001, p. 26). "One of the potential benefits of the Internet and globalization is the ease with which we may be able to dispel prejudice, unmask dishonesty and corruption and separate truth from fiction. This needs to be said despite the troublesome explosion of prejudice, falsehood and hate on Web sites. But the Internet is still in an early stage of development" (Botstein, 2001, p. 7). The majority of global leaders recognize the influence that the Internet has and will continue to have in their country's ability to compete and prosper in the 21-st century (Cisco Systems, Inc., 2002b).

The Digital Work Force: Building Infotech Skills at the Speed of Innovation (1999) documents that Information Technologies share of the US economy nearly doubled, growing from 4.2% to 8.2%, between 1997 and 1998. Information Technologies contributed more than one-third of US economic growth between 1995 and 1997. US business-to-business Internet commerce is

projected to grow from $48 billion to $1.3 trillion, global e-commerce is projected to contribute an additional $1.8 to $3.2 billion; and US consumer Internet sales are projected to rise from $3.9 billion to $108 billion from 1998 to 2003.

The Information Technology (IT) industry experienced an excellent employment growth, generating large numbers of jobs with salaries almost 80% more than other professions (The White House Office of the Press Secretary, 2000). It has been reported that highly skilled technical workers are required more in the Information Technology industries than the previously dominated areas of government defense and aerospace industries. The computer and data processing service manufacturers have globalized. Computer and data processing service industries currently are the largest employers of Information Technology workers, employing more than 25% of all workers in these professions (Economics and Statistics Administration, National Telecommunications and Information Administration, 2002).

Information Technology industries or those industries that produce or utilize large quantities of information technology products will employ close to 50% of all US workers by the year 2008 (U.S. Department of Labor, 21st Century Workforce Commission, 2000). An estimated two million newly skilled information technology workers are projected to be employed in new positions and as replacement workers for individuals having left the field between the years of 1998-2008 (Bureau of Labor Statistics [BLS], 1999).

In 1999, the US Department of Labor reported that approximately $300 billion was generated by Information Technology industries and provided 1.2

million jobs (Bureau of Labor Statistics, 1999; Lanning, 1999). "The Internet Economy Force has become a more integral part of the US economy than ever before, creating jobs and increasing productivity in companies across the country" (Whinston, Barua, et al., 2001, p. 1). The Internet economy supported an additional 612,375 jobs in the first six months of 2000 (Whinston, Barua, et al., 2001).

Never before has it been easier to conduct business on a global scale. Electronic commerce (E-commerce) has created a huge market increase for business as well as consumers. Businesses of all sizes have benefited. However, small businesses have especially benefited with the opportunity to market to an expanded market base. Due to the Internet, they now have the opportunity to market consumers around the world, if they so desire. Consumers have expanded choices, extended convenience, and decreased costs (U.S. Department of Labor [USDOL], 1999).

E-commerce priorities established by the United States administration include: the Internet Tax Freedom Act, which created a three year moratorium on Internet access taxes and taxes that discriminate against e-commerce; the Digital Millennium Copyright Act, to protect America's intellectual property in cyberspace; creating a moratorium on duties on electronic transmissions; providing consumer protection against online fraudulent practices under existing consumer protecting laws; encouraging the implementation of privacy policies on all commercial web sites; and creating the Children's Online Privacy Protection Act, which requires a parent's permission prior to collecting personal information

from a minor on any commercial web site (The White House Office of the Press Secretary Office of the Press Secretary, 1999).

The economy of America today is powered by technology, fueled by information, and driven by knowledge. Changes that have been identified to possibly contribute an impact on the workplace and workforce include adjustment in population, continued influence of the ever advancing technology industry, and the impact of globalization (USDOL, 1999).

The population diversity of the U.S. will contribute a dynamic impact. The U.S. Department of Labor, Report of the American Workforce (1999) projects dramatic adjustments of population diversity in America. By 2050, the total U.S. population is projected to increase by as much as 50%; minorities will increase by 50%; and immigration will contribute approximately two-thirds of the overall population growth. The baby-boomer generation and older American population are expected to more than double and more females and disable workers will be in the workforce. The needs of the workplace will adjust in conjunction with the continued advancement in technology and expansion of globalization.

Educational Impact

"The future ain't what it used to be" L. P. "Yogi" Berra.

Technology changes how people learn and what they need to learn. Lew Platt, former CEO of Hewlett Packard once stated, "Whatever made you successful in the past, won't in the future" (Peters, 1997, p. 1). Individuals

question if they possess the skills that will be needed by the employers in the workplace and workforce of the 21-st Century. Educational attainment will play even a more vital role in workplace success and have a more significant impact on earning potential throughout a worker's life. This substantiates an even greater need for our schools to empower individuals through the development of appropriate and adequate skills necessary to enter and compete in the 21st century workforce. These skills are more inclusive than just technology awareness skills. They include cognitive skills: communication skills and job specific skills (USDOL, 1999).

The Secretary's Commission on Achieving Necessary Skills' (SCANS) recommendations for 2000 joins the economy, schools, and need for workers to maintain current workplace skills. SCANS' recommendation to schools is to prepare students for the "real life", which they will encounter beyond school as citizens, parents, and in workplaces of the future (SCANS, 2000). Schools are challenged to go beyond economic forces to ready all students to enter the digital workforce and global society (Lemke, 2000).

The Internet is not a fad. Its interactive capacity establishes a potential of influence for education and the learner to a degree that has not been previously available (Lanning, 1999). Increased levels of education are required for a knowledge-based economy. Higher levels of skills and knowledge are required for an economy based on information. Eighty-five percent of current jobs require education beyond high school, up from 65% in 1991 (NationsBank Montgomery Securities, 1998; The CEO Forum School Technology and Readiness Report,

2001). "The importance of lifelong learning can not be over-estimated" (USDOL, 1999, p. 74).

Knowledge and skill gained in schools will be essential to each individual's success in the 21st-century. Educators are challenged with preparing students to live, learn, and work in a digital and global society. Schools are challenged to ready all students with the necessary skills to enter the digital workforce and succeed global society (Lemke, 2000).

America is now truly a nation online. Computers, software, and the Internet have become a fundamental and essential tool in our information society. More and more individuals are going online regularly for the day-to-day activities of personal correspondence, business transactions, education and information gathering, and job searches. Being digitally connected has developed a greater influence in economic and educational advancement (Economic and Statistics Administration, 2000; *"Technology for Education"*, n.d.). Forty-five percent of the American population regularly uses e-mail, and 39% of Internet users are conducting online product purchases. Information technologies have rapidly become common fixtures our modern society and economy (Economics and Statistics Administration, National Telecommunications and Information Administration, 2002; Pew Internet & American Life Project, 2002).

Substantial growth of information technology use has occurred during the past few years. According to data gathered by the September 2001 U.S. Census Bureau's Current Population Survey, a survey of approximately 57,000

households and more than 137,000 individuals across the United States, more than half of the American, population is now on line. Approximately 54% of the population (143 million Americans) was using the Internet -- an increase of 26 million in 13 months. One hundred seventy-four million people (approx. 66% of the population) used computers. The survey documented increased Internet use by the American population regardless of income, education, age, race, ethnicity, and/or gender. Currently, Internet users increase by a rate of two million new accounts per month.

Individuals in the lowest-income households, those with earned income of less than $15,000 per year, reported an Internet use increase of 25% per year between December 1998 and September 2001. During the same time frame, Internet use among individuals in the highest-income households, those earning $75,000 per year or greater, grew only 11% a year. At the time of this survey, 60.2 million homes in the United States had at least one personal computer. Seven of every eight households reporting computers (88.1%) subscribed to the Internet. Internet use among Blacks increased by 33% annually; Hispanic annual increase rate was 30%; and the Whites, Asian American, and Pacific Islanders reported annual increase rates of 20%. An increase in use among rural households has increased by 24% annually, resulting in the number of Internet users in rural areas now being approximately 53% -- almost equal to the national user average of 54%. The highest increased household growth rate recorded was that among single mothers (29%). Family households with children under 18 years of age are spending more time online (62%), than family households with

no children are spending (53%). The increased use of computers and Internet in schools has contributed greatly to decreasing the gap of computer usage rates of children, regardless of income levels and single parent status (Economics and Statistics Administration, National Telecommunications and Information Administration, 2002).

As of September 2001, 66.8% of the U.S. population used a computer at home, school, and/or at work. Of those using a computer, 80.6% were connected to the Internet. In September 2001, 143 million people (53.9%) of the U.S. population were using the Internet, an increase from 116.5 million people (44.5%) in August 2000. The increased Internet use was reported across all 50 states. Oklahoma's individual Internet use increased from less than 50% of the population in August 2000, to approximately 50% in September 2001 (Economics and Statistics Administration, 2002).

The population diversity of the U.S. is resulting in an increasingly diverse student population. Thirty-five percent of U.S. children are members of minority groups, a figure that is expected to climb more than 50% by 2040. One in five comes from a household headed by an immigrant. Nearly one-fifth of U.S. children live in poverty (Olsen, 2000).

More and more alternatives to public education are available. As of fall 1999, 350,000 students were enrolled in more than 1,600 charter schools across the United States. Thirty-six states and the District of Columbia passed charter schools legislation (Center for Education Reform, 2000). An individual choosing home schooling over the traditional public school approach continues to multiply

each year. The number of home-schooled students in 1996 was 636,000 (Henke, Kaufman, Broughman, & Chandler, 2000). It has been estimated that this number has increased to currently be between 700,000 and 1.5 million (Greensburg, & Foote, 2000).

The National Center for Education Statistics (NCES) has been surveying public schools since 1994 to collect data regarding their use of the Internet. Statistics gathered in the NCES Fall 2000 survey indicated that 98% of all U.S. public schools have access to the Internet. In 1994, only 35% were connected to the Internet. In 1994, 3% of all public school classrooms, computer labs, library/media centers, and all other rooms used for instructional purposes were connected to the Internet, by 2000, 77% were connected. It is reported that Internet access in classrooms tends to vary according to differences of school characteristics. Schools with a greater poverty concentration (75% or more students eligible for free or reduced-price lunches), tend to have less Internet and/or computer access than those schools with lower poverty concentrations. In 2000, 60% of the instructional rooms in schools with higher poverty concentration reported Internet access, compared to 82% of instructional rooms in schools reporting a lower poverty concentration. In 2000, the ratio of students per instructional computer with Internet access in public schools was approximately 7 to 1, compared to a 5 to 1 ratio of students to instructional computers in private schools. Similar patterns occurred in schools with larger minority enrollments (Cattagni, Farris, & Westat, 2001; Branigan, 2001; Guerard, 2000).

Even though the Internet provides a multitude of instructional advantages, it also generates disadvantages. While being more interesting and motivating to some students than a more traditional approach, it can fully engage a student so he or she becomes a more self directed learner. Although, the Internet can provide a greater breath and depth of instructional materials, it can also leave an instructor resorting to an alternative lesson plan as well. To plan on the Internet as the primary teaching tool without an alternate plan can certainly leave a teacher perplexed. As improved and advanced as technology has become, (e.g., hardware, software, Internet connections, etc.), it is not without malfunction. Web addresses may become non-existent between the time it is published and when it is accessed. Internet servers may not function at the time a lesson is being delivered. A school may not have adequate computer accessibility for all students. Students that have grown up with electronics (e.g., computers, Internet, etc.) favor the 21st-Century computer assisted instruction to the more traditionally non computer-assisted instruction of the 1900s (Leggett, 2001; Lemke, 2000; Wagner, 1995).

Some research indicates that the Internet is affecting the way some teachers are teaching. Market Data Retrieval reported in Technology in Education 2000 that 60% of all schools reported using the Internet in the classroom. Quality Education Data, Inc., reported that, of those teachers included in the Market Data Retrieval Technology in Education 2000 report who were using the Internet in the teaching process, 31% indicated that the Internet provides a more significant assortment of instructional materials and resources,

and 27% indicated utilizing the internet has improved researching skills for both them and their students. Only 18% of the teachers responding indicated they are not teaching any differently because of the Internet (Leggett, 2001).

Textbook publishers recognized the pressing demands that were being created by the ever-increasing use of computers and the Internet in the learning environments they targeted. It became more apparent that they must keep up with the changing times. Many publishers' resources now offer a variety of computer aided materials and Internet accessible resources. The publishers are offering web sites and Internet accessible resources as supplements, not replacements, to their originally produced textbooks. Linda Roberts, White House advisor on educational technology reported in 2001 there was a noticeable increase of interest in content and learning resources rather than the normal focus on hardware at the National Education Computing Conference. Roberts noted she believed the trend will be for online resources to appear on state approved content and learning resource adoption lists as numbers of classrooms connect to the Internet continues to increase (Leggett, 2001).

Phil Harris, Director of the Association of Educational Communications and Technology stated, "the Internet provides the first widespread opportunity for learners not to be bound by instructors or institutions. The educational experience is bound only by what the learner wants to know and is capable of doing" (Leggett, 2001, p. 1).

Internet in the Classroom

"It is an exciting time in education. The Internet offers new opportunities for students and teachers a link to learn in interesting ways" (Ellsworth, 1995, p. xxiii). "The Internet's usefulness is limited only by our level of commitment. We first have to be plugged in before we can be turned on. Then we can help our profession by using our imagination to create a vocational educator's Dream Net in the years to come" (Seguin, & Seguin, 1995, p. 33).

The NCES has gathered data since as early as 1994 for establishing a greater understanding of computers and Internet use by teachers of public schools. A survey conducted in 1999 reflected that 39% of public school teachers that had access to computers and the Internet in their classrooms or elsewhere used it for creating instructional materials. Newer teachers, those with nine or fewer years of teaching experience, are more likely to use computers and/or the Internet to accomplish various teaching objectives (Rowand, 2000).

Information Technology is a very useful tool in the learning environment and is becoming almost essential in today's workforce. However, keeping that in an appropriate context, IT is only an instructional tool to employ in the teaching and learning process as any other instructional tool to accentuate learning and increase productivity (Stahlke, & Nyce, 1996). It can improve learning effectiveness accommodating the broad spectrum of learning styles. Access to a much greater amount of information is attainable through the vast amount of resources. Multiple instructional delivery options become available providing a

variety of options to be explored by students, teachers, and administrators which will better meet the needs of all (Zielinski, & Shibata, 1996).

Effective use of technology requires more than accessibility. "Teachers are being asked to learn new methods of teaching, while at the same time are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom ... [given such challenges] relatively few teachers (20%) report feeling well prepared to integrate educational technology into classroom instruction." (NCES, 1999). Teachers need to be prepared to incorporate the technology into the daily learning/teaching activities in an appropriate, meaningful manner. Professional development time becomes even more essential for teachers. As new technologies become more sophisticated, effective use and appropriate implementation requires even more training time (Levin-Epstein, 2000).

Teachers may utilize the broad range of technology capabilities in a variety of ways to accentuate the learning process. Technology is not a panacea for all educational needs. Technology is an instructional tool, not a fix to all needs -- there is no one approach to all instructional procedures -- no one answer or one fix to all educational needs. The when, where, and how to incorporate technology into instruction depends greatly on many factors. Instructional goals, teacher expertise, subject matter or curriculum focus, available resources and technical support, and student needs are a few of the contributing factors to technology use (Ronnkvist, Dexter, & Anderson, 2000).

The manner in which technology is incorporated influences appreciably the outcomes of the educational experience. Used in a traditional "teacher-centered" model of teaching it has the potential of producing practice, drill and mastery of facts and content. A more student-centered model creates an arena where the learner is more engaged in the learning process and the teacher is acting in a facilitator role. Many times teachers utilizing student-centered models of instruction tend to be more enthusiastic technology users and tend to make learning more relevant to "real life" and more engaging to the student. Real life learning is the learning that occurs due to encountering real-world circumstances. The answers to real-life problems are often illusive, requiring more skillful approaches to determine the solutions, therefore, engaging the learner as an active participant in the learning process (Sternberg, 1990).

Education Week, Harris Interactive, and Market Data Retrieval collaborated to collect data from students in grades 7-12. The 500 students attended schools that participated in the national technology survey conducted by Market Data Retrieval of which the results were reported in Technology Counts 2001. The survey results indicated that students believe schools currently are much more successful in providing access to computers and the Internet than utilizing them as learning tools. The students reported that computers are not often used in class for assisting with the learning process. Eighty-eight percent of the students reported that computer knowledge and skill will be essential for career success. However, only 40% believed that computer knowledge and skill contributes to their performance in school. Of the students

surveyed, most indicated that they are more likely to use a computer at home, than at school, even though computers are available at school. The average time spent on a computer at school by these students was one hour per week, while they reported an average of three hours per week use at home. Additional interesting results included: 1) 56% of students surveyed had gained more computer skill and knowledge at home than at school; 2) 61% having computers at home, believed the quality of their equipment at home greater than the equipment available at school; 3) 45% reported "all" computers at school to be in good working order; and 4) 49% reported "most" and 6% reported few to be in good working order. The three most common computer use activities reported were research for assignments (96%), writing papers (91%), and homework assignments (62%) (Doherty, & Orlofsky, 2001).

"Education is going to become more extended, far beyond neighborhood and political boundaries of the country. We are not only going to have to understand, appreciate and celebrate the diversity in our schools, community and city, but also we are going to have to learn to understand and appreciate the diversity that exists in the world" (Marx, 1998, p. 5). "Schools will become communication centers. We will have to make effective use of available technology. People will be looking for real-world applications for what they learn" (Marx, 1998, p. 5).

"How can we say we are training kids for the 21st Century when we are not spending any money on upgrading skills of teachers? It is hard to teach students computer skills when they [students] have more experience than the

teachers" (Tharp, 1998, p. 5). "They've got to have access. The Internet can be either the great equalizer, or just another missed opportunity.... Access makes the difference." William Kennard, Chairman, Federal Communications Commission (The White House Office of the Press Secretary, 2000).

Cynthia Kurkowski (2000) wrote in an article for ComputerUser.com that schools are beginning to integrate the Internet into the curriculum, but there is still a long way to go. She reported that schools initially used the Internet as a means of relaying communication to students and parents. Next, they would post assignments on Web pages and even develop long-distance relationships with other schools to explore different cultures and lifestyles. However, most schools are still very much in a development phase, in which they are determining how to successfully integrate the Internet into the vast array of curriculum. "The biggest challenge with using the Internet in the classroom is that it is difficult to give students the individual attention when they all seem to have questions " (p. 1), says Elaine Vaughan, a computer teacher for students in Perth Amboy, N.J.

"If teachers won't model the use of technology, then the students won't be as apt to use it," explained W. D. Sayer (2000, p. 3), Director of the 21st Century Teachers Network (21CT). The 21st Century Teachers Network consists of 15,000 plus members that promotes the use of technology in the classroom through supportive resources and forum discussion groups. Teachers may exchange ideas and post questions regarding education technology.

This debate has never been about technology. It has been about what our children have the opportunity to do. It's about much more than just giving

a young person a computer or connecting that person to the Internet. It's about connecting students to a whole new world of learning resources and offering the mind the opportunity to expand and take on a new and challenging future." Secretary Richard W. Riley, U.S. Department of Education (Economic and Statistics Administration, National Telecommunications and Information Administration, 2000).

Impact on Education Administrators

Educational administrators confront challenge on a regular basis. Education in and of itself presents change. Information technologies present challenges in addition to the inherent challenges common to education systems. Education leaders seeking to flourish in an information technology environment must educate and prepare themselves as well as those that they lead in order to be fully prepared and ultimately successful (Anderson, 1999).

"School leaders must work to keep abreast of all the latest developments in curriculum and delivery of the new technology tools" Cheryl S. Williams, Director, Education Technology Programs, National School Boards Association (The White House Office of the Press Secretary, 2000, p. 48). The knowledge and skill gained in schools will be essential to each individual's success in the 21st century. Administrators are challenged with preparing students to live, learn, work, in a digital and global society. Schools are challenged to go beyond

economic forces to ready all students to enter the digital workforce and global society (Lemke, 2000).

"Technology is going to dramatically change the delivery of information. Students can get a lot of information off the Internet. It is important that we are as educated as possible about the impact of technology and its delivery systems. It will become even more important that we get the systems in place to handle the information" (Medlin, 1998, p. 6).

Doug Johnson (1998) District Media Supervisor, Mankato Public Schools, Mankato, MN wrote that technology is not used by schools in a single way for a single purpose. Careful planning and technical knowledge is so essential to administrators. Reports and articles continue to indicate that educators are currently being targeted by an industry that wants to convince them that its' products can and will solve all of their problems (Healy, 1999).

Educational administrators of today are sure to be challenged by the ever increasing demands of a changing economy, the impact of federal educational reforms, accelerating workplace skill expectations of business and industry, a continuing decline of qualified individuals desiring to be educators, increased technological competency expectations, and overburdened physical facilities (Anderson, 1999).

The increased availability of the Internet creates greater use options for teachers and administrators. The technology may be utilized for record keeping, extended communication options, professional development, curriculum development, classroom instruction delivery, and distance learning opportunities.

Provided with increased options of technology are increased challenges. Such challenges may include installing of the technical infrastructure, providing technical support for the hardware and software, and ensuring professional development to faculty and staff. Additional challenges include: implementing effective use of the Internet into curriculum so to ensure that it enhances the learning process; providing adequate security measures so that students do not have access to inappropriate materials through the Internet; and maintaining current and reliable hardware, software and Internet connections (NCES, 1998; USDOE, 2000).

Successful and effective integration and continued use of the Internet depends greatly upon having teachers with not only the technical skills to utilize the equipment properly, but also who have the ability to adequately incorporate its use into the learning activities correctly. The U.S. Department of Congress, Office of Technology Assessment (OTA) report on *Teachers and Technology: Making the Connection* (1995) stated that for teachers to use technology effectively they need easy access to equipment, hands-on training, adequate time to experiment and prepare appropriate learning activities with the equipment, as well as ready access to support personnel. The President's Committee of Advisor's on Science and Technology & Panel of Educational Technology (1997), The CEO Forum (1999 & 2001), and Ronnkvist, Dexter, and Anderson (2000), supported the OTA conclusions, and elaborated on their assistance toward successful technology integration. One of the national goals listed in the United States Department of Education, National Technology Plan of

2000, *e-Learning: Putting A World-Class Education At The Fingertips Of All Children*, was to improve the instructional support available to teachers who use technology.

Kristen Philipkoski (1999) wrote in an article published by Wired News, that even though American schools have acquired the latest technology, many of the teachers cannot operate the equipment. Philipkoski quoted Bob Herbold, Microsoft's chief operating officer who stated, "Only one in five teachers today believe they are prepared to teach in a modern classroom with technology" (p. 1). "Many teachers realize our student's know more than we do about technology and they feel threatened" (Ashworth, 1999, p. 2). Kathy Kugler, a technology coordinator for the Tukwila, Washington school district stated, "Teachers are really busy and they get overwhelmed. They're overwhelmed with education reform and trying to meet the standards. The need lots of support" (Dean, 2000).

An administrator can play a pivotal role in the inspiration of a teachers' perception and ultimate integration of the Internet, as well as other educational technology (Mageau, 1994). Dr. Gary Wenzel, Assistant Professor, Department of Educational Leadership and Foundations, State University of West Georgia (1998), stated that, "at a minimum, school administrators should understand and be able use the basic technologies they are asking their staff to utilize and their students to learn" (p. 1). An administrator's and/or teacher's resistance to the use of technology may possibly result from feeling under-skilled (George, & Sleeth, 1997). However, it is paramount that administrators understand when

and how technology can be least or most cost-effective (Trotter, 1998; Johnson, & Bartleson, 1999).

Technology skills have become the key to success for school administrators as well as those in the private sector. Instructional technology, especially computers and Internet, is now playing a critical role in today's educational institutions. Administrators must manage complex change while maintaining a culture of continual learning (Fullan, & Stieglebauer, 1993).

An administrator's ability to use modern technology affects his or her willingness and eagerness to implement technology into the school system. A survey conducted by Market Data Retrieval in 1997 reported that approximately three-fourths of all school superintendents across the nation used computers. That same survey reported that 63% of Oklahoma Superintendents were using computers at that time. However, the report did not identify specific computer application and/or programming skills of each administrator or how those skills were utilized in daily job duties. The level of skill may vary according to the superintendent's age as well as the duties he/she may be required to perform with a computer. Many administrators use a computer only for accessing e-mail and searching the Internet, while others perform word processing skillfully, tend to have a greater capacity to understand its benefit and/or and spreadsheet functions. Administrators that use technology regularly and skillfully, tend to have a greater capacity to understand its benefit and/or use in the instructional process (Trotter, 1997).

Expenditures for technology implementation differ among schools. Schools with a higher poverty level are likely to experience greater expenses due to having older, less adept facilities and much greater security issues (Pelavin Research Institute, 1997). Technology expenditures in FY98 for the K-12 of all public schools amounted to $7.2 billion, which was approximately 2.7% of the total educational expenditures for that year. Even though billions of dollars were spent on technology, the average school spent only $113 per student on technology for the year, with $22.50 of that amount going toward teacher support services, $8.00 for software, and the remaining $82.50 went for hardware. These expenditure amounts included materials purchased, as well as installation and repair costs (Anderson, & Becker, 2001).

Technology has been described as one of the greatest and potentially, most frustrating administrative challenges encountered by school administration. Management of technology presents administrators a variety of issues: equipment - what type, when to purchase, how to provide maintenance; teacher training - how much will be required, when to provide; curriculum integration - what will be the process, how to accomplish, who will coordinate; funding - who, when, and how will funding be acquired and maintained (Trotter, 1997).

Anderson and Dexter (2000) listed these administrative issues as being associated with inclusion of educational technology: Costs, timetables, performance, technology itself, its use by district staff, its impact on teaching and learning, and fiscal issues. Strategic plans, goal-setting, vision and vision

sharing, budgeting and spending, organizational structure, curriculum - development and revision, program evaluation and impact assessment, external relations and ethical issues.

Some of the readily identifiable expenses of implementing computers and Internet into instruction include: cost of hardware (computers) and software (programs); installation costs (room preparation and/or renovation); installation technical support (personnel to install hardware and software); maintenance technical support (repair and maintenance); and professional development (administrators, teachers, and support staff training). Implementing computers and Internet into the instructional curriculum many times will create need for facility renovations. These expenses many times are difficult to quantify, however result in an expense that must be considered by administrators. Space converted to computer labs many times eliminates classroom and/or laboratory space otherwise utilized by additional students (Oberlin, 1996).

One of the greatest and never ending administrative challenges encountered is technical support and maintaining quality technology equipment. Equipment becomes more sophisticated every day resulting in out-of-date, obsolete equipment occupying classrooms and labs. Thus, replacement equipment must be purchased and installed, but which equipment and how much of the equipment will be replaced? The greater the technology infusion in a school system, the greater the need for a technology coordinator and possibly assistants. Large districts can better meet the funding issues presented by the need for additional staff (Trotter, 1997).

Steven Moskowitz (2001) reports that it is very important for schools to consider the total cost of ownership when purchasing computers and related equipment. According to Moskowitz, it is very important that an administrator consider the total cost of technology rather than just the initial purchase price. He states that the following are all factors that should be calculated in TCO: procurement costs (bids, contracts); original equipment costs; software; service and support; upgrade costs; loss of productivity (down time, recreational computing); file server costs; cabling; Internet access; asset tracking; and professional development training. All costs associated with maintaining computers and all technology equipment must be included when calculating the TCO.

Implementation expense of computers and related equipment many times can be funded from federal, state, and corporate dollars. However, financially sustaining the computer networking can become a budgeting issue. Many times the budgeting issues are of greater concern when careful planning did not precede the technology implementation process. Technology needs can vary greatly according to the identified role that technology is to play within a school district. Variables that may affect the role of technology within a district include: the administrative management philosophy, teaching styles, availability of trained teachers and staff; size and age of the physical facilities, and existing budget challenges. Financially preparing for long-term costs related to computers, Internet and other technology equipment can be quiet challenging, as well as present unexpected expenses ("*Taking TCO*", 2001; Slowinski, 2000).

Another administrative responsibility of great value, which potentially can result in an extensive time and labor investment, is the district technology plan. The development and continual review and assessment of the technology plan are a critical component of technology management. This process incorporates the efforts of a variety of stakeholders and the significant investment of valuable time as well as district resources. The product can be quiet beneficial to the district administrator as a means of supporting financial investments, implementation plans, and professional development, etc. (Trotter, 1997).

A study conducted by Nancy Law and Associates (1999) found that administrative leadership is a major component of successful implementation and maintaining of technology (computers and internet) in a school district. In addition, the development and implementation of an explicit technology plan is essential for administrators to obtain a successful outcome.

Successful implementation, utilization, and maintaining of technology in any instructional setting require a shared vision and a well-developed technology plan (Mehlinger, 1996; Costello, 1997). There must be agreement and commitment among all stakeholders: school administrators, teaching staff, parents, private sector businesses, and other contributing community association and organization members to the following:

- technology is an integral part of every academic subject
- student achievement will include thinking and problem solving skills through the support of technology

- curriculum must be structured to include higher order thinking skills, such as problem-solving, efficient learning strategies, and decision-making
- teachers must receive adequate and appropriate professional development that includes computer use training, and training to assist in productively incorporating the Internet into curriculum
- districts will focus future hiring on computer literate teachers and administrators
- districts will seek out funding sources, which will assist in meeting the established technology goals set by the district
- districts will provide adequate, appropriate, and up-to-date technology goals compatible with the infrastructure of the district by which the technology goals may be satisfied (*"Leader's Guide"*, 1998; KickStart Initiative, n.d.).

Much of the planning and decisions related to technology is related to funding and budgeting for equipment, software, networks, supports services, etc. This is not just a startup activity, rather an ongoing one that involves quite an investment of time and knowledge on the part of administration. Oberlin (1996) suggest that an incremental planning process is often advantageous, realizing that budgets will not facilitate all expense of an extensive implementation process at once. Reallocating a portion of the annual budget for information technology will many times assist with the ongoing, long-term related expense. Many times administrators are required to search well beyond normal funding to

external sources (e.g., local business, grant writing, etc.) to meet the technology needs for the district (Pelavin Research Institute, 1997).

The Collaborative for Technology Standards for School Administrators (TSSA Collaborative) has facilitated the development of a national consensus on what P-12 administrators should know and be to do to optimize the effective use of technology. This consensus was presented by the Collaborative in November 2001 as Technology Standards for School Administrators (TSSA). An underlying assumption of the standards is that administrators should be competent hands-on users of technology. By being hands-on users of technology, they will recognize how technology can motivate learners and create a multitude of instructional technologies for teachers (*"School Administrators"*, 2001).

Implementation is a multidimensional process, which requires careful planning. A process involves the cooperation of teachers, technology specialists and/or coordinators, as well as administrators. The success of this process hinges on the leadership and communication of administrators with teachers providing technical support and needed time and assistance that is needed to effective incorporate the technology into the curriculum (Polka, Mattai, & Perry, 2000).

CHAPTER III

Methodology

Overview

The purpose of this study was to create a current information base of identified perceived challenges regarding the utilization and maintenance of the Internet in the instructional programs and recommended solutions address the perceived challenges experienced by administrators of Oklahoma Career and Technology Centers and their suggested solutions to those identified challenges. The Oklahoma Department of Career and Technology Education (ODCTE) has not documented data of this nature to date. Thus far, this researcher has not located evidence of this type of data having been documented by the National Career and Technology Education Association. This chapter describes the research methodology used in this study. Major topics addressed within the chapter include: research design, research questions, population, instrument design and development, institutional review board approval, and data collection and analysis.

Research Design

This study was descriptive in nature. Key (1992) stated "descriptive research is used to obtain information concerning the current status of the phenomena. The purposes of these methods are to describe 'what exists' with respect to variables or conditions in the situation" (p. 126). "Descriptive research reports the way things are, generally asking questions that have not been asked before" (Gay, 1987, p. 11). Descriptive data has provided a foundation by which many decisions have been formed for educational administrators.

> Before much progress can be made in any field, scholars must possess descriptions of the phenomena with which they work. Early developments in educational research, therefore, as in other disciplines, have been concerned with making accurate assessments of the incidence, distribution, and relationships of phenomena in the field. To solve problems about children, school administration, curriculum, or the teaching of arithmetic, investigators ask the question: What exists -- what is the present status of the phenomena: Determining the nature of the prevailing conditions, practices, and attitudes -- seeking accurate descriptions of activities, objects, processes, and persons -- is their objective. However, descriptive research is not confined to routine fact gathering. Identifying and clarifying relationships among variables are the goals of many investigators (Van Dalen, 1979, p. 284).

Descriptive data are typically collected by means of questionnaire surveys, observations, or interviews (Gay, 1996; Fink, 1995b; Rea, & Parker, 1997). Cook and LaFleur (1975) indicated that survey research is one of the three types of descriptive research, the other two being correlation research and casual-comparative. Survey research has served as an excellent data-gathering tool from which educational management formulates decisions.

> When trying to solve problems, researchers in educational, governmental, industrial, and political organizations often conduct surveys. They collect detailed descriptions of existing phenomena with the intent of employing the data to justify current conditions and practices or to make intelligent plans for improving the conditions and practices. Their objective may be not only to ascertain stats but also to determine the adequacy of status by comparing it with selected or established standards (Van Dalen, 1979, p. 286).

According to Gay (1996), "determining current status . . . with respect to some variable(s) involves assessment of a variety of types of information such as attitudes, opinions, characteristics, and demographic information" (p. 251).

A survey instrument designed to gather information regarding the perceived challenges and recommended solutions to the utilization and maintaining of the Internet for instructional programs was used to gather the data for this study. The research instrument answered the following questions.

Research Questions

The following questions, as presented in Chapter I, were developed for providing direction to this study.

1. What are the perceived challenges Oklahoma Career and Technology Center Administrators identify when utilizing the Internet in career and technology instructional programs?
2. What are the perceived challenges Oklahoma Career and Technology Administrators identify for maintaining the Internet in career and technology instructional programs?
3. What recommended solutions do Oklahoma Career and Technology Administrators provide for the perceived challenges identified regarding utilizing and maintaining the Internet in career and technology instructional programs?

Population

Population includes the entire group from which a researcher selects to obtain data. The researcher defines the population. They must be accessible, quantifiable, and related to the purpose of the research (Belnaves, & Caputi, 2001). The population of this study included all administrators of the 29 Oklahoma career and technology center districts. For the purpose of this study administrator's of the Oklahoma career and technology center districts included

superintendents and assistant superintendents. The population was identified from the 2001-2002 Career Tech Personnel Directory (Oklahoma Department of Career and Technology Education, 2001). Seventy administrators were identified for this study. Balnaves and Caputi (2001) indicated that a minimum of 30 subjects is recommended for most research.

Seventy survey questionnaires were deployed. Two of the 70 survey questionnaires, both delivered to administrators at the same career and technology center, were returned undeliverable. Sixty-eight (68) Internet survey questionnaire recipients were used to represent the defined population. Forty-seven completed survey instruments were returned from the 68 deliverable Internet survey questionnaires. The number of returned survey instruments resulted in a return sample. This type of sample is sometimes referred to as a nonresponse sample (Fink, 1995a).

A sample is a section or group of a larger group called a population (Fink, 1995a). "A good sample is a miniature version of the population ... a sample is representative, or a model, of the population. A sample is representative of the population if important characteristics (e.g., age, gender, health status) are distributed similarly in both groups" (Fink, 1995a, p. 1). Survey samples are not meaningful in themselves. Their importance lies in the accuracy with which they represent the target population. When a sample arises from nonsampling sources, such as occurred in this study, bias may take place. It is essential that the sample be examined for biases (Fink, 1995a).

The population included 27 career and technology center districts, which included 58 (85%) male administrators and 10 (15%) female administrators. Those administrators included 28 (41%) superintendents and 40 (59%) assistant superintendents. Fifty-five (81%) of those administrators had been recognized as working at a career and technology center located in a rural area. Seven (10%) were at suburban career and technology centers, while six (9%) were at urban locations.

The analysis of the sample was very close to the target population. The sample responses included 41 (87%) male administrators and six (13%) female administrators. Of those 47 total responses, 15 (32%) were self-identified as superintendents, 29 (62%) as assistant superintendents, and 3 (6%) specified other. Those specifying other identified their titles to be Deputy Superintendent, a title that had not been provided on the survey instrument. The respondents identified the locations of their respective career and technology centers to include 34 (72%) rural, 6 (13%) suburban, 6 (13%) urban, and one (2%) other (combining rural and urban). Refer to figures 3-5 on pages 59 through 61.

The 47 completed survey instruments became the sample of this research study (see Figure 1). The study yielded an overall response rate of 69% (see Figure 2). Responses were received from 27 of the 29 Oklahoma career and technology center districts, yielding 93% of the Oklahoma career and technology center districts represented in the survey results.

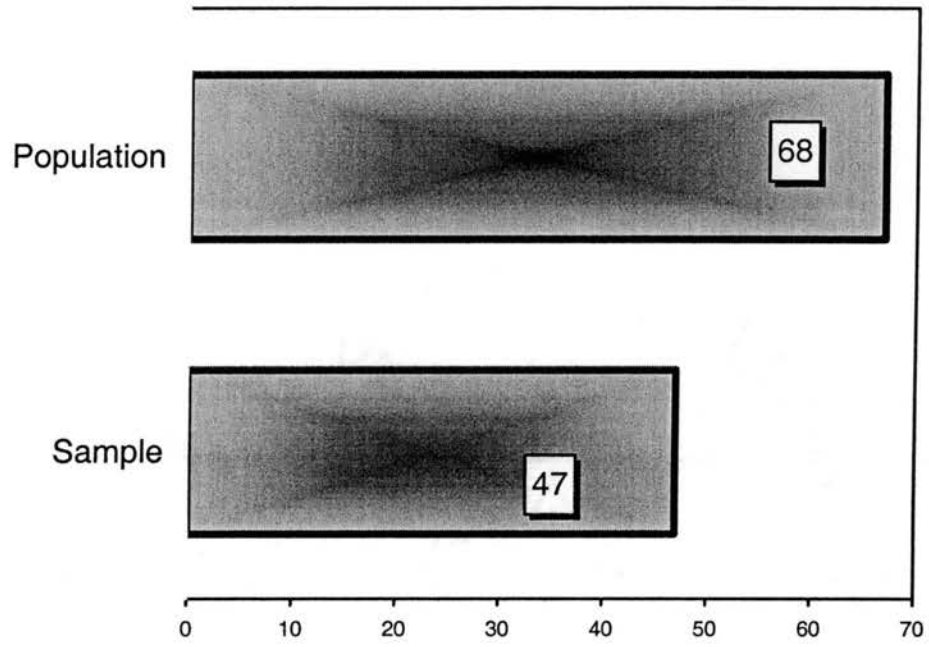


Figure 1. The population and sample numbers as stated on page 57.

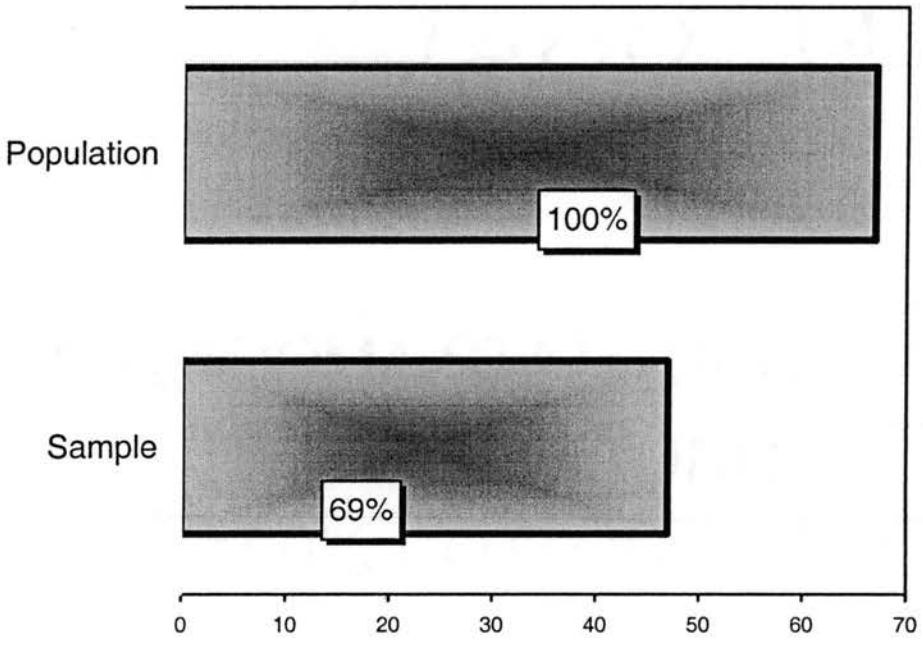


Figure 2. The population and sample percentages presented on page 57.

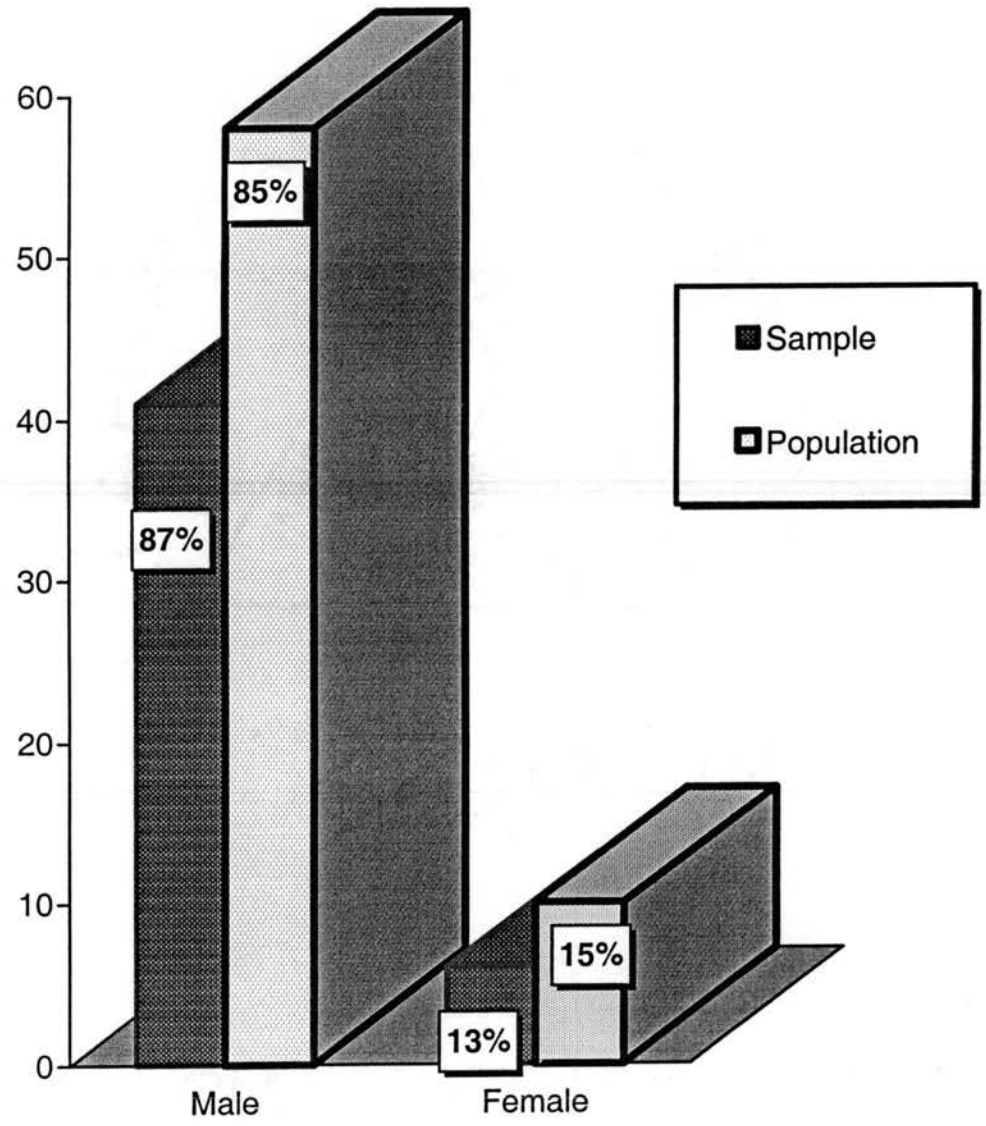


Figure 3. The population and sample gender percentages.

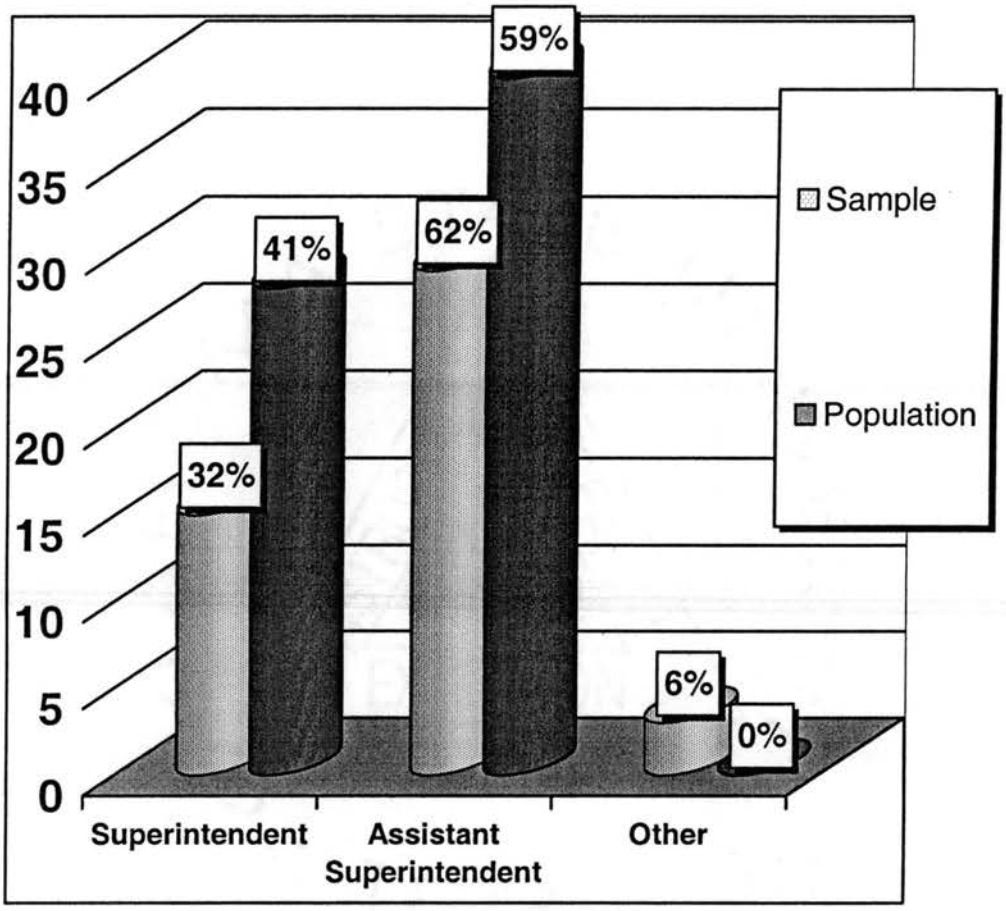
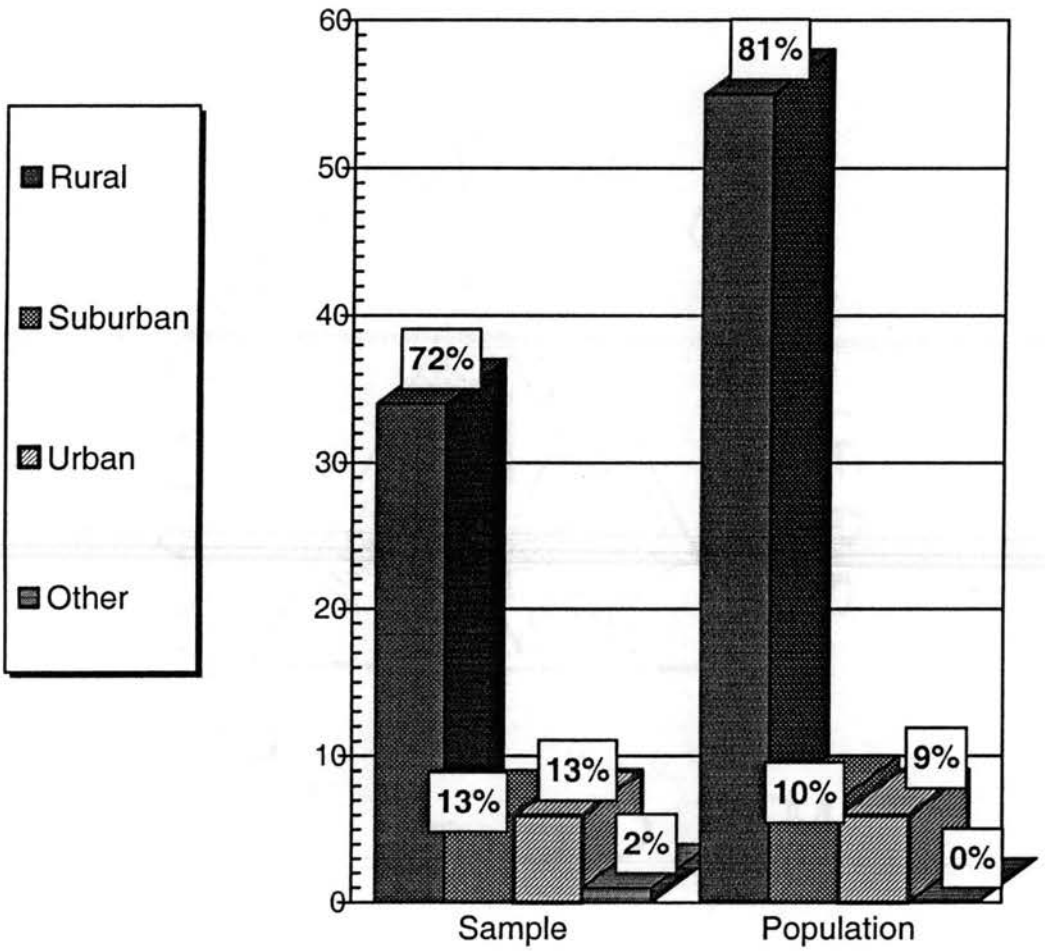


Figure 4. The population and sample administrative title percentages.



	Sample	Population
Rural	34	55
Suburban	6	7
Urban	6	6
Other	1	0

Figure 5. The population and sample geographic classification percentages.

Fink (1995a) points out that all samples contain biases, especially when they result from nonsampling sources. Even though this sample resulted from a nonsampling source, it is this researcher's opinion that it does reflect the target population. The researcher concedes it is not identical, however, it is believed to reflect the overall appearance of the target population as demonstrated by the closeness of percentages.

Research Instrument

Descriptive research involves collecting data for the purpose of testing a hypotheses or answering questions concerning the current status of the study. A descriptive study determines and reports the way things are. The research is usually concerned with the assessment of attitudes, opinions, biographic information, conditions, and procedures. Descriptive data are collected by means of questionnaire surveys, observations, or interviews (Gay, 1996; Keeves, 1997).

The research instrument for this study was created and distributed by the researcher for the specific purpose of collecting data for this study. After reviewing a substantial number of survey questionnaires, this researcher chose to develop a survey questionnaire specific to this study. The survey questionnaire was created, distributed, and retrieved online, via Internet e-mail.

An informal pilot study was conducted by the researcher prior to finalization of the research instrument. A group of education colleagues was asked to examine the survey instrument for face validity and readability. The group was asked to complete the survey, identify any unclear items or items

difficult to complete, and offer suggestions for further improvement of the survey instrument. The survey instrument was distributed and retrieved via Internet e-mail. Appropriate changes were made as recommended. This researcher's dissertation committee was utilized to review the instrument for readability content and construct validity.

The researcher selected Zoomerang.com, an online survey tool, as a means by which this research data would be collected. The following factors contributed to the selection of this online survey tool: 1) it provided a choice of aesthetically appealing formats; 2) it contained a well designed survey instrument; 3) it provided for e-mail deployment to a researched identified population list; 4) it collected responses in real time as submitted by the target population; 5) the responses could be tabulated and recorded in graphic format; 6) it provided a no cost use option to the researcher.

MarketTools, Inc., a California based corporation, owns, and operates Zoomerang.com. It provides and maintains an Internet Web site, which is accessible from any web browser, with related tools and processes to create individualized surveys and obtain survey results for use by individuals that have opted to become "members". At this time, a no-fee related membership option continues to be available. The services and use of the website are provided under terms and conditions set forth in rules and policies published on the website and required in the Terms of Agreement acceptance statement for all individuals choosing to make use the website. Zoomerang.com provides and is committed to its policy of protecting the privacy and confidentiality of all members

and participants. Expanded tools and services are available for a fee. The related costs are listed and described on the website.

For the purpose of this study, the researcher chose to utilize the no-fee service option. This option allowed the researcher to create a survey questionnaire by choosing from a variety of prepared templates. The templates provided for the development of a maximum of 20 research specific questions. Limited analysis was available on a maximum of 50 survey questionnaire responses, with a data storage limit of ten days from the deployment date.

The instrument began with an introductory greeting. The greeting included an explanation for the purpose and use of the survey, as well as assurance that participation is strictly voluntary. The survey instrument consisted of thirteen questions. The first six questions were specific answer questions for collecting demographic and general information. This data was collected for the purpose of determining geographic and/or population bias of the respondents. The questions could be answered by clicking the computer mouse by a selected response. The second section of the survey, consisting of six questions open-ended questions, was designed to gather data specific to the three research questions identified to guide the study. The participants input individual responses to the open-ended questions in data boxes appearing directly below the question (see Appendix B).

An Agreement to Participate was the final item (question 13) appearing on the survey instrument. The agreement specifically indicated that the participants' agreement to participate was strictly voluntary and that all information provided

would be kept completely confidential. Spaces were provided for the participants' name and date to be input prior to selecting the "SUBMIT" arrow at the bottom of the survey instrument (see Appendix B).

Institutional Review Board Approval

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before a study may begin. This researchers data collecting instrument was submitted to and reviewed by the Oklahoma State University Institutional Review Board for Human Subjects Research as stipulated by 45 CFR 46 and was granted permission to proceed with the following approval number: ED02119 (see Appendix A).

Data Collection

"Survey research in education involves the collection of information from members of a group of students, teachers, or other person associated with the educational process, and the analysis of this information to illuminate important educational issues" (Keeves, 1997, p. 107). Survey techniques are very popular since they provide a means of collecting a variety of information in a relatively short time frame (*"Survey Techniques"*, 2002). Collecting data on the Internet is relatively new. Information about Internet surveys in the literature does not currently contain many examples of scholarly research utilizing web-based data

gathering (Spencer, 2000, p. 77). However, Dillman (2000) proposed that the electronic survey has become more popular than the advances of random sampling in the 1940s and the telephone interviews of the 1970s.

Using the Internet as a data collection method provides many advantages for the researcher as well as the participants. Access is fast and easy. "The speed of electronic transmission allows messages to be transmitted worldwide in a matter of minutes as opposed to traditional mail which may take months to reach a country outside the U.S." (Heflich, & Rice, 1999, p. 2). Surveys distributed directly to participant's e-mail addresses have produced the convenience of easy access and the potential to reduce completion time, thus resulting in reduced turn-around time (Stevens, 2000).

A reduction of related survey expenses is another benefit of utilizing the Internet as a data collection tool. Surveys distributed via Internet e-mail greatly reduce related expenses. Internet surveys eliminate copying and postal cost related to mail surveys, as well as the expensive service fees that can be incurred with telephone surveys (Heflich, & Rice, 1999; Dillman, 2000; Bourque and Fielder, 1995; Matz, 1999).

Due to a limit of 50 responses per deployed survey questionnaire, this researcher choose to deploy two identical survey questionnaire instruments in order to accommodate the total study population. The survey questionnaire instruments were identified as *A Study of Perceived Administrative Challenges and Resolutions Regarding the Utilization and Maintaining of the Internet in Career and Technology Programs at Oklahoma Career and Technology Centers*

- A, and A Study of Perceived Administrative Challenges and Resolutions Regarding the Utilization and Maintaining of the Internet in Career and Technology Programs at Oklahoma Career and Technology Centers - B. No specific order was utilized when entering the administrators' names and e-mail addresses on the participant list, for assuring anonymity of responses, as they were collected. The data was collected online, via Internet e-mail. The Zoomerang.com instrument provided a ten-day window for viewing the participant responses. Due to the ten-day storage limitation, the researcher viewed and printed data responses daily following the distribution of the survey instrument.

Low and non-response rate is a common issue encountered when descriptive data are collected by means of questionnaire surveys that are distributed by mail or Internet. "Although some research indicates little or no difference in response rate between electronic or mail surveys, most of the literature points to a general trend of lower response rates for electronic surveys" (Matz, 1999, p. 26). Various factors determine the success of questionnaire survey response. Electronic surveys generally produce a much higher response rate when the recipient is pre-advised of the survey, its' intent and a tentative arrival date. Unsolicited e-mail many times is susceptible to being deleted from a recipient's e-mail box, receiving similar reactions as postal junk mail or telephone telemarketing (Spencer, 2000). This researcher utilized several of the methods suggested by Dillman (1991), Bourque and Fielder (1995), and Spencer (2000) to improve response rates.

This researcher contacted each identified participant by telephone one-week prior to distributing the survey instrument. The telephone contact was to pre-advise each participant of the survey's intent and announce a tentative arrival date (see Appendix C). In addition, the researcher created an opportunity for questions to be presented by the identified participants.

An introductory e-mail (see Appendix D) restating information delivered in the pre-survey telephone conversation was distributed immediately, minutes, prior to the deployment of the online survey instrument (see Appendix B). The survey instrument, designed with an aesthetically appealing template, provided for ease of completion with a limited time investment, included an introductory greeting. The greeting introduced the purpose and benefit of the survey questionnaire to the completion of the researchers study and provided contact information in the event the participant wished to inquire about the survey's intent and/or process prior to opening the survey instrument.

Dillman (1991) recommended that one of the greatest methods to increase response rates is to issue complete follow-up package by certified mail several weeks following the initial mailing. Even though this research utilized the Internet and e-mail for distribution and collection purposes, rather than mail, this component of Dillman's methodology was not followed in this study. Time limitations prevented the opportunity to issue a second deployment of the research instrument to non-respondents.

Bourque and Fielder (1995) suggest follow-ups be used to ensure higher response rates. Follow-ups represent re-contacting all participants with

reminders regarding the survey questionnaire. The reminder can be accomplished easily and without expense when employing e-mail and Internet as the primary source of distribution. However, to improve the response rate, this researcher contacted all non-responders by telephone on the fourth day following the survey deployment (see Appendix E). On the fifth day following survey deployment, five days prior to the close of the ten day time frame allowed by Zoomerang.com. a follow-up e-mail (see Appendix F) was issued to non-responders. On the seventh day following survey deployment, three days prior to the close of the ten-day time frame, an additional effort to increase the response rate was made with the issuing of a second follow-up e-mail (see Appendix G).

Seventy surveys were distributed initially. Of those 70, a total of 47 completed survey questionnaire instruments were returned. The 47 completed survey instruments returned yielded an overall response rate of 69%. Responses were received from 27 of the 29 Oklahoma career and technology center districts, yielding 93% of the Oklahoma career and technology center districts represented in the survey results.

Analysis

A qualitative approach was utilized in analyzing the identified perceived challenges of utilizing and maintaining the Internet in career and technology instructional programs; as well as suggested recommended solutions for those perceived challenges as provided by the administrators of the Oklahoma career

and technology centers are presented through use of descriptive statistics. Descriptive statistics consists of methods for organizing, displaying, and describing data by using tables, graphs, and summary measures (Johnson, 1998; Kelly, 1999; Belnaves, & Caputi, 2001). The demographic and general data questions were tabulated according to the number of responses per specific answer selected.

The researcher utilized content analysis to extrapolate the data from the returned survey questionnaires. Content analysis is a research methodology that examines words and phrases within a wide range of texts. It is utilized to determine the presence of specific words, phrases, and/or concepts within gathered data. Researchers quantify and analyze the presence, meanings, and relationships of words and concepts, and then make inferences regarding the findings in their reports and writings (Weber, 1990).

Coding of text is utilized when conducting content analysis. Coding is basically selective reduction. Data is reduced into categories consisting of a word or a set of words or phrases. Those categories then can be analyzed for specific words, patterns, and/or themes specific to and relating to the research question(s). Many methods and approaches exist for coding data. Researchers must determine the level of analysis desired, the number of concepts to code and whether to code for existence or frequency. Existence coding provides more limited results than the broader interpretation of data presented by frequency coding (Krippendorf, 1980).

Frequency coding was utilized by the researcher for this study. Utilizing an existence coding approach possibly would have limited the survey results. The researcher chose to not establish a pre-identified set of challenge categories prior to gathering and analyzing the survey data. Instead, challenge categories were allowed to emerge from the data during the coding and analysis process.

The level of generalization, (e.g., how data is recorded - in exact form or with different form and same meaning) utilized is a researcher decision (Krippendorf, 1980; Weber, 1990). Translation rules, which allow the researcher to streamline and organize the coding process, establish a crucial level of consistency during the coding process. The translation rules are developed by the researcher as well (Weber, 1990). Coding occurs after all the parameters have been established. The coding process may be conducted manually or by computer. Coding by computer provides a quicker and more efficient means of examining data, especially large quantities of data (Carley, 1989).

The responses from the surveys received from the Oklahoma career and technology center administrators were recorded in a computer database/ spreadsheet. The data were analyzed in terms of themes, and groupings of similar and unique responses. The resulting categories emerged from the coding and analysis process. Tables were used to record the identified categories along with the number of responses and response ratios where appropriate. The analyzed data results are presented and interpret by the researcher in Chapter IV.

CHAPTER IV

Presentation of Findings

Overview

The purpose of this study was to create a current information base of identified perceived challenges regarding the utilization and maintenance of the Internet in the instructional programs. Recommended solutions address the perceived challenges experienced by administrators of Oklahoma career and technology center districts and their suggested solutions to those identified challenges. The previous chapter described the rationale for the chosen research design, the population, instrumentation, and the methods of data collection and analysis. This chapter presents the findings of the research study and an analysis of the data collected.

The results of the research study were gathered by an online Internet survey instrument created by the researcher. The survey questionnaire consisted of three sections. The first section of the survey instrument was designed to gather demographic and general information. The second section presented the three research questions that guided the study with the final section containing an Agreement to Participate.

The findings of the study are presented in this chapter in three sections: 1) Demographic and general information; 2) Perceived Challenges; and 3) Recommended Solutions. Sections two and three presented data gathered specifically to answer the following research questions:

1. What are the challenges you encounter as the administrator of an Oklahoma career and technology center in using the Internet in career and technology instructional programs?
2. What are the challenges you encounter as the administrator of an Oklahoma career and technology center in maintaining the Internet in career and technology instructional programs?
3. What solutions can you offer to your identified challenges in using and maintain the Internet in career and technology Instructional programs?

Reporting and Response Rate

The research instrument, *A Survey of Perceived Administrative Challenges and Resolutions Regarding the Utilization and Maintaining of the Internet in Career and Technology Programs at Oklahoma Career and Technology Centers*, was deployed via Internet e-mail to all administrators (superintendents and assistant superintendents) of the 29 Oklahoma career and technology center districts. Seventy survey questionnaires were deployed. Two of the 70 survey questionnaires, both delivered to administrators at the same career and technology center, were returned undeliverable. Sixty-eight Internet

survey questionnaire recipients were used to represent the defined population. The research analysis is based on the 68 deliverable Internet survey questionnaires. Forty-seven completed survey instruments were returned from the 68 deliverable Internet survey questionnaires. The 47 completed survey instruments returned yielded an overall response rate of 69%. Responses were received from 27 of the 29 Oklahoma career and technology center districts, yielding 93% of the Oklahoma career and technology center districts represented in the survey results.

Demographic and General Information

The demographic and general information collected in the first section of the research instrument was gathered for the purpose of determining geographic and/or population bias of the respondents. Table 1 displays the administrative position of the respondents with the respective response ratio. Of the 47 responses received, 15 were superintendents, producing a 32% response ratio. Twenty-nine assistant superintendents responded with a response ratio 62%. Three respondents selected the category of "Other". Two of those self-identifying to be deputy superintendents, response ratio 4%, and a single associate superintendent, response ratio 2%.

Table 1

Respondents Administrative Title

Administrative Role	Number of Responses	Response Ratio
Assistant Superintendent	29	62%
Superintendent	15	32%
Other:		
Deputy Superintendent	2	4%
Associate Superintendent	1	2%
Totals	47	100%

Table 2

Respondents Years in Current Position

No. Years In Position	Number of Responses	Response Ratio
4-7 Years	19	40%
1-3 Years	16	34%
13-20 Years	8	17%
8-12 Years	4	9%
Other, Please Specify	0	0%
Totals	47	100%

The respondents total years in their current position is reflected in Table 2. Sixteen, 34%, of the responding administrators indicated that they had held their current position for one to three years. Nineteen, 40%, reported four to seven years in their current position. Nine percent, four respondents, reported eight to twelve years in their current positions, while 17%, eight respondents, reported

thirteen to twenty years in their current position. Forty-one, 87%, of the responding administrators identified themselves to be male. The remaining six, 13%, indicated female (see Table 3).

Table 3

Frequency of Response by Gender

Gender	Number of Responses	Response Ratio
Male	41	87%
Female	6	13%
Totals	47	100%

A larger percentage of the respondents identified their respective career and technology center to be located in a rural location. Thirty-four, 72%, indicated rural, while six, 13%, reported urban and six, 13%, reported suburban. One administrator, 2%, selected the "Other" option, indicating an urban and rural combination (see Table 4).

Table 4

Career and Technology Center Geographic Classification

Location	Number of Responses	Response Ratio
Rural	34	72%
Suburban	6	13%
Urban	6	13%
Other:		
Urban and Rural	1	2%
Totals	47	100%

Table 5 reflects the number of secondary students served in an average academic year at the career and technology centers. Twenty-eight, 60%, of the responding administrators replied that 200-500 secondary students will be served in the programs at their career and technology centers in an average academic year. Nine, 19%, reported 500-1000, while six administrators, 14%, reported 1000-2000. Only four, 8%, of the responding administrators indicated 2000-5000 secondary students would be served through the programs at their career and technology centers. Zero responses were selected for the option of 2000-5000.

Table 5

Number of Secondary Students Served in an Academic Year

Secondary Students	Responses	Response Ratio
200-500	28	60%
500-1000	9	19%
1000-2000	6	13%
2000-5000	4	8%
More than 5000	0	0%
Totals	47	100%

The administrators were provided the same selection of number sets to choose from for post-secondary students served in an average academic year (see Table 6). Twenty-three administrators, 49%, reported 200-500; 21%, ten, reported 500-1000; 4.5%, two, reported 1000-2000 and 4.5%, two, reported

2000-5000. Ten administrators, 21% of the total respondents, reported their career and technology centers would serve more than 5000 post-secondary students in an average academic year. Of the 18% serving more than 5000 post-secondary students, three reported being urban and the remaining eight reported being rural career and technology centers.

Table 6

Number of Post-Secondary Students Served in an Average Academic Year

Post-Secondary Students	Responses	Response Ratio
200-500	23	49%
500-1000	10	21%
More than 5000	8	18%
1000-2000	2	4.5%
2000-5000	2	4.5%
Totals	47	100%

Perceived Challenges

The second section of the survey instrument focused on gathering data specific to the three research questions, which guided the study. Six open-ended questions appeared in this section. Each of the three specific questions were followed by an additional open-ended question presenting the participant with additional space for entering data related to the specific question (see Appendix B). Only four respondents entered data in any of the additional spaces provided.

The first question in this section was:

What are the challenges you encounter as the administrator of an Oklahoma career and technology center in using the Internet in career and technology instructional programs?

The majority of the responding administrators submitted more than one response indicating that there are many perceived challenges encompassing utilizing and maintaining the Internet in career and technology instructional programs. The categorical content analysis of the survey data produced 103 responses with reference to perceived challenges of utilizing the Internet. Eleven challenge categories emerged at the completion of the coding process. The number of responses per challenge category and a response ratio for each is reflected in Table 7 on page 80.

A combined total of 37 responses were submitted regarding security and "Acceptable Use Policy", the two challenge categories reflecting the largest number of responses. Many administrators commented on the difficulty, almost impossibility to supervise all sites accessible on the Internet. Even with the most sophisticated software and the use of well-established firewalls, access to all undesirable, inappropriate materials and sites cannot be blocked. "We cannot prevent access to inappropriate sites," was input by Administrator #23. Administrator #12 submitted:

> Assuring that Internet use is not abused is a challenge. The problems I have experienced are relative to playing games instead of doing required

work, viewing pornography, and working on personal e-mail, personal inquiries, surfing, etc., during class time.

Table 7

Oklahoma Career and Technology Center Administrator's Perceived Challenges of Utilizing the Internet in Instructional Programs

Response	Number Per Response	Response Ratio
1. Security	22	21%
2. Acceptable Use Policy	15	15%
3. Instructional Management	14	14%
4. Professional Development	12	12%
5. Equipment	11	11%
6. Budget and Funding	10	10%
7. Curriculum Development	6	6%
8. Technical Personnel and Support	6	6%
9. Virus Protection	3	3%
10. Administrative Management	2	1%
11. Professional Ethics	2	1%
Totals	103	100%

Administrator #38 expressed:

The number one challenge is keeping the students focused on what they are using the Internet for – a large number of students are very good at using the net and know a lot of different places to go.

Administrator #47 stated, "Security – providing enough that high school student don't go to sites prohibited, but open enough for Practical Nursing students to do research, etc." "Difficulty monitoring – some acceptable sites have links to unacceptable sites," was presented as a challenge by Administrator #41. A challenge provided by Administrator #9 was, "The integrity of maintaining the net for educational issues." Administrator # 28 added, "Security of systems and keeping students on websites that relate to instruction is a challenge."

An "Acceptable Use" challenge submitted by Administrator #12 included: "Assuring that all individuals, students and staff, have read, understand, and have signed an 'Acceptable Use Policy'. While we have firewalls installed, people can still access unacceptable sites." Administrator #47 responded, "Time and effort to enforce the 'Acceptable Use Policy' and supervise acceptable use by students while utilizing the Internet takes away from valuable instruction time."

Administrator #16 provided this unique response to the challenge category of "Acceptable Use Policy":

> "Challenges" is not a word I would use, as it is not a challenge at this point. "Concern" is a better choice of words in our situation. There is a concern in walking the fine line between censorship, big brother, and appropriateness for any public educational institution, especially one where secondary students have access. Concern in that we are supported by taxpayer dollars and as such, administrators inherently have a keen sense of community standards and morals. Another concern is that of potentially "wasted" time and effort. Students have been seen

> "logging on" to game sites whenever there is an opportunity. Depending upon the experiences and philosophy of the instructor, these activities may or may not be adequately supervised. Access to the Internet brings in valuable learning resources and opens up brand new opportunities for learning. With any new frontier, concerns accompany opportunity.

Instructional management emerged as the third most frequently submitted challenge category of utilizing the Internet in instructional programs. Administrator #12 provided this comment, "Teacher supervision is another challenge. The very nature of our classes means that students are in a variety of places. The teacher can only be in one place." Administrator #44 entered this instructional management response:

> Instructional supervision of Internet use is a new and emerging supervision area. Students may perceive incorrectly that access to the Internet is both for instructional and for personal use. As Internet usage increases, this line will become increasingly blurred for students and employees.

Administrator #13 stated, "Students over enthusiasm to access the Internet sometimes leads to neglect of other important topics of study. This requires instructor's supervision, almost on an individual student basis, when students use the Internet." "Keeping focus on productive learning activities rather than time-wasters," was presented by Administrator #32. Administrator #31 submitted, "Lack of interest of the instructor to encourage the students to use the Internet related to their training area is an ongoing challenge."

Administrator #4 responded with, "Instructor willingness and effective usage, as in time-on-task are challenges of using the Internet in the instructional programs." This response regarding time on task was submitted by Administrator #35 input, "Teacher complaints regarding students staying on task – wanting to wander around on the Internet when the teacher isn't looking. A great deal of time is needed to keep students on task ." A challenge contributed by Administrator #36 stated, "Ensuring that computers are being used for authorized instructional purposes." "Inadequate instructional supervision while students are using the Internet leads to misuse," was submitted by Administrator #7.

Fourteen responses were submitted in the challenge category of professional development. Many responses echoed the response entered by Administrator #15, "Keeping teachers up-to-date with new, and emerging technology. Administrator #10 stated, "All our instructional staff is not as skilled with technology in their programs as they should be. Finding time for training is an issue." "More time to provide staff development to ensure the usage of available technology is needed" was entered by Administrator #39. Administrator #27 added:

> ... the most reluctant seem to be the T & I program instructors. These instructors are more skill oriented and we have more challenges getting them to learn how the Internet and computers in general can help their programs.

Equipment, as well as budgeting and funding were challenge categories that received many responses. Administrator #3 stated, "The recurring costs to

keep processing speed of computer hardware and servers at optimal levels is definitely a challenge." "Cost of equipment and software upgrades," was the response entered by Administrator #24. Administrator #12s response encompassing equipment, budget, and cost stated:

> The cost of installing and maintaining the infrastructure to all, both staff and students, for access to the Internet. These costs include not only the basic costs of hardware and software, but the cost of personnel as well.

"Equipment failure is probably the biggest challenge," was the response input by Administrator #33; much like Administrator #10 who stated, "We have a problem with keeping our system up and working – it's not dependable." Administrator #40 responded with, "Providing student access to the Internet in each classroom is a challenge."

Several responses regarding bandwidth for networking were submitted. Administrator #19 stated, "Our greatest challenge is bandwidth. We are limited by our T1. At this point T3 is cost prohibitive." Administrator #17 submitted this response, "Increasing the bandwidth so that the network will provide faster service for gathering information from several locations." "Not having enough T-1 lines to provide adequate network space" was submitted by Administrator #30. Administrator #46 entered, "Retaining and increasing connectivity to other sites" as a challenge.

Curriculum development and technical personnel and support tied with six responses each as perceived challenges of utilizing the Internet in instructional programs. Finding appropriate instructional materials, under utilizing the Internet

as a teaching tool, as well as and it is time consuming and challenging to screen the vast amount of information available on the Internet to ensure appropriate and meaningful curricular infusion are some of the responses submitted. Technical personnel and support responses included: "affording the man power to properly set up all the options we use and want to use is a challenge"; "providing adequate support staff to train and assist the faculty and staff with the Internet"; "instructional staff are no longer capable of keeping up with all the technical support required to remain totally functional at all times"; and "the number of technical support personnel needed increases with each upgrade of software and addition of new equipment."

Virus protection was submitted as a challenge by three administrators. Administrator #47 stated, "Controlling computer viruses and the amount of time required related to maintenance," as a challenge related to utilizing the Internet in the instructional programs. Two additional challenge responses reflected the need to be able to control the amount of viruses encountered.

Challenge categories of administrative management and professional ethics both received two responses each. Administrator #6 summed up administrative management by stating,

> As a typical chief executive officer, the same as any other organization of our size, encounters political, financial, organization, operational, motivational, fiscal, managerial, executive aloneness, and time management.

A challenge category of professional ethics emerged when Administrator's #11 and #46 submitted responses identifying plagiarism as a challenge encountered at their respective career and technology centers. Administrator #46 stated, "more instructor time and effort is being invested on plagiarism – it seems the more the students learn about computers the more security issues we encounter." In addition, Administrator #46 input, "the challenge is insuring appropriate and proper use by employees, as well as students."

The second question presented to the administrators in section two of the survey instrument was:

> *What are the challenges you encounter as the administrator of an Oklahoma career and technology center in maintaining the Internet in career and technology instructional programs?*

The categorical content analysis of the survey data resulted in 81 perceived challenges relating to maintaining the Internet in the career and technology instructional programs from the 47 survey respondents. As with responses reported for the previous question, the responses regarding challenges of maintaining the Internet in career and technology instructional programs were coded and categorized. Nine challenge categories emerged (see Table 8). Administrator #1 submitted an all-encompassing response to this question. The response stated, "cost, security, improper use, virus protection." This response was somewhat representative of the responses submitted by other respondents. Table 8, below reflects the results of the nine challenge categories, which emerged during the categorical content analysis process. The

table displays the number of responses per challenge category and a response ratio for each.

Table 8

Oklahoma Career and Technology Center Administrator's Perceived Challenges of Maintaining the Internet in Instructional Programs

Response	Number Per Response	Response Ratio
1. Technical Equipment	20	25%
2. Technical Personnel and Support	17	21%
3. Budget for Technology & Equipment	15	19%
4. Security and Appropriate Use	11	14%
5. Professional Development	7	9%
6. Curriculum Development	5	6%
7. Student Record Privacy	2	2%
8. Technology Planning	2	2%
9. Virus Protection	2	2%
Totals	81	100%

Technical equipment was another challenge category that emerged during the content analysis. Many of the twenty responses in this category were very similar. Administrator #33 stated, "Keeping equipment running and keeping up with new technology is our biggest challenge." "Network reliability and speed" was the response of Administrator #36. Administrator #22 added to the equipment challenge category by submitting, "bandwidth on the infrastructure - increased audio and video usage." "Old equipment," was presented as a

challenge by Administrator #42. Administrator #46 stated, "Our growing challenge is maintaining an adequate amount of current equipment for the number of students that we have using that equipment." "The cost of equipment and software updates is a challenge," was input by Administrator #3. Administrator #30 entered this response, "We have had server issues such as separating the computer repair classes from the main campus servers." "Providing the necessary access to students in all program areas is a challenge. This includes access hardware and hardware available in all individual programs."

Receiving the second largest number of responses to the question regarding challenges of maintaining Internet in the career and technology instructional programs was technical personnel and support. This challenge category received 17 of the 81 total responses. Administrator #15 submitted, "Keeping certified and knowledgeable employees." "Technical support in maintaining equipment and software," was entered by Administrator #40. Administrator #4 stated, "The personnel required to maintain our Intranet is a significant challenge." A technical support response from Administrator #12 included, "... we employ sixteen people in our Information Technology Department." Administrator #23 added, "We employ an MIS department for support. However, our infrastructure is not up-to-date enough to handle all the traffic." Administrator #37 stated, "It requires a significant investment of personnel to maintain a reliable, up-to-date system." "We employ technical staff to take care of the school's computer network and assure connectivity," was the

response of Administrator #47. Administrator #28 stated, "Maintaining requires a full time staff person and much cooperation from teachers to make a workable system." A challenge response to technical support submitted by Administrator #44 was, "Instructors are the frontline of defense regarding maintenance." Administrator #35 entered, "We have added additional staff to assist with the daily maintenance of the system." Administrator #10 added, "Keeping well-trained staff in our technology department, as well as recruiting staff, is a challenge. It is difficult to compete with industry for well-trained staff."

Budgeting and funding was another challenge category emerging from the responses regarding maintaining the Internet in the career and technology instructional programs. "Budgeting for the cost of services and equipment" was entered by Administrator #13. Reponses regarding cost of technical support were input by both Administrator #3 and #12. Administrator #3 entered, "ongoing costs of technical support is a challenge"; Administrator #12 stated, "the cost of personnel is the greatest challenge of maintaining the Internet in the instructional programs..." "The upgrades in software and hardware require a significant investment," was submitted by Administrator #37. Administrator #40 stated, "Funding to provide the needed technical support is a challenge." "Cost to upgrade equipment as technology advances" was the response of Administrator #11. Administrator # 27 stated, "Probably cost is the main factor, it seems like every year we have increased cost in all areas related to the Internet and its' use. "The cost of purchasing the equipment and keeping up-to-date with technology is the biggest challenge," was submitted by Administrator #10.

"Maintaining a budget that allows districts to upgrade equipment (i.e., computer, software, etc.)," was input by Administrator #17.

Security and acceptable use emerged as a challenge category for the content analysis for maintaining the Internet in the instructional programs as well. "Making sure it is safe, without unnecessary restrictions," was submitted by Administrator #2. Administrator #22 responded, "Close monitoring of students to keep off porn sites." Administrator # 5 entered, "Making sure firewalls are in place and still allow the student the freedom to utilize the Internet." Administrator #30 added, "Students misuse of the Internet has been a problem however we are not going to better control it with filtering, etc." Administrated #19 stated, "Filtering is a challenge. We recognize the need for filtering, however it is far from perfect. Good information is often stopped while undesirable information may easily slip through. "Assuring that the Internet is being used for authorized instructional purposes and not being used for personal purposes of e-mail, personal business, and games," was the response of Administrator #18.

Additional challenge categories to emerge from the survey responses were professional development and curriculum development. Administrator #6 submitted this unique professional development response, "Learning new techniques, while staying on the go - kind of like trying to change out two of four jet engines on a 747 on a plane full of people in mid-flight." Administrator #18 stated,

> Finding time and resources to provide all of our instructional staff with quality professional development to keep them up-to-date with all the new

Internet instructional options, as well as the needed equipment training to ensure that the Internet is used appropriately with the instructional process.

Supporting the responses of Administrator #18 was the input of Administrator #14 stating, "Ongoing instructor training is a challenge." Quality of instruction and an ongoing need for the development of instructional materials were responses received as well. Administrator #34 stated, "another problem is the under utilization of the Internet as a teaching tool." "The development of new materials is a challenge," was a response from Administrator #14.

Technology planning, student record privacy, and virus protection each received responses from the administrators. The expertise, time, and effort required to develop, implement, and monitor a long-range technology plan was considered a challenge by two respondents. Establishing and maintaining adequate student record privacy was put forward as a challenge to administrators as well. Administrator #18 stated, "Maintaining an appropriate level of record security which ensures privacy of confidential student records is an on-going challenge." Administrator #29 entered a response stating, "Virus protection is a continuing challenge."

Suggested Solutions

The third research question guiding this study and the last question appearing in this section of the survey questionnaire was:

What solutions can you offer to your identified challenges in using and maintaining the Internet in career and technology instructional programs.

Once again as with the previous two questions, many administrators provided more than one response. However, fewer suggested solutions were provided than perceived challenges. Thirty-seven responses were received to the third research question presented on the survey questionnaire. A surprisingly smaller number of responses compared to the 103 perceived challenges for the utilization of the Internet and the 81 perceived challenges for maintaining of the Internet.

The suggested solution responses are presented in category and paraphrase format, not as direct quotes. Suggested solutions for security issues and "Acceptable Use Policy" included:

- screening software
- develop, implement, and enforce an appropriate "Acceptable Use Policy"
- continually addressing proper use practices and expectations with students, faculty and staff
- assuring constant and diligent supervision by instructors when students are utilizing the Internet

- professional development for administrators, faculty, and staff
- be conservative with the number of Internet stations created and establish limited user time frames at each station
- position the teacher's station so that visual inspection of all student computer screens is available and expect the teachers to supervise student computers when Internet is being used
- utilize network and classroom surveillance software
- install good filtering software that is capable of sounding an alarm or notifying the instructor when inappropriate use is occurring
- provide training to faculty and staff so that they will know how to enforce the AUP policy --- and so they will understand how it will be enforced
- use firewalls and blocking software to assist with keeping the system secure and safe.

Suggested solutions emerging for instructional management included:

- provide more professional development activities
- provide frequent instructor in-service opportunities
- provide instructional staff with appropriate equipment, tools, and training to ensure that security is monitored properly during instructional activities
- ensure there is an applied learning activity prior to granting Internet use privileges
- require the faculty to monitor student use of the Internet

- provide release time to instructors for the purpose of developing curriculum
- contract instructors for eleven or twelve month rather than the typical ten -- the additional one to two months can be utilized for in-service training and curriculum development.

The responding Administrators offered these suggested solutions to the technical support and technical equipment challenges:

- design and implement infrastructure for expansion potential
- technical support training for current personnel
- employ technology specialist when possible, if not feasible to employee a specialist full-time, train current faculty and staff to provide adequate technical support
- utilization of expandable services to allow adjustments in bandwidth
- purchase, maintain, and install adequate filtering software for virus protection
- continue to expand and upgrade bandwidth.

Recommended solutions for budgeting and funding challenges included:

- accept these are recurring expenditures and budget accordingly
- utilize consortiums to assist with the cost factors
- utilize a statewide purchasing clearinghouse for computer technology
- take advantage of the e-rates
- the development and adherence to a well-developed technology plan

- develop and use a technology plan, including hardware, access -- full center plan, not just specific programs (i.e., IT programs)
- continue to explore federal grant opportunities that will assist with funding challenges
- utilize the option to incorporate technology costs into the building fund, as allowed by state law.

CHAPTER V

Summary, Conclusions, and Recommendations

Summary

This study was conducted to create a current information base of perceived challenges experienced by administrators of Oklahoma career and technology centers of utilizing and maintaining the Internet in the instructional programs and their recommended solutions to those perceived challenges. The review of related literature revealed that: (a) technology is an integral part of every academic subject; (b) student achievement will include thinking and problem solving skills through the support of technology; (c) curriculum must be structured to include higher order thinking skills, such as problem-solving, efficient learning strategies, and decision-making; (d) teachers must receive adequate and appropriate professional development that includes computer use training, and training to assist in productively incorporating the Internet into curriculum; (e) districts will focus future hiring on computer literate teachers and administrators; (f) districts will seek out funding sources, which will assist in meeting the established technology goals set by the district; (g) districts will

provide adequate, appropriate, and up-to-date technology goals compatible with the infrastructure of the district by which the technology goals may be satisfied (*"Leader's Guide"*, 1998; KickStart Initiative, n.d.). Although there is a plethora of literature available specific to the Internet and career and technology education, none provided specific data regarding the challenges of utilizing and maintaining the Internet in career and technology instructional programs experienced by administrators of career and technology centers; certainly none specific to Oklahoma career and technology center administrators. This study was conducted with all 29 career and technology center districts administrators (superintendents and assistant superintendents) in Oklahoma, and the following research questions guided the study:

1. What are the challenges you encounter as the administrator of an Oklahoma career and technology center in using the Internet in career and technology instructional programs?
2. What are the challenges you encounter as the administrator of an Oklahoma career and technology center in maintaining the Internet in career and technology instructional programs?
3. What solutions can you offer to your identified challenges in using and maintain the Internet in career and technology Instructional programs?

An online research instrument was distributed via Internet e-mail to all administrators (superintendents and assistant superintendents) of the 29 Oklahoma career and technology center districts. Forty-seven completed survey instruments were returned from the 68 deliverable Internet survey

questionnaires. The 47 completed survey instruments returned yielded an overall response rate of 69%. Responses were received from 27 of the 29 Oklahoma career and technology center districts, yielding 93% of the state career and technology center districts. The data collected were compiled, coded, and recorded in Tables 1 - 8 presented in Chapter IV.

Demographic and general information was collected for the purpose of identifying geographic and/or population bias of respondents. The 47 responses received represented 27 of the 29 Oklahoma career and technology center districts, 93%. Geographically, all areas of the state were represented in the results. A larger percentage of the respondents reported rural geographic classification for their respective career and technology center. Thirty-four respondents designated rural, six chose urban, and one respondent indicated an urban and rural combination.

The eleven perceived challenge categories of utilizing the internet and the nine perceived challenge categories of maintaining the Internet that emerged from the survey data are quiet similar. The perceived challenge responses for both utilizing and maintaining the Internet in the career and technology instructional program are very closely related.

The 11 perceived challenge categories that emerged from the 103 responses received to the question regarding perceived challenges of utilizing the Internet included:

1. Security
2. Acceptable Use Policy

3. Instructional Management
4. Professional Development
5. Equipment
6. Budget and Funding
7. Curriculum Development
8. Technical Personnel and Support
9. Virus Protection
10. Administrative Management
11. Professional Ethics

The large number of perceived challenge responses received suggests that the utilization of the Internet in the Oklahoma career and technology center instructional programs has presented and continues to present many challenges for the administrators. Security and "Acceptable Use Policy" reflected the greater number of responses. Many administrators commented on the difficulty, almost impossibility to supervise all sites accessible on the Internet. Even with the most sophisticated software and the use of well-established firewalls, access to all undesirable, inappropriate materials and sites cannot be blocked.

Nine challenge categories emerged from the 81 responses received to the question requesting perceived challenges of maintaining the Internet in career and technology instructional programs. Those nine challenge categories are listed below in the order of greatest to least response ratio.

1. Technical Equipment
2. Technical Personnel and Support

3. Budgets for Technology & Equipment
4. Security & Appropriate Use
5. Professional Development
6. Curriculum Development
7. Student Record Privacy
8. Technology Planning
9. Virus Protection

The third research question guiding this study and the last question presented in the second section of the survey questionnaire asked the administrators to offer solutions to their identified challenges of using and maintaining the Internet in career and technology instructional programs. Again, many administrators provided more than one response. However, fewer suggested solutions were submitted than perceived challenges. Thirty-seven suggested solutions were received, comparing to 103 perceived challenges for the utilization of the Internet and 81 perceived challenges for the maintaining of the Internet. This is a very expressive outcome of the study. Suggesting that quiet possibly the administrators of Oklahoma career and technology centers are still seeking solutions to the more easily identified challenges for utilizing and maintaining the Internet in the instructional programs.

Conclusions

This study examined the perceptions of Oklahoma career and technology administrators. Its purpose was to generate a current database regarding challenges of utilizing and maintaining the Internet in career and technology instructional programs, as well as recommended solutions. An online survey questionnaire was utilized to gather the career and technology center administrators' perceptions. The researcher utilized descriptive research methods to gather the data and categorical content analysis procedures were followed to accomplish the analysis and define the findings. The study revealed an abundance of perceived challenges identified by career and technology administrators, accompanied by their suggested solutions for a number of, but not all of the perceived challenges. The following conclusions emerged from this study.

The findings of the study produced numerous perceived administrative challenge categories for utilizing and maintaining the Internet in career and technology instructional programs. The eleven perceived challenge categories of utilizing the Internet and the nine perceived challenge categories of maintaining the Internet that emerged from the survey data are closely related. This is a significant finding of this study. The researcher concluded there appears to be a relationship between the challenges of utilizing and maintaining the Internet in career and technology education programs.

Four primary areas of focus emerged from the perceived challenge categories resulting from the survey responses: technology planning, teacher training and education programs, supervision, and cost.

The researcher concluded from analysis of the data that technology infrastructures were implemented prior to the development of technology plans structured to the mission and vision of the individual technology centers. The challenges perceived by the administrators suggest reactive management processes have resulted from inadequate planning prior to implementation of the Internet into instructional programs.

Technology planning can sound like another piece of bureaucracy, however utilized effectively, it can be a valuable management tool to assist and guide the use of technology effectively toward the mission established by the educational institution. An effective technology plan incorporates and addresses many of the challenge categories identified in the survey questionnaire responses: funding and budgeting, appropriate and adequate hardware, software, and networking equipment, technology personnel, security and appropriate use, professional development and instructional management.

A technology plan does not need to be just another required document that was developed to meet state and/or national requirements, which ends up lying on the shelf of a bookcase collecting dust. Just like a business plan, a technology plan is a document, which provides guidance and direction for technology integration, utilization, and maintenance within an educational institution. Technology planning is a process, not a product. The process of

planning can provide administrators an opportunity of grounding their technology plan with the mission and vision of the educational institution. It is an opportunity to acquaint all stakeholders with the idea that it is not all about technology. It is about setting the stage to provide quality education and learning opportunities in well equipment environments equipped with appropriate technology.

Components of a technology plan include:

- mission and vision statement that will form the foundation for technology training and/or use within the educational institution
- establishes specific goals and objectives that structure the use and outcome of technology within the education process
- identifies existing technical resources, technology hardware and software, and determines if they are adequate to support all established goals and objectives
- identifies technology equipment and software that may need to be procured
- evaluates related costs and funding of the over all plan
- identifies associated costs and supplementary funding sources (when accessible)
- ascertains the maintenance needs existing and new technology equipment and software
- evaluations, assessments, and revisions must occur frequently to ensure an overall effectiveness a technology plan.

In order to gain the greatest benefit from technology hardware and software, educators will benefit from a firm foundation of technology knowledge and skills. Training may be required to prepare faculty and staff with the hardware, software, or possibly both. All effective technology plans are revisited on a regular basis to provide assurance that appropriate fundamentals exist result and remain in alignment with educational institutions technology mission and vision.

As with any project, funding is crucial to the success of a technology plan. Many times additional funding can be obtained from external sources to defray the related costs. Therefore, it is essential to embark upon identifying funding needs early in the planning process. Effective technology planning has the potential to create pro-active management practices. Reactive management practices bring about crisis management practices.

The researcher concludes, based on the analysis of the data and information gained through the literature review presented in Chapter II, the frequency, and adequacy of teacher training regarding utilization and maintenance of the Internet is insufficient to meet the challenges perceived by Oklahoma career and technology center administrators. The administrator's responses suggest that more training must occur to prepare the instructors to effectively infuse the Internet into career and technology instructional programs.

Teacher training and education programs, encompassing formal collegiate education to in-service training, are essential for utilizing and maintaining Internet in career and technology education programs. "In the early days of educational

computing, dating roughly from the launch of Sputnik in 1957 to the advent of personal computers, teacher training institutions addressed professional development needs for technology through in-service programs." (International Society for Technology in Education [ISTE], 1998, p. 7). Teacher training programs are now beginning to advance, however as late as 1998 teacher technology training had not increased markedly (International Society for Technology in Education Accreditation Committee, 1998). Willis and Mehlinger (1996) wrote:

> Most pre-service teachers know very little about effective use of technology in education and leaders believe there is a pressing need to increase substantially the amount and quality of instruction teachers receive about technology. The idea may be expressed aggressively, assertively, or in more subtle forms, but the virtually universal conclusion is that teacher education, particularly pre-service, is not preparing educators to work in a technology-enriched classroom (p. 978).

Unfortunately, this is much to close to being the same today in the 21st century. Even though teacher education programs have incorporated more technology preparation in to curriculum, most pre-service teachers are still not prepared to work in a technology-enriched classroom.

> Teachers are being asked to learn new methods of teaching, while at the same time are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom ... [given such challenges] relatively few teachers (20%) report feeling well

prepared to integrate educational technology into classroom instruction." (NCES, 1999).

This study revealed many challenges related to and focused in the realm of supervision. The conclusion gleaned from the analysis of data gathered in this research study is that challenges related to supervision are the most common regarding utilizing and to some degree maintaining the Internet in the career and technology instructional programs. The survey responses were many regarding security, the use, and enforcement of acceptable use policies (AUP) and instructional management.

The researcher ascertained from the survey results that administrators are investing large amounts of time, money, and effort in the processes related to providing safe and lawful Internet use within the career and technology centers. They have become very aware that managing students' Internet use encompasses various legal ramifications, a great deal of hardware, and software are required, as well as personnel to supervise student Internet access.

Regardless of how thorough the efforts put forth to limit access to inappropriate sites, some will still slip past the sensors and gain access to sites deemed unsuitable -- accidentally and/or intentionally. eSchool News online published an article by David A. Splitt (2001) in which he listed ten unacceptable student uses of the Internet -- behaviors that should be prohibited when students access the Internet at school. The list included: plagiarism, violation of copyright laws, accessing inappropriate materials (i.e., pornography), to engage in any illegal act, using e-mail to sell drugs online, using a chat room for gang

meetings, sending threats to classmates and/or faculty and staff via e-mail, intentionally spreading computer viruses or worms, and hacking into restricted files or web sites. Student must be made aware that abuse of the Internet is far more serious than anonymous scribblings on the walls in the restroom. The Federal Communications Commission, under the Children's Internet Protection Act (CIPA) of 2000, requires schools and libraries to certify they have adopted and are enforcing an Internet safety policy that includes measures to block or filter access to content that is obscene, pornographic, or harmful to minors on Intern-connected computers used by minors. Additional software and computer equipment is dedicated to providing safe and secure learning environments (Loupe, 2002).

Another conclusion derived from the analysis of the research data is that budgeting and funding for all components related to the utilization and maintaining of the Internet in career and technology instructional programs are lacking. Inadequate funding has impacted training, instruction, instructional management, supervision, equipment, management of equipment, and faculty and staff, etc. Expenses, overhead expenditures, budgets, and funding are underlying obstacles that have influence in all areas of career and technology education, most definitely in utilizing and maintaining the Internet in the instructional programs. Fluctuating economic conditions have and will continue to establish budget and funding challenges for career and technology administrators. The constant changing nature of technology, equipment, hardware, software, and networking equipment, will continue to present funding

challenges. Employing qualified instructors and technology specialists may present additional budget and funding challenges. Competing with business and industry for the highly qualified and skilled specialist is hamper due to inadequate funding for salaries.

Justifying technology equipment upgrades and expansions has the potential to present challenges in the face of continual dwindling funding in the midst of unstable economic conditions. Quality instruction and learning is hampered from the lack of sufficient connectivity, lack of computers or broken computers, and other multimedia equipment that is inaccessible due to limited funding. Commitments of funding, equipment and training are essential to effectively utilize and maintain the Internet in career and technology instructional programs.

Recommendations

The findings of this study revealed that the administrators of Oklahoma career and technology centers have identified challenges of utilizing and maintaining the Internet in the instructional programs. However, the number of suggested solutions compared to the number of perceived challenges implies this is still a relatively new frontier for some and much effort and time is still needed to discover adequate and appropriate solutions.

Career and technology center administrators could benefit immensely from a technology plan, developed specifically to the needs of the career and

technology center. A functional technology plan needs to be flexibility and be revisited frequently. Since the average life span of technology is now less than 18 months, the feasibility of working with a five-year technology plan is no longer valid for effective management.

Professional development for modern teachers must include information technology readiness and technology maintenance training. Collegiate undergraduate, and graduate programs should include pedagogy, maintenance, and technology management components. Teachers must be prepared in the collegiate arena with the technology skills they will be expected to perform, teach, as well as model when they enter the classrooms.

Educational administrators must provide on-going professional development and in-service training for teachers and technology specialists as well. Technology cannot drive curriculum - curriculum should drive technology. Technology should fit into existing curriculum, rather than curriculum being developed specifically to incorporate technology. However, effective Internet infusion into the learning environment requires an instructor to possess technological skills and knowledge. Focus returns once again to appropriate training for teachers. An administrative commitment to training and professional development is critical to any instructional program, but especially for programs that are successful in incorporating, utilizing and maintaining technology in instructional objectives and learning outcomes.

Teacher training and education programs are essential to utilize and maintain the Internet in the career and technology instructional programs. These

training programs need to be current and progressive, incorporating the most current technology applications and maintenance skills applied in work places of the 21-st century.

A variety of in-service and professional development activities should be incorporated into the academic schedule to provided the instructional staff with the skills for utilizing the Internet in the instructional programs. In addition, similar activities could focus on curriculum development methods. Team teaching, mentoring, modeling, and showcasing best practices are methods that could be utilized to assist the instructional staff in the efforts to embrace infusion of the Internet into the instructional programs.

Collegiate teacher education programs, both undergraduate and graduate, should contain instruction concentrating in pedagogy, information technology knowledge and application skills, technology maintenance, as well as management of technology. They need to educate teachers on how to evaluate, select, and use appropriate technology-based tools for instruction and assessment. Prepare teachers to use multiple approaches to achieve educational objectives. Technology is an excellent mentoring tool. Teachers must model the skills, and concepts they teach.

The concern of access to and availability of in-appropriate material on the Internet has become a growing concern to administrators and instructors alike. Student use of the Internet should be supervised by designated staff and faculty. Identify specific locations, such as media centers, dedicated computer labs, specified classroom locations, etc., for Internet accessibility for students.

Designating use areas enables controlled instructional supervision as well as provides a controlled environment; in some instances, it may even reduce the amount of equipment required. In addition, the amount of filtering equipment may be reduced by designating use areas.

Surveillance software may be utilized in facilities that have large numbers with Internet accessibility. Require staff and faculty to supervise the computer sites accessed by students, reviewing computer histories of Internet sites accessed. Administrators must continue to assess the positive, as well as negative aspects of providing Internet accessibility in the instructional environment. Focusing on challenges alone may limit use within career and technology instructional programs.

Require students to log on to one of three environments each time they turn on the computer, failure to log on correctly will lock the individual off the Web. Install software that will provide for screen security options. Block or prohibit access to specific websites, utilize screening software and when essential, use surveillance software. Increase bandwidth when needed, in an effort to maintain quick and easily accessible data. Additionally, provide in-service training to faculty and staff so they may become knowledgeable of the related state and federal regulations.

Administrators must continue to provide administrative and financial support toward the utilization of computers in the career and technology education programs. They need to ensure that adequate computer hardware and

current software is available and located in the appropriate programs. In addition, fast and reliable connectivity to the Internet is an essential component.

Technology can be established as a line item in the yearly budget. Technology expenses do not just occur once, they are on-going. In order to maintain a level of technology competitive with those in the work force education will need to seek additional funding sources. Utilization of federal e-rates can provide budget assistance. Outside funding sources are another potential to source for boosting budgets. A multitude of private, state and federal grants exist. Even though the process of grant writing is time tedious and time consuming, it has the potential to provide much needed financial resources to support an educational institutions technology plan. Given that funding will continue to be an uncertain variable, employ technical specialist and provide technical support according to what the budget will allow.

The utilization of statewide consortiums and administrative organizations could function as a network by which knowledge and resources might be shared with others experiencing like circumstances. Sharing of suggested knowledge, resources and successful outcomes many times is all that is necessary for direction and achievable resolution to be obtained.

Recommendations for Future Research

During the course of this study, which examined perceived challenges and suggested solutions of utilizing and maintaining the Internet in career and

instructional programs as presented by the administrators of Oklahoma career and technology centers, other issues were identified that might be explored in future research studies. These issues included:

1. How do the perceived challenges and recommended solutions of utilizing and maintaining the Internet in career and technology instructional programs of instructors compare to those identified by administrators?
2. Do Internet technology concerns/challenges change with time?
3. What are the attitudes and perceptions related to required professional development for the effective integration of educational technology in career and technology instructional programs?
4. Is the integration of the Internet in curriculum of career and technology programs beneficial? How and to what degree?
5. How much professional development time is offered to career and technology instructional staff for infusing educational technology into the curriculum?
6. Conduct a national survey on the perceived challenges of utilizing and maintaining the Internet in career and technology programs.
7. Because challenges of utilizing and maintaining the Internet in the career and technology education programs are so similar, additional research should be conducted to explore the relationship between the two sets of challenges,.

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Appendixes

Appendix A

Institutional Review Board Approval

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/27/03

Date: Tuesday, May 28, 2002 IRB Application No: ED02119

Proposal Title: A SURVEY OF PERCEIVED AMINISTRATIVE CHALLENGES AND RESOLUTIONS REGARDING THE UTILIZATION AND MAINTAINING OF THE INTERNET IN CAREER AND TECHNOLOGY PROGRAMS AT OKLAHOMA CAREER AND TECHNOLOGY CENTERS

Principal Investigator(s):

Linda F. Hubbard Joan Warren

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson, Chair
Institutional Review Board

Appendix B

Research Instrument

Help

zoomerang™

A SURVEY OF PERCEIVED ADMINISTRATIVE CHALLENGES AND RESOLUTIONS REGARDING THE UTILIZATION AND MAINTAINING OF THE INTERNET IN CAREER AND TECHNOLOGY PROGRAMS AT OKLAHOMA CAREER & TECHNOLOGY CENTERS - A

Thank you for participating in my research project. Your administrative experience and knowledge will be of extreme value to the outcome of this study. I am requesting only a few minutes of your time to complete the attached survey and return it via Internet by depressing the "SUBMIT" arrow that appears after the last question. This survey is the first component of my research collection and has been deployed to only Oklahoma Career and Technology Center Superintendents and Assistant Superintendents. I am conducting research for the purpose of creating an information base of perceived challenges experienced by administrators of the career and technology centers for utilizing and maintaining the Internet in the instructional programs and their recommended suggested solutions to those identified challenges. Your participation in this survey is strictly on a voluntary basis. However, your participation is key to the success of the study. I sincerely appreciated your time in completing the survey instrument. Your participation will be kept totally confidential. No names, titles, or locations of career and technology centers will be identified in the final summary. The researcher is the only individual with access to submitted information. All responses will be coded for the purpose of tracking and for the purpose of publishing the findings of the study. Upon the completion of the study, all responses will be placed in a locked file cabinet. I will be happy to furnish you with a copy of the survey results upon request. I realize that this a very busy time in the year and you are very busy. However, your participation in this study will provide vital data for the assistance of other administrators as they set forth to manage the continual challenges encountered when providing Internet training in the instructional programs at career and technology centers. Again, thank you for your valuable input and willingness to participate. Linda Hubbard, Doctoral Candidate, Oklahoma State University, Stillwater, OK

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Demographic and General Information - Please provide the following information about yourself and your career and technology center.

1 What is your role at the career and technology center?

- Superintendent
- Assistant Superintendent
- Other, Please Specify

2 How many years have you held your current position?

- 1-3 years
- 4-7 years
- 8-12 years
- 13-20 years
- Other, Please Specify

3 Are you male or female?

- Male
- Female

4 Which of the tems below best describes your career and technology center?

- Urban
- Suburban

Rural

Other, Please Specify

5 Approximately how many secondary students will be served at your center in an average academic year?

200-500	500-1000	1000-2000	2000-5000	More than 5000
1	2	3	4	5

6 Approximately how many post-secondary students will be served at your center in an average fiscal year?

200-500	500-1000	1000-2000	2000-5000	More than 5000
1	2	3	4	5

The questions below ask for your input about challenges you encounter as an administrator of a career and technology center. Please consider carefully and then indicate the challenges you perceive related to the Internet being available in the instructional programs and instructional processes at your career and technology center.

Please enter your answer in the open space below each question. You may identify as many challenges as you wish. Please include any descriptive information essential for clarity. Should the initial space not accommodate your complete response, please continue in the additional space provided.

7 What are the challenges you encounter as the administrator of an Oklahoma career and technology center in using the Internet in career and technology instructional programs?

8 Additional comment space for item #7.

9 What are the challenges you encounter as the administrator of an Oklahoma career and technology center in maintaining the Internet in career and technology instructional programs?

10 Additional comment space for item #9.

11 What solutions can you offer to your identified challenges in using and maintaining the Internet in career and technology instructional programs?

12 Additional comment space for item #11.

AGREEMENT TO PARTICIPATE

I, _____, hereby agree to participate in this research project that gathers perceived challenges and recommended solutions of administrators of Oklahoma career and technology centers regarding utilizing and maintaining the Internet in instructional programs of career and technology programs. I understand the research is part of an Oklahoma State University research project. To maintain confidentiality, all information obtained in the process will be reported in aggregate and/or by code. No specific reference to my identity, career and technology center or location will be made at any time. All records of this research will be kept exclusively by the researcher under lock and key. After the research has been concluded and the report approved, all records will be destroyed.

The purpose of the procedure is to gather insightful information into the perceived challenges and recommended solutions of administrators of Oklahoma career and technology centers regarding utilizing and maintaining the Internet in career and technology instructional programs. The findings gathered, conclusions and recommendations offered from this study could establish a database that may be referenced by administrators of career and technology centers in the future.

I understand participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project director. I may contact Dr. Joan Warren, under whose supervision the study is being

conducted, at Oklahoma State University by telephone at 405-744-7125, or Linda Hubbard, the researcher, by telephone at 405-743-1931 or 405-377-3333, ext. 252, or by e-mail at hubbard_linda@hotmail.com. I may also contact Sharon Bacher, IRB Secretary, 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078; telephone 405-744-5700.

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I have read and fully understand the agreement to participate provided above. I agree to participate freely and voluntarily by providing my name and today's date in the spaces provided below. In addition, I understand when I select the "SUBMIT" arrow below; the data provided in the survey will be submitted to the researcher electronically. I may retain a copy of this survey and the agreement to participate by printing a copy on my personal printer before selecting the "SUBMIT" arrow below.

Participant Name

Date

After answering all the questions, click the "submit" arrow below to complete the survey.

SUBMIT

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Thank you for participating in my research project. Your administrative experience and knowledge will be of extreme value to the outcome of this study. I am requesting only a few minutes of your time to complete the attached survey and return it via Internet by depressing the "SUBMIT" arrow that appears after the last question. This survey is the first component of my research collection and has been deployed to only Oklahoma Career and Technology Center Superintendents and Assistant Superintendents. I am conducting research for the purpose of creating an information base of perceived challenges experienced by administrators of the career and technology centers for utilizing and maintaining the Internet in the instructional programs and their recommended suggested solutions to those identified challenges. Your participation in this survey is strictly on a voluntary basis. However, your participation is key to the success of the study. I sincerely appreciated your time in completing the survey instrument. Your participation will be kept totally confidential. No names, titles, or locations of career and technology centers will be identified in the final summary. The researcher is the only individual with access to submitted information. All responses will be coded for the purpose of tracking and for the purpose of publishing the findings of the study. Upon the completion of the study, all responses will be placed in a locked file cabinet. I will be happy to furnish you with a copy of the survey results upon request. I realize that this a very busy time in the year and you are very busy. However, your participation in this study will provide vital data for the assistance of other administrators as they set forth to manage the continual challenges encountered when providing Internet training in the instructional programs at career and technology centers. Again, thank you for your valuable input and willingness to participate. Linda Hubbard, Doctoral Candidate, Oklahoma State University, Stillwater, OK

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Demographic and General Information - Please provide the following information about yourself and your career and technology center.

1 What is your role at the career and technology center?

- Superintendent
- Assistant Superintendent
- Other, Please Specify

2 How many years have you held your current position?

- 1-3 years
- 4-7 years
- 8-12 years
- 13-20 years
- Other, Please Specify

3 Are you male or female?

- Male
- Female

4 Which of the tems below best describes your career and technology center?

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Other, Please Specify

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1	2	3	4	5

The questions below ask for your input about challenges you encounter as an administrator of a career and technology center. Please consider carefully and then indicate the challenges you perceive related to the Internet being available in the instructional programs and instructional processes at your career and technology center.

Please enter your answer in the open space below each question. You may identify as many challenges as you wish. Please include any descriptive information essential for clarity. Should the initial space not accommodate your complete response, please continue in the additional space provided.

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8 Additional comment space for item #7.

9 What are the challenges you encounter as the administrator of an Oklahoma career and technology center in maintaining the Internet in career and technology instructional programs?

10 Additional comment space for item #9.

11 What solutions can you offer to your identified challenges in using and maintaining the Internet in career and technology instructional programs?

12 Additional comment space for item #11.

AGREEMENT TO PARTICIPATE

I, _____, hereby agree to participate in this research project that gathers perceived challenges and recommended solutions of administrators of Oklahoma career and technology centers regarding utilizing and maintaining the Internet in instructional programs of career and technology programs. I understand the research is part of an Oklahoma State University research project. To maintain confidentiality, all information obtained in the process will be reported in aggregate and/or by code. No specific reference to my identity, career and technology center or location will be made at any time. All records of this research will be kept exclusively by the researcher under lock and key. After the research has been concluded and the report approved, all records will be destroyed.

The purpose of the procedure is to gather insightful information into the perceived challenges and recommended solutions of administrators of Oklahoma career and technology centers regarding utilizing and maintaining the Internet in career and technology instructional programs. The findings gathered, conclusions and recommendations offered from this study could establish a database that may be referenced by administrators of career and technology centers in the future.

I understand participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project director. I may contact Dr. Joan Warren, under whose supervision the study is being

conducted, at Oklahoma State University by telephone at 405-744-7125, or Linda Hubbard, the researcher, by telephone at 405-743-1931 or 405-377-3333, ext. 252, or by e-mail at hubbard_linda@hotmail.com. I may also contact Sharon Bacher, IRB Secretary, 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078; telephone 405-744-5700.

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I have read and fully understand the agreement to participate provided above. I agree to participate freely and voluntarily by providing my name and today's date in the spaces provided below. In addition, I understand when I select the "SUBMIT" arrow below; the data provided in the survey will be submitted to the researcher electronically. I may retain a copy of this survey and the agreement to participate by printing a copy on my personal printer before selecting the "SUBMIT" arrow below.

Participant Name

Date

After answering all the questions, click the "submit" arrow below to complete the survey.

SUBMIT

Appendix C

Pre-Survey Telephone Script

Pre-Survey Telephone Script

HELLO (Administrator)

I am Linda Hubbard, a doctoral candidate at Oklahoma State University. I am conducting a survey as the first component of my research study and have selected the administrators (superintendents and assistant superintendents) of the Oklahoma Career and Technology Centers as the population. The survey focus is the perceived administrative challenges and recommended resolutions regarding the utilization and maintaining of the Internet in career and technology programs at Oklahoma Career and Technology Centers. Your administrative experience and knowledge will be of extreme value to the outcome of this study.

The data for the study will be collected via an Internet survey that will be distributed to all administrators early next week. Participation in this survey is strictly on a voluntary basis. However, your participation is key to the success of the study. All information received will remain completely confidential. No names, titles, or locations of career and technology centers will be identified in the final summary. All responses will be coded for the purpose of tracking and for the purpose of publishing the findings of the study. Upon the completion of the study, all responses will be destroyed.

I realize that this is a very busy time in the year and you are very busy. However, your participation in this study will provide vital data for the assistance of other administrators as they wet forth to manage the continual challenges

encountered when providing Internet training in the instructional programs at career and technology centers.

Do you have any questions that I might be able to answer at this time? Thank you for your willingness to participate. You will be receiving the survey via Internet e-mail in approximately one week. Should you have any questions at the time you receive that e-mail, please telephone me at the number provided on the survey instrument.

Again, thank you very much for your time and assistance.

Goodbye.

Appendix D

Introduction E-mail

Introduction E-mail

Dear Administrator:

I am Linda Hubbard, a doctoral candidate at Oklahoma State University. I am conducting a survey as the first component of my research study and have selected the administrators (superintendents and assistant superintendents) of the Oklahoma Career and Technology Centers as the population. The survey focus is the perceived administrative challenges and recommended resolutions regarding the utilization and maintaining of the Internet in career and technology programs at Oklahoma Career and Technology Centers. Your administrative experience and knowledge will be of extreme value to the outcome of this study.

The data for the study will be collected via an Internet survey that will be distributed to all administrators later today. The survey will go to each administrator via Internet e-mail. The e-mail sender will be me (hubbard_Linda@hotmail.com) and the subject line will read, "You've Received a Zoomerang." This subject line appears on the e-mail because the name of the survey instrument is "Zoomerang."

I know that this is a very busy time in the year however; this brief survey will require only a few minutes for responses. Your participation in this study will provide vital data for the assistance of other administrators as they set forth to manage the continual challenges encountered when providing Internet training in the instructional programs at career and technology centers.

Thank you for your willingness to participate. Should you have any questions please telephone me at one of the following numbers: 405-743-1931, 405-747-7378, or 405-377-3333, ext. 252.

Linda Hubbard
Oklahoma State University Doctoral Candidate
Stillwater, Oklahoma

Appendix E

Follow-up Telephone Script

Follow-up Telephone Script

HELLO (Administrator):

I am Linda Hubbard, a doctoral candidate at Oklahoma State University. I spoke with you approximately one week ago regarding a survey that I am conducting a survey as the first component of my research. I am just checking back with you to answer in questions that you may have at this time.

Did you receive the e-mail from me with the subject line of, "You've Received a Zoomerang"? Did the survey open readily for you? How may I assist you with questions that you may have at this time?

I know that you a very busy however this brief survey will require only a few minutes for responses. Your participation in this study will provide vital data for the assistance of other administrators as they set forth to manage the continual challenges encountered when providing Internet training in the instructional programs at career and technology centers.

Thank you for your participation.

Goodbye.

Appendix F

First Follow-up E-mail

First Follow-up E-mail

Hello Administrator:

The "Zoomerang" e-mail described in a previous communication has been distributed to you via Internet e-mail.

Please click the Internet address below, highlighted in blue, to open the survey instrument. The first page of the survey provides a general introduction of the research study. At the bottom of that page is a purple arrow with the words "Start Survey." Click the "Start Survey" arrow to begin.

Your administrative experience and knowledge will be of extreme value to the outcome of this study. Please return the completed survey by June 14 Thank you for your willingness to participate. Should you have any questions regarding the survey, please telephone me at one of the following numbers: 405-743-1931, 405-377-3333, ext. 252, or 405-747-7378.

Again, thank you for your participation.

Linda Hubbard
Oklahoma State University Doctoral Candidate
Stillwater, Oklahoma

Appendix G

Second Follow-up E-mail

Second Follow-up E-mail

Hello Administrator:

The "Zoomerang" e-mail I described in a previous communication has been distributed to you via Internet e-mail. If you have not yet received that e-mail or have experienced difficulty opening the survey, please telephone me at one of the following numbers: 405-743-1931, 405-377-3333, ext. 252, or 405-747-7378.

If you have the survey, please click the Internet address below, highlighted in blue, to open the survey instrument. The first page of the survey provides a general introduction of the research study. At the bottom of that page is a purple arrow with the words "Start Survey." Click the "Start Survey" arrow to begin. Only a few minutes are required to provide responses.

Your administrative experience and knowledge will be of extreme value to the outcome of this study. Please return the completed survey by June 14.

Thank you for your participation.

Linda Hubbard
Oklahoma State University Doctoral Candidate
Stillwater, Oklahoma

VITA 2

LINDA FAYE HUBBARD

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF OKLAHOMA CAREER AND TECHNOLOGY CENTER ADMINISTRATORS REGARDING PERCEIVED CHALLENGES AND RECOMMENDED SOLUTIONS OF UTILIZING AND MAINTAINING INTERNET IN INSTRUCTIONAL PROGRAMS

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Lindsay, Oklahoma, July 11, 1952 the daughter of E. A. and Loretta Lynn.

Education: Graduated from Tecumseh High School, Tecumseh, Oklahoma in May 1970; received Associate of Science degree from Sayre Junior College, Sayre, Oklahoma in May 1981; received Bachelor of Science degree in Education from Southwestern Oklahoma State University, Weatherford, Oklahoma in December 1982; and received a Master of Education from Southwester Oklahoma State University, Weatherford, Oklahoma in July 1984. Completed the requirements for Doctor of Education in Occupational and Adult Education from Oklahoma State University, Stillwater, Oklahoma in August 2002.

Professional Experience: Adult Education Instructor, Western Area Vocational Technical School, Burns Flat, Oklahoma, 1984-1985; Academic Director, United Technical Institute, Oklahoma City, Oklahoma, 1985-1989; Adjunct Professor, El Reno Junior College, El Reno, Oklahoma, 1989; Business and Office Instructor, Oklahoma Department of Vocational and Technical Education at Mabel Bassett Correctional Center, Oklahoma City, Oklahoma, 1989-1990; Assistant Department Head, Business and Office Occupations, Oklahoma State University-Okmulgee, Okmulgee, Oklahoma; 1990-1991; Coordinator of Evening/Weekend Studies, Oklahoma State University-OKC; 1993-1995; Student Services/Financial Aid Coordinator, Meridian Technology Center, Stillwater, Oklahoma, 1995-1999; Evening Supervisor, Meridian Technology Center, Stillwater, Oklahoma, 1999 to present.