LEVEL OF ADOPTION OF THE INTERNET
BY
ESL TEACHERS AT THE OHIO STATE UNIVERSITY

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
The Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

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* * * * *

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ABSTRACT

The purpose of the study was to describe the level of adoption of the Internet by teachers of English as a Second Language (ESL) using a major, public university in the U.S. Midwest as a sample or a model. The study also investigated relationships between the level of use of the Internet and selected variables: personal characteristics; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet.

A descriptive-correlational research design combined with a qualitative research data collection approach (i.e., follow-up interviews) was used. A questionnaire was developed and mailed to ESL teachers at the research site (N=42) during February and March 2000. Validity and reliability of the instrument were established and are reported in the dissertation. Follow-up questions were developed and used in interviews with nine college ESL teachers.

Descriptive research methods were used to describe the selected variables associated with an ESL teacher's decision to use the Internet. Two-group discriminant analysis was used to determine which of the following two variables better discriminates between users of the Internet for instructional purposes: computer proficiency or Internet proficiency. Correlations were used to reveal the relationships between use of the Internet
and selected variables. Semi-partial regression was used to reveal which variables
determined the unique variance of Internet use. Miles and Huberman's (1994) procedures
for analyzing qualitative data were used to analyze the follow-up interviews, which
focused on issues related to the adoption of the Internet in ESL college instruction.

Quantitative findings showed that ESL teachers occasionally to frequently use the
Internet. Ninety-eight percent of the ESL teachers have Internet access at work; 78.6
percent have Internet access at home. ESL teachers are a little to somewhat proficient in
Internet skills. ESL teachers are most proficient at e-mail and the World Wide Web, and
they have a generally positive perception of the Internet. Internet proficiency
discriminated better between high and low users of the Internet for instructional purposes
than did computer proficiency. Statistically significant, moderate associations existed for
Internet access at home and Internet proficiency. Internet access at home was the variable
explaining the greatest variance in Internet use.

Qualitative data showed that interviewees advocate the use of the Internet in ESL
instruction for a variety of reasons including: the Internet is a communication tool; the
Internet is a tool for gathering information; the Internet is accessible; the Internet is a
learning tool; the Internet is a teaching tool; and students need to learn to use the Internet.
Interviewees also revealed that factors associated with Internet access, Internet content,
student-related limitations, and teacher-related limitations may affect their adoption of
the Internet in ESL instruction.

The study concluded that ESL teachers have taken on the additional responsibility
of being computer-technology instructors besides teaching English. Additionally, a lack
of access to the Internet in the classroom, a lack of training, and a lack of time for training seem to seriously limit teachers' use and/or adoption of the Internet in ESL instruction at OSU.

The study includes details about the survey and interviewing processes. Included are a copy of the questionnaire, sample interview questions, sample letters to participants, and a bibliography.
Dedicated to my family, especially my parents, wife, and children
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First and foremost, I would like to thank my advisor, Dr. Charles R. Hancock, for his guidance, encouragement, and support.

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CHAPTER 1

INTRODUCTION

The Internet is a global computer network, or network of networks, used by millions of people around the world to access and share vast amounts of information, data, and expertise through several media such as remote login, file transfer protocol, electronic mail, and newsgroups (Williams et al., 1997). The creation of the Internet may be among the most significant achievements in history, especially because it allows the accessing and sharing of information anywhere and at anytime, generally at minimal cost. The Internet offers a huge and continually growing library of resources (Li & Hart, 1996). These resources include, but not limited to, the following, as North (1994) writes:

- Research information, newsletters, journals, and reports from sources as varied as the International Center for Distance Learning, the United States Food and Drug Administration (USFDA), and the National Aeronautics and Space Administration (NASA);

- Library information services such as the Library of Congress and WorldCat, the world's largest computerized catalogue with 30-million bibliographic records representing the holdings of 17,000 libraries worldwide;

- Large quantities of education-related software applications and manuals on how to use software;

- Academic discussions on a wide variety of educational, social, and technological subjects, ranging from horticulture and artificial intelligence to biology and cosmetology; and
• Education databases such as ERIC, which includes over 800,000 references to thousands of educational topics, available in journal articles, books, theses, conference papers, and information about curricula and standards and guidelines for teaching.

Evolving out of the U.S. Advanced Research Projects Agency (ARPANET), the networks, which comprise the Internet, did not begin to approach their current global-spanning size until the mid-1980s. Since then, the number and scope of networks have been growing rapidly. By the middle of 1999, about 200 million people used the Internet worldwide most of them are located in the United States (The World Almanac and Book of Facts 2000). In the United States, university students, faculty, and staff are probably among the most frequent users of the Internet.

The use of the Internet is spreading rapidly all over the world, especially in schools. For example, in a serious effort to reform education, the U.S. government recently proposed a mammoth project using computers and communication systems, with plans to make the Internet available in every school in the nation by the year 2000 (Williams et al., 1997). Additionally, in Canada, a similar, large-scale project is under construction to change curricula taught in high schools, including English language arts. The project’s goal is to incorporate electronic technologies and computer applications into all aspects of high school curricula. Policy makers believe that technological competence is one of the major learning outcomes high-school students should possess before graduation (Barrell, 1999). Furthermore, in Finland, a number of small, individual projects, as well as institutional projects, have been conducted to use the Internet for language teaching at secondary and university levels (Multisilta, 1998).
In addition, commercially, a number of collaborative projects have been established in the United States to link public and private businesses and educational institutions electronically (Plugged In, September 1996). As an example, Microsoft, the giant software company, has designed and produced software which can be used by children, parents, and educators to assist in the effective use of technology as a teaching and learning tool (Pathways, March/April 1996).

**Statement of the Problem**

Recently, there has been a rapid expansion of interest in the use and adoption of computers and the Internet in language teaching, particularly in English as a Second Language (ESL) instruction. Many language-teaching researchers are now encouraging ESL teachers to use the Internet, especially in language instruction and professional development. However, while some educators embrace the advice, others resist it (Hunt, 1993), leading to differences of viewpoints among groups of professionals.

Supporters of the use of computer technology in language teaching assert that the Internet, in particular, has significant potential to enhance ESL instruction (e.g., Garrett, 1991). For example, the Internet can connect students, faculty, and staff with each other and with the world at large and thus create new opportunities for classroom teaching (e.g., designing individual or class web pages, and communicating about class materials and activities via chat rooms and/or electronic mail). Over the last several decades, methodologists and linguists have stressed the importance of the concept of communicative competence in the second language (L2). Therefore, teaching for communication is one of the major goals of ESL, with the possible use of the Internet as an appropriate medium.
Furthermore, a considerable number of researchers, such as Hoffman (1996), Li & Hart (1996), Bush (1997), and Tillyer (1997), have pointed out that technology, including the Internet, has become powerful and affordable. And English is the dominant language of the Internet. Thus, ESL teachers can find and refer students to many electronic sources of authentic materials, such as newspapers and magazines. In addition, ESL teachers can interact easily with students via accessible means such as electronic mail and newsgroups. Furthermore, ESL teachers can use the Internet to obtain information, online services, and new ideas that can save time and effort. The use of the Internet can aid the language teaching profession in such tasks as writing and publishing research reports and can assist with teaching responsibilities, such as constructing lesson plans. Therefore, ESL teachers could teach and help students to learn language.

In this era of technological advances, ESL teachers are expected to actively and creatively use electronic technologies such as the Internet for instructional, developmental, and educational purposes as the potential for improved language instruction becomes more apparent (e.g., Bush, 1997; Murison-Bowie 1993). Yet, language teachers “have not taken the opportunities offered by existing and emerging technologies to a degree commensurate with their potential benefits” (Murison-Bowie, 1993, p. 6). He continues:

...teachers are adept at inventing reasons for not seeking out and employing worthy, newer technologies. It is possible, even in the 1990s, to offer one’s own technophobia and/or maladroitness as reasonable excuses for avoiding available technologies. Why? Is it teachers’ innate conservatism or is it that materials developers are failing to deliver? (p. 6).

Murison-Bowie, like other educators and researchers, wonders about and reflects on the reasons that explain why language teachers do not adopt and use technology in
their classes. Several factors make the issue of adoption and use of the Internet in ESL instruction complex. One factor is the mixed research results regarding the impact of computers on language learning (Shrum and Glisan, 1994), leading some language teachers to hesitate about using computers and the Internet in their instruction.

Murison-Bowie (1993) writes that a second factor is a basic fear of technology (i.e., technophobia) among some ESL teachers. This researcher has observed that there appear some other factors, including: (a) differing amounts of computer expertise among ESL teachers; while some have solid knowledge regarding the use of computers and the Internet, others do not; and (b) teachers expressing concern about students’ knowledge of computers and/or its applications and access to the computers and the Internet.

A key element in the debate over the use and integration of technology in education is the fact that teachers are “the agents of change.” Teachers control what happens in the classroom (Allwright and Bailey, 1994). Lee (1996) highlights the significance of understanding the critical role faculty members play in the process of adoption of an innovation. He also argues that faculty members are “the missing link” in the systematic planning and implementation of technology, specifically in colleges and universities where individuality and voluntary behavior of teachers are the organizational culture of higher education (p. 10). The Office of Technology Assessment in 1995 published a lengthy report titled *Teachers and Technology: Making the Connection* emphasized the importance of teachers’ role as the critical connection for the integration of technology in teaching and learning (http://ota.nap.edu/pdf/data/1995/9541.PDF). Consequently, if the potential of the Internet is to be fulfilled, convincing language teachers that the Internet could have a positive impact on language learning and,
therefore, can help enhance language instruction is necessary. In addition, listening to the teachers’ voice or opinion is one of the main reasons that may explain and solve the puzzle of extensive home use of computers and limited, low-end classroom use than so the presently fashionable ones, such as teachers’ lack of training, insufficient preparation in universities and technophobia (Cuban, 1999).

However, there has been little research regarding ESL teachers’ use of the Internet. Much of the research to date has emphasized the technology itself, and has ignored the relationship between teachers and technology. If one wants to adopt and use an innovation successfully, it is necessary to involve teachers (Lee, 1996) as well as technology and learners. Therefore, one needs to know more about ESL teachers themselves regarding their use of the Internet. In particular, one needs to know: (a) who among ESL teachers adopt the Internet for different purposes, including language instruction and professional development and why (b) to what extent are they adopting the Internet, and (3) why are some teachers continuing to avoid the Internet, especially for instructional purposes.

**Purpose and Objectives**

The purpose of the study was to describe the level of adoption of the Internet by ESL teachers using The Ohio State University (OSU) as a sample or a model. OSU was used because of its distinctive characteristics, including its large size, different ESL programs, and the availability of access to computers and/or the Internet on campus for both teachers and students. In addition, the study investigated the relationships between the level of use of the Internet and a number of selected variables. These variables included personal characteristics of ESL teachers, access to the Internet, computer
literacy and proficiency, Internet literacy and proficiency, and perceptions of the Internet. One of the intended outcomes of this study was either to help or to provide information about how and to what extent ESL teachers at the college level adopt the Internet appropriately. The study investigated these areas through seeking answers to the following primary research questions:

1. What is the level of use of the Internet by ESL teachers at OSU?

2. What is the relationship between the level of use of the Internet and the following variables: personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perceptions of the Internet?

3. Which of the following variables explain the greatest amount of variance on the level of use of the Internet: personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perceptions of the Internet?

The secondary research questions included:

1. How do ESL teachers at OSU access the Internet?

2. What are the variables limiting Internet access by ESL teachers at OSU?

3. What is the level of computer literacy and proficiency of ESL teachers at OSU?

4. What is the level of Internet literacy and proficiency of ESL teachers at OSU?

5. Which of the following two variables better discriminates between high and low users of the Internet for instructional purposes: computer proficiency or Internet proficiency?

6. What are the perceptions of ESL teachers at OSU about the Internet?
Quantitative and qualitative data have been collected to answer these questions. All ESL teachers at OSU (i.e., participants) have been surveyed, and three teachers in each of the three ESL programs: the American Language Program (ALP), ESL Composition Program, and Spoken English Program (SEP) have been interviewed from those who indicated that they were willing to participate in the follow-up interviews.

**Significance of the Study**

The study is significant for several reasons. First, the study will provide valuable information about the characteristics of some users of the Internet (e.g., why and how they use the Internet for different purposes). This knowledge may be beneficial for language teachers who want to know what others have found helpful for language instruction. Therefore, they could do the same and get to know new and perhaps better ways of language teaching. Recent scholarly research and studies indicate that more research is needed on who, what, why and how the Internet is utilized by academia (Roberts, 1998; Ruth, 1996; and Lee 1996). Also, recently, researchers have been investigating the characteristics of Internet users that might explain their adoption of the Internet. However, some users might prefer to use user names different from their real names and conceal their identities. Thus, the answer to the question: “who adopts and uses the Internet?” is unknown (Maloy, 1996). Ruth (1996) argues that because the Internet is a new innovation, literature on the acceptance and resistance of using the Internet is limited. Furthermore, although there is growing interest in adoption of the Internet in language teaching/learning, there has been little research on the adoption of the Internet for different purposes, including ESL instruction and professional
development. Thus, the information obtained in this study could contribute to knowing how teachers use the Internet and how it disseminates among them.

Second, the results of this study may be valuable for materials developers and software designers. Finding out more about teachers and the way they adopt and use computers and software for language instruction and other educational purposes may help improve educational software and programs by providing more insight into teachers’ attitudes toward technology and their pedagogical use of the Internet. Murison-Bowie (1993) contends that both language teachers and materials developers share the responsibility for finding connections between technologies and the teaching of English. Of course, this task cannot be completed unless these technologies are adopted and used by language teachers. This task also requires increased knowledge of teachers’ use of and attitudes toward the Internet.

Third, the study will also provide valuable information on the issue of why some teachers use the Internet for language instruction and others do not. Increased understanding of this issue might contribute to closing the gap between these groups. Cuban (1999) argues that consulting teachers and listening to their voice is one of the main issues that policymakers, vendors and corporate cheerleaders need to know in order to solve the puzzle of limited and low-end use of computers in classrooms. Furthermore, policymakers and teacher trainers may find this information helpful in fulfilling the needs of teachers, such as technological training, as some studies have indicated (e.g., Shoemaker, 1997, and Ruth, 1996).
Basic Assumptions

The present study was based on the following assumptions:

1. Diffusion of innovations theory applies to the adoption and/or use of the Internet by ESL teachers.

2. Participants provided honest responses to the items on the questionnaire.

3. Participants had sufficient knowledge of basic computer terminology (e.g., hard disk, software, modem, web browser and so forth) to understand and respond to the questionnaire.

4. There was sufficient use of the Internet among the teaching staff in ESL programs at OSU to ensure that appropriate data could be collected.

Limitations of the study

Only ESL teachers at OSU were studied to find out their level of adoption of the Internet. Therefore, the findings of this study can only be generalized to its population. Studying other ESL teacher populations may reveal different findings.

Definition of Terms

The following terms as used in the present study were defined as follows:

Access to the Internet

Constitutive definition – Access is defined by The Merriam WWWebster Dictionary* (1999) as gaining entry. Accessible is defined as anything that is capable of being used, seen, or known (e.g., something that is obtainable like information). The Internet is defined by the same source as an electronic communications network that

* The Merriam WWWebster Dictionary is a frequently updated, on-line version of the printed edition of the Merriam Webster Dictionary. Since this study is about the Internet, using this dictionary is seen appropriate.
connects computer networks and organizational computer facilities around the world. Therefore, access to the Internet can be defined as gaining entry to the electronic communications network that connects computer networks and organizational computer facilities around the world.

Operational definition – For the purpose of this study, access was measured by nominal data, yes, no, and do not know. Access was defined as physically being able to get on-line with a computer at home and in the office. ESL teachers who had access to the Internet were asked to check the correct response that describes their home access and work access to the Internet. Frequencies and percentages were used to describe a teacher’s access to the Internet.

ESL teachers

Constitutive definition – ESL stands for English as a Second Language. The Longman Dictionary of Language Teaching and Applied Linguistics defines ESL as the role of English for immigrants, language minority groups, and international students in English-speaking countries. A teacher is defined as one who teaches, i.e., one whose occupation is to instruct (The Merriam WWWebster Dictionary, 1999). ESL teachers may therefore be defined as those who taught English for immigrants, language minority groups, and international students for whom English is a second or a third language English-speaking countries, such as the U.S.

Operational definition – For the purpose of this study, ESL teachers were those who were employed at least for 20 hours per week by The Ohio State University and who had primary responsibilities in teaching English as a second language for international students who want to pursue their academic study in a U.S. college/university.
Level of Use of the Internet

Constitutive definition – Level is defined by *The Merriam WWWWebster Dictionary* (1999) as a position in a scale or rank, and use is defined in the noted source as the act of using or the employment of something for some purpose. The Internet is defined by the same source as an electronic communications network that connects computer networks and organizational computer facilities around the world. Therefore, level of use of the Internet may be defined as the relative rank on a scale of use of the global electronic communications network (the Internet).

Operational definition – For the purpose of this study, the Internet was defined as an interactive network allowing users to have access to different functions within the system. On the Internet, information can be exchanged through several services. An example of these services would be electronic mail or the World Wide Web.

The following Internet services were used as qualifiers for two purposes: (a) to help ESL teachers determine what the term Internet exactly means and (b) to help teachers assess their own level of use of the Internet. Internet services were: electronic mail (e-mail), USENET newsgroups, World Wide Web (WWW) browsers, search engines, File Transfer Protocol (FTP), and TELNET. The following are descriptions of the Internet services identified in this study.

Electronic mail, or e-mail, is a software-controlled system by which computer users can send and receive messages electronically (between terminals linked by telephone lines or microwave relays) (Williams et al., 1997). An e-mail address consists of three portions: a username, a service, and a domain. An example of an e-mail address
would be john@osu.edu. The username is john, the service provider is osu; and the
domain is edu, which is an abbreviation of the term “education.”

USENET is a network that contains thousands of unique newsgroups that cover
practically every human proclivity. A newsgroup is a sort of electronic bulletin board in
which users can post various sorts of messages, such as job openings or items for sale
(Porter, 1997). These postings can be accessed by anyone using the network. The names
of newsgroups are comprised of a string of words or abbreviations separated by periods,
such as: rec.humor.funny. The first abbreviation – rec stands for recreation – represents
the top level of the newsgroup. The next word – humor – is the newsgroup’s subcategory.
The last word – funny – is a further subcategory. Furthermore, the names of newsgroups
are chosen to give an indication of what is being discussed in the group ((North, 1994).

The World Wide Web (WWW) is a distributed hypertext system in which web
pages can be viewed using browsing software (i.e., browsers) like Netscape Navigator
and Microsoft Internet Explorer (Katona, 1999). A website address begins with http://. The Web links related documents use a powerful information presentation method called
hypertext. In a web document, many of the pieces of displayed information are pointers
or hyperlinks to other information that can be accessed just by clicking on the link
(Williams et al., 1997). This feature enables users to access information without knowing
in advance the location of the information. Users need only to know a convenient starting
point that is likely to have a link to the desired resource.

A “Search Engine” allows Internet users to locate and find resources, including
documents, software, people, and images, on the Internet by typing a keyword or more
(Katona, 1999). Some popular search engines include AltaVista, Yahoo, and Lycos.
FTP (File Transfer protocol) is an Internet protocol that enables users to transfer images, audio and video files, and text between computers on the Internet (Williams et al., 1997). This process is called file transfer, and the program that is used to do this file transferring process is called FTP or File Transfer Protocol (North, 1994).

TELNET is a protocol that allows a user to connect to another computer on the Internet and run programs that are residing on another computer. FTP and TELNET have quite different functions. FTP enables programs (and other files) to be copied from another computer, whereas TELNET enables programs that reside on another computer to be run without first having to make a copy of them (North, 1994).

For the purposes of this study, the dependent variable, level of use of the Internet, was quantified by using Likert-scale questions about ESL teachers’ frequency of use of Internet services (Appendix A: Use of the Internet Instrument). Internet services included electronic mail, World Wide Web, USENET newsgroups, browsers, FTP, and TELNET. A six point Likert-scale of 0 - 5, from 0 = Never to 5 = Very Frequently, was used to measure the level of use of the Internet with a total possible score of 50. A higher score indicated a higher level of use. Data collected was analyzed as continuous, interval data. A mean score was reported for level of use. In addition, a not familiar column was added for teachers who were unfamiliar with the different Internet services.

Limitations to Internet Access

Constitutive definition – Limitations is defined by *The Merriam WWWWebster Dictionary* (1999) as “to set limits to.” A limit is defined in the same dictionary as something that restrains or confines. Internet access is gaining entry to the global information system or network through an Internet service provider (ISP). An ISP is a
company that allows other computer users to dial-in and to connect to the Internet typically for a fee. Therefore, limitations to Internet access can be defined as the factors that restrain from gaining entry to the global information network.

Operational definition – For the purpose of this study, limitations were measured by factors defined as most commonly occurring restraints to access the Internet for ESL teachers. The limiting factors included hardware not working, too many people trying to use the computer, a busy signal with Internet Service Provider (ISP), server down-time system timed out, and computer response time too slow. A six point Likert-scale of 0 - 5, from 0 = Never to 5 = Very Frequently, was used to measure the factors limiting Internet access for ESL teachers at OSU.

Level of Computer Literacy and Computer Proficiency

Constitutive definition – Level is defined as a position in a scale or rank. Computer is "a machine capable of following instructions to alter data in a desirable way and to perform at least some of these operations without human intervention" (Que's Computer User's Dictionary, 1992, p. 139). Literacy is defined by The Merriam WWWebster Dictionary (1999) to become educated, meaning to develop mentally and morally. The term literacy can be related to proficiency; proficient is defined by the same dictionary as well advanced in an art, occupation, or branch of knowledge. The words adept, skillful, expert, masterful, and masterly are synonyms to "proficient." Therefore, level of computer literacy may be defined as the relative position or rank on skills and knowledge about computers.

Operational definition – For purposes of this study, computer literacy was operationalized by summatiing a teacher’s reported computer skills in operations and
functions related to the use of a computer. Data was measured as continuous and interval, and a mean score was calculated. The possible mean score for a teacher’s reported computer skills ranged from 0 to 27. A higher mean score indicated higher computer literacy.

A four-point Likert-scale of 0 - 3, from 0 = Not at all to 3 = proficient was used to measure an ESL teacher’s level of proficiency with each computer skill. Data was measured as continuous and interval and, a mean score was calculated. A higher mean score indicated higher perceived computer proficiency.

Level of Internet Literacy and Internet Proficiency

Constitutive definition – Rogers (1995) defines knowledge as the first step of five main steps in the innovation-decision process. Knowledge occurs when an individual learns of an innovation’s existence and gains some understanding of how it functions (p. 20). The Merriam WWWebster Dictionary (1999) defines knowledge as the understanding gained by actual experience. The term literacy can be related to proficiency; proficient is defined by the same dictionary as well advanced in an art, occupation, or branch of knowledge. The words adept, skillful, expert, masterful, and masterly are synonyms to “proficient.” Therefore, level of Internet literacy can be defined as the relative position or rank on skills and knowledge about the Internet.

Operational definition – For purposes of this study, level of Internet literacy was measured by asking ESL teachers about their perceived Internet literacy which was calculated on a teacher’s reported networking skills with Internet services. Data was
measured as continuous and interval, and a mean score was calculated. The possible mean score for a teacher’s perceived Internet skills ranged from 0 to 8. A higher mean score indicated higher Internet literacy.

Internet proficiency was measured by the teacher’s reported proficiency with each Internet skill. Data collected for level of Internet proficiency was analyzed as continuous, interval data by using a four-point Likert-scale of 0 - 3, from 0 = not at all to 3 = proficient. A higher score indicated higher proficiency levels.

**Perceptions of the Internet**

Constitutive definition – *The Mariam WWWebster dictionary* (1999) defines perception as the act of perceiving; perceive means to attain awareness or understanding of or to regard as being such. Among the synonyms of perception are image, impression, intellection, notion and thought. Rogers (1995) defines an innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. The five characteristics of innovations, as perceived by individuals, that help to explain their different rate of adoption are: a) relative advantage, b) compatibility, c) complexity, d) trialability, and 5) observability.

Operational definition – For the purpose of this study, the answers to 15 questions determined ESL teachers’ perceptions of the Internet. A six-point Likert-type scale was used to measure the ESL teachers’ perceptions. Data was analyzed as interval. A mean was calculated based upon the following scale ranging from 1 - 6, where 1 = Strongly Disagree, 2=Disagree, 3=Somewhat Disagree, 4=Somewhat Agree, 5=Agree, and 6 = Strongly Agree. A higher mean score indicated a more positive perception of the Internet.
CHAPTER 2

Review of Literature

The purpose of this study was to describe the level of adoption of the Internet by teachers of English as a Second Language (ESL) at the Ohio State University (OSU). In addition, the study investigated the relationships between the level of use of the Internet and a number of selected variables. These variables included access to the Internet; computer literacy, computer proficiency; Internet literacy; Internet proficiency; perceptions of the Internet, and personal characteristics of ESL teachers.

Several areas of professional literature were pertinent to this study, and a survey of the literature revealed available information and documentation. Since the major focus of this inquiry was the level of adoption of the Internet by ESL teachers, this chapter includes: literature related to the field of educational technology, including computer-assisted instruction (CAI), computer-assisted language learning (CALL), and the Internet; empirical research related to the topic of this study; and an overview of the diffusion of innovations approach which was suggested by Rogers (1971; 1995) and which was used as the theoretical framework for this study.
Overview of the Field of Educational Technology

Educational technology (ET) is not a new field of study, as some educators assume. ET has had a long and continuous history that started in ancient times. As a process, “educational technology emerged out of the early technological tradition when a kind of knowledge began to be systematically applied to instruction,” (Saettler, 1990, p. 4). According to Saettler, each important change or shift in educational goals and objectives has led to the adoption and use of a variety of technologies of instruction.

It is common to use the term “technologies” to refer to equipment like computers, televisions, and overhead projectors. However, Eisele and Eisele (1990) write that technology can be viewed not only as equipment or products but also as the process of using the equipment or products. Therefore, technology is a broad concept that refers not only to pieces of equipment, but also to the knowledge, skills, and values employed to develop and use such equipment for personal or social purposes.

Different technologies have long been utilized to improve education. The link between technology and education resulted in the birth of an important field of study known as educational technology.

Definition of educational technology

Through the years, the field of ET has taken on a surprisingly wide range of meanings (Gentry, 1987). Eisele and Eisele (1990) contend that the nature of ET has been misunderstood. Some would associate ET with audiovisual materials, while others would restrict it to computer-assisted instruction (CAI). And others see educational technology as the application of systems and approaches to teaching and learning. Ely (1997) defines ET as “a particular approach to achieving the ends of education” (p. 3).
Gentry (1987) argues that the terms educational technology and instructional technology are often used interchangeably, and he sees instructional technology as a subset of educational technology, however. The Commission on Instructional Technology (Tickton, 1970) defines instructional technology as "a systematic way of designing, carrying out, and evaluating the total process of learning and teaching based on research in human learning and communication employing a combination of human and non-human resources to bring about more effective instruction" (p.19). But, it seems that educational technology focuses more on the craft or/and art of using technology to support learning whereas instructional technology has more emphasis on the scientific and systems approach of instructional problem solving.

Paradigms of educational technology

Major developments in the field of educational technology have occurred during the 20th century, particularly during and after World War II (Ely, 1997). Saettler (1990) argues that at least four distinct paradigm shifts affecting the theory and practice of educational technology in the 20th century can be identified. These are the physical science or media approach; the audiovisual-communications approach; the behavioral-sciences approach; and the cognitive approach.

The physical science or media approach, which flourished during the first half of the 20th century, emphasized the effects of media instructional aids and the design of instructional content. The underlying assumption of this approach was that nonverbal media such as films and television are more effective and concrete than the more traditional verbal instructional process. Consequently, an increased use of visual materials was seen as a way to de-emphasize verbalism in instruction.
In the 1960s, however, the emphasis on visual/audiovisual materials shifted to a more complete process of communication and caused the name “audiovisual instruction” to be changed to “audiovisual communications.” A synthesis of communications and system concepts, audiovisual communications focused on the entire process of communicating information (i.e., the communication of information from a source such as a teacher or medium to a receiver such as the learner). This approach viewed media devices as components or parts of an instructional system rather than as isolated aids. This paradigm also suggested that educational technology should be viewed as utilizing human as well as nonhuman resources.

The communications paradigm contained the beginnings of what would be known as the systems approach or the systems-as-process. Shortly later, it tended to move closer to the systems approach. However, the communications approach also began to lose its popularity. One reason was its weak connection between communications theory and practice (e.g., failure to deal with institutional constraints, inability to be specific about the types of resources that could be used and the necessary teacher-learner interaction required). Another reason was the increasing impact of the behavioral sciences (psychology, anthropology and sociology) on educational technology during the 1960s and 1970s.

In the behavioral-sciences approach, it is believed that educational practice should be based on two elements—the methods of science developed in the broad areas of the behavioral sciences and more specialized areas of learning such as communications, language, and linguistics. Behaviorists said that science must study observable events or behavior and emphasized the notions of stimulus-response and reinforcement in learning.
Skinner's notions of reinforcement and its applications in teaching machines and programmed instruction resulted in the development of a science-based technology of instruction. These notions also revived the old trend of individualized instruction, especially in computer-assisted instruction. Despite its accelerated influence on educational technology, the behaviorist view gradually declined.

The cognitive approach had emerged by the early 1980s, particularly in the instructional design process. The cognitive approach sought to understand the internal processes of behavior and emphasized knowing instead of responding to stimuli. The cognitive approach focused on mental events and viewed the learner as a constructive and active participant in the process of acquiring and using knowledge. Furthermore, the cognitive approach asserted that the learner's organization, processing, and storage of information are major elements in instructional development (Saettler, 1990).

The cognitive approach led to development of the concept of learning strategies. From a cognitive view, educational technology should focus on activating appropriate learning strategies. A number of criticisms have been leveled at the cognitive approach; these include an overemphasis on cognition, the neglect of motivation, and a de-emphasis on affective components.

The future of educational technology is currently in a pre-paradigmatic state of development. Several suggestions for new paradigms already have been made—such as the psychotechnology approach of Gullette (1987) that focuses on the management and control of the psychological processes of the learner and the support of learning strategies such as anxiety reduction, and the interpretative or hermeneutic approach of Messer (1988) that seeks to understand individual cases in their historical and cultural settings.
and that recognizes the inseparability of observation and theory, fact and value, and detail and context. New explorations that are different in terms of methodology and outlook will certainly be made (Saettler, 1990).

The aims of educational technology

The main task of educational technology is finding ways to enhance the educational experience. In other words, the major goal of using educational technology is to facilitate learning and to increase learning effectiveness. In this era of digital explosion, educational technology’s aims may have become wider than ever before. In addition to enhancing and/or improving teaching and learning, educational technology is now being used to: establish electronic collaborations between users; provide students with technological skills; help educators and students to share resources, overcome scheduling obstacles; and accommodate learning styles and distance learning.

Throughout the history of technological innovations, including computers, educational technology has been expected to play a permanent role in reforming or revolutionizing the way teachers teach, learners learn, and schools deliver education. However, that has not always been the case. Low technologies such as textbooks, the chalkboard, and overhead projectors have had a more lasting impact than high technological innovations, such as films, radio, television, and computers (Kent & McNergney, 1999).

The failure of high technological innovations to “revolutionize” education has helped create public skepticism toward technology-based educational reform. Cuban (1986) describes the pattern older instructional technologies tended to follow: a period of excitement over the capabilities of new technologies to change education; a period of
scientific studies on the effectiveness of these technologies; a period of disappointment as technologies fail to gain widespread acceptance in schools; then new surveys showing infrequent use of the technologies by educators followed by a period of criticizing teachers for resisting change and subverting the improvements which new technologies offer. Cuban calls this pattern the "exhilaration/scientific-credibility/disappointment/teacher-bashing cycle" and gives examples of it from the history of film, radio, and television.

However, some researchers (Bush, 1997; Reinking, 1998; and Kent and McNerney, 1999) believe that the new electronic technologies, especially the Internet, are different from past technologies. Computers and the Internet, for example, have become more powerful, more affordable, more user-friendly, and faster. In addition, the Internet allows students and teachers to access a large amount of valuable information—anytime and anywhere Internet access is available. Furthermore, teachers can interact and communicate with each other and with students faster.

Researchers argue that these electronic technologies are capable of revolutionizing classrooms, schools, and instruction. Reinking (1998) claims that this transformation is slow but steady. Roberts (1998) writes that the Internet will be a means of educational reform, noting that teachers, administrators, and students will support and expand uses of the Internet in education.

Computer-Assisted Instruction (CAI) & Computer-Assisted Language Learning (CALL)

New technologies already have begun to reform the way languages are taught. Computers have been used for language learning for more than 30 years. The use of
computers in education began in the 1960s with the introduction of computer-assisted instruction, although early use of computers was hampered by the unwieldy mainframe computer. In the late 1970s, the advent of microcomputers presented new hope for the use of computers in education (Saettler, 1990).

When microcomputers hit the classroom, the focus shifted to the cognitive processes of learning, problem solving in particular, rather than the products of learning suggested by behaviorism. In the language-arts field, new emphasis was placed on composition and editing in addition to the traditional focus on grammar and spelling.

Uses of microcomputers also expanded to many applications including information processing, numerical analysis, and databases due to the invention of powerful new technologies that offered a variety of possibilities such as combining motion and sound, low cost, and small size. Among these technologies were the videotape, compact disc, and CD-ROM. These technologies improved access to information and computer use in general.

In the 1980s, a large number of American schools purchased microcomputers and made them available for classroom instruction. By 1988, there were about three million microcomputers in U.S. schools. Publishers began to produce educational software in the form of drill-and-practice activities that accompanied classroom textbooks. Despite the significant increase in computer availability, use of computers was minimal or sporadic and limited to only a few activities and applications such as practice-and-drill in the elementary schools, computer literacy in the secondary schools, tutorial CAI, and instructional CAI games (Saettler, 1990).
Another significant advancement was the creation of networking systems in which computer users could interact and communicate with each other across long distances and at most any time. This development made information easily accessible to all users.

The availability of a wide range of information technologies increased the potential for educational technology in instruction. These technologies were used in macro as well as micro levels. At the macro level, there were communication satellites and cable systems. As a result, new applications of technology have emerged, such as distance education. At the micro level, there were micro technologies such as videocassettes and electronic films.

**Computer-assisted language learning**

Computer-assisted language learning is the branch of computer-assisted instruction devoted to the use of computer technology for language learning. According to Warschauer & Healey (1998), the history of CALL can be divided into three major phases—with each phase having its own specific level of technology and its own pedagogical approaches. The first phase, CALL’s behaviorist stage, began in the 1950s and was implemented in the 1960s and 1970s. At that time, CALL was considered a subcategory of the field of CAI. Language drills or drill-and-practice activities were widely employed during the era using mainframe computers. Drill-and-practice activities were employed because: (a) the repetition or repetitive exposure to the same material is crucial for language learning; (b) the computer does not get bored or exhausted and can give judgmental feedback; and (c) students can be given the freedom to work individually or at their own pace. After about two decades, the behaviorist approach to language teaching
was rejected theoretically and pedagogically, and microcomputers generated new
possibilities for computer use in education. These two factors caused the second stage of
CALL, the communicative phase, to evolve and develop.

Communicative CALL emerged in the 1970s and early 1980s; during that time
personal computers or microcomputers came on the market. CALL was based on the
communicative approach to language teaching. The focus was on using computers to
support communication-based activities and communicative aspects of language
teaching. These aspects included an emphasis on meaning rather than form; the teaching
of grammar implicitly rather than explicitly; and the generating of original utterances
rather than just manipulating prefabricated language.

In addition, communicative CALL was compatible with the cognitive approach
that emphasized the notion that learning is a process of discovery, expression, and
development. Therefore, CALL software produced at that time included language
activities involving text reconstruction and simulations. Computers were used in three
models, even though the distinctions among these models are not absolute: (a) as a
stimulus, mostly, to encourage and boost students to communicate and interact; (b) as a
tutor (but not like the behaviorist CALL) by giving students more choices, more control,
and more interaction; and (c) as a tool to empower students to use language through word
processing, spelling and grammar checking, desktop publishing programs, and so on
(Warschauer & Healey, 1998).

By the late 1980s and early 1990s, language-teaching specialists and educators
began to criticize communicative CALL for using computers in what was seen as an ad
hoc and disconnected way (Warschauer & Healey, 1998). This criticism occurred during
the reassessment of the theory and practice of the communicative approach to language teaching. The result was the introduction of a new approach that could be called integrative CALL.

In integrative CALL, the social or socio-cognitive approach to language teaching is used. This approach aims at integrating the four language skills (i.e., listening, speaking, reading, and writing), as well as at integrating technology more fully into the language-learning process. The integrative approach also places greater emphasis on language use in authentic social settings and uses task-based, project-based, and content-based approaches to integrate learners into authentic environments. Unlike the behaviorist or communicative approach, the integrative approach requires students to use a variety of technological tools as an ongoing process of language learning and use (Warschauer & Healey, 1998).

During the current integrative stage, two newer technological advances, multimedia computers and the Internet, have been adopted to serve students. Multimedia computers enable students to access text, graphics, sound, animation, and video. A number of features and advantages are possible including the integration of all four language skills. However, for several reasons, multimedia software has not yet significantly impacted language teaching. The quality of available commercial and non-commercial programs is poor, teachers generally are not able to develop their own programs, and, most importantly, the programs are not interactive. However, a new technology that can help in overcoming these problems is the Internet (Warschauer, 1996).
The Internet

During the past few years, the Internet has influenced and changed the way people communicate. With the Internet, time and space restrictions can be overcome easily (Porter, 1997). An individual can communicate with relatives, friends, and others very quickly and at an affordable cost by using electronic tools like e-mail. The Internet is reshaping the ways language teachers can use computers for language learning and teaching. With the availability of the Internet, computers have become a tool for information processing and communication in both the classroom and society (Warschauer & Healey, 1998).

By sending and receiving messages and exchanging information electronically, the Internet is a major contribution to distance education. This form of communication technology has caused distance education to spread all over the world. A teacher can interact with and deliver instruction to students via technological tools while never entering a classroom. Consequently, there exist a considerable number of virtual schools, universities, and courses based exclusively on the use of the Internet (Frizler, 1995).

Definition of the Internet

The Internet—also known as the Net, the mother of all networks, the information superhighway, and cyberspace—is a worldwide network connecting thousands of smaller networks that all use the TCP/IP communications protocol and share a common address space. The Internet supports an array of electronic services such as electronic mail (e-mail), the World Wide Web (WWW), File Transfer Protocol (FTP), and Internet Relay Chat (IRC) (Williams et al., 1997). E-mail is perhaps the most commonly used service on the Internet (The World Almanac and Book of Facts 2000), but the WWW is the most
popular service offered on the Internet today (Porter, 1997). Web pages are viewed using
browsing software like Netscape Navigator, Mosaic, and Microsoft Internet Explorer.

Sources say that the Internet has grown tremendously in its number of users,
domain names, hosts, and computers connected to it and is gradually subsuming other
media, such as proprietary computer networks, newspapers, books, television, and the
telephone. For example, *The World Almanac and Book of Facts 2000* presents these
statistics: (a) in 1994, three million people (most of them in the U.S.) used the Internet.
By the middle of 1999, about 200 million people used the Internet worldwide and experts
estimate that by the year 2005 the number of people connected to the Internet may
become one billion people; (b) the number of Internet domain names which has been
registered jumped from about 627,000 by December 1996 to over 10 million by
September 1999; (c) latest research estimates that there are now more than 800 million
web pages on the Internet; and (d) experts say that the traffic on the Internet doubles
every 9 to 12 months.

**Types of Internet users**

Computer users can be classified into two types: professionals and end-users.
Professionals are those who have formal education in the technical aspects of computer
and communication systems, such as computer programmers. In contrast, end-users do
not have much technical knowledge of computers and communication systems and
simply use computers for personal, educational, entertainment, or work-related purposes
(Williams et al., 1997).

Nobody controls or owns the Internet (*The World Almanac and Book of Facts
2000*). In fact, the Internet is not funded. Users can gain access to the Internet through an
Internet Service Provider (ISP), such as CompuServe or America On-line (Williams et al., 1997). The Internet is monitored by its users, and each user is responsible for self-policing his or her behaviors (Rogers, 1995).

**Interest in use of the Internet in ESL**

Support for computer use in instruction is increasing (Kent and McNergney, 1999), and it seems likely that more educators have become interested in using computers in education because of the Internet. A growing number of ESL teachers and researchers are advocating the use, adoption, and integration of the Internet for language instruction, in particular. This advocacy is reflected in different ways. One way is writing and publishing pedagogical books such as *Virtual Connections* (1996), edited by Mark Warschauer. This resource is a large collection of on-line projects and activities for language teaching/learning that was produced by language teachers. Another popular resource of this kind in the language-teaching field is *Technology-Enhanced Language Learning* (1997) edited by Michael Bush. This book discusses a number of important topics regarding how technology, computers, and the Internet, in particular, can be used to enhance language learning.

Teachers are becoming more active users and developers of Internet applications by designing Web pages, publishing pedagogical articles, doing research on-line, and becoming members of newsgroups. On the Internet, teachers can access and surf a wide range of web sites that encompass research reports, articles, and educational information. In addition, teachers can enhance their teaching skills by interacting with others who have the same interests via e-mail and USENET newsgroups.
Research is being done on why and how language teachers can use the Internet effectively. For instance, at the TESOL 99 Conference, in New York City, 85 technology-related papers, colloquia, and academic sessions were presented. Those titles mainly focused on the use of the Internet and its benefits in language teaching/learning. One of those papers, “Integrating Virtual Communities into the Language Class,” discussed why and how language teachers could use Internet-based virtual communities for language learning. Another paper, “Success on the Net for Beginners,” presented the basics for exploring the WWW and emphasized the use of the Internet for practical classroom applications and professional development for ESL teachers. A third paper “Web Resources for Successful Materials Development,” looked at how language teachers could use the WWW as a source of materials for language teaching. “Scripting the Web for Interactive Language Learning,” was intended for experienced teachers who can create Web pages; the paper looked at the advantages and disadvantages of using Java Script as a development tool for interactive language-learning resources. The presentation, “Learning Language and Culture by e-mail,” was a purposeful e-mail project done outside the language class. It showed how e-mail was used by some ESL students to communicate with English native speakers in order to increase their knowledge about the English language and American culture.

Advantages and disadvantages of using the Internet in ESL

In their papers, researchers have presented the advantages, as well as a few disadvantages to using the Internet in the classroom. Garrett (1991) writes that the Internet has significant potential to enhance ESL instruction. For example, students can use the Internet to write and read in their target language. Also, the Internet is capable of
creating an atmosphere in which students can negotiate meaning, participate in meaningful communication, and socialize and interact with each other as well as the outside world. Moreover, the Internet allows students to gain more knowledge and information about other cultures, including the target language culture. In other words, the Internet can provide a viable linguistic as well as cultural environment for language learners. The Internet can create an interactive environment for language learning, so students can interact with their teachers and classmates. By using the Internet, both teachers and students can eliminate the pedagogical restrictions of time and space. Language teachers can use the Internet to locate and access authentic and contextualized learning materials. And, the Internet allows language teachers to exchange information, opinions, experiences, lesson plans, and to-do activities.

Researchers (e.g., Hackett, 1996; Firek & Purcell, 1995; and Frizler, 1995) argue that the application of Internet activities supports theoretical perspectives and principles of foreign-language learning as suggested by well-known researchers Krashen and Omaggio. For example, the Internet can provide “comprehensible-input” resources and activities; offer self-paced, learner-centered instruction which helps lower the “affective filter” of some students, and allow for individualized learning styles. Also, the Internet allows students to compose for a real reason, interact and communicate with a real audience, and negotiate meaning.

But the Internet is not without possible problems. It requires costly hardware and software; it has fees for monthly service; in terms of content and function, some software is of poor quality; and technical problems may interrupt a teaching or learning experience.
Classroom use of computers and the Internet

Despite the unique advantages of technology, especially the Internet, only a limited number of teachers use technology as a teaching/learning tool. Even when they do employ computers, the teachers “most often” use new powerful technology (e.g., computers and information technology) only “for word processing and other low-end applications”, notes Cuban (1999, p. 24). Cuban discusses “the technology puzzle” which asks: Why is greater access to computers not translating into better classroom use? Cuban writes that most teachers use computers at home more than at school. According to Cuban (p. 14): “No technophobes here.”

The author offers several reasons for the failure of teachers to use computers at school. Technology experts offer ever-changing or contradictory advice to teachers regarding how to use computers in classrooms. The working conditions in schools, as well as the internal and external high demands on teachers’ time and stamina, may affect or limit teacher use of technology in classrooms. Computers can be flawed or unreliable. And policy makers have ignored teacher voices or opinions regarding which technologies and what machines and software they need for their classrooms.

Recent research (e.g., Westfall, 1998; Layfield, 1998; Shoemaker, 1997; and Ruth, 1996) offers additional reasons that might explain teachers’ limited use of technology. These reasons include a lack of knowledge and experience in the use of technology, lack of access to computers, insufficient funding; an insufficient number of computers available; and lack of training. The research also suggests that factors such as appropriate advance planning, adequate funding, technical support, access to computers
and the Internet, a sufficient number of computers, departmental support, and incentives for teachers who use technology in their classes may have a major impact on the successful use of technology in instruction.

Researchers (e.g., Frizler, 1995; and Kassen & Higgins, 1997) also indicate that teachers might consider a number of factors when deciding whether to use technology (including the Internet) in their classes. First, they need to think about how to integrate technology into the curriculum and always remember that they are using technology only as an educational tool. Second, they have to consider appropriate evaluation measures when using any technology to determine its efficiency and appropriateness for the educational situation. Third, teachers may have to give students training sessions prior to the use of technology. Fourth and most importantly, they need to be educated/trained in how to use and integrate technology into teaching/learning in proper ways.

Algabe (1997) stresses the importance of successful strategies for facilitating the integration and use of the Internet in classrooms. This task can be done through pre-service and in-service teacher-education or technology-preparation programs and workshops (Bush 1997, Kassen & Higgins, 1997, Warschauer & Healey, 1998, Kent and McNerney, 1999). Educators (e.g., Kent & McNerney, 1999) assert the importance of integrating technology, especially computers and the Internet, into teacher-education programs and workshops in order to meet the needs and expectations of the new millennium. Therefore, they recommend that no teacher be certified unless he or she has been educated to use computers and technology in classroom.

Many colleges and universities now offer technology training for pre-service and in-service teachers. Some components necessary for technology preparation programs to
be effective are: clearly articulated goals; adequate allocation of time for education and training; sufficient and constant funding for these preparation programs; and ongoing support (Kassen & Higgins, 1997).

**Related Research**

Numerous studies have been conducted in recent years on the Internet, including its users and its influence on education. This research stems from the growing interest in the Internet and its influence on all aspects of life, including education. This section discusses some of the recent studies on Internet use in education.

**Internet general research**

Lee (1996) studied why faculty members have not widely adopted technology-mediated instruction and learning despite their familiarity with technology and plentiful efforts to integrate information technology into teaching. The study proposes that the integration of technology into teaching depends on three conceptual approaches: learner-oriented, institution-oriented, and faculty-oriented. The study also argues that disregarding the differences among faculty members’ processes of innovation-adoptions is one of the fundamental reasons for the failure to integrate technology into teaching. Rogers’ adoption of innovations theory was used as conceptual framework for investigating the perceptions and attitudes of faculty members in higher education toward issues related to the instructional use of technology such as technology use patterns, reasons for and against the use of technology in teaching, problems/barriers, motivating factors, and campus and departmental support issues. Data was gathered by a survey instrument that surveyed 1,392 faculty members teaching in four California State Universities located in the San Francisco Bay Area and follow-up interviews (n=6). The
response rate of the survey was 51% (n=706). Data analysis revealed major findings. Firstly, in the technology use pattern area, participants reported that Internet applications were the most highly used technology category with 78% of them using the Internet. However, 30% of participants responded that they used the Internet for instructional purposes. Secondly, participants had differing perceptions and attitudes toward the instructional use of technology with 20% of faculty identify themselves as innovators, 29% as early adopters, 28% as early majorities, 14% as skeptics and 9% as resisters. Thirdly, familiarity with and knowledge of technology were the most important factors that explained the differences among the five groups regarding the use of technology in instruction. Fourthly, in terms of motivating factors, availability of equipment was rated as the most important factor by innovators, while the early majority group rated technical support as most important. The skeptic group rated “released time” as most important factor. Fifthly, participants indicated that “rewards in promotion and salary” is less important factor, either as motivator or problem, than “time” and “availability of equipment”. Sixthly, all participants reported that institutional and departmental plans and guidelines for the instructional use of technology were not satisfactory. From the participants’ viewpoint, the availability of departmental technology support and consulting staff was the most unsatisfactory support item. The study concluded that the use of the Internet in instruction is still limited in higher education. In addition, faculty members used technology mainly because they believe that it can improve teaching and learning. Furthermore, lack of time and resources were important factors that inhibited faculty members’ instructional use of technology. Moreover, familiarity with and knowledge of technology was the key factor in the instructional use of technology. The
study implied the following: (a) the instructional policy and guidelines for using
technology in instruction should be refined, with considering the diversity needs and
attitudes of faculty members; (b) technology training, technical support and consulting
services at the departmental level is crucial to promote the instructional use of technology
by faculty members; and (c) because rewards in promotion and salary are either difficult
or not welcomed by faculty members, it is important that an educational institution
provides public acknowledgement and incentives for faculty members who use or
integrate technology in instruction.

Porter (1997) describes the level of use of the Internet by extension educators at
The Ohio State University and investigates the relationship between the level of use of
the Internet and certain selected factors. The study also investigates which selected
factors explained the unique variance of Internet use by the participants. Porter surveyed
207 extension educators. Results revealed the following findings: (1) Extension educators
occasionally or rarely used the Internet because of a lack of proficiency in the skills
needed for Internet use; (2) Most extension educators at OSU had Internet access at work
(94%) and about half (47%) had access at home; (3) Extension educators were familiar
with e-mail and had somewhat positive perceptions of the Internet; (4) There were
significant associations between the level of Internet use and home access, computer
literacy and proficiency, and Internet literacy; (5) There exist very strong associations
between level of use of the Internet and Internet proficiency and perception of the
Internet; and (6) Internet proficiency, home access, and perceptions of the Internet
explained the greatest amount of variance in Internet use.
Ruth (1996) used quantitative and qualitative research methodologies in an attempt to investigate the level of acceptance of and resistance to the Internet by faculty at Moorhead State University (MSU) in Minnesota. The purpose of the study was to ascertain the perceptions of use of the Internet by 261 full-time tenured and non-tenured faculty members. The research sought answers to three questions: (a) to what extent is the Internet used by faculty at MSU; (b) what are the primary inhibiting factors or barriers to using the Internet; and (c) what are the Internet functions most commonly used? Results showed that although most MSU faculty members used the Internet to some extent, they did not use the Internet in their classes. Age had some relationship to the use of the Internet, and certain university divisions used the Internet more than others. The most commonly used Internet applications by the participants were e-mail and Netscape. Participants indicated that factors inhibiting their use of the Internet included time, support, and access; while benefits of using the Internet included communication with fellow faculty members and students, helping students to learn and reinforce class information, and research.

Toms (1997) conducted a descriptive correlational study to explore patterns in the stages of concern of the faculty at the University of Florida regarding the adoption of the Internet for instructional purposes. The study posed three questions: (a) What are the relationships of the level of Internet use for instructional purposes and the level of Internet use for all other purposes to the sequence of stages of concern; (b) Are there significant differences in the peak stages of concern of the faculty members grouped by the extent to which they modify their instructional practices based on how or what students learn; and (c) Are there significant differences in the peak stages of concerns
among faculty members grouped by rank, gender, age, or national origin. The study was based on the Concern-Based Adoption Model (CBAM). CBAM is a conceptual framework for understanding how an individual in an educational setting reacts to change or innovation. CBAM claims that an individual passes through seven stages of concern when confronted with change or innovation. Concerns are defined as an individual’s motivation, thoughts, feelings, and perceptions toward the innovation. The study revealed two major findings. First, there were significant correlations between the peak (most intense stage of concern) and level of use of the Internet for instructional purposes, level of use of the Internet for all other purposes, and attention to how students learn. Second, the level of use of the Internet for instructional purposes and gender were the only two significant predictors of peak stage of concern.

Rodriguez (1997) studied and analyzed teachers’ Internet utilities use of the Nevada School network during the 1995-1996 academic year. The sample was 1,292 teachers. After counting the teachers’ frequencies of Internet utilities use, teachers were divided into two groups: heavy users (i.e., those who used the Internet over 20 hours for the school year) and light users (i.e., those who used the Internet less than 20 hours). The analysis of the data revealed that 15% of the teachers accounted for 76% of the total Internet use during the school year. Also, statistically significant differences were obtained between the two groups concerning frequencies of Internet utilities use. Light users were characterized as those who use e-mail, while heavy users were mainly characterized as those who use Talk, TELNET and Lynx.

Shoemaker (1997) conducted a study aimed at providing a description of current and planned uses of the Internet by K-12 school districts in Michigan, and at identifying
the factors that inhibit and encourage the use of the Internet in education. Participants were technology directors, principals, superintendents, media specialists and teachers chosen from a random sample of 534 K-12 public school districts in the state of Michigan. The study used a written and a telephone survey for collecting the data. Findings revealed that factors encouraging the use of the Internet include an existing technology plan, a single user or building initiative, and the presence of a district technology director. The greatest inhibitors were a lack of training; a lack of time; a lack of resources; and the school districts’ failure to develop a long-term plan for the use and management of technology.

Wilson (1997) investigated how students used the Internet to access information for course-related research and what accounts for such use or non-use. The population of the study was 73 full-time, undergraduate students from five small independent, residential, liberal arts colleges in Pennsylvania that had Internet access on campus. Participants were divided into two groups: (A) those who used the Internet for course-related research and (B) those who had not. Data was collected during small focused group interviews in which students were required to answer a number of open-ended questions. Group A students were asked 11 questions about their use patterns, search processes, information retrieval and evaluation, and evaluation of use of the Internet. On the other hand, group B were asked 4 questions about why they do not use the Internet, research patterns, purposes of use of the Internet, and factors that might encourage use of the Internet. Results showed that the Internet was used mainly for three purposes: email, course-research, and entertainment. The most-wired campuses were found to have high use of the Internet by participants. Thirty-six students (half of participants) reported that
they presently use the Internet for course-related research. Participants expressed that they like the convenience and variety of information available on the Internet. Non-users reported that they had no reason to use the Internet and they did not know how to access or locate information on the Internet. Furthermore, concerning comfort level of using the Internet, no gender differences were noted, however some differences occurred among academic levels and college campuses. The study’s recommendations included the need for: widespread computer accessibility on campuses, teaching students how to use the Internet and evaluate information available on the Internet, and faculty involvement and collaboration between faculty and librarians to support informed and appropriate use of the Internet as a research option.

Based on the diffusion research tradition, Wallace (1998) investigated the relationship between innovativeness, Internet use, demographic variables, and the attitude of teachers toward the use of the Internet. The population was 100 full-time teaching faculty of a school system located in Tennessee where each school had access to the Internet. Data was collected by using a self-report questionnaire instrument. Results showed that innovators possessed higher positive attitudes toward the Internet than other adopter groups. In addition, in terms of the relationship between adopter type and Internet use, innovators and majority group members were found to have used the Internet, while laggards had little experience. Furthermore, younger age groups, females, and general subject teachers had higher mean scores for innovativeness than other groups. Moreover, there was a significant positive relationship between increased attitudes toward using the Internet and an increase in teachers’ Internet use.
Chung (1998) conducted two studies that examined why ordinary people use the Internet. The study contrasted two perspectives: the Information Actor perspective which says that information systems are mainly used for retrieving and processing information, and the Social Actor perspective which emphasizes the importance of social context on decisions to use or not to use something, i.e., the Internet in Chung's study. In study 1, Chung designed a questionnaire to examine Information and Social Actor perspectives. The participants were 1,000 MBA students. In study 2, a larger number and more representative sample, (i.e., more than 16,000 out of 20,000 U. S. households responded), was surveyed after revision of the same questionnaire. Consequently, study 2 provided more generalizable findings than study 1 (in which a shortened questionnaire was used due to the practical constraints). Findings of both studies revealed that people began using the Internet because of its information contents. However, over time, social context played an increasingly important role in determining whether or not an individual continues to use the Internet. What does this sentence mean?

Roberts (1998) examined the attributes of educators using an Educational Internet Network (i.e., GlobalSchoolNet) to support instruction. The study utilized an on-line survey as well as telephone interviews to gather data concerning: demographic characteristics of educators who use the Internet, the influence of the Internet on instruction and school reform, and reasons for continuing to use the Internet. The population included educators in K-12 schools who had used the Internet for instruction for more than a year. The respondents were 229 individuals among a target population of approximately 500 English-speaking educators and who had used GlobalSchoolNet's activities. Collected data showed that about 90% of the educators were teachers with six
or more years of teaching experience. The respondents identified themselves as self-taught Internet users who were personally motivated to use the Internet. In addition, participants indicated that the Internet has a broad spectrum of applicability for the K-12 classroom. Furthermore, participants reported that the benefits of the use of the Internet in teaching include: improving students' global perspective, being motivated by real world information, investigating problems by themselves, and having an active role in the learning process. Moreover, respondents reported that they have three needs in order to use the Internet in instruction. These needs were: support and time to learn how to use and plan to use the Internet; sufficient Internet-connected computers; and a change in the view of learning (i.e., from a teacher-centered classroom to a student-centered environment with collaborative, project-based instruction).

The Internet and Language Teaching

In a case study, Frizler (1995) explored qualitatively the benefits and limitations of teaching university-level English to speakers of other languages (ESOL) on-line or via the Internet. The research population was university-level students learning English as a foreign language (EFL). The sample was purposive and comprised of seven computer and Internet literate university level students, who participated in the study until the end, living in non-English speaking countries. The participants enrolled in an eight-week, free, non credit EFL composition class taught through a MUD--multi-user dimension object-oriented (MOO), and a web page on the WWW. For data collection and analysis, the researcher used interview transcripts, students’ writing samples and a journal the researcher/instructor kept for the study. Participants indicated that learning English via the Internet helped them to use natural English, improve overall writing ability, be
exposed to natural language, develop their ability to think in English, interact with students from different cultures, improve their reading speed, learn beyond the classroom, be exposed to the process of writing, and have freedom of expression. During the study, the instructor discovered that there were also benefits that the students did not indicate. These benefits were motivation to write with authentic communicative purposes for real audiences, the opportunity to learn when inspired, increased student responsibility for learning, the option of using unreal names (anonymity), and removal of cultural, racial and sexual barriers. However, the instructor found that a virtual English as a Foreign Language classroom can have problems or limitations—such as increased opportunities for plagiarism, lack of spontaneity, feelings of isolation, technical problems which may have a negative affect on the whole class, lack of self-motivation and self-discipline, exposure to disorganized and poorly-written English, limited availability of resources (e.g., the Internet is not accessible to all people everywhere in the world), and physical reactions to overuse of the computer (e.g., strained eyes, headache, backache, and lack of exercise).

Frizler’s study implied a number of important outcomes regarding using the Internet to teach ESOL writing classes. First, interactivity among students and between the teacher and students is the key to a successful on-line writing class. In this respect, a program like MOO could be used in discussions where instant response and elaboration are important. Second, although the WWW in itself is not interactive, what students do with it can become interactive. For instance, students can design and publish web pages collaboratively and share their experiences and work with other students. They can also work in pairs or groups to do research using e-mail to share thoughts and documents and
using MOO to discuss important issues in real-time. Third, EFL teachers should address the issue that cyber-English is different from traditionally acceptable written English (standard written English), thus students would know when to use each one appropriately. Fourth, when teachers use the Internet as an educational tool, they must keep pedagogical goals in focus. In other words, teachers should teach whatever they should teach and not get caught up in the technical aspect of an activity. Fifth, using the Internet to teach ESOL requires teachers to change their roles, approaches, and attitudes toward teaching, e.g. from teacher-centered to student-centered. Sixth, in order to be able to use the Internet successfully in the classroom, teachers should be trained in how to use the technicalities of the Internet, as well as the philosophies of how and why to teach with it. Seventh, Internet tools such as e-mail and WWW can be used not only as means of classroom facilitation, but also as language-learning tools in and of themselves. Eighth, teachers also can use the Internet for their own professional growth by communicating and collaborating with fellow educators worldwide. And finally, using the Internet to distribute course materials could save time, money, and paper.

Voytyuk (1997) conducted a study to investigate and evaluate the level and efficiency of computer usage in the teaching of foreign languages. The findings of the study were used as guidelines for designing, maintaining and improving Shenandoah University ESL and TESOL web sites. The participants were 100 faculty members of foreign language departments randomly selected from small colleges and universities located in the tri-state area of Virginia, West Virginia and Maryland. Data was collected using a survey that involved questions about respondents' demographic information, languages they teach, items related to usage of computer for teaching/learning such as
general usage, language-oriented software, and communication software and the WWW, describing successful experience of integrating computer applications into language instructions, and estimating computer technology impact on FL teaching in the future. After analyzing the collected data, results revealed that 81% of the respondents used computers while preparing lessons and 37% during the lessons. In addition, grammar drills, building vocabulary, writing/spellcheck and grammar correction of composition were found to be the most frequently used computer activities. Furthermore, respondents indicated that the dominant Internet-related activities were writing/reading and that full-fledged multimedia capabilities e.g., sound, video and so forth were not in spread use because of financial reasons or lack of time needed to master those capabilities. Moreover, the majority of respondents (55%) did not use commercial foreign language software because of the software was not compatible with the syllabus and textbooks they used or it seems wasteful to spend time adapting this software for the classroom. The study concluded that the difficulties respondents experienced when integrating computers into their lessons could be divided into four sets: hardware-related problems, money-related problems, time and methodology-related problems, and attitude-related problems.

**Diffusion of Innovations Theory**

Diffusion is defined by Rogers as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). And despite the fact that the Internet is not entirely new to many users such as researchers and scientists, the network system and/or information technology is still generally described as “an innovation” (Porter, 1997). This research study of the
adoption of the Internet in the teaching of ESL was based on Rogers’ theory. The diffusion of innovations theory has been applied successfully in many fields, including education. In addition, the diffusion research has had numerous contributions. Rogers (1995) explains that these contributions have been “impressive” so far (p. 96). Among the advantages of the diffusion model are: (a) its relevancy to many disciplines and topics (i.e., its multidisciplinary nature that is relevant to various scientific and educational fields and social science disciplines); and (b) its strong application value (i.e., its results can be utilized to solve a variety of problems). Diffusion theory also was used because the ESL faculty can be viewed as members of a social system. Because this research is investigating the diffusion of an innovation, Internet technology, among ESL college/university teachers, the goals/purposes of this study are compatible with Rogers’ approach. In other words, the diffusion of innovations theory fits the nature of this study.

In the fourth edition of Diffusion of Innovations, (1995), Rogers revises the theoretical framework and the research that support his latest diffusion of innovations theory. He also synthesizes the important findings of previous research and analyzes that work. The information in this section is, for the most part, a summary of Rogers’ theory (1995) unless otherwise indicated.

As the definition of diffusion suggests, there are four main elements in the diffusion of innovations: an innovation, communication channels, time, and a social system. The diffusion process or spread of new ideas can occur in two fashions: spontaneously and planned.
Innovation

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, p. 11). The innovation is considered to be “new” in terms of knowledge, persuasion, or decision to adopt.

Uncertainty about an innovation is reduced (alleviated) by seeking three types of information: (a) hardware (i.e., information about the physical object of the innovation) such as the computer screen, keyboard, or modem; (b) software (i.e., information about what the innovation is, how it works, and why it works); and (c) innovation-evaluation (i.e., information about how well the innovation works or the advantages and disadvantages of the innovation in specific settings).

The most significant characteristics of innovations that explain their rate of adoption are:

a) Relative advantage – the degree to which the innovation is perceived as better than the idea it supersedes (Rogers, p. 15). This relative advantage is measured in terms of a number of significant factors such as economy, social prestige, convenience, and satisfaction. However, the most important factor is whether an individual perceives the innovation as advantageous. Thus, the more an individual perceives an innovation to be advantageous, the faster its adoption rate is likely to be.

b) Compatibility – the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters (Rogers, p.15). If an innovation is compatible with the values and norms of a social system, it will be adopted faster.
c) Complexity – the degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, p. 16). Complicated innovations are likely to take more time to spread.

d) Trialability – the extent to which the innovation may be experimented with on a limited basis (Rogers, p. 16). Generally, innovations that are tried according to an installment plan will be adopted more quickly.

e) Observability – the degree to which the results of the innovation are visible to others (Rogers, p. 16). Individuals adopt an innovation when they can see its results quickly. This visibility encourages peer discussion and feedback concerning the innovation (i.e., requesting innovation-evaluation information).

Communication channels

The second element in the diffusion of innovations is communication channels; this refers to the process by which participants create and share information with one another in order to reach a mutual understanding (Rogers, p. 17). The heart of the diffusion process is information exchange among individuals. A communication channel is the means by which information travels from one individual to another. An example of such communication channels would be interpersonal channels (i.e., the face-to-face exchange of information), which are found to be effective in spreading new ideas among individuals, especially when those individuals have similar educations, socioeconomic status, or other important features. Research has shown that interpersonal channels are essential in the process of adoption or rejection of an innovation. Also, mass media channels, such as radio and television, are effective and fast means to diffuse initial information about an innovation.
Time

The third element of innovation diffusion is the time dimension. An individual passes through stages in order to decide whether to adopt or reject an innovation. The decision-making process for using an innovation, the Internet in this study, is an information-seeking and information-processing task during which an individual aims to reduce uncertainty about the innovation. This decision-making process involves five stages—knowledge, persuasion, decision, implementation, and confirmation. Diffusion research uses the relative time in which an individual adopts an innovation to measure innovativeness and classifies individuals into one of five various adopter categories: innovators, early adopters, early majority, late majority, and laggards, based on the normal adopter distribution (Rogers, 1995, p. 262).

The innovators (2.5%) are characterized as being venturesome. They like to network with other innovators, have financial resources, understand complex technical knowledge, and are able to cope with uncertainty. Early adopters (13.5%) are characterized as respectable, more local than innovators; they are strong opinion leaders. The early majority group (34%) is characterized as interacting frequently with peers, they seldom hold positions of opinion leadership, are interconnected to the system's interpersonal networks, and engage in long period of deliberation before making an adoption decision. The late majority group (34%) is characterized as those whose adoption might result from economic/social necessity; they are skeptical, cautious, and possess relatively scarce resources. The laggards (16%) are characterized as those who are traditional and who are suspicious of change.
The same innovation may have different rates of adoption in different social systems. Therefore, in order to gain a better idea about different aspects of diffusion, individual behavior, as well as characteristics of the social system, should be examined. Social systems have a direct effect because of their norms and qualities, while an individual has an indirect effect on the social system to which he or she belongs.

**Social system**

The fourth element in innovation diffusion is the social system, a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal (Rogers, p. 23). According to diffusion research, the diffusion of innovations in a system may be facilitated or impeded by the social and communication structure of a social system. Also, the adoption of innovations can have unanticipated, unintended, and unfavorable consequences on a social system. Given the role a social system can play in the diffusion of innovations, it is possible to identify three main types of innovation-decisions: (1) optional innovation-decision made by an individual member of a system; (2) collective innovation-decision made by the entire social system; and (3) authority innovation-decision made by a few members of a social system who have power, status, or technical expertise. To date, little research concerning the role of the social structure in the diffusion of innovations has been reported in the professional literature.

**A conceptual model**

Figure 2.1 is a conceptual model of the diffusion approach of Rogers (1971, 1995). The model represents theoretically possible relationships between the level of use of the Internet and a number of variables related to individual adoption decisions. These variables include: personal characteristics of participants (i.e., age, gender, type of job,
and program type); access to the Internet (i.e., having access to a computer at home and in the office, and factors that limit an individual’s use of the Internet at home and in the office); computer literacy (i.e., an individual’s knowledge of operations and functions related to the use of a computer); computer proficiency (i.e., to what extent an individual is adept in various computer skills); Internet literacy (i.e., an individual’s knowledge of Internet or networking skills); Internet proficiency (i.e., to what extent an individual is adept in Internet or networking skills); and perceptions of the Internet.

The model was used by Porter (1997) to study the level of use of the Internet by extension educators at OSU. Porter’s successful use of Rogers’ approach and the fact that she adapted the approach to the OSU context supported its use in this study. Indeed, Porter’s recommendations for further study regarding choose-nots (i.e., individuals who indicate some degree of information anxiety and resist using technology) call for applications to other disciplines.
Figure 2.1: Factors associated with the individual adoption decisions of the Internet
Summary of literature review

In this chapter, literature on three basic subjects was examined: the history and definition of educational technology which includes the Internet; previous empirical research into Internet use; and the diffusion theory of Rogers which provides the basic theoretical framework for this research’s study.

Educational technology

The use of technology in education has a long history. Educational technology can be as simple as chalk and chalkboard or as complex as the electronic communications network known as the Internet. The major purpose underlying the adoption of various educational technologies over the years has been to enhance the educational experience. Ely (1997) defines educational technology as the application of systems and approaches to teaching and learning.

In the second half of the 20th century, several newer technologies began to change the way languages—including English as a Second Language—were being taught. Computer-assisted instruction was introduced in the 1960s, although early use of computers was hampered by the unwieldy mainframe computer.

In the 1970s, the advent of microcomputers presented new hope for the use of computers in education. Along with the microcomputer came such technologies as the videodisc, the compact disc, and the CD-ROM, which improved access to information, as well as to computers in general.

Computer-assisted language learning, or CALL, is the name given to the branch of computer-assisted instruction devoted to language learning. Through the years, CALL has employed a number of different approaches including a drill-and-practice
(behaviorist) approach; a communicative approach that emphasizes meaning over form; a cognitive approach that emphasizes learning as a process of discovery; and the integrative approach that aims to integrate the four language skills of listening, speaking, reading, and writing.

The most recent educational technology to impact CALL is the Internet. The Internet is capable of creating an atmosphere in which students can negotiate meaning, participate in meaningful communication, and socialize and interact with each other as well as with the outside world. The Internet allows students to gain information about other cultures—including the culture of the language under study. With the Internet, both students and teachers can eliminate the pedagogical restrictions of time and space.

Research on Internet use

Despite the increasing sophistication of CALL, as well as the increasing number of computers in the classroom, scholars believe instructional technology has failed to live up to its promise to revolutionize education. A number of researchers have conducted empirical studies to examine the level of technology use and to identify possible barriers to the adoption of new technologies in education. Some of the more outstanding studies are discussed in this section.

In a study of 261 faculty members at Moorhead State University, Ruth (1996) found that although most faculty members used the Internet to explore the World Wide Web, as well as to send and receive e-mail, they did not use the Internet as an instructional tool in the classroom. Factors identified by Ruth as inhibiting such use included age, access, time, and support.
In her study of 207 Ohio State University extension educators, Porter (1997) found that participants rarely used the Internet, even though 94 percent of the participants had Internet access. Barriers to Internet use as identified by Porter included lack of computer and Internet proficiency and perceptions of the Internet as an educational tool.

In a study of Internet use in 534 school districts in Michigan, Shoemaker (1997) found that factors encouraging Internet use in the classroom included an existing technology plan, a single user or building initiative, and the presence of a district technology director. Factors inhibiting use included a lack of training, a lack of time, the lack of resources, and school-district failure to develop a long-term plan for technology use and management.

In a case study, Frizler (1995) explored qualitatively the benefits and limitations of using the Internet to teach university-level English to speakers of other languages. Using student interviews and writing samples for the study, Frizler concluded that learning English via the Internet helped students to use natural English, improved their writing abilities, developed their abilities to think in English, improved reading speed, and allowed the students to learn beyond the classroom.

**Diffusion of innovations theory**

Although the Internet is not entirely new to many users, the information highway (i.e., the Internet) is still generally described as “an innovation.” According to Rogers (1995), an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. An innovation is considered “new” in terms of
knowledge, persuasion, or decision to adopt. Some educators may be familiar with the
Internet for personal use, yet the technology may remain “new” in terms of adopting it for
use in the classroom.

Rogers defines diffusion as the process by which an innovation is communicated
through channels over time by the members of a social system. This research study of the
adoption of the Internet in the teaching of ESL was based on Rogers’ diffusion of
innovation theory. Rogers’ approach was used because it fits the nature of this research
study.

The most significant characteristics of innovations that explain their rate of
adoption are: relative advantage, or the degree to which an innovation is perceived as
better than the idea it supersedes; compatibility, or the degree to which an idea is
perceived as consistent with existing values; complexity, or the degree to which an
innovation is perceived as relatively difficult to use and understand; trialability, or the
degree to which an innovation may be experimented with or tested; and observability, or
the degree to which the results of an innovation are visible to others.

This research study used a conceptual model based on Rogers’ theories to
represent possible relationships between the level of Internet use by faculty members and
a number of variables related to individual adoption decisions. These variables include:
personal characteristics of participants, access to the Internet, computer literacy,
computer proficiency, Internet literacy, Internet proficiency, and perceptions of the
Internet.
CHAPTER 3

METHODOLOGY

Purpose of the Study

The purpose of the study was to describe the level of adoption of the Internet by ESL teachers using OSU as a sample or a model. In addition, the study investigated the relationships between the level of use of the Internet and these variables: personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet.

Design of the Study

A descriptive-correlation research design was used to accomplish the objectives of the study and predict the level of adoption of the Internet by ESL teachers. Descriptive research techniques were used to describe the distribution of ESL teachers’ personal characteristics, as well as their access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Correlations were used to determine the relationships between the variables previously described. Furthermore, semi-partial multiple regression was used to explain the degree to which these variables determined the unique variance on the level of use of the Internet by the participants.
In addition, interviews were conducted with three ESL teachers per program among the three ESL Programs at OSU: the American Language Program (ALP), ESL Composition Program, and Spoken English Program (SEP). It was assumed that the nine participants from the three programs could reveal sufficient data that represent the ESL teachers’ population at OSU. The main purpose of the interviews was to discuss in more detail interviewees’ level of adoption of the Internet, including how and why they use or do not use the Internet for purposes, such as language instruction and professional development. The interview questions were generated in accordance with the objectives/purposes of the study.

Population of the Study

The target population (N) was ESL teachers at OSU. The population was forty-two ESL teachers, full and part-time, employed by OSU for the 1999-2000 academic year. One of the population members was an associate professor in English linguistics, and who was also teaching some ESL courses.

OSU is an appropriate setting for this study because of its distinctive characteristics. Thus, OSU was used as a sample or a model because it is a major, large, public, university. OSU also has network and computing sites for teachers and students all over the campus. Therefore, both teachers and students can use computers and access the Internet. In addition, OSU provides each teacher with a personal computer for educational needs such as communicating with students via e-mail. Furthermore, OSU has technology services that support teachers’ and students’ technological needs, i.e., University Technology Services (UTS). Moreover, OSU is known for its ESL programs, which attract and serve large and diverse number of international students. In ESL
programs at OSU, a technology committee has been formed in order to promote teachers’ use of technology for language teaching/learning. The main goal of this committee is to keep the three ESL programs (American Language Program, ESL Composition Program, and Spoken English Program) abreast of each other’s technology concerns and plans. The committee also tries to keep program members, in general, up to date on various technology issues, including computer technology and audio technology, which might benefit students/instructors in all three programs. As some examples of its past activities, the committee organized technology-related workshops, explored various ESL and language-related software, and developed a multimedia kiosk to demonstrate some of the ways ESL programs can use technology. Currently, the committee is doing some strategic planning to further delineate its purpose and long-range goals.

ESL teachers at OSU taught in three English as a Second Language Programs: the pre-admission American Language Program (ALP), post-admission ESL Composition Program, and post-admission Spoken English Program (SEP). When the term English as a Second Language (ESL) is used in this dissertation, the term is used to collectively refer to these three programs. Brief descriptions copied from these programs’ websites are below.

ALP offers intensive English language instruction for international students who need to improve their ability to use English before beginning academic study at American colleges and universities, and for those who need to improve their ability to use English for professional purposes (http://www.esl.ohio-state.edu/ALP.htm).

The ESL Composition Program is one of the largest post-admission English as a Second Language programs in the United States, with a broad spectrum of courses for
both graduate and undergraduate students. The goal of the program is to bring students' writing skills to a level at which they can perform successfully as writers in university courses (http://www.esl.ohio-state.edu/Comp.htm).

The goal of the SEP is to ensure that International Teaching Assistants (ITAs) demonstrate the communication skills necessary to teach effectively in the U.S. university setting. Specifically, the program screens all prospective International Teaching Assistants, provides coursework for those who require it, and administers teaching performance tests at the end of coursework to determine certification to teach (http://www.esl.ohio-state.edu/sep.htm).

An updated list of all ESL teachers was obtained through a personal contact within OSU. Frame error was controlled by ensuring the frame contains an up-to-date list of all ESL teachers. Selection error was controlled by checking for duplication of names on the computer list.

To establish the validity and reliability of the research instrument, samples from similar populations (i.e., ESL teachers at Capital University, Ohio Dominican College, Franklin University in Columbus, Ohio, and Ohio University in Athens, Ohio) were selected for the field test and pilot test. Five ESL teachers from Capital University were selected for the field test. A comment form were developed so the field test participants could indicate whether the instrument was clear, concise, had appropriate questions, and was understandable. In addition, nineteen ESL teachers from three schools: Ohio University, Ohio Dominican College, and Franklin University in the state of Ohio were selected for the pilot test (Table 3.1).
<table>
<thead>
<tr>
<th>School:</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio University</td>
<td>10 ESL teachers</td>
</tr>
<tr>
<td>Franklin University</td>
<td>5 ESL teachers</td>
</tr>
<tr>
<td>Ohio Dominican College</td>
<td>4 ESL teachers</td>
</tr>
</tbody>
</table>

Table 3.1: School Name and Number of Pilot Study Participants

ESL programs in the previous schools were selected because they shared main goals with OSU’s ESL programs: to help international students achieve the necessary language proficiency in English to qualify for admission to colleges and universities in the United States, or to help students who are already admitted to the university to perform satisfactorily.

**Instrumentation**

After careful consideration of some instruments, the researcher proposed to use Porter’s instrument (1997) as an example to develop a survey for ESL teachers. Porter’s instrument was designed to determine the level of use of Internet by OSU Extension educators. This instrument was selected because of its appropriateness in terms of purpose (i.e., investigating the level of use of the Internet), setting (i.e., OSU), and theory used in its design (i.e., Diffusion of Innovations by Rogers). Both Porter (1997) and Roger’s theory are discussed in detail in the literature review chapter. The instrument, which has been modified to fit this study purposes, gathered data on all of the variables previously described to investigate teachers’ level of use of the Internet (Appendix A). Content validity of the instrument was established by a panel of experts. The panel consisted of six individuals who have knowledge of measurement, the content of the
study, and ESL teachers’ population (Appendix B). The panel was selected from OSU
and similar university settings. The experts were also asked to assess the instrument
during and after development (Appendix C). The instrument was carefully modified to
include all recommendations, comments, and concerns identified by the panel of experts.

The instrument was field tested for face and content validity by a representative
sample of ESL teachers (n= 5) selected randomly from a similar population (i.e., ESL
teachers at Capital University). The field test group was furnished with an explanation of
the instrument’s purpose and detailed directions for reviewing the questionnaire. A
comment form was developed so the field test participants could comment on whether the
instrument was clear, concise, had appropriate questions, and was understandable
(Appendix D).

The instrument was also pilot tested for reliability by a similar population of ESL
teachers from Ohio University, Franklin University and Ohio Dominican College in the
state of Ohio (n= 19). In Part 1 of the instrument, “Use of the Internet,” questions 1 - 7
were measured on a six-point Likert-type scale, in which 0 = Never, 1 = Very Rarely, 2 =
Rarely, 3 = Occasionally, 4 = Frequently, 5 = Very Frequently, and 6 = Not Familiar.
Questions 8-10 were measured on a six-point Likert-type scale, in which 0 = Never, 1 =
Very Rarely, 2 = Rarely, 3 = Occasionally, 4 = Frequently, and 5 = Very Frequently.
Reliability was reported with a Cronbach’s alpha coefficient of .83.

Part 2 of the instrument, “Access to the Internet,” gathered nominal data and
interval data. Part 2 contained eight questions. Questions 11 - 12 were for descriptive
purposes concerning personal Internet access. Respondents were asked to check “yes”,
“no”, or “I don’t know” to questions about their access to the Internet at home and work.
Questions 13 - 18 asked respondents to report how frequently certain factors affected their access to the Internet. The six questions were measured on a six-point Likert-type scale, in which 0 = Never, 1 = Very Rarely, 2 = Rarely, 3 = Occasionally, 4 = Frequently, and 5 = Very Frequently. Reliability was reported with a Cronbach's alpha coefficient of .60. As Nunnally (1967) suggests, it can be assumed that .5-.6 reliability is acceptable in the early stages of research. In addition, this researcher decided not to sacrifice validity because of reliability by excluding some items to raise the reliability score for this section. Instead, this researcher decided to keep all this section's items.

Part 3 of the instrument had four sections: “Computer Literacy”, “Computer Proficiency”, “Internet Literacy”, and “Internet Proficiency”. The “Computer Literacy and Proficiency” section contained 27 questions; they were questions 19-45. The “Internet Literacy and Proficiency” section contained 8 questions (i.e., questions 46-53). Question 30 was developed through comments and personal communication from panel experts.

Both “Computer Literacy” and “Internet literacy” were measured by having respondents indicate/check the specific computer skills and Internet skills they possessed. In addition, Level of Computer Proficiency and Internet Proficiency were reported by interval data measured on a four point Likert-type scale ranging from 0 - 3, in which 0 = Not at all, 1 = A little, 2 = Somewhat, 3 = proficient. Reliability for both sections was reported with a Cronbach's alpha coefficient of .93 for “Computer Literacy” section and a Cronbach's alpha coefficient of .67 for “Internet Literacy” section. As Nunnally (1967) suggests, it can be assumed that .5-.6 reliability is acceptable in the early stages of research. In addition, this researcher decided not to sacrifice validity because of reliability.
by excluding some items to raise the reliability score for this section. Instead, this researcher decided to keep all this section’s items.

Part 4 of the instrument, “Perceptions of the Internet,” contained 15 questions. Questions 53 - 67 were measured on a Likert-type scale. The anchors were (1) Strongly Disagree, (2) Disagree, (3) Somewhat Disagree, (4) Somewhat Agree, (5) Agree, and (6) Strongly Agree for ESL teachers’ perceptions of the Internet at OSU, with a total possible score ranging from one to six. Questions 67 and 68 were developed through comments and personal communication from panel experts. Reliability was reported with a Cronbach's alpha coefficient of .86.

**Data Collection**

This study used quantitative, (the survey), as well as qualitative, (the interviews), data collection methods. As some researchers stipulate (e.g., Rudestam & Newton, 1992) the combination of qualitative and quantitative methodologies is better than using either methodology alone. This approach allows researchers to exploit the advantages of both methodologies in order to gain a much clearer picture and deeper understanding of the investigated phenomenon. In fact, the move towards embracing both methodologies for research is appropriate for a field that deals with complex phenomena and interrelated issues such as ESL.

Furthermore, adoption of the Internet is probably a personal decision for each human subject. The qualitative dimension is needed for such complex issues as adoption of the Internet in one’s teaching; it provides in-depth information. A number of studies investigated this issue quantitatively, but few studies reported use of the qualitative dimension. However, hard and/or numerical data do not tell the whole story; a
combination of quantitative and qualitative methodologies will provide more complete findings.

Prior to data collection, approval was obtained from the Ohio State University Human Subjects Review Committee (Appendix E). As shown in Table 3.2, data collection encompassed six weeks. Data collection followed the steps outlined in Salant and Dillman (1994), which are listed below.

First step: a personalized, advance-notice letter was sent to all members of the population. The letter's purpose was to inform participants of the study, and to request their participation in it by completing a questionnaire that was sent to them a short while later (Appendix F).

Second step: About one week later, again to all members of the population, the researcher hand delivered and used campus mail to give each participant a personalized cover letter with slightly more detail about the survey, a copy of the questionnaire, and placed a drop-off box in each secretary's office in the ESL Programs at OSU.

Third step: Four to eight days after distribution of the questionnaire, a follow-up letter was sent to all members of the population thanking those who have responded and requesting a response from those who have not (Appendix F).

Fourth step: Three weeks after the first questionnaire was distributed, a new personalized cover letter with a replacement questionnaire and stamped returned envelope was sent to those who have not yet responded.
Late-respondents – A follow-up phone call was made or a written letter was sent to encourage late-respondents to participate in the study. The letter was structured in accordance with guidelines explained in Salant and Dillman (1994). The letter explained the importance of the study and instructions for participation (Appendix F).

<table>
<thead>
<tr>
<th>Mailings</th>
<th>Activity</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Invitation Letter/Advance-notice Letter</td>
<td>February 9, 2000</td>
</tr>
<tr>
<td>2</td>
<td>Cover Letter with Questionnaire and incentive</td>
<td>February 16, 2000</td>
</tr>
<tr>
<td>3</td>
<td>Follow-up Thank you/Reminder Letter</td>
<td>February 28, 2000</td>
</tr>
<tr>
<td>4</td>
<td>New Cover Letter, replacement questionnaire</td>
<td>March 7, 2000</td>
</tr>
<tr>
<td></td>
<td>Late-respondents: Follow-up phone call</td>
<td>March 13-16, 2000</td>
</tr>
<tr>
<td></td>
<td>Final return deadline</td>
<td>March 17, 2000</td>
</tr>
</tbody>
</table>

Table 3.2: Schedule for Data Collection

To further encourage participation, teachers received a gift incentive in the second step. A note was enclosed thanking the participants for completing the questionnaire and encouraging them to accept the enclosed gift as a token of appreciation from the researcher. The gift incentive was a note pad, a pencil, a pen, and a highlighter.

About a week after all the questionnaires had been collected, three ESL teachers per program were interviewed orally to gather more information about their level of adoption of the Internet. These teachers were chosen randomly from those who indicated in the questionnaire that they were willing to participate in the interviews.
Before the interviews, the researcher established prior contact with interviewees, scheduled a time for each interview, and selected an appropriate setting for each interview. During the interview, the researcher established rapport with the interviewees by listening carefully to them, using silence effectively, observing the respondent carefully, probing for clarity, and providing a suitable closure to the interview. After the interview, the researcher rewrote notes taken during the interviews, transcribed each recorded interview immediately, and wrote a letter of appreciation to each interviewee. In addition, all interviewees received a gift incentive after they had been interviewed. A note was enclosed thanking the interviewees for participating in the follow-up interviews and encouraging them to accept the enclosed gift as a token of appreciation from the researcher. The gift incentive was a calendar.

The questions used during the interviews were semi-structured. However, the researcher spontaneously added questions if there was a need for clarification of information. The core interview questions were the following:

1. Do you advocate the use of the Internet for educational purposes? Why or why not?

2. Which factors, if any, do you think limit your adoption of the Internet in ESL instruction?

3. How do you think ESL teachers at the college level can make appropriate adoption of the Internet for language instruction?

Validity (i.e., credibility) of previous follow-up interview questions was established by a panel of experts. The panel consisted of two individuals from OSU who have knowledge of measurement, the content of the study, and ESL teachers’ population.
The experts assessed the follow-up interview questions during and after development. The questions were carefully modified to include all recommendations, and comments identified by the panel of experts. In addition, the follow-up interview questions were pilot tested for reliability by interviewing two individuals from the same population and discussing with them the interview questions afterwards. The two participants were asked to assess and comment on the clarity, and appropriateness of questions, as well as the length of the interview.

**Data analysis**

Quantitative data (survey data) were analyzed using SPSS for Windows (10.0) and reported using appropriate measures and procedures. Follow-up interviews were analyzed using procedures for analyzing qualitative data as described by Miles and Huberman (1994).

**Questionnaire**

The following is a description of the statistical analyses that were used to accomplish each of the research objectives of the study:

1. Means, standard deviations, and range were used to describe teachers’ level of use of the Internet. Sample paired t-test was used to compare the means of use of the Internet for instructional purposes, professional development purposes, and personal purposes and find out if they were significantly different.

2. a. Frequency counts and percentages were used to describe teachers’ access to the Internet.

   b. Means, standard deviations, and ranges were used to describe factors limiting teachers’ access to the Internet.
4. Means, standard deviations, and ranges were used to describe teachers’ computer literacy and computer proficiency.

5. Means, standard deviations, and ranges were used to describe teachers’ Internet literacy and Internet proficiency.

6. Two-group discriminant analysis was used to determine which of the following two variables better discriminates between high and low users of the Internet for instructional purposes: computer proficiency or Internet proficiency. Both variables were loaded into the SPSS statistical computer program at once (i.e., direct discriminant analysis). The independent variables were computer proficiency and Internet proficiency, whereas the dependent variable was users of the Internet for instructional purposes. Because there were two groups, only one discriminant function was generated. The median was used to convert the interval variable “use of the Internet for instructional purposes” into a categorical variable. Consequently, ESL teachers were classified into two groups: low users and high users of the Internet for instructional purposes. In the interpretation of the results of the two-group discriminant function analysis, discriminant function is tested for statistical significance. Those variables with the largest standardized regression (b) coefficients are the ones that contribute most to the prediction of group membership.

7. Means, standard deviations, ranges, and frequency counts were used to describe teachers’ perceptions of the Internet.

8. Regarding participants’ personal characteristics, means, standard deviations, and ranges were used to describe teachers’ age, while frequency counts and percentages were used to describe teachers’ gender, program area, and type of job.
9. To describe relationships between the level of use of the Internet and personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Hopkins, Glass, & Hopkins (1987, 1978) basic statistics along with Davis' (1971) conventions were used to calculate relationships measurements. Specific relationships were reported by Pearson's Product Moment, Point bi-serial, and Eta correlation coefficients. Pearson's Product Moment correlation coefficients were calculated for age, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Point bi-serial correlation coefficients were calculated for gender. Eta correlation coefficients were calculated for work and home access, and program area.

10. To determine which selected factors explained the greatest amount of unique variance on the level of use of the Internet, multiple regression was used to determine the greatest variance in each of the statistically significant variables influencing an ESL teacher's decision to use the Internet. Selected variables were loaded into the SPSS statistical computer program simultaneously using step-wise regression. The statistical equation was amended to include syntax commands for partial and semi-partial correlation coefficients. Selected variables included those described earlier: personal characteristics, access to the Internet, computer literacy and computer proficiency, Internet literacy and Internet proficiency, and perception of the Internet among ESL teachers at OSU.

    The alpha level of .05 was set a priori. Davis' (1971) conventions for describing measures of association (relationship) were used to interpret the magnitude of all relationships reported in the study, as follows:
<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70 or higher</td>
<td>Very strong association (relationship)</td>
</tr>
<tr>
<td>.50 to .69</td>
<td>Substantial association</td>
</tr>
<tr>
<td>.30 to .49</td>
<td>Moderate association</td>
</tr>
<tr>
<td>.10 to .29</td>
<td>Low association</td>
</tr>
<tr>
<td>.01 to .09</td>
<td>Negligible association</td>
</tr>
</tbody>
</table>

**Follow-up interviews**

In addition to taking notes, follow-up interviews were audio tape-recorded and subsequently transcribed for analysis. In the analysis process, the interviews were read numerous, coded, and examined using procedures for analyzing qualitative data as described by Miles and Huberman (1994). The researcher developed a coding system for the interviews by looking at question number, patterns and key themes. Furthermore, the researcher consulted an expert, who has knowledge about the study and how qualitative data is analyzed, to read and code the interviews (i.e., verify the results of the interview data analysis). The two coding systems were then compared and contrasted. The researcher and expert’s conclusions were identical.
CHAPTER 4

FINDINGS

Introduction

Data collected through the survey were analyzed using the SPSS statistical package program (SPSS version 10.0). Qualitative data collected through the follow-up interviews were transcribed and analyzed by the researcher using procedures for analyzing qualitative data as described by Miles and Huberman (1994). The findings of data analysis of the survey are presented in part one, in seven sections: a) a description of ESL teachers at OSU on selected personal characteristics; b) a description of the reported level of use of the Internet by ESL teachers at OSU; c) a description of the reported levels of computer literacy and proficiency, and Internet literacy and proficiency of ESL teachers at OSU; d) a determination of the variable that discriminates between low and high users of the Internet for instructional purposes; e) a description of OSU ESL teachers’ perception of the Internet; f) identification of access to the Internet by ESL teachers at OSU and the perceived factors limiting OSU ESL teachers’ access to the Internet; g) a description of the relationship between the level of use of the Internet and these selected variables: personal characteristics, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, and perception of the Internet; and h) a
prediction of the level of use of the Internet by selected personal characteristics, access to
the Internet, computer literacy and proficiency, Internet literacy and proficiency, and
perception of the Internet. In addition, part one presents a synthesis of the open-ended
responses participants provided in the survey about the use of the Internet in education,
especially ESL. Part two presents the findings of data analysis of the nine follow-up
interviews.

Data population

The advance-notice letter, initial mailing, and reminder notice letter resulted in a
100% response rate. The advance-notice letter of data collection to ESL teachers at OSU
(N=42) was sent on February 9, 2000. On February 16, 2000, a second mailing
containing a cover letter, copy of the questionnaire, and a gift incentive was sent to all
ESL teachers at OSU. On February 28, 2000, a reminder notice letter was sent to all
members of the population thanking those who had responded and requesting a response
from those who had not. On March 7, 2000 a replacement questionnaire and
stamped-return envelope with a new personalized cover letter urging the importance of
response was sent to all those who had not yet responded. March 17, 2000, was set as a
final return deadline for collecting the survey questionnaires. The overall return response
rate for the study was 100%.

Part One: Survey Results

Description of ESL teachers at OSU on selected personal characteristics

In the section “Demographic Information” of the survey, participants were asked
to answer questions related to their personal characteristics (i.e., age, gender, type of job,
and program type). A description of English as a Second Language (ESL) teachers’ personal characteristics can be found below.

**Age**

The mean age of the population of English as a Second Language (ESL) teachers at The Ohio State University (OSU) was 43.7 years, as presented in Table 4.1.

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>43.7</td>
<td>8.6</td>
<td>28 - 64</td>
</tr>
</tbody>
</table>

Table 4.1: Mean Age of ESL Teachers at OSU

**Gender**

Of the 42 ESL teachers at OSU, 29 (69%) were females and 13 (31%) were males.

**Type of job**

Of the 42 ESL teachers at OSU, 28 (67%) were full-time ESL teachers and 14 (33%) were part-time ESL teachers.

**Program type**

Of the 42 ESL teachers at OSU, 13 (31%) were teaching in the American English Program (ALP); 18 (43%) were teaching in the ESL Composition Program; and 11 (26%) were teaching in the Spoken English Program.
Description of the reported level of use of the Internet by ESL teachers at OSU

Level of Use of the Internet

In the section “Level of Use of the Internet” of the survey, ESL teachers were asked to report their level of use of Internet services such as e-mail and WWW by circling the appropriate number in a six point Likert-scale, in which 0= Never, 1= Very Rarely, 2= Rarely, 3= Occasionally, 4= Frequently, and 5= Very Frequently. A not familiar column was added for teachers who were unfamiliar with the different Internet services. As represented in Table 4.2, the summated mean was 3.28, indicating that ESL teachers at OSU reported occasional or frequent use of the Internet.

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>3.28</td>
<td>.868</td>
<td>1.5 - 5</td>
</tr>
</tbody>
</table>

Table 4.2: Mean Level of Use of the Internet by ESL Teachers at OSU

As illustrated in Table 4.3, the most frequently used Internet services were e-mail (98%), and WWW (86%). The least used Internet services were USENET Newsgroups (2%), and FTP (12%).
<table>
<thead>
<tr>
<th>Internet service</th>
<th>Very Frequent to Frequent</th>
<th>Never or Not Familiar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>E-mail</td>
<td>41</td>
<td>98</td>
</tr>
<tr>
<td>WWW</td>
<td>36</td>
<td>86</td>
</tr>
<tr>
<td>Browsers</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>USENET</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>FTP</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>TELNET</td>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: The following response categories were used: very Frequently, frequently, occasionally, rarely, very rarely, never, and not familiar.

Table 4.3: Frequency of Reported Use of Internet Services (N=42)

In addition, ESL teachers were asked to report their level of use of the Internet for three purposes: instructional, professional development, and personal, using the same six-point Likert-scale. Then, a paired sample t-test was calculated to find out if the three means are significantly different. As represented in Table 4.4, the summated mean for instructional purposes was 3.09, indicating that ESL teachers occasionally use the Internet for instructional purposes. The summated mean for professional development purposes was 3.61, indicating that ESL teachers occasionally or frequently use the Internet for professional development purposes. The summated mean for personal purposes was 4.21, indicating that ESL teachers frequently or very frequently use the Internet for personal purposes.
<table>
<thead>
<tr>
<th>Type of purposes</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional purposes</td>
<td>3.09</td>
<td>1.46</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Professional development purposes</td>
<td>3.61</td>
<td>1.14</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Personal purposes</td>
<td>4.21</td>
<td>1.11</td>
<td>1 - 5</td>
</tr>
</tbody>
</table>

Table 4.4: Level of Use of the Internet for Instructional, Professional Development, and Personal Purposes by ESL Teachers at OSU (N= 42)

As Table 4.5 shows, the generated means for using the Internet for instructional purposes, professional development purposes, and personal purposes were found to be significantly different.

<table>
<thead>
<tr>
<th>Pairs</th>
<th>t</th>
<th>Degrees of Freedom (df)</th>
<th>Significance (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional purposes – Professional dev. purposes</td>
<td>-2.454*</td>
<td>41</td>
<td>.018</td>
</tr>
<tr>
<td>Instructional purposes – Personal purposes</td>
<td>-4.779*</td>
<td>41</td>
<td>.00</td>
</tr>
<tr>
<td>Professional dev. purposes – Personal purposes</td>
<td>-2.831*</td>
<td>41</td>
<td>.007</td>
</tr>
</tbody>
</table>

*p<.05

Table 4.5: Paired Sample t-test for Instructional purposes, Professional Development Purposes, and Personal Purposes
Description of the reported levels of computer literacy and proficiency, and Internet literacy and proficiency of ESL teachers at OSU

Level of computer literacy

ESL teachers were asked to report their computer skills in operations and functions related to the use of a computer. As illustrated in Table 4.6, the mean score for ESL teachers’ level of computer literacy was 17.5. Scores could range from 0-27. The higher the score, the higher a participant’s perceived level of computer literacy.

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>17.5</td>
<td>6.95</td>
<td>3 - 27</td>
</tr>
</tbody>
</table>

Note: The mean was calculated based on summed, continuous interval data.

Table 4.6: Mean Score of Computer Literacy of ESL Teachers at OSU

Level of computer proficiency

ESL teachers were asked to report their level of proficiency with each computer skill in a four-point Likert-scale of 0 - 3, from 0 = Not at all to 3 = proficient. Computer proficiency of ESL teachers was then determined by summatimg the level of proficiency reported by the participants. A higher score indicated higher proficiency levels. The summated mean for level of computer proficiency was 1.46, indicating that ESL teachers were a little or somewhat proficient with skills needed to use computers (Table 4.7).
### Level of Computer Proficiency

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>1.46</td>
<td>688</td>
<td>0.185 - 2.85</td>
</tr>
</tbody>
</table>

Note: The mean was calculated based upon the following scale: 3 = Proficient, 2 = Somewhat Proficient, 1 = A Little Proficient, and 0 = Not At All Proficient.

Table 4.7: Mean Score of Computer Proficiency of ESL Teachers at OSU

As represented in Table 4.8, ESL teachers reported to be most proficient in printing a document on a word processor (100%), creating a document on a word processor (95%), and copying files (74%). ESL teachers reported not to be at all proficient in merging a word-processed letter with an integrated database (69%), using interactive video in the classroom (67%), and using a formula in a database (64%).

<table>
<thead>
<tr>
<th>Computer Skill</th>
<th>Level of Computer Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td></td>
<td>f</td>
</tr>
<tr>
<td>Create a document on a word processor</td>
<td>40</td>
</tr>
<tr>
<td>Print a word processor document</td>
<td>42</td>
</tr>
<tr>
<td>Search a database mgmt. systems for specific information</td>
<td>16</td>
</tr>
<tr>
<td>Print selected information from a database</td>
<td>23</td>
</tr>
<tr>
<td>Create a database (e.g. DBase, Paradox, Access)</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: The following response categories were used: proficient, somewhat proficient, a little proficient, and not at all proficient.

Table 4.8: Reported Computer Proficiency of ESL Teachers at OSU (N=42)

Continued
Table 4.8 continued

<table>
<thead>
<tr>
<th>Computer Skill</th>
<th>Level of Computer Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td></td>
<td>f</td>
</tr>
<tr>
<td>Use a formula in a database</td>
<td>2</td>
</tr>
<tr>
<td>Merge word processed letter with an integrated database</td>
<td>1</td>
</tr>
<tr>
<td>Create a spreadsheet</td>
<td>7</td>
</tr>
<tr>
<td>Write a formula in a spreadsheet</td>
<td>7</td>
</tr>
<tr>
<td>Create a newsletter with desktop publishing</td>
<td>9</td>
</tr>
<tr>
<td>Use graphics software to create pictures</td>
<td>7</td>
</tr>
<tr>
<td>Use database, spreadsheet or word processing software to create tables and figures</td>
<td>12</td>
</tr>
<tr>
<td>Use a scanner to import graphics, photos and/or text</td>
<td>10</td>
</tr>
<tr>
<td>Import clipart into text or desktop publishing</td>
<td>11</td>
</tr>
<tr>
<td>Modify ready-to-use clipart</td>
<td>6</td>
</tr>
<tr>
<td>Troubleshoot malfunctioning computer</td>
<td>2</td>
</tr>
<tr>
<td>Troubleshoot malfunctioning printer</td>
<td>2</td>
</tr>
<tr>
<td>Format a floppy disk</td>
<td>24</td>
</tr>
<tr>
<td>Copy files</td>
<td>31</td>
</tr>
<tr>
<td>Install a program on a fixed (hard) disk</td>
<td>15</td>
</tr>
<tr>
<td>Identify quality instructional software</td>
<td>11</td>
</tr>
<tr>
<td>Use interactive video in the classroom</td>
<td>4</td>
</tr>
<tr>
<td>Use images from camcorder or digital camera in computer applications</td>
<td>4</td>
</tr>
<tr>
<td>Use presentation software to create a lesson or lecture</td>
<td>6</td>
</tr>
</tbody>
</table>
Level of Internet literacy

ESL teachers were asked to report their networking skills with Internet services. The possible score for a teacher’s Internet skills ranged from 0 to 8. A higher mean score indicated higher Internet literacy. As illustrated in Table 4.9, the mean score for ESL teachers’ perceived level of Internet literacy was 6.26.

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>6.26</td>
<td>1.60</td>
<td>3 - 8</td>
</tr>
</tbody>
</table>

*Note:* The mean was calculated based on summed, continuous interval data.

Table 4.9: Mean Score of Computer Literacy of ESL Teachers at OSU

Level of Internet proficiency

ESL teachers were asked to report their level of Internet proficiency with each Internet skill in a four-point Likert-scale of 0 - 3, from 0 = Not at all to 3 = proficient. Internet proficiency of ESL teachers was then determined by summing the level of proficiency reported by the participants. A higher score indicated higher proficiency levels. The summed mean for ESL teachers’ level of Internet proficiency was 1.97, indicating that ESL teachers were a little or somewhat proficient with skills needed to use the Internet (Table 4.10).
<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>1.97</td>
<td>.620</td>
<td>.5 - 3</td>
</tr>
</tbody>
</table>

Note: The mean was calculated based upon the following scale: 3 = Proficient, 2 = Somewhat Proficient, 1 = A Little Proficient, and 0 = Not At All Proficient.

Table 4.10: Mean Score of Computer Proficiency of ESL Teachers at OSU

As represented in Table 4.11, ESL teachers reported to be most proficient in accessing or sending e-mail (98%), and browsing the WWW (81%). ESL teachers reported not to be at all proficient in participating in on-line chat rooms (52%), and creating a page on the WWW (45%).

<table>
<thead>
<tr>
<th>Internet Skill</th>
<th>Level of Internet Proficiency</th>
<th>Proficient</th>
<th>Not at All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Access or send e-mail</td>
<td></td>
<td>41</td>
<td>98</td>
</tr>
<tr>
<td>Attach application files to e-mail</td>
<td></td>
<td>31</td>
<td>74</td>
</tr>
<tr>
<td>Browse the World Wide Web (WWW)</td>
<td></td>
<td>34</td>
<td>81</td>
</tr>
<tr>
<td>Use remote login (TELNET)</td>
<td></td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>Create a page on the World Wide Web (WWW)</td>
<td></td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Use search engines (e.g. Lycos, Yahoo, AltaVista)</td>
<td></td>
<td>26</td>
<td>62</td>
</tr>
<tr>
<td>Upload/download files to/from the Internet</td>
<td></td>
<td>15</td>
<td>36</td>
</tr>
<tr>
<td>Participate in on-line chat rooms</td>
<td></td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 4.11: Reported Internet Proficiency of ESL Teachers at OSU (N=42)
**Determination of the variable that discriminates between high and low users of the Internet for instructional purposes**

Two-group discriminant analysis (DA) was used to determine which variable better discriminates between high and low users of the Internet for instructional purposes. The independent variables were computer proficiency and Internet proficiency, whereas the dependent variable was users of the Internet for instructional purposes. Because there were two groups, only one discriminant function was generated. The median was used to convert the interval variable "use of the Internet for instructional purposes" into categorical. Consequently, ESL teachers were classified into two groups: low users and high users of the Internet for instructional purposes.

As represented in Table 4.12, the test of discriminant function was significant. Standardized discriminant coefficients were 1.014 for Internet proficiency and -.018 for computer proficiency, indicating that Internet proficiency discriminates better between high and low users of the Internet for instructional purposes than did computer proficiency. Thus, Internet proficiency was more important than computer proficiency in discriminating group membership.

<table>
<thead>
<tr>
<th>Wilks' Lambda</th>
<th>Chi-square</th>
<th>Degrees of Freedom</th>
<th>Significance</th>
<th>Computer Proficiency</th>
<th>Internet Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>.644</td>
<td>17.164</td>
<td>2</td>
<td>.000</td>
<td>-.018</td>
<td>1.014</td>
</tr>
</tbody>
</table>

**Note:** 81% of original grouped cases (N=42) were correctly classified

Eigen value was .553a  
Canonical correlation was .597  
Median was 3.50

Table 4.12: Summary of Discriminant Analysis Result
Description of OSU ESL teachers’ perception of the Internet

ESL teachers’ perceptions of the Internet

ESL teachers were asked to report their level of agreement/disagreement on statements that use of the Internet may increase ESL teachers advantage, decrease complexity, increase ease of learning, and other factors. As represented in Table 4.13, the summated mean on a six-point Likert scale for participants’ views about the Internet was 4.9, indicating that ESL teachers have somewhat positive or positive perception of the Internet.

<table>
<thead>
<tr>
<th>Perception of the Internet</th>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>4.9</td>
<td>.578</td>
<td></td>
<td>3 - 5.8</td>
</tr>
</tbody>
</table>

Note: The mean was calculated based upon the following scale: 1 = Strongly Disagree, 2= Somewhat Disagree, 3= Disagree, 4= Somewhat Agree, 5= Agree, and 6 = Strongly Agree.

Table 4.13: Mean Score of ESL Teachers’ Perception of the Internet

As represented in Table 4.14, ESL teachers reported that they strongly agree or agree that the Internet increases their: personal convenience (95%); access to information (93%); and job performance (81%). In addition, ESL teachers reported that they strongly agree or agree that: A large percentage of my colleagues within my program currently use the Internet (93%); ESL teachers should be educated/trained on how to use the Internet in instruction (81%); and the Internet has the potential to enhance ESL instruction (79%).
<table>
<thead>
<tr>
<th>Perceptions</th>
<th>Perception of the Internet</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Agree to Agree</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree to Disagree</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>- Use of the Internet increases my:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>social prestige.</td>
<td></td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>personal convenience.</td>
<td></td>
<td>40</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>personal satisfaction.</td>
<td></td>
<td>30</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>job performance.</td>
<td></td>
<td>34</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>access to information.</td>
<td></td>
<td>39</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>- I am comfortable using the Internet:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>within my profession.</td>
<td></td>
<td>32</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>given my past experiences with computer networking.</td>
<td></td>
<td>27</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>given my overall information needs.</td>
<td></td>
<td>29</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>- For me, the Internet is:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>easy to understand.</td>
<td></td>
<td>29</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>easy to use.</td>
<td></td>
<td>31</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>- My job provides opportunities for me:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to learn about the Internet.</td>
<td></td>
<td>26</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>to teach about the Internet.</td>
<td></td>
<td>17</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

Note: The following response categories were used: Strongly Disagree, Somewhat Disagree, Disagree, Somewhat Agree, Agree, and Strongly Agree.

Table 4.14: Reported ESL Teachers' Perceptions of the Internet (N=42)
Table 4.14 continued

<table>
<thead>
<tr>
<th>Perceptions</th>
<th>Perception of the Internet</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Agree to</td>
<td>Strongly Disagree to</td>
</tr>
<tr>
<td></td>
<td>Agree f</td>
<td>%</td>
</tr>
<tr>
<td>• A large percentage of my colleagues within my program currently use the Internet.</td>
<td>39 93</td>
<td>0 0</td>
</tr>
<tr>
<td>• The Internet has the potential to enhance ESL instruction.</td>
<td>33 79</td>
<td>1 2</td>
</tr>
<tr>
<td>• ESL teachers should be educated/trained: on how to use the Internet in instruction.</td>
<td>34 81</td>
<td>1 2</td>
</tr>
</tbody>
</table>

Description of the level of access of ESL teachers at OSU to the Internet and the reported factors limiting their Internet access

Level of access to the Internet

Access to the Internet was described by participants’ response to whether they had access to the Internet at home or/and work. Of the 42 ESL teachers at OSU, 97.6% reported having access to the Internet at work; and 78.6% ESL teachers reported having access to the Internet at home (Table 4.15).

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Level of Access to the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Work</td>
</tr>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>97.6</td>
</tr>
<tr>
<td></td>
<td>97.6</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Table 4.15: Level of Access of ESL Teachers to the Internet
In addition, ESL teachers were asked to report how frequently certain factors limited their access to the Internet using a six-point Likert-type scale, from never to very frequently. As represented in Table 4.16, the summated mean for factors limiting participants’ access to the Internet was 2.06, indicating that these factors rarely limit ESL teachers’ access to the Internet.

<table>
<thead>
<tr>
<th>Population</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum - Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESL teachers at OSU</td>
<td>42</td>
<td>2.06</td>
<td>.888</td>
<td>.2 - 3.6</td>
</tr>
</tbody>
</table>

*Note*  The mean was calculated based upon the following scale: 5= Very Frequently, 4= Frequently, 3= Occasionally, 2= Rarely, 1= Very Rarely, 0= Never.

Table 4.16: Level of Factors Limiting ESL Teachers’ Access to the Internet

The reported factors that limited ESL teachers’ access to the Internet either at home and/or work are presented in Table 4.17. Between 2% and 31% of the respondents reported never having Internet access limited by the five factors.
<table>
<thead>
<tr>
<th>Factors</th>
<th>Occasionally to Very Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware not working</td>
<td>34  81</td>
<td>5  12</td>
</tr>
<tr>
<td>Too many people trying to use the computer</td>
<td>26  62</td>
<td>13  31</td>
</tr>
<tr>
<td>Busy signal with Internet service provider</td>
<td>20  48</td>
<td>9   21</td>
</tr>
<tr>
<td>Server down-time, System timed out</td>
<td>38  91</td>
<td>1    2</td>
</tr>
<tr>
<td>Computer response time too slow</td>
<td>29  69</td>
<td>4    10</td>
</tr>
</tbody>
</table>

Note: The response scale was based upon the following scale: very frequently, frequently, occasionally, rarely, very rarely, never.

Table 4.17: Reported Factors Limiting ESL Teachers’ Access to the Internet (N= 42)

Description of the relationships between the level of use the Internet and ESL teachers’ personal characteristics

This study described the relationships between level of use of the Internet and personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Specific relationships were reported by Pearson's Product Moment, Point bi-serial, and Eta correlation coefficients. Pearson's Product Moment correlation coefficients were calculated for age, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Point bi-serial correlation coefficients were calculated for gender. Eta correlation coefficients were calculated for work and home access, and program area.
Gender

As illustrated in Table 4.18, a negligible relationship was found between gender and level of use of the Internet. Female ESL teachers (n=29) had a mean level of use score of 3.27 (S.D. = .87), while male ESL teachers (n=13) had a mean level of use score of 3.30 (S.D. = .89). No statistical difference was found between gender and level of use of the Internet.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Level of use of the Internet</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.013a</td>
<td>.936</td>
</tr>
<tr>
<td>Home access</td>
<td>.443b*</td>
<td>.003</td>
</tr>
<tr>
<td>Work Access</td>
<td>.125b</td>
<td>.432</td>
</tr>
<tr>
<td>Program Area</td>
<td>-.159b</td>
<td>.315</td>
</tr>
<tr>
<td>Type of Job</td>
<td>.189a</td>
<td>.231</td>
</tr>
</tbody>
</table>

A Point biserial
B Eta
*p<.05

Table 4.18: Differences Between Level of Use of the Internet and Variables Associated with an Individual’s Decision to Use the Internet

Age

As illustrated in Table 4.19, a negative, low relationship (r = -.158) was found between age and the level of use of the Internet. No statistically significant relationship was found between age and level of use of the Internet.
Program area

As illustrated in Table 4.18, a negative, low relationship was found between program type and level of use of the Internet. ALP teachers (n=13) had a mean level score of use of 3.44 (S.D. = .989); ESL Composition Program teachers (n=18) had a mean level score of use of 3.29; and SEP teachers (n=11) had a mean level score of use of 3.28. There was no statistically significant difference between program area and level of use of the Internet.

Type of job

As illustrated in Table 4.18, a low relationship was found between type of job and level of use of the Internet. Full-time ESL teachers (n=28) had a mean level score of use of 3.39 (S.D. = .795); and part-time ESL teachers (n=14) had a mean level score of use of 3.05 (S.D. = .987). There was no statistically significant difference between type of job and use of the Internet.

Description of the relationships between the level of use of the Internet and other variables related to Internet use

Home access

As illustrated in Table 4.18, a statistically significant moderate association was found between an ESL teacher’s access to the Internet at home and his or her level of use of the Internet. Internet use means were compared between those ESL teachers who indicated having Internet access at home (n=33, Mean=3.48, S.D. = .76), and no Internet access at home (n=9, Mean=2.55, S.D. = .889). ESL teachers who had access to the Internet at home tended to have a higher level of use of the Internet than those who did not have access to the Internet at home.
Work access

As illustrated in Table 4.18, a low, positive association was found between an ESL teacher's access to the Internet at work and his or her level of use of the Internet. Internet use means were compared between those ESL teachers who indicated having Internet access at work (n=41, Mean= 3.30, S.D.= .868) and no Internet access at work (n=1, Mean= 2.60). No statistically significant relationship was found between work Internet access and use of the Internet.

Level of computer literacy

As illustrated in Table 4.19, a low, positive association (r= .289) was found between an ESL teacher's level of computer literacy and his or her level of use of the Internet. No statistically significant relationship was found between level of computer literacy and level of use of the Internet.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Level of use of the Internet r</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.158</td>
<td>.316</td>
</tr>
<tr>
<td>Level of computer literacy</td>
<td>.289</td>
<td>.063</td>
</tr>
<tr>
<td>Level of computer proficiency</td>
<td>.278</td>
<td>.074</td>
</tr>
<tr>
<td>Level of Internet literacy</td>
<td>.260</td>
<td>.097</td>
</tr>
<tr>
<td>Level of Internet proficiency</td>
<td>.344*</td>
<td>.026</td>
</tr>
<tr>
<td>Perception of the Internet</td>
<td>.292</td>
<td>.061</td>
</tr>
</tbody>
</table>

*p<.05

Table 4.19: Differences between Level of Use of the Internet and other variables Associated with an individual’s Decision to Use the Internet
Level of computer proficiency

As illustrated in Table 4.19, a low, positive association ($r = .278$) was found between an ESL teacher’s level of computer proficiency and his or her level of use of the Internet. No statistically significant relationship was found between level of computer proficiency and level of use of the Internet.

Level of Internet literacy

As illustrated in Table 4.19, a low, positive association ($r = .260$) was found between an ESL teacher’s level of Internet literacy and his or her level of use of the Internet. No statistically significant relationship was found between level of Internet literacy and level of use of the Internet.

Level of Internet proficiency

As illustrated in Table 4.19, a statistically significant moderate, positive association ($r = .344$) was found between an ESL teacher’s level of Internet proficiency and his or her level of use of the Internet. ESL teachers with a higher mean score for Internet proficiency tended to have a higher level of use of the Internet than those teachers with a lower mean Internet proficiency score.

Perception of the Internet

As illustrated in Table 4.19, a low, positive association ($r = .292$) was found between an ESL teacher’s level of perception of the Internet and his or her level of use of the Internet. No statistically significant relationship was found between perception of the Internet and level of use of the Internet.
Regression of level of use of the Internet on selected factors

Multiple regression was used to determine the variance in the level of use of the Internet explained by personal characteristics, access to the Internet, computer literacy, computer proficiency, Internet literacy, Internet proficiency, and perception of the Internet. Eleven variables associated with an individual’s decision to use the Internet were entered step-wise. Only one variable was statistically significant; it was home access.

As illustrated in Table 4.20, home access accounted for and explained 20% of the total variance in each participating ESL teacher’s use of the Internet.

<table>
<thead>
<tr>
<th>Variable</th>
<th>R Square</th>
<th>R Square change</th>
<th>b</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Access at Home</td>
<td>.197</td>
<td>.197</td>
<td>.93</td>
<td>3.13</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Standard error = .296 For model: F = 9.788; p<.01
Adjusted R Square = .177

Table 4.20: Regression of Level of Use of the Internet on Internet Access at Home (N=42)

Synthesis of open-ended responses provided in the survey

ESL teachers were requested to comment on their use of the Internet for educational purposes, especially ESL instruction. Of the study participants (N=42), 17 (40%) provided supplementary written responses. Common responses were grouped into general themes. Respondents’ comments were subsequently categorized by the researcher into more specific themes based on patterns of responses. The themes which emerged
ultimately were: a) uses of the Internet and importance of knowledge of the Internet for teachers; b) advantages of using the Internet; and c) limitations (e.g., information, time, and equipment) of using the Internet. Participants’ comments that represent the above themes areas are provided below. Additional comments are included in Appendix G.

**Uses of the Internet and importance of knowledge of the Internet for teachers**

Responses included:

- “Most important uses are: being able to send a message to entire class, and being able to return papers submitted file as attachment file – to return them with interlinear comments in color.”

- “I’ve used it [the Internet] to let students ask me questions out of class, submit certain items late, if necessary, but haven’t made special use like students chat rooms just for the class, etc."

- “Internet services are becoming crucial for administrators. I’d like to talk to you regarding this aspect of Internet use.”

- “I believe it [the Internet] is a necessary tool, but better suited to some areas and levels of instruction than others.”

- “As the use of technology at younger age levels increases, those of us who teach adults will find it increasingly important to be comfortable enough with the Internet to help our students use it to accomplish academic goals.”

Study participants seemed to believe that knowledge of how to use the Internet in ESL instruction is important, yet many participants discussed this knowledge in an abstract way rather than a practical way. It was not always easy to elicit responses as to actual ESL classroom applications of the Internet. Among responses that did provide
practical Internet applications, those applications included: sending messages to the class; grading and returning papers via the Internet; and answering student questions via the Internet. Several participants acknowledged that there are additional ways they could be using the Internet, although the participants state that they have not yet instituted these uses.

**Advantages of using the Internet**

Responses included:

- “I think it [the Internet] is an excellent source for reading/writing assignments. E-mail and chat rooms provide opportunity for class documents. E-mail to listserv of class members helps the teacher communicate with class. E-mail between teacher/instructor provides best opportunity for communication next to tutorials.”

- “The Internet can be a useful teaching/learning tool if used properly (and for a well-thought out purpose). It’s a fact that more of our students are arriving in our program with computers and/or Internet skills.”

Two participants seemed to believe that the Internet provides a method of one-on-one communication outside the classroom. Unlike the telephone, which might ring at an inconvenient time, a teacher can decide when he or she wants to log on to the Internet. One respondent stated that the Internet is the best means of communicating with students outside of the tutorial.
Limitations of using the Internet: information, time, and equipment

Information:

Responses included:

- “I think the information on the Net is often too hard for students to understand. I think students can’t easily infer if the information is from a reliable source or not. I also think that there is often a lot of slang or cultural references.”
- “Information is so abundant. It is overwhelming.”
- “Although I think the Internet offers very valuable tools for many kinds of need, I’m not sure that we’re yet at the point where there are many Internet resources that are valuable in ITA [International Teaching Assistants] training. In our program, we tend to prepare instructional materials in-house that are tailored closely to the needs of our students. It is sometimes helpful to have Internet information for this purpose, but I haven’t found a great deal that is very directly applicable frankly. I am, however, hopeful that this will change as time goes on.”
- “ESL students especially need to be guided in the selection of sites with regard to length, difficulty of language and reliability of source. They can often find material but are then overwhelmed when they come to use it.”

Time:

Responses included:

- “I think that we have just begun to scratch the surface in what we could do with the Internet in education, particularly in the areas of providing materials
for student to use in practicing their English outside of class. The hardest thing right now is finding the time to develop the materials I would like to do.”

Equipment

Responses included:

- “Limited PCs at work (more Macs).”
- “The Internet has great potential in ESL for research purposes, and perhaps some other purposes. But, I am convinced that, in language instruction, the key is personal interaction. The negotiation of meaning that occurs in a face meeting cannot be completely simulated with a machine.”

Factors limiting the use of the Internet in ESL instruction included: the type and amount of information found on the Internet; the time involved in developing materials for the Internet; and the equipment needed to use the Internet. Regarding information found on the Internet, some study participants stated that the amount of information can be overwhelming and that it is difficult to ascertain whether or not this information is reliable. Regarding time, some study participants stated that they do not necessarily have the time to develop materials for the Internet. Regarding equipment, some study participants stated that the computers and computer programs necessary for Internet use are not always readily available to instructors and/or students.

Part Two: Teachers Follow-up Interviews Results

Nine teachers from the Ohio State University ESL programs participated in follow-up interviews. Three of the participating teachers were from the American Language Program (interviewees 1, 3, and 4), three from the ESL Composition Program (interviewees 6, 7, and 8), and three from the Spoken English Program (interviewees 2, 5,
and 9). These teachers had indicated on the questionnaires their willingness to participate in follow-up interviews. The teachers were contacted via e-mail and/or telephone in order to arrange a personal interview with this researcher. Each interview lasted about 20-30 minutes. The teacher interviews were conducted during the months of March and April 2000.

The nine participating interviewees were asked three basic questions: Do you advocate the use of the Internet for educational purposes? Which factors, if any, do you think limit your adoption of the Internet in ESL instruction? How do you think ESL teachers at the college level can make appropriate adoption of the Internet for ESL instruction? The researcher also took notes during the interviews and he sometimes asked additional questions in order to verify information or to ask for clarification. The interviews were transcribed, coded, and examined using procedures for analyzing qualitative data as described by Miles and Huberman (1994). Following numerous readings of individual interview protocols, an analysis of interview responses suggested four general themes of responses:

A) Reasons for using the Internet in ESL instruction

In this category, Interviewed ESL teachers discussed their personal points of view regarding the use of the Internet for ESL instruction.

B) Factors limiting adoption of the Internet in ESL instruction

Interviewed ESL teachers shared their thoughts regarding the factors that limit their adoption of the Internet in English as a Second Language (ESL) classes.
C) Current uses of the Internet by ESL teachers at the Ohio State University

ESL teachers discussed their current uses of the Internet for language instruction.

Some of the ESL teachers gave examples to illustrate how they have incorporated the Internet into their language classes and lessons.

D) Future uses of the Internet in ESL instruction

ESL teachers discussed how the Internet could be used in the future for ESL instruction.

When asked: "How do you think ESL teachers at the college level can make appropriate adoption of the Internet for ESL instruction?" interviewees explained their experiences regarding the use of the Internet in their ESL instruction, which appeared to be appropriate adoption of the Internet for ESL instruction to them. Additionally, some interviewees referred to or/and rephrased their answer to the second question (i.e., factors that limit their adoption of the Internet in ESL instruction).

The following sections look more closely at the four categories and include excerpts from the teacher interviews that represent and relate to the specific themes.

A) Reasons for using the Internet in ESL instruction

All nine interviewees stated that they advocate the use of the Internet for educational purposes. For example, when they were asked about their advocacy of the use of the Internet for educational purposes, especially in ESL instruction, interviewee # 1 answered: "Actually I could say that I do very clearly." Interviewee # 3 replied: "I certainly do advocate the use of the Internet for educational purposes." And interviewee # 7 responded: "In terms of ESL composition in the university level, sure, I advocate it. I try to support it."
The ESL teachers expressed a variety of reasons for advocating the use of the Internet in ESL instruction. These reasons can be categorized to include the following main headings: the Internet is a tool for communication; the Internet is a tool for gathering information; the Internet is accessible; the Internet is a learning tool; the Internet is a teaching tool; and students need to learn to use the Internet (Figure 4.1).
REASONS FOR USING THE INTERNET IN ESL INSTRUCTION

The Internet is a tool for communication
- The use of e-mail by teachers to communicate with students and with fellow teachers
- The use of e-mail by students to communicate with their instructors, their classmates and other peers.

The Internet is accessible
- The Internet can be used wherever available, such as home and computer labs, to access courses materials.
- The Internet is more convenient to access than other materials.

The Internet is a teaching tool
- The Internet can help teachers teach. For example, teachers use the Internet for preparing lesson plans and for professional development.

The Internet is a tool for gathering information
- The Internet could be used: for conducting research; for finding up-to-date information; as an information database; and as a means to expose students to a variety of perspectives.

The Internet has become a learning tool
- Teachers can, for instance, use the Internet: to motivate students; to increase student interest in learning; to expand the scope of the classroom; to incorporate multimedia; and to help students be independent when they leave the classroom (self-study).

Students need to learn to use the Internet
- Students need to learn how to use the Internet in order to be successful in their academic study at the university/college and during their work endeavors after graduation.

Table 4.1: ESL teachers’ reasons for using the Internet in ESL instruction at OSU
Communication tool

Communication included the use of e-mail by teachers to communicate with students and with fellow teachers, and the use of e-mail by students to communicate with their instructors, their classmates, and other peers. Communication was the most recurrent reason for participants’ advocacy of the use of the Internet in ESL instruction.

Interviewee #1: A lot of communication is done through e-mail between the university and students. I understand they can get great info and other important types of information through e-mail. Also, contacting other students. I try to help my students be as independent as possible once they are out of my class and starting their academic courses, and one way students communicate a lot is through e-mail. So, this is one of the things I consider important.

Interviewee #6: To communicate with students, you can use the telephone; you can use just your class time; or you can use the Internet. So, in this case, I find the Internet a very useful way to communicate with students and for students to communicate with their instructor. It’s much better than the telephone. It doesn’t interrupt your privacy, and there are so many advantages over the telephone. The Internet provides a very convenient way to communicate.

Interviewee #7: In terms of second language (L2) writing, I use it [the Internet] a lot for students communicating out of class, whether they are doing e-mailing back and forth, whether they are doing publishing on the Web, because it gives them that form; it gives them that ease of contact outside the class. I also use it for peer reviews on-line outside the class. So, they communicate back and forth. So, it gives them a vehicle of communication outside the class when I talk about specifics to the courses I teach.

Interviewee #9: It’s [The Internet is] great for communication. I use e-mail. If I forget to tell my students something in class, I can e-mail them. So, it’s great for communication purposes for students too.

In summary, the reasons interviewees gave for using the Internet as a communication tool in ESL instruction include: a way of providing information to students; convenience; a way for students to communicate with each other; a way for students to become more independent; and a vehicle for student learning and discussion outside the classroom. Interviewees pointed out that the Internet can be used as a way for
teachers to communicate with other teachers, as a way for teachers to communicate with students, and as a way for students to communicate with other students.

*Tool for gathering information*

Another frequently cited reason for using the Internet in ESL instruction was the Internet’s value as a tool for gathering information. Interviewees noted that the Internet could be used for conducting research; for finding up-to-date information; as an information database; and as a means to expose students to a variety of perspectives.

Interviewee #1: Another reason that I would like to include the Internet in my lessons is that, especially for upper-level services such as electronic resources on-line, OSCAR and on-line journals and other resources through the Web; it’s very convenient that they [students] can even do it from their own home if they have a computer. It’s absolutely essential. So this is another reason that I think it is important.

Interviewee #3: You know that the Internet is a great place because it’s an ongoing debate, and you can find people whose opinions range across the spectrum. And so, if I am trying to encourage my students to think critically about an issue, I can give them examples of various people on the Web who are thinking about that issue or looking at that issue from different perspectives. It’s the timeliness and the broad range of perspectives that are available.

Interviewee #4: It [The Internet] is an informational database that is growing everyday. And it’s the easiest and the most plentiful source of information for anything under the sun and beyond the sun as well.

Interviewee #6: Most databases for research are already on the Internet. We can’t do without it [the Internet] any more. We need the Internet to get into library databases. We must use the Internet, if we are going to do any kind of research because that’s where the databases are.

In summary, the reasons cited by interviewees for using the Internet in gathering information in ESL education included: convenience; access to on-line library catalogs and academic journals; the diversity of opinions found on the internet, which can
encourage critical thinking, and the timeliness of information found on the Internet. One
interviewee noted that the Internet is a source of information for “anything under the sun
and beyond the sun as well.”

*Internet accessibility*

The Internet’s accessibility was mentioned several times as a reason to use the
Internet in ESL instruction. Interviewees noted that the Internet is more convenient to
access than other materials.

Interviewee #2: The materials for our most advanced class we have available on
the Internet. All the materials for the course except things that are copyrighted—
those are all available on the Internet for students to access. Another example is
that we made audiotapecs, which go with our instructional texts also available on
the Internet using audio streaming. So, students can go to the Web site and listen
to the tapes. It gives students easier access, much easier access, and that’s really a
key because I think it encourages our students to use the materials more often.
And when it’s convenient for them, it’s much easier for them to spend time
practicing. They don’t have to go to the lab and borrow the tape—that’s less
convenient, much less convenient.

Interviewee #9: The advantages are you can use the Internet in home if you have a
computer. I think a lot of my students who have computers in home like using it
instead of having a walk to the language lab. It’s something they can do late in the
evening or late in the day to drill themselves a little bit and just whenever they
have a little bit of time, they don’t have to make special trips. I think this is a main
advantage.

In summary, a number of interviewees believe that, in ESL instruction, the
Internet often is more accessible than other materials. The Internet can be accessed day or
night, and the Internet allows students to drill themselves at their own pace. One
interviewee noted that, using audio-streaming tapes also are available on the Internet.
This interviewee added that because class materials are so accessible on the Internet,
students are more likely to use them and to use them more frequently.
Learning tool

Interviewees stated that the Internet has become a learning tool. Teachers can, for instance, use the Internet: to motivate students; to increase student interest in learning; to expand the scope of the classroom; to incorporate multimedia; and to help students be independent when they leave the classroom (self-study).

Interviewee #1: I also like to use the Internet in my lessons because I think that this is a form of communication that’s very motivating and interesting especially for younger students. And sometimes it takes just that kind of activity to get students to do something with language that he or she might be reluctant, otherwise, to use in the classroom.

Interviewee #4: It [The Internet] allows also the classroom to become broader and bigger than it actually is by virtually inviting people to the classroom that couldn’t be there. You are stepping outside the classroom to experience something you would never be able to experience if you didn’t have the Internet.

Interviewee #9: The nice thing about the Internet is how you can use multimedia. There are so many multimedia things you use. So, it’s a good way to get listening material out or video or anything like that you want to be seen. Plus, they can get text as well. So, you can get almost any form as long as they know how to use it… I think it’s a great tool for self-study for students, particularly for our area of teaching. We use it a lot for helping students in their listening, speaking, drilling themselves, and accessing materials on the Web. I don’t think it’s a substitute for a teacher, but I think that it’s a great supplement for a teacher—for self-learning, especially.

In summary, interviewees believe that the Internet is a good learning tool because: it is motivating and interesting; it allows students to privately engage in activities that they might be reluctant to participate in during class; it expands the classroom and allows students to broaden their horizons; it makes use of multimedia approaches to learning; and it allows for self-study.
Teaching tool

Interviewees noted that in addition to helping students learn, the Internet can help teachers teach. For example, teachers use the Internet for preparing lesson plans, and for professional development.

Interviewee #2: I think there are some good things on the Internet. I mean they could get better probably in some ways. I look at the TESOL site. I watch the site for our special interest section. I find that useful.

Interviewee #4: I take advantage of instant lesson plans many times when I am lacking something. And getting my material to teach from basic different kinds of news sources, on-line magazines, articles. The Internet is very, very helpful for planning and providing information, for training purposes in a way also. I had a chatting exercise where I invited a guest. We were talking about cross-cultural marriages and had a guest logging in who is not present—you know in another area in the United States. And my class was interviewing them, talking to them in a chat room. And other people in our program were logging in also in just a kind of observing the conversation as it went a long. And that kind of thing is really nice to do for observation and training. So, I think it’s very useful for professional development purposes. Also, networking. I know several people in our program have developed presentations and materials without even meeting their counterparts, seeing them for the first time at a conference prior to doing presentations. So, it was very nice way to collaborate.

Interviewee #9: I think there are some really good sites. I know there are really some good sites for a lot of general purpose things. For specifics, for like what I use for pronunciation, that’s a little harder to come by. But for general ESL use, I think there are a lot of good sites for discussion, for information, grammar tests and quizzes and things like that, which are pretty good. ESL sites like Dave’s Café. Dave’s ESL Café has a lot of different links for the teachers. The Ohio University CALL lab has a lot of teacher helps.

In summary, interviewees believe that the Internet is a good teaching tool because: it provides instant lesson plans; it provides materials from many sources; it can be used by teachers for self-development, collaboration, and networking; it offers sites that are excellent in promoting discussion and cross-cultural exchanges, as well as sites that specifically aid ESL teachers.
Meeting student needs

Six interviewees discussed how students need to learn how to use the Internet in order to be successful in their academic study at the university/college and during their work endeavors after graduation. These teachers considered it their duty to be sure their students learned how to use the Internet.

Interviewee #1: I think it’s actually my duty as a teacher to include some form of contact with my students with the Internet in my class lessons and the structure of my class and for different reasons. The first is that I want always to consider what my students have to do once they leave the English classes or they leave the English program. It’s very clear that students at OSU need to be familiar with the Internet.

Interviewee #3: I think that given the current popularity of the Internet, we owe it to our students to encourage them to become more fluent and aware of the opportunities that are presented by the Internet. And I think it a very valuable resource that they are going to be positive of as they do their coursework—academic work at the university and beyond that during their working life. I think, interacting with the medium. I mean as the medium itself is important given their long academic goals. We are hoping to give students the tools that they will need to succeed as students at the university, and I think that being aware of and comfortable with the Internet is one of those tools.

In summary, interviewees believe that the Internet should be used in ESL instruction in order to meet students needs by preparing students for future courses they may take that will require student knowledge of Internet use, and by preparing students for future careers that may require a working knowledge of Internet use.

B) Factors limiting adoption of the Internet in ESL instruction

Participating ESL teachers discussed various factors that limit their adoption of the Internet in ESL instruction at The Ohio State University. These limiting factors include Internet access, Internet content, student-related limitations, and teacher-related limitations (Figure 4.2).
FACTORS LIMITING ADOPTION OF THE INTERNET IN ESL INSTRUCTION

Internet access
- Access to: computers, the Internet, and computer labs.
- OSU computer labs had more Macintosh computers than PC's, but that students usually were more comfortable with PC's.

Student-related limitations
- Student lack of computer skills, student lack of language skills, and inequality among students of access to computers.

Content of materials found on the Internet in general and the WWW in particular
- Concerns/worries about Internet content focused on reliability, accuracy, language used, and commercialism.

Teacher-related limitations
- Teacher time constraints (especially the lack of time to sift through Internet information or to design and update Web sites), teacher lack of computer or Internet knowledge, and teacher attitudes toward the appropriateness of Internet use in ESL instruction.

Figure 4.2: Factors limiting ESL teachers' adoption of the Internet in ESL instruction at OSU
Internet access

Access was one of the most frequently mentioned factors limiting the adoption of the Internet in ESL instruction. Internet access includes access to computers, the Internet, and computer labs. Teachers also complained that the OSU computer labs had more Macintosh computers than PC’s, but that students usually were more comfortable with PC’s.

Interviewee #1: Let’s say I do have a clear objective, and I do know that I want to do it in the classroom, do the lesson involving the Web or the Internet. My next objective is finding the right lab, and sometimes it is not easy. And there is a limit because of that. So, I may use the computer lab a few times during a quarter because it is not easy to get one.

Interviewee #3: Certainly, the technology presents some barriers in that, here at OSU, the labs are—most of them—are Macs and most of our students are PC people. That doesn’t really matter actually once you get on the Net, but getting the students through the steps to get them on Internet Explorer or Netscape Navigator—that becomes an issue. And I’ve had students walk into a Mac lab, and they panic because they never saw a Mac before. So, that creates some issues, variation issues.

Interviewee #4: We have Mac labs that some students hate to go to, but we go to, and we also have PC labs. It would be nice to have both very close and accessible and easy to walk to. This campus is really a big campus and students don’t like to walk altogether in the campus. It’s [walking altogether is] just inconvenient for classes and for teachers in classes. So, if you had a nice local lab that had both kinds of machines for preferences of the people—that would be a good thing. The tendency though now is moving away from Macs to PC-based things, and I think that’s good. But, Macs have a big hold on educational systems. They are both fine. This is not only an Internet problem, but this is also the use of the lab—but another problem would be the format of the discs. You know using a floppy disc, using a zip disc, using super discs. So, what we advise students to do—some programs like this university uses Eudora and has problems with regular floppy discs—sometimes it fills it up and causes problems. So, we try to advise students to use zip discs, but again not all of them have zip discs. And if you use a zip disc for a Mac, you can’t use it on a PC, and the opposite is true. It’s a problem.

Interviewee #6: I know students often have trouble getting access to computers unless they have a computer at home and they have the Internet at home. It could be a problem—and so, that’s one of the limiting factors. Access on campus isn’t convenient enough and there are peak times during the quarter where it’s very difficult to get a computer. Other limiting factors, of course, there is a problem in
the Internet—you can’t get a connection. But these are usually, from my experience here, not a significant factor. It is just a little inconvenient from time to time.

Interviewee #7: For our courses, I think it is a matter of getting into a lab. We are a writing class, so we don’t meet in class. To reserve a lab, we need two-week advance notice to tell them when we want a lab. That’s kind of tricky. So, I don’t get students to the lab very often. They do it out of class, and with that you have problems of the OSU server situation, access. They can’t get access from home because it’s busy. Or they can’t do from here in the campus, because there are too many people in the lab.

In summary, a number of interviewees found that using the Internet in ESL instruction was limited by a lack of access to the Internet. Interviewees noted that it is difficult to reserve campus computer labs for the students to use; many students do not know how to use Macintosh computers, and many computers on campus are Macs; the computer labs are not always located near the classroom; some students are at a disadvantage because they do not have computers at home; and class use of a computer lab often requires a reservation made two weeks in advance.

Internet content

Interviewees extensively discussed concerns related to the content of materials that can be found on the Internet in general and the WWW in particular. Their worries about Internet content focused on reliability, accuracy, language used, and commercialism.

Interviewee #1: There is such an inundation of information available to students that I think they have to have some sort of guidance in not only learning how to find, how to search for it, but also to evaluate the info for what it is. It’s like evaluating a print source, I believe. Is this newspaper article credible? Who wrote it? For whom did that person write it? I think that that’s even crucial with the Web. There is too much information and the fact that it’s not controlled in any way, like a newspaper or a magazine or a journal would be—or a book. The information has to be very carefully considered for its authenticity and validity. I think students often too quickly grab something from the Web. And I think it is
important that they learn how to evaluate it. So, I don’t mind if my students cite info from the Web, but they have to cite appropriate sources of info. And I don’t think that it is not just international students in my courses but all students need to consider very carefully the sources of info they are receiving or finding because some of them can be very legitimate, but some of them are not so clearly legitimate. And maybe they are, but the person who put the site with the info on the Web perhaps, for example, didn’t bother to cite where the info came from. Pulling statistics of the Web is a dangerous thing if you don’t know where they come from… In terms of chat language and the other things that I mentioned, that’s a problem. We get it actually in essays and more formal writing assignments, especially younger students, I do not want to say all students. But every once in a while, we get a student who wants to use reduced forms of the language that they pick up in chat rooms or e-mail, especially more often e-mail. And we have to explain to them again that you are very comfortable and obviously very proficient in this use of the language, but it is not appropriate to communicate with your professor or with your teacher or writing a paper. It’s only a form of language that you would use in a chat room or with friends. And you know that is all it usually takes. But there has to be that recognition and that understanding first, that is a separate kind of language but it’s not appropriate or registered. That’s important.

Interviewee #3: I tend to stay away from the educational sites probably for two reasons. First, I am probably not aware of all of them, which I mean I am willing to acknowledge. And secondly, those that I am aware of often seem to be commercially driven. And I don’t really see it as part of my job to make another person’s business succeed or fail. If I push students towards sites, it might be things—what I would refer to is authentic sites where I would send them to the New York Times Web page, for instance. Or identify an article on CNN.com and have them take a look at that. Or if we are doing some sort of thematic unit, I might have them go to, for instance, Nationalgeographic.com and have them look at an article over there. And so, as opposed to having the educational site owner be the filter or be the person who determines what’s there, I put myself in that place and tend to direct my students to the places I would want them to go to based on my own trust or search… I think that there is excellent content there. But I mean there are small pieces that are wonderful, and there are things that are garbage. And it takes a lot of time to sift and to weed out the bad stuff and find the good stuff. And as a teacher on a schedule… It’s a very subjective thing in a sense of putting myself in a place as an editor for my students, but essentially this is what you have to do if you want to use the Web.

Interviewee #6: I think one of the most serious problems with the Internet is for students to be able to judge quality of the sources. And this something that teachers really need to emphasize. There is so much garbage out there, and I think it’s really important that students learn what to look for, how to judge the source, the reliability or the quality of the source, or the quality of the information.
Interviewee #8: I think just the information resources are amazing, but, one of the problems, the flip side of that, is there is a lot of information that—anybody can put anything on the Web. I think that’s one of the things we have to educate students in. And this is actually an old skill, but I think the application of the Internet is very immediate. They need to ascertain the authority of the source, who they are quoting, who are they reading. For instance, we assigned students a research paper, and this has been done in the past in some of our courses, and tell that they have to find at least two sources on the Web to use, they type in “PETS.” They type in animal rights, and three thousand pages come up. And some of them found a source linked to PETA, which is a legitimate if somewhat extreme organization. Some of them found sources that were keyed to veterinary colleges and some of them didn’t. And what surprised us was, to the students, it was equally valid in their eyes because it was in print.

Interviewee #9: The amount of commercialism that exists on the Internet—trying to again limit the students’ exposure to that. And find materials and sources that are appropriate for an educational setting in that they are trying to sell you today’s highest CD or whatever. So try to balance the commercialism of the Net versus the content of it. I think there are some really good sites. Unfortunately, a lot of them are commercial and you have to pay to get into them. I think the hardest thing for students, or for both for us as teachers and for students, is to find the appropriate site.

In summary, a number of interviewees found that using the Internet in ESL instruction was limited by the content of the materials found on the Internet. Interviewees noted that: the amount of information on the Internet can be overwhelming; information on the Internet may not be accurate, and students may not know how to evaluate the material for validity; some of the Web sites are too commercial; and language used on the Internet may not be appropriate for students to use in academic situations.

**Student-related limitations**

Several student-related issues were described as limitations to the adoption of the Internet in ESL instruction. These limiting factors included student lack of computer skills, student lack of language skills, and inequality among students of access to computers.
Interviewee #1: Another problem that I have is the mixed level of abilities that my students have. I have had students who haven’t even touched a computer in one class with students who know computer programming. So, there’s a wide range of knowledge coming to the classroom. I must say, however, that this has recently started to change. More and more students are coming into our program with more computer skills, and younger and younger ages are getting better and better.

Interviewee #3: Well, certainly there are a number of factors. As I mentioned earlier, if students are not familiar with the medium, then there has to be a period of training. And, of course, that slows things down. Right now, we are kind of on the cusp of a significant change in the students’ background. Some of our students are wizards when they come in. I mean they know about the Net and they know even more than I do and my colleagues. They are ready to take off. And then in my class, we also have students who never worked on it before. And so, trying to rein in those who are competent and, at the same time, bring those who are lacking the skills up to speed creates sort of a little bit of friction in the classroom… Other factors [are] students not staying on task and perhaps wandering off... If they are sitting in a lab, I encourage them to do the lesson and they are looking at a newspaper from home. Of course, that’s fine. I want them to read something related to their home, and I understand what’s this like. But, at the same time, you almost wished that you could have a valve that you could point them to what you want them to go to and to keep them on task because in a large class in a lab setting, it is hard to keep them on task.

Interviewee #5: There is some limitation in that students have different levels and amounts of equipment available to them as well. Here on the university campus... someplace generally has what they need. They can use it. But it causes a little inequality between the people who can do it easily at home and those people who have to search around for the right computer where they can listen to whatever.

Interviewee #8: I think the limitations for the students in terms of finding sources, there are two things. I think that their reading abilities and especially their reading speed is often negative. I think that a native speaker can sometime scan materials more quickly to determine if they are useful or not. I think a native speaker is also, what we were talking about in terms of authority; a native speaker is more likely to look at something and if he looks at something like Johns Hopkins University Medical School immediately knows that it is going to be a very high quality site. And that just is not something necessarily part of the culture knowledge that the new particular ESL students would be carrying. So, I think sorting things out can be perhaps more problematic or more time-consuming for ESL students in terms of what the site comes from and also in terms of just being able to scan something.

Interviewee #9: The other problem is the students having enough knowledge of the programs they would use to use them well. Most of the students who are
savvy have no problem figuring out anything. Some of the students that may be in majors that really don’t need to use computers much—which I think is becoming fewer and fewer students—but some of them get really confused when you tell them to do something a little bit complicated. If you want to send something in Real audio, and they don’t have Real audio and they don’t know Real audio and how they can get it working. Things like that.

In summary, a number of interviewees found that using the Internet in ESL instruction was limited by student-related issues. Interviewees noted that: students may not have adequate computer skills; students may lack the knowledge necessary to ascertain reliable sources on the Internet; students may have inadequate reading skills to scan information on the Internet; students may not have access to certain computer programs or equipment that teachers might want to use; students may get distracted by all the information on the Internet and not stay on task; and students who lack sophisticated computer knowledge and/or equipment are at an unfair disadvantage with students who do have sophisticated computer knowledge and/or equipment.

Teacher-related limitations

Interviewees also discussed teacher-related limitations that inhibit the adoption of the Internet for ESL instruction. These limitations included teacher time constraints, teacher lack of computer or Internet knowledge, and teacher attitudes toward the appropriateness of Internet use in ESL instruction. The limitation mentioned most frequently was the lack of time on the teachers’ part to sift through Internet information or to design and update Web sites.

Interviewee #1: I think what limits it for me is the fact that right now, especially in ESL, there is big push to include technology in education, especially computer technology and especially the Internet. I call it the jump-on-the-bandwagon approach. I don’t have any idea why I am doing this, but everybody is saying let’s do it. I think it’s a very dangerous mentality because there are ways you can use this in the classroom that are not helpful at all and can actually cause problems in
the end. I think that a teacher who takes his students to lab and says: ‘We will search the Web’ without giving them any instructions to what they are supposed to look for or any kind of guidelines for searching for info and explaining, you know, the things that we were talking about earlier about analyzing sources. That’s to me a waste of time, and I think it happens a lot and it’s very tempting. So, I think the most important thing that limits it for me are the considerations of, first of all, why do they need to use this. Why, I would ask them, do this? Is it because you cannot do this activity in any other form? How is this going to help them later on? And what the outcome of that particular lesson that I want to help the students reach. So, that’s one limiting factor and that is the appropriateness for it.

Interviewee #3: I think that there is excellent content there [on the Internet]. But I mean there are small pieces that are wonderful and there are things that are garbage. And it takes a lot of time to sift and to wind out the bad stuff and find the good stuff.

Interviewee #5: For me personally, it’s because of my lack of ability to develop things on the Internet myself. So I don’t know how to make a Web site. The one we are using now was made by somebody out there. So, I can use it but I don’t know how to make it, so I am limited to what other people put out there. I use it in my class, but I really don’t know how to make any additions. So, that’s the main limitation I have that I see for me…is just my lack of ability to do stuff on the Internet.

Interview #6: Let’s face it. I am not as familiar with how to do things on Web pages the way as I should be. I can’t really do some of the more sophisticated stuff yet. I have to take some courses on it. And I just haven’t gotten around to it. So, I have to learn more about doing Web pages. So my own limitation is there. Another thing is time. I have a couple of Web pages for a couple of courses that I teach, but I find with this quarter system, it’s so difficult to keep them updated. I just don’t have time to update them. I like to put my class schedule on, due dates for assignments. I give [students] a handout, and this is easy enough for me to work on my word processor and get a handout. But, of course, when you try to put it on the Web, everything is a little more difficult. It just doesn’t copy and paste so easily. You have to change things, have to make it look nice and presentable. And the extra time that it requires makes it more inconvenient, especially with the quarter system. So, I just don’t have the time to keep my Web pages up-to-date. I am always changing, you know, assignments change a bit…materials might change. And it’s hard to keep them up-to-date. Part of our problem is the quarter system. I have to do this four times a year. It drives me crazy. So, that’s one of the reasons I can’t use Web pages effectively as I’d like to. You know, we have started the third quarter and I still have not updated my Web pages. And there wasn’t enough time during the break to do it.
Interviewee #9: One factor is time for the teachers — having time to develop materials to put on the Internet. I know there is a lot of material I would love to do if I had time...

In summary, a number of interviewees found that using the Internet in ESL instruction was limited by teacher-related issues. Interviewees noted that: teachers may not have time to keep their Web pages updated; teachers may not have time to put material on the Internet; teachers may lack sufficient skills to use the Internet; and teachers may question the importance or validity of the Internet as a tool in the classroom.

C) Current uses of the Internet by ESL teachers at OSU

The participating ESL teachers at the Ohio State University described current uses of the Internet in ESL instruction. Their comments indicated that the ESL programs at OSU have developed some specific, concrete teaching procedures that incorporate the Internet. Additionally, certain teachers have developed their own personal ways to further incorporate the Internet into their ESL instruction. Also, three ESL teachers noted that the ESL program at OSU has its own technology-support person who develops Web sites for the ESL program and is available to instruct and assist ESL teachers.

Interviewee #1: As I said, I was talking about the baseline things that students have to do, and we have actually in our program a list at each level of instruction—requirements for incorporating e-mail, the Internet, and word processing skills. So, it starts out with the lowest level of instruction, of course. But as the students go higher in levels in ALP, they have increasing requirements for incorporating these things. The teachers do incorporate the skills in the classroom. So, what we do is taking care of the basics and some teachers choose to take it further—maybe incorporating more in the classroom. But there is a baseline for all teachers. And as a result, in our case, we do have workshops given by our CALL coordinator and computer support persons.

Interviewee #2: In our program, we are teaching spoken language. That’s really what we concentrate on, and we are teaching classroom communication to
international graduate students. We began to use the Internet in a number of ways. For example, the materials for our most advanced class we have available on the Internet—all the materials for the course except things that are copyrighted which is just a small portion of the materials. Those are all available on the Internet for students to access. Another example is that we made audiotapes, which go with our instructional texts also available on the Internet using audio streaming. So, students can go to the Web site and listen to the tapes.

Interviewee #7: When we are talking about using technology in our program, I use purely Internet-based technology. I do not use specific software packages or anything currently because I have had problems in the past trying to fit that in.

Interviewee #9: What we do right now is mostly providing course materials over the Net. Students can print out common content assignments—things like that. So, part of it is just saving us copying costs. Students have to print at home. Another thing is providing some of the language lab material using a password for protected site. So, it is not open to the general public, only to our students... It’s mostly giving the most appropriate materials on the Web, and giving them the other material to print out. And announcing assignments and sending e-mail back and forth. Making schedules.

In summary, teachers stated that current uses of the Internet in ESL education include: having course materials, including audio tapes, available on the Internet;
employing the Internet for class assignments with the intention of teaching students how to use word processing, e-mail, and the World Wide Web; teacher-student communication using e-mail; announcing assignments on the Internet; and making schedules using the Internet.

D) Future uses of the Internet in ESL instruction

Interviewees discussed ways they would like to see the Internet used in the future for instructional purposes. Several participants said that they would like to learn more about such Internet capabilities as distance learning.

Interviewee #1: One thing that I think is interesting that I would like to know more about is distance education. To me, it is kind of an interesting concept in terms of language instruction because I think at some point, if you want to learn to speak and actually listen well to a language, you have to have that personal
contact. But there are so many things, I am sure, that you could do with language instruction through distance education. That's something I don't know a lot about and I am kind of interested to know more about. I think it is going to be a very hot topic in the future, especially with the demand for language instruction—especially English in other countries where students may not have the opportunity to come to an English-speaking country and learn. It's kind of interesting I'd like to say where it goes. So that might be another issue that teachers are going to have to deal with. And I know in searching for jobs, especially community colleges in the U.S., distance education is something that's talked about a lot.

Interviewee #2: Even though we work on spoken language instruction, recently we've discussed the idea of spending some time sort of working with our student on e-mail communications... I found at TESOL in some other institutions, there are people who have been using e-mail as a sort of a teaching device—kind of working with their students on e-mail communications to teach something about appropriate use of language, pragmatic knowledge, and certain kinds of social information, and things like that. So, I think that's something we are going to do at some point in the future—probably pretty soon we will try incorporating that.

Interviewee #3: Well, I am intrigued by the delivering of the content, and I am intrigued by the movement toward distance education. I should say I am intrigued, but I am also frightened because as a real instructor, you know, a person who teaches in an actual classroom, I would be saddened to see that trend towards distance education get too big. I mean that I don't think that real classrooms are ever going to disappear entirely, but I do think that there are some unique weaknesses in the ESL field that are—I can see people set up businesses where if you were sitting in Indonesia, you can take language lessons at home. And certainly you could learn a lot that way, but there is still something to be said about immersing in the culture that you would advocate. I hope that it does not get to the point where students are discouraged to travel overseas and live in the culture because they think can get everything they need at home. I don't think it will ever work out that way, but I mean from my own experience with studying languages, sure I could sit at home and surf the Net and do whatever I want to do, but there is something in being in an actual classroom, in the actual country that takes you a step higher. So, I hope that people don't take it too easy—don't forget the real world.

Interviewee #4: I have no idea how it's going to be in the future. I only see it as becoming more integrated. The Internet is not going away, and it will be here. And we need to adapt to it. And the students are coming in many time more aware of things than the teachers are and so, teachers need to be open-minded and listen to their students for new ideas and new ways to use things.

Interviewee #9: I have thought in the past if the technology gets to the point where it's clear enough—right now I have students do tapes and hand me cassette
tapes—I’d like them to be able to sometimes do audio files. They can just record their own voice; send it to me, to my e-mail as an attachment, so I could listen to it later. That’s going to be a while. The compression seems to lose some qualities and for the spoken English that I teach is not clear. That’s just an idea I had. For speaking and listening, I’ve thought there are the Internet telephony voice chat things. I thought if... we develop good sites for ESL students to go to where the chat is worth being involved with, it could be a good way for them to work on speaking and listening outside the class. Some of the shy ones who have a hard time going out and talking to somebody and say: Could I practice English with you? They could get on and chat with people on the internet and practice their speaking and listening. Those are just dream ideas I have, but it’s part of what we actually do.

In summary, the interviewees cited the following as possible future uses for the Internet in ESL instruction: incorporating e-mail as a teaching device; having students make and use audio tapes so they can practice speaking and listening to English; and employing distance education.

Part 1 of this chapter presented the findings of the data analysis of the survey questionnaire in seven sections, and a synthesis of the open-ended responses/comments that participants provided in the survey about the use of the Internet in education, especially ESL instruction. Part 2 of the chapter presented the findings of the data analysis of the nine follow-up interviews. In Chapter 5, both quantitative and qualitative data are examined closely in order to: (a) understand numerical results in relation to non-numerical data, and (b) look at survey and interview results in relation to other research as a whole.
CHAPTER 5

SUMMARY, CONCLUSIONS AND DISCUSSION, AND RECOMMENDATIONS

This chapter is organized into four sections: summary of the study; conclusions and discussion; recommendations; and suggestions for further study.

Summary of the study

The purpose of the study was to describe the level of adoption of the Internet by ESL teachers using a major, large, public university in the U.S. Midwest as a sample or a model. In addition, the study investigated the relationship between the level of use of the Internet and these selected variables: personal characteristics of the ESL teachers; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet. A descriptive-correlational research design combined with a qualitative research data collection approach (i.e., nine follow-up interviews) was used to guide the objectives of the study and measure an ESL teacher’s level of adoption of the Internet.

The objectives of the study were as follows:

1. To describe the level of use of the Internet by ESL teachers at OSU.
2. To describe selected personal characteristics of the participating ESL teachers: gender; age; program area; and type of job.
3. a. To identify ESL teachers’ access to the Internet.
   b. To describe the variables limiting Internet access by ESL teachers at OSU.
4. To describe the level of computer literacy and computer proficiency of ESL teachers at OSU.
5. To describe the level of Internet literacy and Internet proficiency of ESL teachers at OSU.
6. To determine which of the following two variables better discriminates between high users low and users of the Internet for instructional purposes: computer proficiency and Internet proficiency.
7. To describe the perceptions of ESL teachers at OSU about the Internet.
8. To describe the relationship between the level of use of the Internet and the following variables: personal characteristics; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet.
9. To determine which of the following selected variables explain the greatest amount of variance on the level of use of the Internet: personal characteristics; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet.

The target population of this study was full-time and part-time ESL teachers (N=42) at a major, public university in the U.S. Midwest. An up-to-date list of names was obtained from the directors of the three ESL programs at the research site (the American Language Program, the English as a Second Language Composition Program, and the Spoken English Program). Assigned numbers from one to 42 were given to each ESL
teacher in the study population. Numbers were matched to the corresponding names on a computer list the researcher developed for the members of the population.

The questionnaire, adopted from Porter (1997) and modified by the researcher to fit this study (see Appendix A), was used to acquire data to address the objectives of the study. Content and face validity of the instrument were established by a panel of experts (n=6) and a field test sample of ESL teachers (n=5). The panel of experts assessed the instrument during and after development. The instrument was field tested with a representative sample of ESL teachers selected purposefully from a similar educational setting. The instrument was also pilot tested for reliability with a representative sample of ESL teachers (n=19) selected from similar educational settings. Reliability was established using Cronbach’s alpha for five parts of the instrument: use of the Internet; factors limiting access to the Internet; computer proficiency; Internet proficiency; and perceptions of the Internet.

Prior to data collection, approval was obtained from OSU’s Human Subject Review Committee and the directors of the ESL programs. Data collection encompassed six weeks. The advance-notice and reminder-notice letters resulted in a 100 percent usable response/return rate. To encourage response, a token of appreciation was sent to each participant.

Quantitative and qualitative techniques were used to analyze the data collected. Descriptive, correctional, two-group discriminant analysis, and regression statistics were used to analyze the data collected through the survey questionnaire. Statistical results were calculated using the SPSS/PC version 10.0 for Windows software program.
Qualitative data (survey comments and the nine follow-up interviews) were analyzed according to guidelines suggested by Miles and Huberman (1994).

**Summary of questionnaire findings**

**Objective 1** - Describe the level of use of the Internet by ESL teachers at OSU.

The mean summed rating on a six-point Likert scale was 3.28, indicating that ESL teachers at OSU occasionally or frequently used the Internet. E-mail and the World Wide Web were the most frequently used Internet services. The mean summed rating on the six-point Likert scale for instructional purposes was 3.09, indicating that ESL teachers occasionally use the Internet for instructional purposes. The mean summed rating on the six-point Likert scale for professional development purposes was 3.61, indicating that ESL teachers occasionally or frequently use the Internet for professional development purposes. The mean summed rating on the six-point Likert scale for personal purposes was 4.21, indicating that ESL teachers frequently or very frequently use the Internet for personal purposes.

**Objective 2** - Describe selected personal characteristics of ESL teachers at OSU: age, gender, program area, and job type.

The mean age of participants was 43.7 years. Participants ranged in age from 28 to 64 years. Of the participants, 69 percent were females, and 31 percent were males. Within program areas, 26 percent were teaching in the American Language Program (ALP); 43 percent were in the English as a Second Language (ESL) Composition Program; and 31 percent were in the Spoken English Program (SEP). Of the 42 participants, 66.7 percent were employed full time by the ESL programs, and 33.3 percent were employed part time.
Objective 3. a. - Describe ESL teachers’ level of access to the Internet.

Forty-one of the 42 ESL teachers (97.6 percent) reported having access to the Internet at work, while 78.6 percent had access to the Internet at home.

Objective 3. b. - Describe the factors limiting ESL teachers’ access to the Internet.

Receiving a busy signal from the Internet Service Provider and having too many people using the computer were rated as the top two factors limiting participants’ access to the Internet.

Objective 4 - Describe the level of computer literacy and computer proficiency of ESL teachers.

The mean score for computer literacy was 17.5 with 27 the highest possible score. The higher the score, the higher the individual’s level of computer literacy. The mean score for computer proficiency was 1.46 on a four-point Likert scale, indicating that ESL teachers perceived themselves to be a little to somewhat proficient with the skills needed to use computers.

The computer skills ESL teachers reported to be the most proficient at were printing a document on a word processor, creating a document on a word processor, and copying files. The computer skills in which ESL teachers reported to have the least proficiency were merging a word-processed letter with an integrated database, using interactive video in the classroom, and using a formula in a database.

Objective 5 - Describe the level of Internet literacy and Internet proficiency of ESL teachers.

The mean score for Internet literacy was 6.2 with 8 the highest possible score. The higher the score, the higher the individual’s level of Internet literacy. The mean score for
Internet proficiency was 1.97 on a four-point Likert scale, indicating that ESL teachers perceived themselves to be a little to somewhat proficient with skills needed to use the Internet.

The Internet skills ESL teachers perceived themselves to be most proficient at were accessing/sending e-mail and browsing the World Wide Web. Internet skills ESL teachers perceived themselves to have the least proficiency with were on-line chat rooms and creating a page on the World Wide Web.

Objective 6 - Determine which of the following two variables better discriminates between high and low users of the Internet for instructional purposes: computer proficiency and Internet proficiency.

Test of discriminant function was significant. Standardized discriminant coefficients were 1.014 for Internet proficiency and -.018 for computer proficiency, indicating that Internet proficiency discriminates better between high and low users of the Internet for instructional purposes than did computer proficiency. Thus, Internet proficiency was more important than computer proficiency in discriminating group membership.

Objective 7 - Describe perceptions of the Internet among ESL teachers.

The mean summated score on a six-point Likert-scale was 4.9, indicating that ESL teachers have a positive perception of the Internet. This included having a positive perception toward the use of the Internet to enhance ESL instruction.
Objective 8 - Describe the relationship between the level of use of the Internet and the following variables: personal characteristics; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet.

Person product moment, point bi-serial, and eta correlation coefficients were used to reveal the statistically significant associations between level of use of the Internet and selected variables. A statistically significant moderate, positive association was shown to be present for access to the Internet at home and level of use of the Internet. Data also showed a statistically significant moderate, positive association for level of Internet proficiency and level of use of the Internet.

Objective 9 - Determine which of the following selected variables explain the greatest amount of variance on the level of use of the Internet: personal characteristics; access to the Internet; computer literacy; computer proficiency; Internet literacy; Internet proficiency; and perceptions of the Internet.

The only variable among the selected variables explaining the unique variance in Internet use was having access to the Internet at home.

Summary of follow-up interview findings

Findings of the nine follow-up interviews suggested four general themes: (1) reasons for advocating the use of the Internet for educational purposes; (2) factors limiting adoption of the Internet in ESL instruction; (3) current uses of the Internet in ESL instruction; and (4) possible future uses of the Internet in ESL instruction.

1. Reasons for advocating the use of the Internet for educational purposes
All nine interviewees stated that they advocate the use of the Internet for educational purposes, especially in ESL instruction. The ESL teachers gave a variety of reasons for advocating use of the Internet in ESL instruction. These reasons can be categorized as follows: (a) the Internet is a good communication tool. Communication included the use of e-mail by teachers to communicate with students and with fellow teachers, and the use of e-mail by students to communicate with their instructors, their classmates, and other peers; (b) the Internet is a good tool for gathering information. The Internet can be used for conducting research, for finding up-to-date information, as an information database, and as a means to expose students to a variety of perspectives; (c) the Internet is accessible—more accessible than other materials. The Internet can be accessed day or night, and the Internet allows students to drill themselves at their own pace. Audio-streaming tapes are also available on the Internet. Students are more likely to use class materials and to use these materials more frequently when they are so accessible on the Internet; (d) the Internet is a learning tool. Teachers can use the Internet to motivate students, to increase student interest in learning, to expand the scope of the classroom, to incorporate multimedia, and to help students be independent when they leave the classroom (self-study); (e) the Internet is a teaching tool. The Internet provides instant lesson plans and materials from many sources; it can be used by teachers for self-development, collaboration, and networking. The Internet offers sites that are excellent in promoting discussion and cross-cultural exchanges, as well as sites that specifically aid ESL teachers; and (f) ESL students need to learn to use the Internet. Students need to learn how to use the Internet in order to be successful in their future
academic studies, and during their work endeavors after graduation. Several teachers considered it their duty to be sure their students learned how to use the Internet.

2. Factors limiting adoption of the Internet in ESL instruction

Interviewees discussed various factors that limit their adoption of the Internet in ESL instruction at OSU. These limiting factors included the following: (a) problems with Internet access that includes access to computers, the Internet, and computer labs. Teachers complained that the OSU computer labs had more Macintosh computers than PC’s, but that students usually were more comfortable with PC’s; (b) problems with Internet content of materials found on the Internet in general and the WWW in particular. Interviewees worried about the reliability, accuracy, language used, and commercialism found on the Internet; (c) student-related limitations. These limitations included student lack of computer skills, student lack of language skills, and inequality among students of access to computers (i.e., some students have access to computers at home while other students do not); and (d) teacher-related limitations. These limitations included teacher time constraints, teacher lack of computer or Internet knowledge, and teacher attitudes toward the appropriateness of Internet use in ESL instruction. The limitation mentioned most frequently was the lack of time on the teachers’ part to sift through Internet information or to design and update Web sites.

3. Current uses of the Internet in ESL instruction

Interviewees described their current uses of the Internet in ESL instruction. Their comments indicated that the ESL programs at OSU have developed some specific and concrete teaching procedures that incorporate the Internet. Some teachers also have developed their own personal ways to further incorporate the Internet into their ESL
instruction. Some interviewees noted that the ESL program at OSU has its own technology-support person who develops Web sites for the ESL program and is available to instruct and assist ESL teachers.

4. Possible future uses of the Internet in ESL instruction

Interviewees discussed ways they would like to see the Internet used for instructional purposes in the future. Several participants said that they would like to learn more about such Internet capabilities as distance learning.

Conclusions and discussion

In recent years, there has been a rapid expansion of interest in the use and adoption of computers and the Internet in language teaching, particularly in English as a Second Language instruction. The use of computer technologies in language instruction, and particularly the use of the Internet, have significant potential to enhance ESL instruction (Garrett, 1991). Many language-teaching researchers are encouraging ESL teachers to use the Internet, especially in language instruction and professional development. The Internet can connect faculty and students with each other and with the world at large, thus creating new opportunities for teaching, learning, and communication.

Teachers in the ESL programs at the Ohio State University (OSU) share the preceding sentiments and believe that the Internet has much to offer ESL teachers. This study found that these teachers have positive perceptions toward the use of the Internet in ESL instruction. These teachers perceive Internet use as a way to increase personal convenience, increase access to information, and improve job performance. Thus, it is not
surprising that, according to this study, teachers in the English as a Second Language (ESL) programs at OSU are occasional or frequent users of the Internet.

The ESL teachers at OSU use the Internet for instructional purposes (a mean of 3.09 on a six-point, 0-5, Likert scale), for professional development (a mean of 3.61 on a six-point, 0-5, Likert scale), and most frequently for personal purposes such as entertainment (a mean of 4.21 on a six-point, 0-5, Likert scale). One reason that may explain why Internet use is lower for instructional purposes than other purposes is computer access. As a number of interviewees noted, computer labs often are difficult to reserve, and often are located inconveniently. The classrooms, themselves, do not have computers.

Another reason for the lower instructional use may be that Internet applications are more suitable to certain ESL courses than others. The 3.09 figure is the mean for the combined instructional use of the Internet by ESL teachers in the three ESL programs of ALP, the pre-admission language course; ESL Composition; and Spoken English. But, if use is broken down according to individual ESL programs, use is highest in ALP (a mean of 3.44), and lowest in the Spoken English Program (a mean of 3.28). It may be that Internet applications are least beneficial in spoken-language learning (as opposed to written-language learning). Internet applications do exist that are geared specifically to spoken English, but not in as great number as Internet applications suitable for written English.

However, the ESL teachers at OSU do make use of the Internet for instructional purposes occasionally or frequently. And some of the reasons these teachers gave for using the Internet are: the Internet is a good communication tool; the Internet is a good
learning tool; the Internet is a good teaching tool; the Internet is more convenient for students than language labs; the Internet provides an ever-increasing and up-to-date information base; the Internet is a great tool for self-study; the Internet is accessible; and the Internet broadens the horizons of the classroom.

In Rogers' theory of diffusion, one significant characteristic of an innovation that influences the rate of adoption is compatibility. Compatibility is the degree to which an innovation is perceived as consistent with the existing values and needs of potential adopters (Rogers, p. 15). This study's findings indicate that the Internet is compatible with the values and needs of teachers in OSU's ESL programs, and that compatibility may help to explain the moderate-to-high level of Internet adoption by these ESL teachers.

The follow-up interviews conducted by this research revealed another reason for adoption of the Internet by ESL instructors at OSU. For many of these teachers, Internet use is a standard part of the curriculum. For example, in certain levels of ESL composition classes, student assignments include creation of a Web page and Internet research.

Teachers in another ESL division at OSU, the American Language Program, also make the Internet part of student assignments, particularly the use of e-mail. An interesting and surprising finding from this research's qualitative data was that ESL teachers believe it is their responsibility to teach students to use the Internet in order to prepare the students for courses the students might be taking later in their college careers. As one teacher said:
I think it's actually my duty as a teacher to include some form of contact for my students with the Internet. ... I want always to consider what my students have to do once they leave English classes or they leave the English program. It's very clear that students at OSU need to be familiar with the Internet (Interviewee #1, an ALP teacher).

Similar thoughts were iterated by other ESL teachers. It is apparent that a number of ESL teachers at OSU believe they should not only be teaching their students English, but the teachers believe they should further prepare their students by teaching them how to use the Internet. Thus, many ESL teachers are not only English instructors but also have taken on the additional responsibility of being computer-technology instructors. Consequently, it is apparent that ESL teachers at OSU are redefining their job and changing ESL teachers’ role. A number of incoming foreign students lack basic computer and Internet skills that they need not only to complete ESL class assignments but also to complete future class assignments they will have after finishing their ESL instruction. At OSU and at other American universities, use of the Internet is required in many courses. For example, at OSU Internet use is needed to do library searches, to register for classes, and even to obtain grades for completed courses.

Another possible explanation for why ESL teachers take on this additional responsibility is the fact that ESL classes often are the first classes taken by many foreign students. This is particularly true in the ALP division of ESL programs at OSU. The ALP classes are pre-admission classes that these students are required to successfully complete before those students can be accepted into the university and take classes in their proposed fields of study. So, the ESL teachers are preparing the students for future coursework by teaching the English language, as well as by teaching how to use the Internet.
Thus, a student's introduction to the Internet may come from an ESL teacher. Because teacher attitudes toward a subject area can influence student attitudes toward that subject area, it is particularly important that ESL teachers have positive perceptions toward the Internet and confidence in using the Internet.

As noted previously, ESL teachers at OSU do have positive perceptions toward the Internet. But their confidence in using various Internet skills, measured in terms of perceived proficiency, is not as strong. In terms of perceived Internet proficiency, the ESL teachers rated themselves a little to somewhat proficient (a mean of 1.97 on a four-point, 0-3, Likert scale). In the related area of perceived overall computer proficiency, the ESL teachers rated themselves even lower (1.46 on a four-point, 0-3, Likert scale).

Since the educational background of ESL teachers is in the use of the English language, not in the use of the Internet, it is not surprising that their perceived proficiency is limited. Also, the mean age of ESL teachers at OSU was 43.7 years. Because computers in general, and the Internet in particular, have only become a part of American culture in the past ten to twenty years, many of the ESL teachers would have grown up, or even completed graduate school, without being introduced to computers and the Internet. This might be one reason for the limited perceived proficiency in Internet and computer use by ESL teachers at OSU.

This limited perceived proficiency may be an important factor in the type of Internet use by ESL teachers at OSU. For while these teachers have moderate-to-high Internet use, that use most often is in lower-level applications such as sending/accessing e-mail and browsing the Web. More complex Internet applications like remote
computing, and File Transfer Protocol were used rarely or occasionally. As Rogers (1995) notes, complexity of an innovation—in this case upper-end Internet applications—can negatively affect the adoption rate.

In a study of 100 foreign-language teachers at colleges in Maryland, Virginia, and West Virginia, Voytyuk (1997) similarly found that teachers tended to employ lower-level Internet applications instead of such full-fledged multimedia capabilities as sound, video, and so forth. Cuban (1999) also maintains that teachers tend to employ information technologies for lower-end applications. Cuban calls the situation the "technology puzzle," and asks: Why is greater access to technology not translating into better classroom use?

In the case of ESL teachers at OSU, the answer to that question seems to be a lack of access to the Internet in the classroom as well as a lack of training and the related issue of a lack of time for training. As noted earlier, the ESL teachers at OSU have been trained in the use of language, and not necessarily in the educational use of computer technologies such as the Internet. Despite this lack of formal training in computers and the Internet, the ESL programs at OSU apparently do offer few specific technology workshops or in-service training for their teachers. Such training could be important for several reasons. First, because ESL teachers often provide foreign students with their first introduction to the Internet, it is important that the teachers are proficient and confident in Internet use. Second, specific training in how the Internet can be specifically used to enhance ESL instruction would assist teachers in better utilizing this powerful technology. As ESL teachers noted in the follow-up interviews, it is difficult for teachers
with hectic schedules to find time to learn more about the Internet. For that reason, it is important that administrators of the ESL programs set aside specific times for Internet training and continuing education.

**Recommendations**

Based on the findings from the quantitative survey, as well as the follow-up interviews, the following recommendations are being made:

1. The findings as to levels of ESL teachers’ computer literacy, computer proficiency, Internet literacy, and Internet proficiency point to a need for on-going, comprehensive, and well-structured Internet education courses and/or workshops that focus on the use and incorporation of the Internet into ESL instruction. Recent research (e.g., Westfall, 1998; Layfield, 1998) concludes that technology education for teachers is a significant factor in the use of technology in the classroom. For in-service teachers, decisions on when, where, and how Internet education/training can occur need to be addressed, because the Internet takes time to learn (Sherry, 1996).

2. Qualitative data indicates that ESL teachers lack the time to search the Internet for information, or to design and update their own Web sites. Helping teachers to overcome time constraints may result in improving the quality of Internet content relating to ESL and in reducing the worries of ESL teachers regarding Internet content. In interviews, ESL teachers expressed concerns about the reliability, accuracy, language used, and commercialism of certain Web sites. Perhaps, specific times should be scheduled for ESL teachers in order for them to pursue Internet training, Internet exploration, and Web site development.
3. If the ESL programs at OSU want to encourage the use of the Internet in the classroom, then the ESL programs must work with university officials to create a sufficient number of conveniently located and well-equipped computer/Internet labs for ESL instruction. The computer labs should have an adequate number of PC computers since the qualitative data indicates that students are more comfortable with PCs than with Macs.

4. The underutilization of the Internet by ESL teachers at OSU in language instruction points to the need for the university to develop undergraduate and graduate courses that examine the most effective ways to use the Internet in the teaching of English as a second language.

**Suggestions for further study**

Based on the findings of this study and the review of literature, the following suggestions for further study are being made:

1. The ESL teachers surveyed for this study had positive attitudes toward the Internet as an educational tool and advocated the use of the Internet in ESL instruction. Because adoption of the Internet as an educational tool strongly affects students, a study should be done to examine the attitudes of ESL students at OSU toward the use of the Internet in ESL instruction. The survey should include, as this study did, questions to measure the students’ skill and proficiency in the use of computers and the Internet.

2. This study found that the Internet has, indeed, been adopted as an educational tool on a departmental basis by the ESL programs. Certain ESL course materials and language drills have been placed on the Internet for student use and retrieval, and ESL teachers believe that the use of the Internet enhances ESL instruction. Is this adoption of
the Internet as an educational tool unique to the ESL programs or have other OSU departments already gone on-line? How widespread is the use of the Internet as an instructional tool at OSU? Do teachers in other departments find the Internet enhances their instruction? To research these questions, the survey used in this study could be adapted and given to other departments for a comparative study.

3. A major complaint made by ESL teachers in the follow-up interviews was that they did not have enough time to explore the World Wide Web to find appropriate sites to recommend to their students. A useful study would be an extensive exploration of the Web, resulting in a compilation of good Web sites for ESL teachers and/or students. The list could be made available to both teachers and students. Once an initial compilation was made, the list could be updated periodically by members of the ESL programs. The compilation could be maintained as a Web site, and students and teachers could be asked to comment on the listings via the Internet.

4. This study focused on adoption of the Internet among ESL teachers from the perspective of Rogers’ diffusion of innovation theories (1995). Investigating the level of adoption of the Internet from a perspective different from that of Rogers’ diffusion of innovation theory, such as the communications perspective, might provide additional insights regarding an ESL teacher’s decision to use the Internet for language instruction and other purposes.

5. This study mainly used a quantitative methodology to investigate ESL teachers’ level of adoption of the Internet. Qualitative research aims to provide in-depth information that quantitative research might not be able to access. Nine follow-up interviews were conducted for this research project. Conducting additional qualitative
studies with a larger number of ESL teachers might provide more understanding of the issue of ESL teachers’ adoption and/or use of the Internet.

6. Qualitative data indicated that time constraints (teachers’ lack of time to sift through Internet information or to design and update Web sites) was the most frequently mentioned teacher-related limitation inhibiting the adoption of the Internet for ESL instruction. This time constraint finding supports other research (e.g., Ruth, 1996), which investigated the level of acceptance of and resistance to the Internet by faculty at Moorhead State University in Minnesota. More studies are needed to investigate time-constraint limitations, as well as instructor and departmental priorities.

7. The ESL teachers surveyed for this study had positive attitudes toward the Internet as an educational tool and expressed several reasons for their use and adoption of the Internet in ESL instruction. However, there have been no definitive studies regarding the impact on student achievement from teacher use of the Internet in ESL instruction. This study can be used as a basis to conduct follow-up research to explore the impact and outcomes on learning from using the Internet in ESL instruction.

8. This study used ESL teachers at OSU as a model to investigate their level of adoption of the Internet mainly for educational purposes. Replicating this study in similar settings would be beneficial. The purpose of replicating the study would be to address questions such as why and why not ESL teachers adopt the Internet, and how ESL teachers at other institutions adopt the Internet in ESL instruction. The results of the studies can be compared and contrasted. By replicating this study, more insight and understanding would be achieved about the issue of adoption of the Internet by ESL teachers.
REFERENCES


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Wallace, P. R. (1998). Diffusion of Internet adoption: a study of the relationship between innovativeness, the attitude of teachers toward using the Internet, and Internet use (idea transfer). Dissertation. The University of Tennessee.


APPENDIX A
Internet Use Instrument
LEVEL OF ADOPTION OF THE INTERNET
BY
ESL TEACHERS AT THE OHIO STATE UNIVERSITY

Dissertation Study

Department of Foreign Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University
Purpose of the Study

The Internet is a global computer network, or network of networks, used by millions of people around the world to access and share vast amounts of information, data, and expertise through several mediums such as TELNET, file transfer protocol (FTP), electronic mail, USENET newsgroups and the World Wide Web (WWW).

The purpose of the study is to describe the level of adoption of the Internet by ESL teachers at The Ohio State University (OSU). In addition, the study investigates the relationship between the level of use of the Internet and the following selected variables: personal characteristics, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, and perceptions of the Internet.

This questionnaire is divided into five parts; each part and/or set of questions has instructions for completing. These parts ask about your use of the Internet, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, perceptions of the Internet, and personal characteristics.

Please take a few minutes to read each set of questions carefully and respond accordingly. In addition, note that this survey will be tracked for a response, however all of the given responses will be confidential and used for research purposes, only. A small token as an appreciation for completing and returning the survey is included.

I greatly appreciate your help and would like to thank you very much for completing and dropping off this questionnaire in the box located in the secretary office as soon as you possible or by Friday, February 25, 2000.

Researcher

Sami Muqirreek
Ph. D. Candidate
Department of Foreign Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University

Please go to the next page
PART 1. USE OF THE INTERNET

INSTRUCTIONS: Express your perceived level of use of the Internet for the services below by circling the appropriate number. For items 1-10, use the following scale of 0-5 for frequency of use with 0 = never, 1 = very rarely, 2 = rarely, 3 = occasionally, 4 = frequently, 5 = very frequently. If the Internet services are unfamiliar to you, please circle N/A.

How frequently do you use the following Internet services:

<table>
<thead>
<tr>
<th>Q.</th>
<th>Level of Use of the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td>1. Electronic-mail (e-mail)</td>
<td>0</td>
</tr>
<tr>
<td>2. World Wide Web (WWW)</td>
<td>0</td>
</tr>
<tr>
<td>3. USENET newsgroups</td>
<td>0</td>
</tr>
<tr>
<td>4. Browsers to view documents (e.g. Lycos, Yahoo)</td>
<td>0</td>
</tr>
<tr>
<td>5. File Transfer Protocol (FTP)</td>
<td>0</td>
</tr>
<tr>
<td>6. Remote computing (TELNET)</td>
<td>0</td>
</tr>
<tr>
<td>7. Other (specify and rate)</td>
<td>0</td>
</tr>
</tbody>
</table>

8. How frequently do you use the Internet for instructional purposes (e.g., for your lessons):

<table>
<thead>
<tr>
<th>Level of Use of the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

9. How frequently do you use the Internet for professional development purposes (e.g., to locate information):

<table>
<thead>
<tr>
<th>Level of Use of the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

10. How frequently do you use the Internet for personal purposes such as communication or entertainment:

<table>
<thead>
<tr>
<th>Level of Use of the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
PART 2. ACCESS TO THE INTERNET

INSTRUCTIONS: Please respond to the following questions that describe your access to the Internet.

11. Do you have access to the Internet at home? (Circle or check only one)
   - a. Yes
   - b. No
   - c. Don't know

12. Do you have access to the Internet at work? (Circle or check only one)
   - a. Yes
   - b. No (Please, go to Part 3)
   - c. Don't know (Please, go to Part 3)

How frequently do the following factors limit your access to using the Internet at home and/or work:

<table>
<thead>
<tr>
<th>Q.</th>
<th>Access to the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td>13.</td>
<td>Hardware not working (i.e., computer, modem)</td>
</tr>
<tr>
<td>14.</td>
<td>Too many people trying to use the computer</td>
</tr>
<tr>
<td>15.</td>
<td>Busy signal with Internet service provider</td>
</tr>
<tr>
<td>16.</td>
<td>Server down; System timed out</td>
</tr>
<tr>
<td>17.</td>
<td>Computer response time is too slow</td>
</tr>
<tr>
<td>18.</td>
<td>Other: (specify and rate):</td>
</tr>
</tbody>
</table>

PART 3. COMPUTER AND INTERNET LITERACY

INSTRUCTIONS: To the left of each statement, put (✓) next to the skill you have, and circle the number which corresponds to your level of proficiency to the right. For items 19 - 53, use the following scale of 0-5 with 0 = not at all proficient, 1 = a little proficient, 2 = somewhat proficient, 3 = proficient.

✓ Check all computer skills you are familiar with and circle the number that corresponds to your level of proficiency of each skill:

Use the computer operating system to:

<table>
<thead>
<tr>
<th>Use the computer operating system to:</th>
<th>Level of Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not At All Proficient</td>
</tr>
<tr>
<td>19. Create a document on a word processor</td>
<td>0</td>
</tr>
<tr>
<td>20. Print a word processor document</td>
<td>0</td>
</tr>
</tbody>
</table>

152
<table>
<thead>
<tr>
<th></th>
<th>Task Description</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Search a database mgmt. system for specific information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Print selected information from a database</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Create a database (e.g. dBase, Paradox, Access)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Use a formula in a database</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Merge word processed letter with an integrated database</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Create a spreadsheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Write a formula in a spreadsheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Create a newsletter with desktop publishing</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>29</td>
<td>Use graphics software to create pictures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Use database, spreadsheet or word processing software to create tables and figures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Use a scanner to import graphics, photos and/or text</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Import clipart into text or desktop publishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Modify ready-to-use clipart</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Troubleshoot malfunctioning computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Troubleshoot malfunctioning printer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Format a floppy disk</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>37</td>
<td>Copy files</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Delete files</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Install a program on a fixed (hard) disk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Access information on a CD-ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Run software from a CD-ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Identify quality instructional software</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Use interactive video in the classroom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Use images from camcorder or digital camera in computer applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Using presentation software to create a lesson or lecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
\_\_\_\_ Check all Internet skills you are familiar with and circle the number that corresponds to your level of proficiency of each skill:

Networking or Internet skills include:

<table>
<thead>
<tr>
<th></th>
<th>Level of Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not At All Proficient</td>
</tr>
</tbody>
</table>

\_\_ 46. Access or send e-mail   0   1   2   3
\_\_ 47. Attach application files to e-mail  0   1   2   3
\_\_ 48. Browse the World Wide Web (WWW)  0   1   2   3
\_\_ 49. Use remote login (TELNET)  0   1   2   3
\_\_ 50. Create a page on the World Wide Web (WWW  0   1   2   3
\_\_ 51. Use search engines (e.g. Lycos, Yahoo)  0   1   2   3
\_\_ 52. Upload/download files to/from the Internet  0   1   2   3
\_\_ 53. Participate in on-line chat rooms  0   1   2   3

**PART 4. PERCEPTIONS OF THE INTERNET**

**INSTRUCTIONS:** For each set of agreement boxes adjacent to the statements below, please check (\_\_\_) the box that best describes your level of agreement.

<table>
<thead>
<tr>
<th>Use of the Internet increases my:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>54. Social prestige.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55. Personal convenience.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>56. Personal satisfaction.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>58. Access to information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I am comfortable using the Internet:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>59. within my profession.</td>
<td></td>
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</tr>
<tr>
<td>60. given my past experiences with computer networking.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

154
61. Given my overall information needs.

For me, the Internet is:

62. Easy to understand.

63. Easy to use.

My job provides opportunities for me:

64. To learn about the Internet.

65. To teach about the Internet.

A large percentage of my colleagues within my program:

66. Currently use the Internet.

The Internet has the potential to

67. Enhance ESL instruction.

ESL teachers should be educated/trained

68. On how to use the Internet in instruction.

PART 5. DEMOGRAPHIC INFORMATION

INSTRUCTIONS: Please answer the following questions by placing a check (√) in the appropriate box.

69. I am teaching in the:
   (Check only one)
   √ a. American Language Program (ALP)
   □ b. ESL Composition Program
   □ c. Spoken English Program (SEP)

70. I am employed as:
   □ a. Full-time ESL teacher
   □ b. Part-time ESL teacher
71. I am:
☐ a. Male
☐ b. Female

72. In what year were you born?

73. If you are interested in learning the results of this study, write your e-mail address on the line below:

74. If you would be willing to participate in the follow-up interviews, please write your name, office address and phone number on these line:

75. What comments do you have about using the Internet for educational purposes, especially ESL instruction (use back of the page if necessary)?

Please complete and drop off this questionnaire in the box located in the secretary office by February 25, 2000

THANK YOU VERY MUCH FOR YOUR VALUABLE TIME AND ASSISTANCE!

Tracking No. ___
APPENDIX B
List of Panel of Experts
PANEL OF EXPERTS

Charles Hancock, Professor
337A Arps Hall
1945 N High Street
School Of Teaching & Learning
College Of Education
The Ohio State University
Columbus, Ohio 43210

Shelley Wong, Assistant Professor
221 Arps Hall
1945 N High Street
School Of Teaching & Learning
College Of Education
The Ohio State University
Columbus, Ohio 43210

Janet L. Henderson, Associate Professor
Program Development and Evaluation
Ohio State University Extension
700 Ackerman Road, Suite 240
Columbus, OH 43202-1575

Elaine Horwitz, Associate Professor
Curriculum & Instruction Department
Foreign Language Education
528 Education Building
University of Texas
Austin, TX 78712

Zena Moore, Assistant Professor
Curriculum & Instruction Department
Foreign Language Education
528 Education Building
University of Texas
Austin, TX 78712

Timothy Micek, Assistant Professor
Ohio Dominican College
1216 Sunbury Rd
Columbus, Ohio 43219
(614) 251-4671
E-mail: micekt@odc.edu
APPENDIX C
Comment Form/Letter for Validity
November 15, 1999

Dear Expert,

I am conducting a doctoral dissertation study to describe the level of adoption of the Internet by ESL teachers at The Ohio State University (OSU). In addition, the study investigates the relationships between the level of use of the Internet and the following variables: personal characteristics of ESL teachers, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, and perceptions of the Internet. I have developed a questionnaire which includes the previous selected variables. The questionnaire will be sent to ESL teachers at OSU for data collection. A purpose statement is included with the attached copy of the instrument.

However, before conducting the study, I am seeking your expert opinion about the content and organization of the questionnaire. As an experienced and widely respected faculty and researcher in the field of teaching English as a Second Language, you can help me improve the questionnaire for my dissertation research. Please comment on any changes you feel should be made in the instrument as well as providing feedback in the following ways:

- Content validity of the instrument
- Item clarity
- Mechanics (e.g., word choice, typos)
- Complexity
- Reading level of the instrument
- Inappropriate items (e.g., too personal)
- Overall format and length

If you have any questions, please contact me at al-mubireek.3@osu.edu or by telephone at (614) 442-1184. I would appreciate the return of the instrument with your comments in the attached envelope by November 26, 1999.

Thank you very much for your important contribution to this study.

Sincerely,

Sami Mubireek

Advisor's approval
APPENDIX D
Field Test Letter and Comment Sheet
January 5, 1999

"Name"
"School Name"
"Address"
"City", "State", "Zip Code"

Dear "Name",

I am conducting a doctoral dissertation study to describe the level of adoption of the Internet by ESL teachers at The Ohio State University (OSU). In addition, the study investigates the relationships between the level of use of the Internet and the following variables: personal characteristics of ESL teachers, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, and perceptions of the Internet. I have developed a questionnaire which includes the previous selected variables. The questionnaire will be sent to ESL teachers at OSU for data collection. A purpose statement is included with the attached copy of the instrument.

I selected ESL teachers at your school to complete the questionnaire for the pilot test. Your school has ESL teachers who are similar to those teaching in OSU.

If you have any questions, please contact me at the above address, by e-mail at al-mubireek.3@osu.edu or by telephone at (614) 442-1184. I would appreciate the return of the instruments by January 14, 2000.

Thank you very much for your important contribution to this study.

Sincerely,

Sami Mubireek
Ph.D. Candidate
Foreign/Second Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University
FIELD TEST COMMENT SHEET

CONGRATULATIONS! You have been chosen to help in establishing the validity of an instrument.

Thank you very much for taking the time to help establish the validity of a survey instrument. Validity is like asking yourself the question, “Is the instrument (survey) measuring what it says it will measure?”

Directions:
As you complete the questionnaire, consider the following questions and respond on the lines provided. You may write directly on the instrument.

1.a. Given the purpose of the study, found on the front page, were the questions appropriate?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

1.b. Which questions gave you the most difficulty and briefly, why?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

2. How is the wording (terminology) throughout the survey?

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

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3. How was the thoroughness of the questions?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

4. How was the ease in filling out the survey?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

5. How was the clarity of what you were being asked to do?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
APPENDIX E
Human Subjects Committee Approval
APPLICATION FOR EXEMPTION FROM HUMAN SUBJECTS COMMITTEE REVIEW

All research activities that will involve human beings as research subjects must be reviewed and approved by the appropriate human subjects review committee, or receive exemption status prior to implementation of the research.

Principal Investigator: Hancock Charles
(Must be OU Faculty)
(Typed name) Last First Initial
(Signature)

Academic Title: Professor

Department: School of Teaching and Learning

Department No: 1275

Campus Address: 337A Arps Hall
Room Number Building

Co-Investigator(s): Mubireek Sami
(Typed name) Last First Initial
(Signature)

Protocol Title: Level of Adoption of the Internet by ESL Teachers at The Ohio State University

The only involvement of human subjects in the proposed research activity will be in one or more of the exemption categories listed on the back of this application.

Category: (Check one or more) #1 #2 x #3 #4 #5 #6

Source of Funding for Proposed Research: (Check 1 or 8)
A. OSURF: Sponsor RF Proposal/Project No.
B. Other (Identify) Royal Embassy of Saudi Arabia - Cultural Mission

Office Use: EXEMPTION STATUS: ✓ APPROVED ❌ DISAPPROVED**

11/29/99 Date

** Principal Investigator must submit a protocol to the appropriate Human Subjects Review Committee.

Important Notice to Investigators: Exempting an activity from review DOES NOT absolve the investigators of the activity from ensuring that the welfare of human subjects in the activity is protected and that methods used, and information provided, to gain subject consent are appropriate to the activity.
APPENDIX F
Cover Letters for Mail Survey:
1. Advance-notice Letter to Population
2. Follow-up Thank you/Reminder Letter to Population
3. Letter to Late-Respondents
February 9, 2000

Dear ESL teacher at OSU:

I am conducting a doctoral dissertation study to describe the level of adoption of the Internet by ESL teachers at The Ohio State University (OSU). In addition, the study investigates the relationships between the level of use of the Internet and the following variables: personal characteristics of ESL teachers, access to the Internet, computer literacy and proficiency, Internet literacy and proficiency, and perceptions of the Internet.

As an ESL teacher at OSU, within the next few days, you will receive through campus mail a request to complete a brief questionnaire. The questionnaire will be enclosed with the request. In addition, I am going to interview nine participants from those who are willing to be interviewed. Each interview will be brief and should not take more than 20-30 minutes. I am sending the questionnaire to you and interviewing some of you in an effort to learn more about your level of adoption of the Internet. Interviewees will be asked for their consent to be audiotaped.

I would greatly appreciate you taking the few minutes necessary (between 10-15 minutes) to complete and return your questionnaire. Your participation is very crucial for the success of this study.

Thank you very much in advance for your assistance and time.

Sincerely

Sami Mubireek
Ph.D. Candidate
Foreign/Second Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University
February 28, 2000

Dear ESL teacher at OSU:

A few days ago, a questionnaire seeking your response regarding your level of use of the Internet was put in your campus mailbox. Your name was one from an updated list of all ESL teachers at OSU.

If you have completed and dropped off the questionnaire in the box located in the secretary office, please accept my sincere thanks and appreciation. If not, please do so as soon as possible, preferably today. I am especially grateful for your help because I believe that your response will be very useful to my dissertation study.

If you did not receive a questionnaire, or if it was misplaced, please e-mail al-mubireek.3@osu.edu or call me at (614) 442-1184 and I will get another one in the mail to you today.

Sincerely,

Sami Mubireek
Ph.D. Candidate
Foreign/Second Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University
March 07, 2000

Dear ESL teacher at OSU:

About three weeks ago, I wrote to you seeking your response regarding your level of use of the Internet. As of today, I have not received your completed questionnaire. I realize that you may not have had time to complete it. However, I would genuinely appreciate hearing from you.

I am writing to you again because the study's usefulness depends on receiving a questionnaire from each respondent. Your name was among an updated list of ESL teachers at OSU for this Winter Quarter 2000. In order for information from the study to be truly representative, it is essential that each individual in the list return his or her questionnaire.

In the event that your questionnaire has been misplaced, a replacement is enclosed. I would be happy to answer any questions you have about the study. Please, e-mail al-mubireek3@osu.edu or call me at (614) 442-1184.

Thank you very much for your assistance and cooperation.

Sincerely,

Sami Mubireek
Ph.D. Candidate
Foreign/Second Language Education,
School of Teaching and Learning,
College of Education,
The Ohio State University
APPENDIX G
Qualitative Comments
Level of adoption of the Internet by ESL teachers at The Ohio State University

Qualitative Comments-
Responses to Last Item on Questionnaire
Requesting Comments about the use of the Internet for Educational Purposes, Especially ESL Instruction

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>PART 2- Q. 18. Overkill – I use email and the WWW so much at work that it’s nice to take a break from it [the Internet] at home.</td>
</tr>
<tr>
<td>12</td>
<td>PART 1 – Q. 7. Audio streaming</td>
</tr>
<tr>
<td>19</td>
<td>Often more trouble than it’s worth.</td>
</tr>
<tr>
<td>23</td>
<td>I teach courses in English linguistics but occasionally also some in ESL. Most of the use of the web-related material to teaching I do involves courses other than ESL.</td>
</tr>
<tr>
<td></td>
<td>PART 1 – Q7. ITA (International Teaching Assistants) listserv, (TESOL Interest Section) professional organization.</td>
</tr>
</tbody>
</table>