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Online Networks in Institutions of Higher Education: An Assessment of Student Use

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ONLINE NETWORKS IN INSTITUTIONS OF HIGHER EDUCATION: AN ASSESSMENT OF STUDENT USE

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Online networks in university campuses are expected to enhance the learning process, an argument founded on the theories of Cognitive Apprenticeship, Situated Cognition, and Social Constructivism. However, the extent to which students use these networks should be a significant predictor of such benefits.

This study investigated the patterns of use of online networks in universities with a survey administered to 299 students enrolled in a random sample of undergraduate classes at Western Michigan University during the summer semester of 1998.

The findings show extensive use of email and the World Wide Web for activities that arguably benefit their education. Other online applications such as IRC, newsgroups, bulletin boards, and listservs were used by approximately 25% of the respondents. However, gender and computer proficiency were significantly related to the levels of online network usage.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS ii

LIST OF TABLES vii

CHAPTER

I. INTRODUCTION 1

Purpose 1

Background 1

Problem Statement 4

Significance of the Study 4

II. REVIEW OF LITERATURE 6

The Importance of Becoming Proficient in Online Networks 6

Common Internet Applications for Education 7

Communication 8

Information-Retrieval 8

Non-Linear Interaction With Information 9

Theories of Networking and Learning 10

Cognitive Apprenticeship 10

Situated Cognition 11

Social Constructivism 12

The Expectations of the Internet in Education 14

Table of Contents—Continued

CHAPTER

Information Access 14

Interaction 15

Non-Linear Presentation 16

Discovery Learning 16

Student Publication on the Internet 17

Summary 17

Background of Western Michigan University's Networking Systems 18

III. RESEARCH QUESTIONS AND METHODOLOGY 22

Research Questions 22

Population 23

Sampling Frame 23

Sampling Procedure 23

Advantages 24

Disadvantages 24

Research Design 25

Instrument 25

Data Collection 26

IV. DATA ANALYSIS 27

Demographic Background 27

Table of Contents—Continued

CHAPTER

Computer-Related Background....28

Frequency of Connection....30

Time Spent Online....37

Accessing Campus Network....44

Types of Use....45

Internet Application and Frequency of Use....47

Academic Uses Versus Social and Other Uses....49

Email....50

Listservs....51

Newsgroups and Bulletin Boards....53

Internet Relay Chat (IRC)....53

World Wide Web (WWW)....54

Students' Perception of the Campus Network....57

Students' Evaluation of Their Computing Skills....57

V. DISCUSSION....60

Electronic Mail (Email)....64

World Wide Web (WWW)....65

Implications of the Study....66

Limitations of the Study....70

Table of Contents—Continued

CHAPTER

Conclusion 71

APPENDICES

A. Protocol Clearance From the Human Subjects Institutional Review Board 73

B. Mission Statement: University Computing Services 75

C. Consent for Anonymous Data 77

D. Survey Instrument 79

REFERENCES 89

LIST OF TABLES

1. Items Related to Frequency to Connect to the Campus Network: Frequency Distribution 31

2. Frequency to Connect to the Campus Network: Gender Cross-Tabulation 31

3. Frequency of Connection to the Campus Network: Computer Proficiency Cross-Tabulation 33

4. Frequency of Connection to the Campus Network: Year of Study Cross-Tabulation 35

5. Frequency of Connection to the Campus Network: WMU Grade Point Average Cross-Tabulation 36

6. Items Related to Time Spent Online: Frequency Distribution 38

7. Items Related to Time Spent Online: Gender Cross-Tabulation 39

8. Time Spent Online and Computer Proficiency Cross-Tabulation 41

9. Time Spent Online and Year of Study Cross-Tabulation 42

10. Time Spent Online and WMU Grade Point Average Cross-Tabulation 43

11. Methods of Accessing Campus Network 45

12. Internet Usage Across Five Applications 46

13. Internet Applications and Frequency of Use 47

14. Academic Uses vs. Social Uses of Email 50

15. Academic Uses vs. Social Uses of Listservs 52

16. Academic vs. Social Uses of Newsgroups and Bulletin Boards 54

17. Academic Uses vs. Social Uses of IRC 55

List of Tables--Continued

18. Academic Uses vs. Other Uses of the WWW 56

19. Satisfaction With Computing Facilities On-Campus 58

20. Student Perception of Skills to Use WMU Computing Facilities 59

21. Satisfaction With Computer Proficiency: In View of the Demands of the Labor Market 59

CHAPTER I

INTRODUCTION

Purpose

The purpose of this study is to evaluate students' patterns of use of the online networks in institutions of higher education and to examine the extent to which such resources are used for academic related tasks. Various aspects of learning will be investigated to uncover existing patterns of students' usage. The evaluation will be based on the educational goals as defined by the institutions of their campus networks and electronic resources. This research attempts to assess whether these facilities are being used by students in ways that are complementary to the stated objectives and anticipated outcomes.

Background

Incorporating online networking into academic institutions is becoming a normal practice. This is partly due to the support and incentives given by the United States' government, the U.S. Congress, and especially the National Science Foundation (NSF) to the universities and colleges. The United States' Congress showed commitment in deploying networking technologies extensively when it passed the High Performance Computing Act in the late 1980s. Since then the number of

network users has increased exponentially (Barker, 1994). Networking technologies have permeated virtually every sphere of life. Most amazing, online networks have redefined many aspects of life from shopping, job-searching, banking, advertising, and even educating. Since networking technology is accelerating at a rapid pace, the need to become familiar with computer networks becomes crucial.

With the advent of the online network or "internet," it is not sufficient to be skillful in desktop applications, but to keep abreast with the many different internet applications available and being developed. In this digital era, industries are using computer networks to conduct and coordinate their daily operations. Hence, proficiency in computer networking is necessary for the future work force. McConnell (1996) points out that the effect of computer technology penetrates most jobs from clerical to higher management. Even lower operational workers are exposed to simple computer applications. Alvin and Heidi Toffler, in an interview with Working Woman's magazine, state that with technological evolution there are many "peripheral workers" workers who are lacking in skills needed by industry (Brame, 1996). Hence, it is possible that those who do not become part of this revolution may not be able to find jobs in the future or at best left to do peripheral jobs. Since today's economy is highly dependent on computer technology, students who will be filling the labor force are encouraged to be proficient in this technology of the century.

Further, computer networks benefit the learning process. Many academic institutions are rigorously adopting network technology and some educational institutions are even providing universal access to their students where every student gets a

computer. The emergence of computers is said to be responsible in bringing reformation to American education particularly in the area of individualization of instruction (Niemiec & Walberg, 1987). Yang and Chin (1996) claim that the underlying structure of the computer itself appeals to the learners' motivation. Research conducted by Downing and Rath (1997) found that easy access to computing facilities resulted in higher computer literacy among students. Although, convenient access is an important condition for students' computer proficiency yet, access is not an assurance that the connection will be used by students to benefit their education. McLure and Lopata (1996) argue that peripheral attention is given in evaluating the benefits of such computer connection for academic purposes. Along the same line, Maddux (1994) criticizes that many academicians stress network access rather than how the access is used in "educationally appropriate ways" (p. 38). Maddux further argues that physical presence does not necessarily mean worthwhile use in educational context. In addition, Croft (1994) symbolizes the technology as a tool where its utility is shaped by the way the user gives meaning to it. Relevant to this discussion is the importance of using the available tools actively for the purpose of exploiting its potentials (Brown & Duguid, 1996).

According to Kozma (1994) knowing how computers affect learning is essential for deriving media theory. However, prior to building any media theory, Kozma explains that comprehending students' computer usage is crucial.

Some studies argue that student's access to online networks would change the basic premise of the traditional education paradigm, where educators dominated the

learning process (Duchastel, 1997; Owston, 1997). These arguments are supported by some emerging theories of learning and instruction such as situated cognition (Brown, Collins, & Duguid, 1989), cognitive apprenticeship (Sugrue & Kobus, 1997), and social constructivism (Farquhar, 1996; Hannafin, Hall, Land, & Hill, 1994) that acknowledge the potentials of online networking if incorporated into academic environment. It is based on these expectations that universities have invested heavily in online technologies and electronic networks.

Problem Statement

How has access to online networks contributed to the educational process? Specifically, the main purpose of this study is to investigate students' patterns of use of these resources, and to evaluate how this access is used to serve their academic needs. The evaluation will be anchored on the educational goals of the networks as defined by the university.

Significance of the Study

The need to investigate students' patterns of use of the online networks is important because universities have made a huge investment in developing the infrastructure, and updating the computing facilities for students' access. Therefore, it is important to know whether the University is achieving its educational goals by having the network. Hence, an evaluation of the academic networked environment is essential to investigate the contribution of the technology towards achieving the educational

goals. Knowing how online networks and resources are being used to support the learning process is important to educators, students, and university administration. Furthermore, the findings of this study could help the management to determine the quality of their networks from the users' perspective, and work toward improving its facilities and services. Moreover the findings of this study would be helpful in explaining theoretically the nature of online usage in academic institution. Therefore, the problem merits an evaluation that could help to describe the existing patterns of students' usage of online facilities provided by a university.

CHAPTER II

REVIEW OF LITERATURE

The review of literature is divided into four sections: (1) the importance of becoming proficient in online networks, (2) common internet applications for education, (3) networking and learning, and (4) the expectation of the internet use in education.

The Importance of Becoming Proficient in Online Networks

This section will discuss research on the need to have access to networks and to be proficient in emerging computer technology.

A proliferation in telecommunications networks has had a profound effect on higher education (Barker, 1994). According to Gilbert and Green (1997), the phenomenal improvement of personal desktop computers into a vehicle of information superhighway has led to the second phase of "computer revolution in higher education"(p. 26). The foundation of this networking is the internet. The internet is a network of networks that collaborates multiple computers worldwide in the process of transmitting information (Locatis & Weisberg, 1997; Rubin, Rubin & Piele, 1996). For the past seven years, internet host computers have increased 2000 percent (Maddux, 1996). It was reported that 89 million people were using the internet in

November 1996 (Goggin, Finkenberg, & Morrow, 1997). Due to this growing popularity it is not surprising when it is predicted that there will be 101 million internet users in the year 2000 (Maddux, 1996).

Continuous growth of the internet demands students to be proficient in computer technology since it is anticipated that the internet will affect their future (Downing & Rath, 1997). The main force in today's education is the power of information. In conjunction with this, Hill and Misic (1996) argue that the economy is highly dependent on information technology. Given this statement, students who are updated with the evolving technology will successfully face the industry. Adequate exposure and training are highly crucial (Croft, 1994). It is argued that lack of proficiency in the technology would be detrimental for individuals and society, particularly in meeting the needs of a digital society (Croft, 1994; Dyson, 1997).

Therefore, the educational paradigm must incorporate the emerging trend in network technologies. Students need an academic atmosphere that surpasses conventional education which is limited to printed materials. A new learning paradigm brought by the online networks challenges students' abilities to take charge of their learning process. Furthermore, getting students to explore the networks prepares them for the changing work force. For example, telecommuting is becoming widely practiced in today's workplace due to networking interventions.

Common Internet Applications for Education

This section will look at various types of internet applications such as

communication, information retrieval, and non-linear interaction with information, and discuss how these applications could benefit education.

Communication

The internet is a medium that promotes learning through social interactions (Farquhar, 1996). Three types of communication are possible through the internet. According to Brown and Duguid (1996) it is possible that students are able to have a dialog with subject matter experts. Electronic mail, for example, organizes class discussion (Price, 1996), enables students to subscribe to electronic discussion groups (Rubin et al., 1996), and serves as a medium that facilitates interactions between students and instructors (Brown & Duguid, 1996).

Information-Retrieval

Online technology offers an abundance of information resources around the globe for students' retrieval. One useful internet application is telnet which allows user to access remote terminals (Bush, 1995). Retrieving library catalogs is a common use (Rubin et al., 1996). File transfer protocol, on the other hand, enables the user to share files and databases (Hill & Misic, 1996). Therefore, students can access information and databases without having to travel to get this information. All of these applications extend students' options for collecting information.

Non-Linear Interaction With Information

Above all other applications, the world wide web (WWW) is the most popular internet service (Starr, 1997). The WWW is a hypermedia that can transfer multi-media information in a hyperlink format (Price, 1996). In addition, the WWW allows information to be presented in multimedia format. Therefore, the WWW is a rich medium that incorporates audio and video presentation. However, media such as television also possess such property. What distinguishes the web from television is the hypertext element that uses point and click style to navigate related information between modules. Information is not arranged in a sequence. It depends entirely on users to retrieve what information that they want and customize the information based on user interests.

The web is said to revolutionize the structure of information transmission and school curriculum. Quinlan (1997) believes that the web alone could reform the existing curriculum, and school structure. Quinlan argues that the nature of the web technology promotes the idea of self-directed learning. Students lead their navigations beyond the school boundaries. The web also extends on-demand learning, making it possible for students to get information at their convenience. Hence, the old paradigm of education is shifting towards giving more power to students to manage their learning process.

Theories of Networking and Learning

This section describes theories that explain how students' active involvement in the learning process influences the learning environment. The three theories discussed are: cognitive apprenticeship, situated cognition, and social constructivism.

Cognitive Apprenticeship

Theories of learning and instruction acknowledge the existence of essential learning elements in online technologies such as active student participation and social interaction. One of the theories that is often cited to support the use of online technologies in education is cognitive apprenticeship.

According to the cognitive apprenticeship theory, the basic premise of learning is a process of enculturation, where individuals learn through social interaction, typically through conversation. According to this theory, learning continues outside the confinement of school structure. Abstract knowledge taught in school tends to be more understandable when discussed in social environment. Furthermore, students can find other resources in the social environment to help increase their understanding of certain concepts. One important factor highlighted in this theory is collective learning which is thought to contribute towards students' mastery of concept, resulting in collaborative skills and group problem solving. The fulcrum point of this perspective is the encouragement given to students to lead their own learning process (Brown et al., 1989). This aspect of students' empowerment instigates a platform of

independence. Students are able to consult subject-matter experts, not necessarily confined to their instructors, and are able to collect information from multiple perspectives (Sugrue & Kobus, 1997).

Online technologies prepare a platform for students to engage in social interaction and to get better grasp of the knowledge taught at school. One can consult peers, instructors, and experts on certain subjects to increase his/her knowledge on subjects of interest.

This theory points out an important aspect of learning known as "legitimate peripheral participation" (Brown et al., p. 40, 1989). In this aspect, it is not typical for every student to participate in a discussion, rather, some students may just observe the intellectual discourse (Brown et al., 1989). The internet facilitates discussion for students through electronic mail, listserv and internet relay chat, whereby some students may actively participate in the discussion and some can choose to only read messages, yet benefit from the activities.

Situated Cognition

On par with the cognitive apprenticeship perspective is the situated cognition framework which postulates that learning is mediated by cognitive and social factors. According to this theory, an individual maximizes learning when interacting with his/her environment (Farquhar, 1996). Similarly, Kozma believes that active interaction between students and the learning environment is a vital ingredient of effective learning (1994). Consequently, this interaction will lead to the development of

knowledge, attitudes (Heinich, Molenda, & Russell, 1993), skills, and mental models (Kozma, 1994). When students pursue their own learning process, they become more responsible.

There are various terms used to describe students' roles in taking charge of their own learning process. For example, Locatis and Weisberg (1997) describe it as a learner-centered domain. Earlier, Hannafin et al. (1994) called this learning process an open-ended learning. Open-ended learning posits the capacity for students to decide various issues of learning such as what and how to learn. Accordingly, to get a better grasp of certain knowledge, an inquiry approach is important. When students are free to venture into their learning process, they are likely to become more creative.

According to Brown et al. (1989), situated cognition promotes the idea of getting access to distributed knowledge. In computer networking, a student is not limited to standard sources, such as textbooks or a conventional library. Rather, the scope of knowledge quest extends to incorporate other forms of resources that include personal interactions with peers and experts. Hence, emerging learning theories support the use of technology in the learning domain, especially in encouraging students' empowerment toward learning.

Social Constructivism

Another theoretical perspective that could explain the relationships between learning and computer networks is the social constructivism of knowledge. Congruent with the two frameworks discussed above, social constructivism supports the

premise that the essence of knowledge is constructed through social dialogue with social factors. Individualized instruction was once a prime focus of computer usage in a learning context. However, with the emergence of computer networking the focus shifts to highlight the ability of computer technology to facilitate social interaction (Farquhar, 1996).

Listserv, electronic mail, and newsgroups are among the internet applications that possess the ability to facilitate interaction. Starr and Milheim (1996) identify that direct communication is one of the main utilities of the internet. In conjunction with the theory being discussed, Farquhar (1996) explains that structuring social interaction is possible through online technologies.

Perkins (1991) believes that rich learning experience leads to effective learning. Similarly, Hannafin et al. (1994) stress that networked environments expose students to explorations in the learning environment. Hannafin, Hill, and Land (1997) argue that the learning paradigm brought by the networked technologies, based in constructivist epistemology that encourages learner-centered education. Therefore, learners construct meaning from their interactions with the environment.

Theories of learning and instruction have been cited to explain the existence of essential elements of learning in online networks. In this respect, online networks are justified as a viable learning device by arguing that emerging learning theories support its use in an academic context. Basically, cognitive apprenticeship, situated cognition, and social constructivism are similar on one ground, which is their active interactions with the learning environment.

In order to claim that online networks usage is worthwhile in academic institution, the argument goes back to the three theories used as the framework in this study. Access to online networks is beneficial in academic sense only if most students use the internet to engage in academic related tasks which are identified in three distinctive activities: communicating with instructors, discussing with classmates/peers, and consulting subject-matter experts on class related issues. These activities are applicable by using email, listservs, IRC, newsgroups, bulletin boards and the WWW.

The Expectations of the Internet in Education

This section will discuss the capabilities of the internet in education that include the ability to access large amounts of information, to communicate online, and to interact with non-linear information. Further, the section discusses the possibility of extending discovery learning through the internet, and the possibility to make public students' publications on the internet.

Information Access

The internet is a means to access large amounts of information (Hill & Misic, 1996; Tigi & Branch, 1997) and a great resource-sharing vehicle (Hill & Misic, 1996; Quinlan, 1997). When students are exposed to diverse information, they are encouraged to cultivate skills in collecting information. Maddux (1996) states that the WWW stimulates students to engage in information search that leads into unlimited information access.

Interaction

The internet extends the possibility to engage in communication online (Locatis & Weisberg, 1997). With that communication ability, students can continue interacting with peers and instructors without having to be physically present. According to Pence (1996) a quality education emphasizes human interaction even though it is mediated by technology. In this context, a technology that serves as a medium that facilitates interaction is seen as a potential educational tool. In addition, Brown and Duguid (1996) also argue that the essence of learning is personal interactions. Personal interactions can occur at various levels with the intermediary of computer networks. Not limited to on-campus interaction, the internet connects students into a worldwide collaboration (Hamalainen, Whinston, & Vishik, 1996). Given these potentials students can become involved in many intellectual discourses going on around the world to enrich their knowledge. According to Dale (1997), such connection helps to broaden students' perspective.

Rivera, Singh, Messina, and McAlister (1994) comment that students often face problems connecting with their instructors. In this context, the internet is a possible solution, because according to Dale (1997) the internet is a resourceful mailing system. Therefore, students can contact and send messages to their instructors even outside the instructor's consultation hours. In addition, networked environment enhances communication between instructors and students (Bothun, 1996).

Non-Linear Presentation

Web technology incorporates the use of hypertext transfer protocol (HTTP) that makes feasible a non-linear format presentation. The WWW's design allows learners to control their learning pace, hence, supports their thinking process (Tigi & Branch, 1997). Furthermore, the hyperlinking feature is attributed to the increased number of network users (Starr, 1997).

Significantly, the internet enables students to electronically search for information. The world wide web allows students to download files, thus, retrieval of unlimited resources is made possible through this feature (Fleischman, 1996). The web technology enables students to download information at their convenience (Goggin et al., 1997). According to Hamalainen et al. (1996) people demand more information with the coming of networked technologies. In the networking concept, user and server are interfacing in order to retrieve information. Furthermore, information is easily retrieved and at a fast speed.

Discovery Learning

Students are able to be creative in their learning by navigating the net. The internet allows students to discover endless information. Dale (1997) acknowledged the web as a massive encyclopedia. Learning through discovery posits that the methodology encapsulates an inductive as well as an inquiry approach towards learning (Heinich et al., 1993). They argue that through discovery learners will gradually

develop comprehension towards the content. Indeed, the internet prepares students to learn through discovery. Its open technical standards allow learners to explore resources worldwide (Owston, 1997).

Student Publication on the Internet

Of equal importance is the potential for networks to function as channels for students to contribute their works to the public. Rankin (1997) claims that students are more comfortable writing with a computer. Furthermore, a network environment extends the possibility for students to make their work public. Owston (1997) supports the idea of letting students improve their composition by writing to an authentic audience. Through this exposure, students are more cautious of their work which indirectly develops their writing skills.

Summary

In this section we have reviewed four major points that support the use of the internet in academic environments. Proficiency in online networks is an added advantage for today's generation bearing from the computer-intensive industry we are living in. More crucial at this point is the educational value of the internet, particularly in changing the traditional education paradigm. The internet gives more power to students to direct their learning. Also, three theories of instruction and learning have been reviewed to support the value of the internet in academic context from theoretical framework. According to these theories, some of the integral elements of

learning are social interaction, collaboration, and access to distributed knowledge. With the advent of the internet, social interaction is extended beyond school structure, increasing the possibility to continue discussion with an instructor, peers, and experts. With the WWW there is an enormous potential to access knowledge and resources around the world. Based on that, there are many positive expectations associated with the use of the internet in education.

Background of Western Michigan University's Networking Systems

This study proposes to examine the computing and networking facility of one of the large universities in the Mid-West, Western Michigan University (WMU). The university provides computing access to enrolled students through the University Computing Services (UCS). UCS provides academic support for students by providing computer access at two major computing labs known as "keypads," and distributed labs at various departments within the University. Enrolled students are entitled to computer facilities and network access by using their student accounts. The Academic Computing and Information Services (ACIS) of the UCS deals specifically with the academic side of the computing facilities. As 66 percent of the UCS customers are students, their needs are prioritized above others. UCS's role is supplemental for education whereby, its major task is to help enhance students' education and teach about specific computer aspects in order for students to use the computer as a tool for education (K. Keglovitz, personal communication, February 25, 1998).

The UCS is continuously working to improve its services to meet students'

expectations. At present there are more than 1200 computer terminals available on campus for students' use. More students are applying for student personal accounts, as reflected in the issue of over 4,300 email accounts from 1996 to 1997. Furthermore, an increased demand for modem services forces the UCS to allocate more than $50,000 annually for upgrading its modem pool ("Your technology fees: At work", 1997).

Besides upgrading the technical sides of the computing systems, the UCS also offers instructional workshops for students, faculty, and staff. Continuous improvement in software and hardware systems such as Windows 95, Office 97, and Corel WordPerfect, indirectly forces students to become familiar with the new technology. Due to that, the UCS attempts to close the gaps of computing proficiency among students by providing hands-on instructional workshops on various computing topics. The internet courses are becoming popular compared to desktop applications. The UCS supports the use of the internet for educational purposes by offering three workshops: Strategies for Locating Resources on the Internet, Searching the Web and the Internet, and How to Use the Internet for Research ("Upgrade skills with computing workshops", 1997)

Previously, students were charged $2.50 to attend one workshop. However, a new policy eliminates most of the students' fee. The cost of attending the workshops is subsidized to encourage more students to register (K. Keglovitz, personal communication, February 25, 1997).

Enrolled students are entitled to many email accounts such as Student Personal

Accounts (STPA), Class accounts and Research accounts. There are prescribed conditions for use of the University's computing facilities. The UCS has established online policies and the 'Acceptable Use Policy' to regulate students' online activities ("Rules for Use of Computing Resources at Western Michigan University," 1997).

To avoid students using the networking access for unsuitable activities, the UCS blocks some of the newsgroups, newsfeeds, and the outgroups, that are purely recreational. This is to rule out some of the possibilities of losing out academic activities to nonacademic activities (K. Keglovitz, personal communication, February 25, 1998).

A new wave of improvement is expected before Fall 1998, in which all libraries will become fully web-based (K. Keglovitz, personal communication, February 25, 1998).

Basically, the UCS plays a major role in supporting education through continuous effort to upgrade the information technology infrastructure in WMU's premises. This is reflected in its 1994 mission statement (see Appendix B):

> University Computing Services (UCS) is the organization providing a variety of computing and data communication services to the WMU community as well as to the region. The mission of UCS is to furnish computing support for instruction, research, administration, and public service goals of Western Michigan University along with connectivity to information resources throughout the world.

To carry out the evaluation, it is essential to identify the goals of the University in developing the infrastructure. The goals are:

1. To provide students with adequate computing facilities to support their academic related tasks.

2. To provide assistance to students who need help with computer-related problems as well as educational problems.
3. To cultivate awareness among students that computer skills are important to be competitive in the labor market.
   This awareness and encouragement are given directly or indirectly by upgrading both hardware and software. This is done to make sure students have access to up-to-date technology that are needed to face the industry.
4. To assist the libraries in upgrading their electronic cataloging and resources online.
5. To encourage students' productive use of the computing facilities, thus improve their computing skills by offering instructional workshops.

(K. Keglovitz, personal communication, February 25, 1998)

CHAPTER III

RESEARCH QUESTIONS AND METHODOLOGY

The purpose of this research is to evaluate students' patterns of use of the online networks in institutions of higher education and to examine the extent to which such resources are used for academic related tasks.

This chapter will discuss the research questions and the methodology used in carrying out this research.

Research Questions

The goal of the research is to answer various questions pertaining to students' patterns of use of the online networks. Based on the educational goals of having the campus network, the following research questions are proposed.

1. What are students' patterns of use of the university online networks?

1.(a) How frequently do students use the campus network and online networks?

1.(b) How much time do students spend online per session?

1.(c) How do students access the campus network?

1.(d) What types of activities do students engage in when they use the online networks?

2. What are the internet applications that are frequently used for academic-related tasks?

3. What are students' perception of the campus network?

4. How do the students evaluate their computing skills?

Population

The population of the study is university students in the United States. However, in this study we chose to study the Western Michigan University's students who are arguably representative of students in other institutions. The target population was students that attended undergraduate classes throughout the university curriculum during summer semester of 1998.

Sampling Frame

The summer semester class schedule was used as the sampling frame for this study. The schedule listed all classes that were arranged according to the departments.

Sampling Procedure

A probability sampling procedure was used to draw samples from the population. According to Babbie (1991), the basic tenet of probability sampling is to draw samples that are representative. To achieve that, one important condition is to ensure that each unit or subject has an equal chance of being selected. Babbie continues

explaining that representativeness is reflected in the characteristics of the samples. Specifically, Frey, Botan, Friedman, and Krep (1991) add that representativeness is determined on how far the sample selected matches the target population.

A cluster sampling procedure was used to draw samples from the population. To avoid the time consuming process of identifying each student attending the undergraduate classes during summer semester, the researcher selected the samples according to cluster. In this case, the cluster referred to classes offered across university curriculum during summer semester. A sample size of 20 classes was drawn from 157 classes. However, one class's instructor decided not to allow the survey to be conducted in his/her class therefore only 19 classes were used for this research. From these 19 classes, 299 students were generated. Therefore, instead of choosing individuals, this sampling process allows researchers to select classes and distribute questionnaires to all students in that classes.

Advantages

A cluster sampling does not require exhaustive list of the target population (Babbie, 1991). Information about population in its cluster, hence, is sufficient to pursue the research procedure. Since this procedure permits selecting samples in groups, the process is less complicated and not time-consuming (Forcese & Richer, 1973).

Disadvantages

However, cluster sampling does have one possible flaw. Due to its loose

nature of selecting samples, determining sampling error is rather difficult (Forcese & Richer, 1973).

Research Design

A user survey was used to conduct the research. According to Wimmer and Dominick (1991), a descriptive survey would depict the existing conditions in the population. McLure and Lopata (1996) specifically address the significance of user survey to networking activities, in which large user survey would yield important information such as students' patterns of use, and how networking affects them. Furthermore, according to Frey et al. (1991), tracing respondents' beliefs and attitudes are possible through this method.

On the contrary, the method may have one possible flaw. The framing of questions may lead to respondents' suspicions. Hence, they are likely to give dishonest answer to comply with the perceived purpose of the study, thus making them look favorable (McLure & Lopata, 1996; Wimmer & Dominick, 1991).

Instrument

There were few instruments to assess students' patterns of use of the online networks provided on campus. The instruments found were either comprehensive or the focus was more on the entire university community. Specifically, some of the instruments were meant for policy makers of academic institutions. Due to the lack of suitable instruments to pursue this study the researcher developed an instrument to

measure the different variables. The survey instrument is included in Appendix D. Close-ended questionnaires were used to provide greater uniformity of the response.

Data Collection

A group administration was used to collect data. Once the sample of classes were identified, copies of questionnaires were distributed to every student in each class. According to Wimmer and Dominick (1991), one of the advantages of this method is that the response rate is generally high. However, one possible obstacle is the inability to control the interaction among respondents while filling out the questionnaires.

CHAPTER IV

DATA ANALYSIS

Most of the data analysis were descriptive. Chi square tests were used to assess statistical significance of some observed differences among groups of students.

Demographic Background

Two hundred and ninety-nine students from 19 classes throughout the University campus participated in this research design. Demographically, the distribution of subjects based on gender is almost equal with the number of male students exceeding (52.2%) the number of female students (45.8%). The remaining two-percent did not identify their gender.

Senior students turned out to be the largest majority (68.2%), followed by junior (17.7%), graduate (8.4%), sophomore (2.7%), and freshman (1%). Of the samples taken, 44.1 percent were transfer students, while 50.8 percent were not. The rest did not respond to this question.

More than a quarter (31.1%) of students reported they have a WMU Grade Point Average (WMU GPA) between 3.0-3.4, followed by 27.1 percent that have a WMU GPA between 2.6-2.9. Close to a quarter (25.4%) reported they have a WMU GPA between 3.5-4.0. Ten point seven percent reported they have a WMU GPA of

2.00-2.5, while 0.7 percent have less than a 2.0 GPA. The remaining 5 percent did not respond to this question.

The students were affiliated to different colleges. The College of Business had the largest participation of samples (34.8%) with 104 students. The College of Arts and Sciences came second (21.7%) with 65 students, followed by the College of Engineering and Applied Science with 60 students (20.1%), the College of Education with 47 students (15.7%), the College of Health and Human Sciences with eight students (2.7%), the Division of Continuing Education with three students (1%), and College of Fine Arts with two students (0.7%). Ten students (3.3%) did not identify their area of study.

Subjects' ages range from 18 to 58 years old, with age 21 having the largest percentage (28.4%) followed by age 22 with 23.4 percent. The targeted age bracket for this research ranges from 18-25 years old and this intended age generated 80.6 percent ($\underline{n}$ = 268) of the total number of samples hence, representing a majority of the samples. The remaining students who are outside the age bracket are either non-traditional students or graduate students taking undergraduate classes during summer semester.

Computer-Related Background

Information asked regarding computer related backgrounds revealed that a large majority (81.9%, $\underline{n}$ = 245) has access to computers other than those available for students on campus. Computer proficiency data depicted that 41.1 percent of

students (n = 123) rated themselves as "Good". Slightly more than one quarter of the students (31.1%, n = 93) claimed they were "Very Good", while 39 students (13%) reported that they were "Excellent". Overall, approximately 85.2% of the sample rated themselves confidently on the first three proficiency spectrum: (1) Excellent, (2) Very Good, and (3) Good. Twelve percent rated themselves "Fair" while merely two percent reported their computer proficiency as "Poor".

Another computer related background's question was about the type of computers that students are familiar with. Generally a large majority of students (93.3%, n = 279) are familiar with IBM compatible (Windows-based). One hundred fifteen students (38.5%) reported they are familiar with Macintosh. Sixteen point four percent (n = 49) of the students are familiar with Unix-based computers, while 14 students (4.7%) are familiar with other kinds of computers. Only 0.3 percent (one student) claimed that he/she is not familiar with any computers.

Students were also asked where they learned to use the internet. This question asked the subjects to rank the given options according to their contributions in cultivating their knowledge in using the internet.

The main interest of the study is to investigate how students view the role of the University Computing Services (UCS) in contributing to their knowledge in utilizing the online networks. The survey revealed that 72.6% ranked UCS at level five which is the least important contributor of them all. Friends resulted to be the highest ranked option with 70.2%.

Frequency of Connection

Seven categories were used to evaluate how frequently students access the campus network. The categories are: (1) several times a day, (2) daily, (3) several times a week, (4) once a week, (5) every other week, (6) once a month, and (7) less than once a month. However, this analysis further collapse the scales into four categories: (1) Heavy users (at least once a day), (2) Medium users (at least once a week), (3) Low users (at least once a month), and (4) Rare users (less than once a month).

More than a quarter of the students (36.5%, $\underline{n}$ = 109) reported they connect to the campus network at least once a day indicating that they fall under the category of heavy users. Almost similar number of students ($\underline{n}$ =104, 34.7%) are found to be in the medium user range which is connecting to the campus network at least once a week. The frequency pattern starts to decrease in the low and rare users' categories with 13.7 percent ($\underline{n}$ = 41) students using the campus network at least once a month, while 12.4 percent ($\underline{n}$ = 37) students used it less than once a month. Table 1 shows the frequency distribution in detail.

The frequency patterns of connection to the campus network is further analyzed by looking at how gender is related to the frequency of connection to the campus network. Table 2 depicts the analysis in detail.

The results show that there is a significant relationship between the frequency of connection to the campus network and gender. A chi-square test indicated that the calculated value of 17.237 exceeds the critical value of 12.59 at the .05 significant

Table 1

Items Related to Frequency to Connect to the Campus Network: Frequency Distribution

Variables	n	Percentage
At least once a day	109	36.5
At least once a week	104	34.7
At least once a month	41	13.7
Less than once a month	37	12.4
Missing	8	2.7
Total	299	100.0

Table 2

Frequency to Connect to the Campus Network: Gender Cross-Tabulation

Variables		MALE	FEMALE	MISSING	TOTAL
Heavy	Count	72	36	1	109
	% of total	24.7%	12.4%	0.3%	37.5%
Medium	Count	53	50	1	104
	% of total	18.2%	17.2%	0.3%	35.7%
Low	Count	15	25	1	41
	% of total	5.2%	8.6%	0.3%	14.1%
Rare	Count	13	23	1	37
	% of total	4.5%	7.9%	0.3%	12.7%
Total	Count	153	134	4	291
	% of total	52.6%	46.0%	1.4%	100.0%

Missing values =8

Chi-square =17.24; df=6; $p<.05$; critical value = 12.59

level (df = 6) thus, the difference is statistically significant.

Male students (24.7%) reported heavy use of the campus network compared to female students (12.4%) however, the medium use category reflected a similar pattern for both groups. Female students appear greater in percentage (16.5%, n = 48) over male students (9.7%, n = 28) in the last two categories; low and rare users. This finding demonstrates that male students are regular users of the campus network with nearly half of the male respondents indicating that they used the campus network at least once a day.

Frequency of connecting to the campus network is also analyzed with computer proficiency (see Table 3). A chi-square analysis indicates that there is a statistically significant relationship between these two variables. The calculated value of 49.16 exceeds the critical value of 21.03 at the .05 significance level (df =12), hence the difference is significant.

Students who reported to be Excellent, Very Good, and Good in their computer proficiency are the heavy users of the campus network. Students who rated themselves Very Good (15.9%) reported that they connect to the campus network at least once a day, while most (18.7%, n = 54) of the students who rated themselves Good are medium users. The next two computer proficiency categories, Fair and Poor, also show that most of the students in these groups are medium users. However, there are 5.2 percent (n = 15) of the Fair students who reported to be using campus network at low and rare usage categories. These findings show that the more proficient a student is in his/her computing skills, the more frequently he/she connects

Table 3

Frequency of Connection to the Campus Network: Computer Proficiency Cross-Tabulation

Variables		Excellent	Very Good	Good	Fair	Poor	Total
Heavy	Count	28	46	28	5	1	108
	% of total	9.7%	15.9%	9.7%	1.7%	0.3%	37.4%
Medium	Count	7	27	54	13	2	103
	% of total	2.4%	9.3%	18.7%	4.5%	0.7%	35.6%
Low	Count	1	11	21	7	1	41
	% of total	0.3%	3.8%	7.3%	2.4%	0.3%	14.2%
Rare	Count	3	6	19	8	1	37
	% of total	1.0%	2.1%	6.6%	2.8%	0.3%	12.8%
Total	Count	39	90	122	33	5	289
	% of total	13.5%	31.1%	42.2%	11.4%	1.7%	100.0%

Missing cases = 10
Chi-square =49.16; df=12; $p<.05$; critical value =21.03

to the campus network.

The analysis of this data is continued by looking at the difference between the year of studies, and the frequency patterns of connecting to the campus network (see Table 4). A chi-square test indicates that there is no significant relationship between these two variables. The calculated value of 17.40 is less than the critical value of 25.00 at .05 significant level (df = 15). However, the heavy users' category shows that juniors and seniors are the major users of the campus network. By contrast, none of the freshman reported to be using the campus network at the heavy use category. More (25.4%) senior students spent at least once a week connecting to the campus network, however, almost a similar percentage (24.1%) of senior students reported they use campus network at least once a day. Many graduate students also use the campus network at least once a week (3.1% n = 9).

Based on this data, it is reflected that the frequency of connection to the campus network is not related to the year of study. In the freshman category, there is no representative for the heavy user category. As students move to the next year of study, their frequency pattern in connecting to the campus network starts increasing. The junior and sophomore years are presented with most percentage of students are accumulated at the heavy users' range (at least once a day).

Next, the analysis looked at whether there is any difference in the frequency of connection to the campus network with WMU Grade Point Average. The comparison is illustrated in Table 5. A chi-square analysis indicates that there is no relationship between the frequency of network connection and WMU Grade Point Average. The

Table 4

Frequency of Connection to the Campus Network:
Year of Study Cross-Tabulation

Variables		Freshman	Sophomore	Junior	Senior	Graduate	Missing	Total
Heavy	Count	0	6	25	70	7	1	109
	% of total	0.0%	2.1%	8.6%	24.1%	2.4%	0.3%	37.5%
Medium	Count	2	1	17	74	9	1	104
	% of total	0.7%	0.3%	5.8%	25.4%	3.1%	0.3%	35.7%
Low	Count	1	0	3	30	6	1	41
	% of total	0.3%	0.0%	1.0%	10.3%	2.1%	0.3%	14.1%
Rare	Count	0	1	6	27	2	1	37
	% of total	0.0%	0.3%	2.1%	9.3%	0.7%	0.3%	12.7%
Total	Count	3	8	51	201	24	4	291
	% of total	1.0%	2.7%	17.5%	69.1%	8.2%	1.4%	100.0%

Missing cases = 8

Chi-square =17.40; df=15; $p<.05$; critical value=25.00

Table 5

Frequency of Connection to the Campus Network:
WMU Grade Point Average Cross-Tabulation

Variables		> 2.0	2.0-2.5	2.6-2.9	3.0-3.4	3.5-4.0	Missing	Total
Heavy	Count	1	16	34	28	26	4	109
	% of total	0.3%	5.5%	11.7%	9.6%	8.9%	1.4%	37.5%
Medium	Count	1	11	28	32	26	6	104
	% of total	0.3%	3.8%	9.6%	11.0%	8.9%	2.1%	35.7%
Low	Count	0	3	9	15	12	2	41
	% of total	0.0%	1.0%	3.1%	5.2%	4.1%	0.7%	14.1%
Rare	Count	0	1	9	15	11	1	37
	% of total	0.0%	0.3%	3.1%	5.2%	3.8%	0.3%	12.7%
Total	Count	2	31	80	90	75	13	291
	% of total	0.7%	10.7%	27.5%	30.9%	25.8%	4.5%	100.0%

Missing cases = 8

Chi-square =10.09; df=15; $p<.05$; critical value = 25.00

calculated value (10.085) is less than the critical value (25.00) at .05 significant level (df =15). However, the result in Table 5 shows that students who have a WMU GPA between 2.6-4.0 are the major heavy users of the campus network compared to others. The rest of the finding shows somewhat similar pattern.

The cross tabulation analysis between frequency of connection to the campus network and four variables: (1) gender, (2) computer proficiency, (3) year of study, and (4) WMU Grade Point Average, revealed that gender, and computer proficiency, are statistically significant at .05 significant level. Therefore, year of studies and WMU Grade Point Average are not statistically significant for this analysis.

Time Spent Online

Eight categories of time span were used to measure how much time on average students spent online per session. The categories are: (1) 10 hours or more, (2) 5-9 hours, (3) 2-4 hours, (4) one hour, (5) 30 minutes, (6) 15 minutes, (7) 5 minutes, and (8) less than five minutes.

However, in this analysis the measurement was further collapsed into four categories identified as: (1) Heavy users (at least 5 hours), (2) Medium users (at least one hour), (3) Low users (at least 15 minutes), and (4) Rare users (5 minutes or less). Analysis of time spent online is presented in Table 6.

It was found that 47.5% (n=142) of students fell in the category of medium users, that is students who spend at least one hour on average per session online. Most distributions are accumulated in the medium and low users' categories. The

Table 6

Items Related to Time Spent Online:
Frequency Distribution

Hours per session	n	Percentage
At least five hours	14	4.7
At least one hour	142	47.5
At least 15 minutes	111	37.1
Five minutes or less	24	8.0
Missing	8	2.7
Total	299	100.0

pattern is followed by 37.1% (n =111) students who reported they spent at least 15 minutes online. The combination of both categories amounted to 84.6 percent samples.

The first two scales (10 hours or more and 5-9 hours) showed less distribution of students (4.7%, n=14). Similarly rare user category (less than five minutes) have less students' usage (8%, n = 24).

Time spent online is further analyzed to see whether there is any significant differences between four variables: (1) gender, (2) computer proficiency, (3) year of study, and (4) WMU Grade point Average. Table 7 illustrates the comparison between male and female students with regards to their patterns of time spent online.

Based on the data presented in Table 7 it is apparent that there are not many

Table 7

Items Related to Time Spent Online:
Gender Cross-Tabulation

Variables		MALE	FEMALE	MISSING	TOTAL
Heavy	Count	9	5	0	14
	% of total	3.2%	1.8%	0.0%	5.1%
Medium	Count	76	64	2	142
	% of total	27.4%	23.1%	0.7%	51.3%
Low	Count	56	53	2	111
	% of total	20.2%	19.1%	0.7%	40.1%
Rare	Count	8	2	0	10
	% of total	2.9%	0.7%	0.0%	3.6%
Total	Count	149	124	4	277
	% of total	53.8%	44.8%	1.4%	100.0%

differences between male and female students' patterns of time spent online. Both groups spent an average of one hour online per session with male students slightly exceeding (27.4%) the number of female students (23.1%) in this usage category. The cross tabulation analysis proves that there is no significant difference between gender and time spent online. The calculated value (4.092) is less than the critical value (12.59) at .05 significant level (df = 6). Thus, this analysis is not statistically significant.

The comparison between time spent online and computer proficiency also, proves that there is no significant relationship between these two variables. The calculated value (20.609) is less than the critical value (21.03) at .05 significant level (df =

12). Computer proficiency is broken down into five categories: (1) Excellent, (2) Very Good, (3) Good, (4) Fair, and (5) Poor. Table 8 illustrates the patterns of hours per session based on different computer proficiency categories. The first three computer proficiency categories: Excellent, Very Good, and Good are the heavy users, even though the frequency distribution of these groups in this usage range is less compared to other usage range (medium and low). However, the numbers are significant when they are compared to students who rated themselves Fair and Poor. None of the students from these two categories reported to be spending time at least five hours online per session. In addition, most students of the first three categories of computer proficiency reported they spend at least one hour on average per session. The accumulation of percentages in this medium use category ranges from 6.5 to 22.8 percent.

Time spent online was also studied with relation to the year of studies. Table 9 describes the frequency distribution of these variables. Most of the distribution accumulated at the medium users' category (at least one hour). The percentage of students spending time online within the heavy and medium usage categories increases from freshman to senior. However, the chi-square test on these variables indicates that the relationship is not statistically significant. The calculated value (17.088) is less than the critical value (25.00) at .05 significant level (df=15).

The fourth variable that is analyzed with time spent online is the WMU Grade Point Average. The summary of the frequency distribution of these variables is presented in Table 10. A chi-square analysis indicates that there is no significant relationship between these variables. The calculated value (15.219) is less than the

Table 8

Time Spent Online and Computer Proficiency Cross-Tabulation

Variables		Excellent	Very Good	Good	Fair	Poor	Total
Heavy	Count	5	7	2			14
	% of total	1.8%	2.5%	0.7%			5.1%
Medium	Count	18	46	63	12	2	141
	% of total	6.5%	16.7%	22.8%	4.3%	0.7%	51.1%
Low	Count	11	38	48	13	1	111
	% of total	4.0%	13.8%	17.4%	4.7%	0.4%	40.2%
Rare	Count	2		5	3		10
	% of total	0.7%		1.8%	1.1%		3.6%
Total	Count	36	91	118	28	3	276
	% of total	13.0%	33.0%	42.8%	10.1%	1.1%	100.0%

Missing cases = 10

Chi-square = 20.61; df=12; $p<.05$; critical value = 21.03

Table 9

Time Spent Online and Year of Study Cross-Tabulation

Variables		Freshman	Sophomore	Junior	Senior	Graduate	Missing	Total
Heavy	Count		1	3	7	3		14
	% of total		0.4%	1.1%	2.5%	1.1%		5.1%
Medium	Count	1	5	25	93	17	1	142
	% of total	0.4%	1.8%	9.0%	33.6%	6.1%	0.4%	51.3%
Low	Count	2	2	18	83	3	3	111
	% of total	0.7%	0.7%	6.5%	30.0%	1.1%	1.1%	40.1%
Rare	Count			2	8			10
	% of total			0.7%	2.9%			3.6%
Total	Count	3	8	48	191	23	4	277
	% of total	1.1%	2.9%	17.3%	69.0%	8.3%	1.4%	100.0%

Missing cases = 22

Chi-square = 17.08; df=15; $p<.05$; critical value = 25.00

Table 10

Time Spent Online and WMU Grade Point Average Cross-Tabulation

Variables		> 2.0	2.0-2.5	2.6-2.9	3.0-3.4	3.5-4.0	Missing	Total
Heavy	Count			4	4	6		14
	% of total			1.4%	1.4%	2.2%		5.1%
Medium	Count	1	16	36	44	39	6	142
	% of total	0.4	5.8%	13.0%	15.9%	14.1%	2.2%	51.3%
Low	Count	1	10	32	38	23	7	111
	% of total	0.4%	3.6%	11.6%	13.7%	8.3%	2.5%	40.1%
Rare	Count		3	5	1	1		10
	% of total		1.1%	1.8%	0.4%	0.4%		3.6
Total	Count	2	29	77	87	69	13	277
	% of total	0.7%	10.5%	27.8%	31.4%	24.9%	4.7%	100.0%

Missing cases = 22

Chi-square = 15.22; df=15; $p<.05$; critical value = 25.00

critical value (25.00) at .05 significant level (df=15).

None of the students from the first two WMU GPA categories (less than 2.0 and 2.0-2.5) reported that they spent at least five hours on average per session. 2.2 percent (N= 6) of students who reported to have GPA between 3.5 to 4.0 spend at least five hours online. Overall, the frequency distribution reveals that more students spend at least one hour online per session.

The cross-tabulation analysis between time spent online per session and four variables: (1) gender, (2) computer proficiency, (3) year of studies, and (4) WMU Grade Point Average, revealed that all of these variables are not statistically significant for this analysis.

Accessing Campus Network

Students can access the campus network through various means. Connecting to campus network can be done through computer labs, libraries, residence hall, or even from off-campus.

A majority of students (63.5%) accessed the campus network from computer labs available on campus. Those connecting to the campus net-work from off-campus totaled 52.8 percent, while 22.7 percent were connected via libraries. Only 4.7 percent reported that they do not connect to the campus network at all. Table 11 describes the situation in detail.

Further analysis on access from residence hall depicted that 7.4 percent (n = 22) students get connected to the campus network by a modem and phone line, while

Table 11

Methods of Accessing Campus Network

Labs		Libraries		Off-campus		Residence hall	
N	%	N	%	N	%	N	%
190	63.5	68	22.7	158	52.8	38	12.7

4.3 percent (n = 13) students reported they used a direct connection.

Therefore, based from the table above, it is clear that connecting to campus network through computer labs is the most popular method.

Types of Use

To know how students connect to online networks, the research asked whether students use the five internet applications under study: (1) Electronic Mail (Email), (2) Listservs (3) Newsgroups and Bulletin Boards, (4) Internet Relay Chat (IRC), and (5) World Wide Web (WWW). A basic screening question, served as a terminal question, was used to identify whether respondents have ever used the inter-net or not. It was found that a very large majority (99.3%), which is equivalent to 297 students, used the internet. Eighty-six percent (n =257) of students have an email account through this university, however, only 75.9 percent or 227 students actually use their email account.

A smaller percentage is distributed to other internet applications. Only 23.7

percent of the samples subscribed to listservs while an enormous percentage (75.9%) did not subscribe to any listservs. Of those who subscribed to listservs, 20.4 percent reported that they subscribed to less than five listservs. A slightly higher percentage (25.1%) reported they read newsgroups and bulletin boards, while a large majority (74.6%) have never used the application. Similar to listservs, most students (22.1%) reported that they read less than five newsgroups and bulletin boards (see Table 12).

Table 12

Internet Usage Across Five Applications

	Email		Listservs		Newsgroups		IRC		WWW	
	N	%	N	%	N	%	N	%	N	%
Users	227	75.9	71	23.7	75	25.1	73	24.4	281	94.0
Non-users	33	11.0	227	75.9	223	74.6	225	75.3	17	5.4
Missing	39	13.0	1	0.3	1	0.3	1	0.3	1	0.3
Total	299	100	299	100	299	100	299	100	299	100

Internet Relay Chat patterns of use showed a similar patterns if compared to listservs and newsgroup and bulletin boards. Those who used IRC totaled 24.4 percent, while 75.3 percent reported they did not use IRC at all.

A different scenario is presented in the WWW's patterns' of use whereby, a large majority (94%) claimed they used the World Wide Web.

Internet Application and Frequency of Use

The internet frequency of use's depicts that the WWW and electronic mail constitute the largest population of internet users, with 94 percent of students reported that they used the WWW. Approximately 75 percent of students claimed they used email. Of the students reporting, 33.5 percent (n = 100) said that they used email at least once a day. Likewise, the world wide web's data showed a comparable finding with 100 students (33.4%) reporting that they used the WWW at least once a day. Therefore, slightly more than a quarter of students claimed that they are heavy users of both email and the World Wide Web. Table 13 shows the patterns in detail.

Table 13

Internet Application and Frequency of Use

	Email		Listservs		Newsgroups		IRC		WWW	
Frequency of use	n	%	n	%	n	%	n	%	n	%
At least once a day	100	33.5	29	9.7	13	4.3	19	6.3	100	33.4
At least once a week	94	31.4	32	10.7	35	11.8	28	9.4	112	37.5
At least once a month	28	9.4	5	1.7	19	6.3	16	5.3	58	19.4
Less than once a month	10	3.3	4	1.3	8	2.7	10	3.3	10	3.3
Non user	67	22.4	229	76.6	224	74.9	226	75.6	19	6.4
Total	299	100	299	100	299	100	299	100	299	100

Approximately 38 percent (n =112) of students are medium users of the WWW (at least once a week), while a slightly lower (31.4%, n = 94) number of students spent at least once a week using email.

Of the students reporting, 19.4 percent (n = 58) said they use the WWW at least once a month, while 9.4 percent (n = 28) said that they use email at this frequency level.

Out of 23.7 percent who subscribed to listservs, 9.7 percent (n =29) read listservs at least once a day, while one percent more (10.7%, n = 33) reported they read listservs at least once a week. In the low users range, reading listservs at least once a month, 1.7 percent (n =5) reported in this category. Hence, a large number of students fall under the category of medium users, reading listservs at least once a week. However, a somewhat similar number of students read listservs on a regular basis (at least once a day).

Thirty-five students (11.8%) that used newsgroups and bulletin boards reported they used these internet applications at least once a week, followed by 6.3 percent (n =19) of students who reported that they used it at least once a month. A smaller percentage (4.3%, n =13) reported that they read newsgroups and bulletin boards at least once a day. In summary, newsgroups and bulletin boards are read less frequently by students. Most students fall under the category of medium users, that is, reading these online forums at least once a week.

Results from the survey indicate that of the users of IRC 9.4 percent of students (n =28) are medium users. This pattern is similar to newsgroups/bulletin

boards, and listservs. However, the findings of IRC, listservs, and newsgroups/ bulletin boards are insignificant because the data was undermined by a large percentage of non-users.

Academic Uses Versus Social and Other Uses

Various types of activities ranging from academic uses to social uses were studied for each of the five internet applications in order to know which activities were commonly used and considered helpful by students.

The measurement used to evaluate the helpfulness of each of the internet activities was comprised of five scales. The scale ranged from Very Helpful to Not At All Helpful with a Not Sure scale positioned at scale number three.

Seven internet activities were measured in all internet applications to evaluate how students use the internet for different purposes. The activities were categorized into two: (1) Academic uses, and (2) Social uses. Academic uses of the internet were contacting experts, classmates/peers, and experts to discuss class-related issues. Social uses of the internet included keeping in touch with family and relatives, searching jobs, and engaging in online social life. An other category was also added to the list of activities.

However, this analysis further collapsed the measurement into three categories: Helpful, Not Sure, and Not Helpful.

Email

A large majority (76.9%, n =183) of email users reported that discussing with instructors through email is the most helpful academic use of email. Significantly, this activity is the most helpful across all evaluated activities. The frequency distribution for discussing class related issues with classmates and peers is showing that many students (28%, n = 66) tend to settle for the undecided scale (Not Sure). However, 41.9 percent of (n = 99) students evaluated this activity as helpful (see Table 14).

Table 14

Academic Uses vs. Social Uses of Email

		Helpful		Not sure		Not helpful	
		n	%	n	%	n	%
ACADEMIC USES							
	Contacting instructors	183	76.9	24	10.1	31	13.0
	Class-related interaction with classmates/peers	99	41.9	66	28.0	71	30.1
	Contacting subject matter Experts	79	33.6	93	39.6	63	26.8
SOCIAL AND OTHER USES							
	Keeping in touch with family	174	73.1	13	5.5	51	21.4
	Job search	135	57.4	64	27.2	36	15.4
	Online social life	153	64.3	40	16.8	45	18.9
	Others	29	58.0	16	32.0	5	10.0

Another academic use of email is contacting subject matter experts. Of email users, 33.6 percent (n = 79) considered contacting experts by using email as a helpful activity. Hence, the highlight of this data is the fact that communicating with instructors on class-related issues is the most popular email activity. The other two academic uses are reported less helpful compared to contacting instructors by using email.

Social uses of email are used by more students compared to academic uses. Generally a large majority (73.1%, n = 174) of email users reported that keeping in touch with family and relatives is the most helpful activity after contacting instructors. A large majority (64.3%) of email users considers extending online social life via email a helpful activity. Also significantly important is the use of email for job searching. Over half (57.4%) of email users regarded this activity as helpful. The finding on social uses of email show that students generally view all the non-academic activities as helpful.

In summary email uses are evaluated as helpful mostly for social uses. On the other hand, communicating with instructors is considered most helpful for an academic use.

Listservs

Academic uses of listservs is more distinguished by the activity of contacting subject matter experts with 52.9 percent of listservs' users regarding this activity as helpful. However, contacting instructors and classmates to discuss academic issues

was reported as less helpful (see Table 15). Therefore academic uses by using listservs is less obvious.

On the other hand, subjects tend to report that listservs are quite helpful for job searching with 58.6 percent (n =41) evaluating this activity to be helpful. Keeping in touch with family and relatives is less helpful via listservs compared to email. However, extending social life online is quite helpful with 47.9 percent of listservs users evaluating it positively. Therefore, listservs are most helpful for job searching

Table 15

Academic Uses vs. Social Uses of Listservs

		Helpful		Not sure		Not helpful	
		n	%	n	%	n	%
ACADEMIC USES							
	Contacting instructors	26	37.2	19	24.3	25	35.7
	Class-related interaction with classmates/peers	27	38.6	19	27.1	24	34.2
	Contacting subject matter Experts	37	52.9	18	25.7	15	21.4
SOCIAL AND OTHER USES							
	Keeping in touch with family	30	42.2	16	22.5	25	35.2
	Job search	41	58.6	19	27.1	10	14.3
	Online social life	34	47.9	17	23.9	20	28.2
	Others	14	63.6	5	22.7	3	13.6

even though not a large majority considered this activity as helpful.

Newsgroups and Bulletin Boards

Contacting experts in the field by using newsgroups/ bulletin boards is the most helpful activity with 61.4 percent (n = 46) newsgroups/bulletin boards' users reporting this activity as helpful. The other two academic activities are not helpful with 42.6 percent (N=32) regarding this activity as helpful while 36 percent regarding it as not helpful (see Table 16).

However, contacting instructors through this medium is clearly seen as not helpful with the number of students (44%, n=33) who reported it as not helpful outnumbering the number of students (38.7%, n=29) who regarded it as helpful.

The most helpful social and other uses of newsgroups and bulletin boards is job searching. 50.6 percent (n=38) of users considered this activity as helpful. Listservs' users also regarded job searching as helpful.

Internet Relay Chat (IRC)

There is less evidence that IRC users regard academic uses of this application as significant. A large majority of students evaluated all the academic uses as not helpful. Comparatively, the social uses of IRC are evaluated as helpful by most respondents particularly in the aspect of extending online social life. This is the most distinctive utility of IRC with 87.3 percent (n=62) IRC users regarding it as helpful. Keeping in touch with family and relatives is regarded as helpful by a large majority

Table 16

Academic Uses vs. Social Uses of Newsgroups and Bulletin Boards

		Helpful		Not sure		Not helpful	
		n	%	n	%	n	%
ACADEMIC USES							
	Contacting instructors	29	38.7	13	17.3	33	44.0
	Class-related interaction with classmates/peers	32	42.6	16	21.3	27	36.0
	Contacting subject matter Experts	46	61.4	14	18.7	15	20.0
SOCIAL AND OTHER USES							
	Keeping in touch with family	22	29.4	15	20.0	38	50.6
	Job search	38	50.6	22	29.3	17	20.0
	Online social life	34	45.4	20	26.7	21	28.0
	Others	8	40.0	10	50.0	1	5.0

(62%, n=44) of IRC users. However, different from listservs and newsgroups/bulletin boards, job searching through IRC is not considered helpful by most IRC users. In summary, the IRC is a social medium and less perceived by students as an academic utility (see Table 17).

World Wide Web (WWW)

A large majority (94%) of students claimed they used the WWW. The

Table 17

Academic Uses vs. Social Uses of IRC

			Helpful		Not sure		Not helpful	
			n	%	n	%	n	%
ACADEMIC USES								
	Contacting instructors		13	18.5	18	25.7	39	55.7
	Class-related interaction with classmates/peers		21	29.6	14	19.7	36	50.7
	Contacting subject matter Experts		28	39.5	13	18.3	30	64.7
SOCIAL AND OTHER USES								
	Keeping in touch with family		44	62.0	8	11.3	19	26.8
	Job search		16	23.1	26	37.7	27	39.1
	Online social life		62	87.3	4	5.6	5	7.0
	Others		12	54.6	4	18.2	6	27.2

investigation is pursued by looking at six activities that can be conducted using the WWW. Even though the activities are not similar with the rest of the internet applications studied in this research, (due to the nature of the web) the activities were chosen to measure subjects' patterns of use and are parallel or comparable to the other activities measured in the other internet applications. The activities are divided into two broad categories: academic and social uses of the web. Academic uses of the WWW include: (a) getting information on academic topics, (b) getting information for a class

assignment, and (c) retrieving class-related materials on web course pages posted by instructors. Social uses of the WWW include: (a) navigating web sites related to one's hobbies and interests, and (b) looking for job openings. An other category is added to the list of WWW activities. The summary of the evaluation is described in Table 18.

All activities evaluated under the WWW are considered helpful by a large majority of users of the WWW. More importantly, a large majority of web users attributed this technology as helpful in academic sense. All academic uses evaluated

Table 18

Academic Uses vs. Other Uses of the WWW

		Helpful		Not sure		Not helpful	
		n	%	n	%	n	%
ACADEMIC USES							
	Academic research	255	91.1	17	6.1	8	2.8
	Class assignment	228	81.5	30	10.7	22	7.9
	Instructors' course Pages	176	63.3	56	29.1	46	16.5
SOCIAL AND OTHER USES							
	Hobbies and interest	262	94.0	11	4.0	5	0.7
	Job search	182	65.9	70	25.4	24	8.7
	Other activities	31	54.3	23	40.4	2	3.5

under this application obtained 63.3 to 91.1 percent responses under the helpful category. Academic research turned out to be the most helpful among the three academic uses of the web with 91.1 percent (n =255). In summary, the WWW is embraced by a majority of users and a large majority regarded this technology as helpful.

Comparatively, the social and other uses of the web also gained positive evaluation from students. Using the web to pursue one's hobbies and interests is the most helpful activity compared to the other six activities. Ninety-four percent of the students evaluated this WWW utility as helpful. Job searching is also regarded as helpful by approximately 66 percent of web users.

Students' Perception of the Campus Network

Five point scales ranging from Extremely Satisfied to Extremely Dissatisfied with a Not Sure scale positioned at scale number three were used to measure students' satisfaction with the computing facilities available on campus. A large majority (66.5%, n=205) of students reported that they are satisfied with the computing facilities. Only 17 percent (n=51) of students claimed that they are not satisfied with the computing facilities. Hence, in general, students are satisfied with the computing facilities provided by the university (see Table 19).

Students' Evaluation of Their Computing Skills

This research looks at two types of computing skills: (1) computer proficiency to use online facilities on campus, and (2) computer proficiency with regards to the

Table 19

Satisfaction With Computing Facilities On-Campus

Variables	n	%
Satisfied	205	68.5
Not Sure	36	12.0
Not Satisfied	51	17.0
Missing	7	2.3
Total	299	100.0

demands in labor market. Five point scales ranging from Very Proficient to Not At All Proficient were used to evaluate students' proficiency to use online facilities on campus. Five point scales ranging from Extremely satisfied to Extremely dissatisfied were used to measure students' satisfaction with their computer proficiency in light of the demands in labor market. The summary of the results is presented in Tables 20 and 21.

Students perceived they are more confident to use online facilities on campus while less confident with their proficiencies in labor market. More students (18.4%) are not sure with their computer proficiencies in labor market compared to their proficiencies in using online facilities at WMU (7.7%).

Positively 74.6 percent ($\underline{n}$= 223) of students regarded themselves to be proficient to use online facilities on campus. While slightly lower (60.2%, $\underline{n}$= 180) are

satisfied with their computing skills in relation to the demands of computer proficiency in labor market. However, generally, students are satisfied with their computing skills either to use online facilities on campus or meeting the demands in labor market.

Table 20

Student Perception of Skills to Use WMU Computing Facilities

Variables	n	%
Proficient	223	74.6
Not Sure	23	7.7
Not Proficient	43	14.7
Missing	9	3.0
Total	299	100.0

Table 21

Satisfaction With Computer Proficiency: In View of the Demands of the Labor Market

Variables	n	%
Satisfied	180	60.2
Not Sure	55	18.4
Not Satisfied	52	17.4
Missing	12	3.7
Total	299	100.0

CHAPTER V

DISCUSSION

The purpose of this research was to investigate the existing patterns of students' usage of the online networks. A user survey comprised of 35 multiple choice questions was used to collect data. This research probed into the way students use the access to online networks provided by Western Michigan University (WMU) to bene-fit their learning. Two-hundred-ninety-nine students participated in this research which was conducted at Western Michigan University during the summer semester of 1998. The research findings are discussed in the following paragraph.

The theoretical framework of this research, (a) Cognitive apprenticeship, (b) Situated Cognition, and (c) Social Constructivism, argued that internet technologies in the learning environment would lead to students' empowerment. There is enough theoretical evidence from these theories that online networks can benefit the learning process. Universities have invested in these technologies because of this promise. However, the question that we need to address is how students are utilizing this technology.

The research questions of this research were constructed to understand the use of online technology in detail. The questions are categorized into four aspects of investigation: (1) Patterns of use of the online networks, which includes frequency of

connection to the campus network, time spent online, and methods of accessing campus network; (2) Types of use, which includes types of internet applications used, frequency of use, and academic uses versus social uses of the internet; (3) Students perceptions of the campus network; and (4) Students perception of their computing skills to use online facilities on campus and in view of the demand of computer proficiency in the labor market.

It was found that a large majority (99.3%, n=297) of respondents have used the internet. Most of them attributed their knowledge in using the internet to friends, while, the role of the University Computing Services' workshops (UCS) is found to be the least significant contributor of them all. This finding indicates that workshops provided by the UCS are not important enough in introducing students to online networking.

However, UCS is making a significant contribution towards students' computer proficiency. UCS is committed to providing up-to-date computer access to students at various stations on the campus particularly at the two major computer labs. A majority (68%) of students reported they access the campus network through the computer labs, and 66.5 percent (n=205) of the subjects claimed that they are satisfied with the computing facilities available for students' use. The literature review demonstrates that convenient access to computers leads to higher computer literacy. In this study, we found that students are satisfied with the computing facilities, hence we can surmise that convenient access to the technology is a contributing factor to the level of satisfaction. Therefore, by providing convenient access to computer facilities,

UCS is creating a suitable environment for the students to increase their computer literacy. Students' high levels of proficiency is reflected in the percentage of students (86%, n=255) who rated their computer proficiency in the first three proficiency categories: (1) Excellent, (2) Very Good, and (3) Good.

The study further examined how proficient the students are in the use of online facilities on campus. It was found that 74.6 percent of students are satisfied with their computer skills to use online facilities on campus. On asked if their online network skills are adequate to meet the needs of the labor market, over sixty percent of the (60.2%) students said they are satisfied with their computer proficiency to meet the demands of the labor market. This result is positively reflecting the confidence that the students have regarding their computer proficiency. Hence one could conclude that students have adequate resources and capacities to conduct academic related activities through the internet independently.

Furthermore, findings of this research unveiled that 36.5 percent of students are heavy users of the campus network. They connect to the campus network at least once a day and approximately 47 percent of the students reported they used the campus network at least one hour per session. It was also found that the more proficient a student is with computers, the more frequently he/she connects to the campus network. Therefore, computer proficiency is an important factor to predict students' frequency of connection to the campus network. Also significant, is the gender differences in the frequencies of connection to the campus network. Significantly more male students reported to be the heavy users of the campus network compared to the

female students. However, gender comparison with time spent online per session demonstrates that there is no significant difference between male and female students in terms of time spent online per session. Therefore, although male students connect regularly to the campus network, there is no significant difference in the amount of time they spent online per session compared to female students. Both male and female students are medium users of the network, where on average they spend at least one hour online per session. Hence, at this point we could assume that frequency of connection to the campus network does not necessarily lead to more time spent online per session.

The highlight of this research is the comparison between academic uses and social uses of the internet. Among the five internet applications studied in this research, the WWW and email are the two most popular internet applications. Most students conducted their online activities via email and the WWW. Positively, a large number of students use email and the WWW for academic related activities. The other internet applications--listservs, newsgroups and bulletin boards, and IRC--are minimally used for academic related activities. Generally students indicate "Not Sure" with the use of IRC, listservs, newsgroups, and bulletin boards for academic purposes. There are some academic related activities going on in these internet applications. However, the proportion of users is too small to consider these internet programs as worthwhile for academic goals. Merely a quarter of the respondents used IRC, listservs, newsgroups and bulletin boards. Therefore, their representations are not significant enough to generalize their findings. One could argue that only email and

the WWW are the major means of extending academic uses online at higher academic institutions.

This does not mean that students are not taking the advantage of the online networks provided by the university to conduct academic activities. As mentioned in the literature review, today's students are more attracted to a multimedia presentation such as the WWW. Based on that, it is possible to associate the large number of WWW users to the above reason. Newsgroups, bulletin boards, listservs, and IRC are among the earlier internet applications; hence the configuration is less appealing to today's students. The WWW, on the other hand, has gone through tremendous changes, and its penetration into our lives is highly apparent since its first inception in early 1990. Perhaps due to these reasons students are more comfortable using the WWW compared with other applications.

Due to the nature of student's usage of the internet across the five applications, the following discussion will look at electronic mail and the WWW in detail.

Electronic Mail (Email)

Email is embraced by approximately 75 percent of the respondents. On the average, 50.8 percent of email users reported that instructional uses of email fall within the helpful range. On the other hand, 23.3 percent reported it as not helpful. The most significant academic uses of email is for contacting instructors to discuss class-related issues. The significance of the other two academic activities, discussing

academic issues with classmates or peers and communicating with experts in the field, are less popular and both activities seem to sway into the undecided range.

Approximately 77 percent of email users regarded contacting instructors via email as helpful. Research on email proves that this internet application is a convenient medium to send messages instantaneously and a reliable medium to facilitate asynchronous discussion. Furthermore, it obliterates physical as well as time barriers. One can easily reach their instructors without having to deal with consultation hours. Therefore, physical presence is not a necessary condition in most cases to communicate effectively with instructors. For students who have some reservation to face instructors physically, this medium is the best way to meet their academic needs. Students can guarantee a more individualized discussion according to their interests and problems. These factors have contributed to the overwhelming usage of email in an academic context.

World Wide Web (WWW)

The WWW questions produced a more positive result. All academic activities evaluated under the WWW are regarded as helpful by subjects, demonstrating that the WWW is used in accordance with the assumptions made by the three theories. Students' patterns of use displayed a promising finding in which there seems to be a balance between educational and non-educational activities. The findings reflected that students were more interested to use the WWW in collecting resources pertaining to their academic needs compared to other media.

In the literature review, I have discussed some of the attributes of the WWW. For example, the open technical standard of the web allows one to customize their learning venture. Perhaps, a multimedia learning approach appeals more to students than text-based means. If this is the case, one could interpret that today's students are more likely to conduct learning activities in a more interactive platform such as the WWW.

Implications of the Study

The emergence of many internet technologies has to some extent triggered scholars and researchers to speculate or assume that they could change the way students pursue their learning. In fact, the internet technologies are said to embed features that could stimulate students' motivations. The means and theories are there to support the use of the internet in an academic context. The only way to know whether network connection is academically beneficial or not is to delve into students' patterns of use in order to see how they mobilize the resources made available to them by the educational institutions.

This study is especially significant for instructors as it suggests that student's patterns of use of the online networks portray an increasing interest in the WWW. However, the actual usage patterns of online networks is not in line with the expectations of the existing theories of learning and instruction such as Cognitive Apprenticeship, Situated Cognition, and Social Constructivism. These theories were developed in late 1980s, hence the consideration of internet technologies do not include the

WWW. Based on these theories researchers have argued that students would benefit from access to internet technologies such as email, IRC, listservs, newsgroups and bulletin boards. If our argument is based on the assumptions of these theories, we are more likely to conclude that students do not reap any benefits from internet connection. This is because only one quarter of the respondents use listservs, IRC, newsgroups and bulletin boards. Furthermore, students often engaged in social uses rather than academic uses of these applications. The predicted internet usage that learning environment would be enriched by discussions with experts and peers around the world using these electronic forums is not confirmed by the findings of this study. Most students did not turn to IRC, listservs, newsgroups, and bulletin boards to hold academic discussion. For example IRC is regarded as a major means to have an online social life. If students were to use IRC to hold both academic and social uses, the validity of the three theories may still persist. Therefore, the argument of these theories is not supported in this respect.

A new direction leading to the development of theories for predicting internet usage is needed to explain the premises of each of the internet applications and the significance of each application in the learning environment. Assumptions made by the theoretical framework predicted that students would engage in social dialogue with social factors. Interacting in conversation-like activities through IRC, email, newsgroups and bulletin boards are highly expected when students have access to these technologies.

However, these social interactions are less embraced by a majority of students.

Most students prefer a more advanced mode of interaction, not necessarily confined to human interaction but including interaction with information. The web offers a new genre for conducting academic activities. Through the web, students interact with information rather than humans. Furthermore, information gathering can be a more enriching experience than social interaction with peers or classmates over the IRC, or email. Therefore, social interaction as predicted in the three theories is less likely to occur.

Another important finding that needs to be highlighted in this study is the fact that one quarter of the respondents used IRC, newsgroups, bulletin boards, and list-servs. Although IRC is shown to be primarily a social medium, listservs, newsgroups, and bulletin boards do seem to have academic potential. Among the users of these online forums, 61.4 percent (n =46) of newsgroups and bulletin boards' users reported they used these applications for consulting subject-matter- experts. Likewise, 52.9 percent (n= 37) of listservs' users reported they used the application for contacting subject-matter-experts. Therefore, among the users of these forums, more than half are using them to discuss class related issues with experts on the field. Even though the number of users is small, they do use these forums for academic activities. There is a probability that most students do not use these online forums because they do not know how to use them. Further, students may not aware of the uses of these applica-tions for academic purposes. Perhaps, these online forums require a great deal more promotion and training by the UCS. This information is helpful for the UCS especially in reflecting that there are students who use these online forums for academic

purposes. The WWW's popularity may override online forums such as listservs, newsgroups and bulletin boards. Therefore the significance of these forums is not visible to students. The UCS can take an active role to promote the academic uses of these online forums so that more students will use these forums to engage in academic discourses with experts in the field around the world.

However, students are more comfortable using the WWW and email to conduct academic activities. Students pursue their academic research by using the WWW because this medium serves as a giant encyclopedia in today's world. Using the WWW can easily retrieve an abundance of information. Online journals, newspapers, and magazines are widely available over the web. Therefore, information age students tend to form their academic activities into a new pattern that is more gratifying and interacting. The web is a medium of many platforms. It serves as a source of entertainment and education. Due to its user-friendly nature students' academic activities are geared towards the web. Using email on the other hand can extend social interaction. Therefore, student's usages of both of these internet applications (WWW and email) are complementary for each other.

Also critical is the emerging trend among students to adapt the WWW as a major means to support their academic needs. Approximately 80 to 90 percent of students claimed that they used the WWW to get information for class assignment and to conduct academic research. In a glance, this is a positive finding on the uses of the WWW in an academic context. But, this information could also reflect that students are geared toward relying on online information to write their papers. There seems to

be an emerging trend among students in higher academic institutions to depend on the convenience of the WWW. Without much effort, they can download lots of information as main resources for their class assignment. If most students prefer to depend on an easy source such as the WWW, this is an important issue to be addressed in research. Present and future students may not live to appreciate the value of library and books. Another concern is the issue of authenticity of information available on the web. Students may not be able to judge the credibility of the resources that they collected from the web hence, the validity of their work may be questionable.

Limitations of the Study

This study was conducted during summer semester and there were less class offerings throughout the university curriculum. There were also fewer students in a class compared to fall and winter semesters. It was assumed that there would be 20 students in each class, however, there were classes that had only five students, and not every student was willing to participate in the survey. In addition, there were a number of non-traditional students who participated in this research.

The data collection process consumed a lot of time because the respective instructors needed to give their consent prior to the distribution of the survey in their classes. Furthermore, some instructors were reluctant to let the survey be conducted in their classes due to time constraints of a shortened summer schedule. If this survey were to be conducted during long semesters, more students' participation could be anticipated. During summer semester, there are some departments that offered only

graduate classes; therefore their possibility to be selected as samples of this research study was removed.

It is also worth mentioning that the result of this study might be different if this survey would be conducted during fall or winter semesters. Students might not have access to computer labs as easily during these semesters and the off-campus modem dial is congested during peak hours. Students might not be satisfied with the computing facilities available for their use, hence the finding of this research might be different.

Conclusion

This study serves as a preliminary research to explore students' usage of the online networks provided by WMU. Due to the nature of the research study, there was no hypothesis of relationship or differences being proposed. However, the data collected in this study is quite comprehensive covering students' demographic background, computer-related background, patterns of use, computer proficiency, and evaluation of helpfulness of five internet applications. Each internet application was studied in detail, scrutinized for its frequency of use, and types of activities conducted. The above process has generated a valuable insight in understanding the existing patterns of use of the internet; thus, individual patterns of each of the internet application use can be inferred.

There are many interesting findings that are not discussed in this paper due to the nature of the research. However, I would like to make some suggestions for

future research on this topic. One is able to hypothesize relationships and differences based on the generated data. Below are some of the suggestions for future research.

Gender differences in the use of the online networks and the underlying reasons could be further investigated.. Furthermore in investigating students' pattern of use one could draw on equal samples from all area of studies to sustain a more balanced look into the differences of these groups. Given more time and human resources this research could be a valuable evaluation means for the university management in assessing its academic networked environment.

The next level of this kind of research should explore the relationships and differences between different groups and a theoretical framework could be designed to explain this phenomena. A thorough understanding of the relationships and differences between different groups would lay a foundation to the development of a new theory that explains the patterns of students' use of the online networks.

Appendix A

Protocol Clearance From the Human Subjects Institutional Review Board

Human Subjects Institutional Review Board

Kalamazoo, Michigan 49008-3899

WESTERN MICHIGAN UNIVERSITY

Date: 6 July 1998

To: Joseph Kayany, Principal Investigator
Norbaiduri Ruslan, Student Investigator

From: Richard Wright, Chair Richard A. Wright

Re: HSIRB Project Number 98-06-10

This letter will serve as confirmation that your research project entitled "Online Networks in Institutions of Higher Education: An Assessment of Student Use" has been **approved** under the **exempt** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 6 July 1999

Appendix B

Mission Statement: University Computing Services

University Computing Services

Kalamazoo, Michigan 49008-5154
616 387-5430

WESTERN MICHIGAN UNIVERSITY

UNIVERSITY COMPUTING SERVICES

MISSION STATEMENT

University Computing Services (UCS) is the organization providing a variety of computing and data communication services to the WMU community as well as to the region. The mission of UCS is to furnish computing support for instruction, research, administration, and public service goals of Western Michigan University along with connectivity to information resources throughout the world. Our goal is to provide the highest quality leadership, infrastructure, and professional service to meet the needs of students, faculty, staff, and administration through the application of information technology resources.

GUIDING PRINCIPLES

Quality is foremost - Quality work is our top priority and continuous improvement forms the basis for our activities.

Support and Service are the focus of everything we do - Our work is done keeping in mind our customers, the people who comprise our University community. Hardware, software, and systems are only a means of meeting their needs.

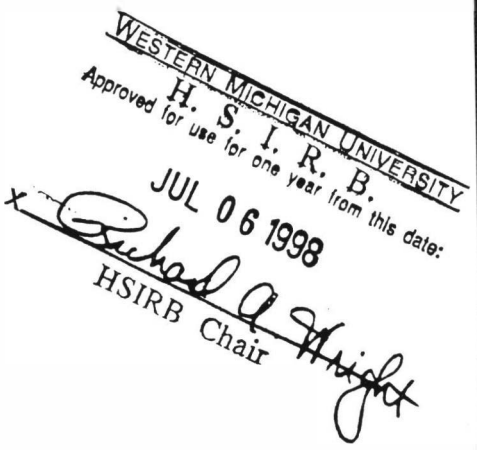
Positive human relations are our standard - Respect and trust serve as the foundations for our team actions and we encourage friendly, professional interaction in an atmosphere of open, effective communication.

Professional development is a personal commitment - All staff members are expected to develop a broad understanding of the UCS enterprise as well as to improve their appropriate specialization skills. UCS is committed to providing an environment that is conducive to such initiatives through training, encouragement, and support.

Integrity is the rule - Our work is conducted in an open and responsible manner that serves as a model for ethical behavior in the University computing environment.

Appendix C

Consent for Anonymous Data



Consent for an Anonymous Survey

You are invited to participate in a research project entitled "Online networks in institutions of higher education: An assessment of student use" designed to analyze students' patterns of use of the online networks, being conducted by Dr. Joseph Kayany and Norbaiduri Ruslan from Western Michigan University, Department of Communication. This research is being conducted as part of Norbaiduri Ruslan's Master's degree requirements. Subjects must be in the age range of 18-25 years to be eligible for participation. This survey is comprised of 35 multiple choice questions and will take approximately 10 minutes to complete. Your replies will be completely anonymous, so do not put your name anywhere on the form. You may choose not to answer any question and simply leave it blank. If you choose to not participate in this survey, you may return the blank survey. If you have any questions, you may contact Dr. Joseph Kayany at (616 387-3139), Norbaiduri Ruslan at (616 387-6187), the Human Subjects Institutional Review Board (616 387-8293) or the vice president for research (616 387-8298).

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Subjects should not complete this document if the corner does not show a stamped date and signature.

Appendix D

Survey Instrument

The purpose of this survey is to assess students' patterns of use of the online networks provided by this University.
Your replies will be completely anonymous, so do not put your name anywhere on the form.
Please circle your answer. Select only one answer unless stated otherwise.

1. Do you have access to a personal computer other than those provided on campus.
   (1).Yes (2). No

2 .Rate your computer proficiency
   (1).Excellent (2).Very Good (3).Good (4).Fair (5).Poor

3. What type of computer are you are familiar with? (Circle all that apply)
   (1).Macintosh
   (2).Windows based (IBM compatible)
   (3).Unix-based
   (4).Other (Please specify: _____)
   (5).Not familiar with any type of computer

4. Have you ever used the internet? (e.g. email, World Wide Web, etc.)
   (1).Yes (2). No (You can stop here).

5. If yes, where did you learn to use the internet? Please rank the options provided in terms of their contributions to your knowledge in using the internet.

   _____ Friends/colleagues
   _____ Instructional workshops by the UCS
   _____ Books
   _____ Others: (please specify: _____)

6. How do you connect to the campus network? (Circle all that apply)
   (1).From computer labs on campus
   (2).From the libraries
   (3).From off-campus
   (4).From residence hall on-campus. Specify by using which method?
      a. by a modem and phone line
      b. by a direct connection
   (5). Not at all.

7. How frequently do you connect to the campus network?

(1).Several times a day
(2).Daily
(3).Several times a week, but not daily
(4).Once a week
(5).Every other week
(6).Once a month
(7).less than once a month

8. How much time on average do you spend online per session?

(1).10 hours or more
(2).5-9 hours
(3).2-4 hours
(4).1 hour
(5).30 minutes
(6).15 minutes
(7).5 minutes
(8). less than 5 minutes

Your use of <u>Electronic Mail (Email)</u>

9. Do you have any email account through this University?

(1).Yes (Go to Question 10)
(2).No (Skip Question 10 through 12.Go directly to Question 13).

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10. If yes, do you use your email account?

(1).Yes (Go to Question 11)
(2).No (Skip question 11.Go directly to question 13).

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11. If yes, how frequently do you use your email?

(1).Several times a day
(2).Daily
(3).Several times a week
(4).Once a week
(5).Every other week
(6).Once a month
(7).Less than once a month

12. How ***helpful*** is the EMAIL account for each of the following activities. Circle your answer according to the list provided.

a. Keeping in touch with family and relatives.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

b. Communicating with instructors on class-related issues.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5). Not at all helpful

c. Discussing class-related issues with classmates and peers.

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

12. How ***helpful*** is the EMAIL account for each of the following activities.

d. Communicating with experts in the field (other than your instructor) on-class related issues.

(1).Very helpful (4). Not helpful
(2).Helpful (5). Not at all helpful
(3).Not sure

e. Having on-line social life/friendships.

(1).Very helpful (4). Not helpful
(2).Helpful (5). Not at all helpful
(3).Not sure

f. Looking for job-openings.

(1).Very helpful (4).Not helpful
(2).Helpful (5). Not at all helpful
(3).Not sure

g. Other (please explain).....

(1).Very helpful (4).Not helpful
(2).Helpful (5). Not at all helpful
(3).Not sure

Your use of <u>Listservs</u>

13 .Do you subscribe to any listservs (electronic mailing, distribution lists)?

(1).Yes (Go to Question 14)
(2).No (Skip Question 14 through 16. Go directly to Question 17)

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14. If yes, how many listservs do you subscribe to?

(1).less than five (2).five to ten (3). eleven to fifteen (4).more than fifteen

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15. How frequently do you read your listserv?

(1).Several times a day (5).Every other week
(2).Daily (6).Once a month
(3).Several times a week (7).Less than once a month
(4).Once a week

16. How ***helpful*** is the LISTSERV for each of the following activities?

a. Keeping in touch with family and relatives

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

16. How ***helpful*** is the LISTSERV account for each of the following activities.

b. Communicating with instructors on class-related issues.

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

c. Discussing class-related issues with classmates and peers.

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

d. Communicating with experts on the field (other than your instructor)on class related issues.

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

e. Having on-line social life/friendships.

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

f. Looking for job-openings

(1).Very helpful (4).Not helpful
(2).Helpful (5).Not at all helpful
(3).Not sure

g. Other (please explain).....

(1).Very helpful (4).Not helpful
(2).Helpful (5). Not at all helpful
(3).Not sure

Your use of Newsgroups and Bulletin Boards

17. Do you read newsgroups and/or bulletin boards?
    (1).Yes (Go to question 18)
    (2).No (Skip question 18 through 20. Go directly to question 21)

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18. If yes, how many newsgroups and/ or bulletin boards do you regularly read?
    (1).less than five (2).Five to ten (3). eleven to fifteen (4).more than fifteen

19. How frequently do you read the newsgroups and/or bulletin boards?

    (1).Several times a day
    (2).Daily
    (3).Several times a week
    (4).Once a week
    (5).Every other week
    (6).Once a month
    (7).Less than once a month

20. How ***helpful*** are the NEWSGROUPs or/and BULLETIN BOARDs for each of the following activities.

a. Keeping in touch with family and relatives.
    (1).Very helpful
    (2).Helpful
    (3).Not sure
    (4).Not helpful
    (5).Not at all helpful

b. Communicating with instructors on class- related issues
    (1).Very helpful
    (2).Helpful
    (3).Not sure
    (4).Not helpful
    (5).Not at all helpful

c. Discussing class-related issues with classmates and peers.
    (1).Very helpful
    (2).Helpful
    (3).Not sure
    (4).Not helpful
    (5).Not at all helpful

d. Communicating with experts in the field (other than your instructor) on class-related issues.
    (1).Very helpful
    (2).Helpful
    (3).Not sure
    (4).Not helpful
    (5).Not at all helpful

e. Having on-line social life/friendships.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

f. Looking for job-openings.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

g. Other (please explain).....

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

Your use of Internet Relay Chat (IRC)

21. Do you use internet relay chat?

(1).Yes (Go to question 22)
(2).No (Skip question 22 through 23.Go directly to question 24)

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22. If yes, how frequently do you use internet relay chat?

(1).Several times a day
(2).Daily
(3).Several times a week
(4).Once a week
(5).Every other week
(6).Once a month
(7).Less than once a month

23. How ***helpful*** is the INTERNET RELAY CHAT (IRC) for each of the following activities?

a. Keeping in touch with family and relatives.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

b. Communicating with instructors on class-related issues.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

c. Discussing class-related issues with classmates and peers.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

d. Communicating with experts in the field (other than your instructors) on class-related issues.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

e. Having on-line social life/friendships

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

23. How ***helpful*** is the INTERNET RELAY CHAT (IRC) for each of the following activities?

f. Looking for job-openings.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

g. Other (please explain).....

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5). Not at all helpful

Your use of the <u>World Wide Web (WWW)</u>

24. Do you use the World Wide Web?

(1).Yes (Go to question 25)
(2).No (Skip question 25 through 26. Go directly to question 27)

25.If yes, how frequently do you use the World Wide Web?

(1).Several times a day
(2).Daily
(3).Several times a week
(4).Once a week
(5).Every other week
(6).Once a month
(7).Less than once a month

26. How ***helpful*** is the WORLD WIDE WEB (WWW) for each of the following activities?

a. Getting information for a class assignment.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

b. Getting class-related materials posted on the Web course pages by your instructors.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

c. Getting information on academic topics that are of personal interest you.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

26. How ***helpful*** is the WORLD WIDE WEB (WWW) for each of the following activities?

d. Navigating web sites related to your hobbies and interests.

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5).Not at all helpful

e. Looking for job openings.

(1).Very helpful
(2). Helpful
(3). Not sure
(4).Not helpful
(5).Not at all helpful

f. Other (please explain).....

(1).Very helpful
(2).Helpful
(3).Not sure
(4).Not helpful
(5). Not at all helpful

27. Are you satisfied with the computing facilities available for students on campus ? How satisfied are you?

(1).Extremely satisfied
(2).Satisfied
(3).Don't know
(4).Dissatisfied
(5).Extremely dissatisfied

28. Are you satisfied that your computing skills are adequate to use the online facilities at WMU?

(1).Very proficient
(2).Proficient
(3).Not sure
(4).Not proficient enough
(5).Not at all proficient

29. Are you satisfied that your computing skills are adequate to meet the demands of computer proficiency in labor market?

(1).Extremely satisfied
(2).Satisfied
(3).Not sure
(4).Dissatisfied
(5).Extremely dissatisfied

BACKGROUND

30. Sex ? (1).Male (2).Female

31. Age? _____

32. Year of studies: (1).Freshman (2).Junior (3).Sophomore (4).Senior (5).Graduate

33. Area of studies: _____
34. WMU GPA: (1) Less than 2.0 (2) 2.00-2.5 (3) 2.6-2.9 (4) 3.0-3.4 (5) 3.5- 4.0

35. Are you a transfer student from another college or community college?

(1) Yes (2) No

Thank you for your time in completing the survey.

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