Awareness and Use of the Internet by Academic Staff and Students of the University of Ghana

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DECLARATION

I hereby declare that except for reference to other people's work, which I have duly acknowledged, this thesis is the result of my own research work and it has neither in part nor wholly been presented elsewhere for another degree.

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Dedication

This thesis is dedicated to my husband and my children, for all their sacrifices, love and support that have enabled me to complete this thesis.

Acknowledgment

I thank the Lord my God for the opportunity to pursue this course and the grace to complete it successfully.

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Evelyn D. Markwei.

Abstract

The aim of the study was to find the extent of awareness and use of the Internet and its services by academic staff and postgraduate students of the University of Ghana. The purposes for , motivations, the limitations and barriers in using the Internet were explored; so were the differences in use among staff, students, and faculty.

The survey method was used. Questionnaires were distributed to 175 academic staff and 216 postgraduate students. One hundred and twenty three (123) and 121 usable responses were received from staff and students respectively. The responses have been presented and analyzed.

The main findings of the study indicate that, both staff and students are fully aware of the Internet and most of its services. Academic staff in general use the Internet and its services more than students. However, both staff and students from the science faculty use the Internet and its services more than those from the Arts and Social Science faculties. The study also established that, among the services, e-mail is highly used by both staff and students. The main motivation for using the Internet is communication with friends and colleagues; and the main limitation in Internet usage is slow data transmission in the case of staff, and difficulty in locating information in the case students. The main barriers to using the Internet are frequently disrupted service and inadequate time available to users for accessing the net. A significant relationship has been established between Internet use and age of student, faculty of student, and computer usage of both staff and students.

Both staff and students found the Internet a very useful resource that, provides them with information in their subject fields. The main reason for non-use of the Internet is inadequate training.

The study recommended among others, the training of staff and students to use specific tools to ensure effective use of the Internet in all their academic pursuits.

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CHAPTER ONE

1. BACKGROUND TO THE STUDY

Information is always a vital and an indispensable component of any academic environment. It makes for effectiveness in any academic system. Both lecturers and students need to use information daily in their various academic endeavours. For decades both academic staff and students have actively used the library and its resources as their main information source. Today information on any conceivable subject from all parts of the world is available to any lecturer or student once he or she has access to the Internet (or the net).

The Internet is a powerful, worldwide network of computers interconnecting thousands of national, regional and local networks scattered around the globe. It has a huge mass of online information from computer networks, library catalogues, bibliographic databases, government organisations, industries, commercial sources, newsgroups, individuals etc. from around the world. The Internet is therefore, a major information resource to all categories of organisations and individuals.

In the developed countries for example, North America, where Internet access is widespread, it is now an integral part of the whole economy, actively used to augment classroom work and also as a major addition to library resource. It is commonplace to find both staff and students in these countries accessing information on the net for academic purposes. In fact, access to the Internet is viewed by faculty and students as a core resource and right similar to a library card. (USA Today, 1996)

For academics in third world countries, especially Sub-Saharan Africa, the Internet could not have come at a more opportune time. This is because most academic institutions in this part of the world are plagued with lack of current books and journals, which are needed for successful academic endeavours. Their deficiencies arise from inadequate funding by their governments and institutions. In Ghana for example, the government has consistently reduced subvention to tertiary institutions for the past several years. Therefore, libraries in these institutions hardly get any funds for acquisition of new books and journals. It is possible to undertake a research without finding a single relevant and current article from the library. A researcher has to depend on Inter-Library loan and other sources for a good literature review. With the advent of the Internet, therefore, academics in Ghana and other Sub-Saharan Africa countries can now gain access to much needed current and timely information for their various activities. It is, therefore, expected that staff and students in academic institutions in Ghana will take advantage of the wealth of information on the Internet and use it widely and effectively for their academic pursuits considering the persistent lack of current information in their libraries.

The problem however, is that, Internet features and their uses are not well known by many staff and students, leading to low level of usage for academic work. Those who use them only do so to communicate with friends through electronic mail (email) and to look for some information. This problem has also been noticed by Brown (1994) who states that, "a widely quoted fact on the Internet is that, only 10% of the faculty with access to the Internet actually use the Internet. And of those, only 30% use it for anything other than e-mail. There are many possible reasons for this. One is lack of awareness of the information resources on the net and of the skills to locate the specific information required". It must be said that, very

few studies have been done to validate the above statement by Brown. According to Tillotson (1995), although the Internet is known to have many users, only few studies have been published on what it is being used for.

The main aim of this study is to find out whether staff and students are taking advantage of the valuable information resources of the Internet in their academic endeavours and, if not, why they do not exploit it to the extent they should. To achieve this aim, the following objectives are being pursued:

1. To investigate and compare the awareness, use and non-use of the Internet and its services among various faculties and also among academic staff and students;
2. To find the purposes for Internet use;
3. To study the barriers, limitations and motivations to use of the Internet;
4. To show relationships of age, gender, discipline, access to computer, position or rank and research activity on Internet use;
5. To make recommendations for effective use of the Internet by academic staff and students.

A similar study conducted by Lazinger et al (1997), at the Hebrew University of Jerusalem, focused on only faculty members, and awareness of the Internet and its services was not included. The researchers found, among other things, that e-mail is extensively used by all faculty members, that faculty members from the sciences generally use the Internet and its services more than those from the humanities and social sciences; that senior faculty members use the Internet less, although they found this inconclusive and finally, that, the primary influences of the Internet on the professional life of all faculty members are, increase

in cooperation with colleagues, especially distant colleagues, and improved access to databases and research updates.

The Internet has been described as "a democratic agora, an electronic meeting place where individuals throughout the world could interact as equals despite differences in nationality, race, social status, gender and other status or physical attributes" (Rheingold, 1993). However, the rapid growth of the Internet has not been without problems. Gilbert, (1994) ha described it as a "library already overflowing with books, with more arriving all the time, bu there's nothing like an Internet Dewey Decimal Classification system yet to find what you need". Consequently looking for information on the Internet is difficult and requires some training and expertise.

Some of the problems that users have encountered are information overload and slow data transmission (Applebee et al, 1997). A few Internet user studies have also concentrated on university students (Perry et al, 1998 and Miller and Ford, 1996). Some of the findings of these researchers are that, majority of students in developed countries have their own web pages, use e-mail, use the Internet, among others, for academic purposes and generally expec to use the Internet in their future careers.

This study is focused on both students and faculty members and the following hypotheses will be tested:

1. Staff and students who use computers tend to use the Internet more than those who do no use computers.
2. Staff and students from the sciences use the Internet more than those from the other disciplines.
3. The higher the position of staff the less he/she uses the Internet.

4. Males use the Internet more than females.
5. The young use the Internet more than the old.
6. Staff and students engaged in research activity use the Internet more than those who are not doing any research.

The researcher considers this study very important and relevant for three reasons. First, the unsatisfactory condition of information provision in academic libraries in Ghana, that is, the libraries are simply full of outdated books that need to be weeded out. Most students visit the libraries to sit and ready their notes and not to look for information. In fact, some lecturers hardly visit the library. They depend on their personal books, journal subscriptions and other sources for their information needs. Obviously, no university can thrive in such a situation and this is why the use of the Internet should be promoted so that both staff and students can take advantage of its vast resources of timely and up-to-date information.
This study will examine the state of Internet usage in the University of Ghana and make recommendations for more effective use.

Secondly, the researcher perceives that, effective use of the Internet may help to ease the pressure on the universities to take more students. This is because adoption of the Internet for comprehensive distant learning programs would encourage students, especially working and also married students who can afford the cost of distant learning to do so. This will make it possible for the university to cater for more students without provision of extra accommodation facilities. Secondly, it will reduce costs to the university and make university education accessible to most, if not all, qualified students. Thirdly, it will go a long way to minimize, if not eradicate, the prevalent clashes of students with authorities over inadequate accommodation facilities. Fourthly, an examination of the literature on the

Internet has revealed that a large category deals with the impact of the Internet on libraries and library services. Very few studies have been published about what the Internet is being used for and by whom (Applebee et al, 1997). Furthermore, no studies were found to have investigated the awareness of the Internet and its services by any group at all. Therefore the researcher has chosen to undertake this study of the Awareness and Use of the Internet by Academic Staff and Students of the University of Ghana to add to the body of knowledge on that important aspect of Internet use.

The study consists of five chapters:

Chapter One is a background to the study discussing among others the aim objectives and justification for the study.

Chapter Two is the literature review of the study. It starts with the historical background of the Internet, narrating how the Internet grew out of an earlier United States Department of Defense project, the ARPANET, that was put into place in 1969 as a pioneering project to test packet-switching networks. ARPANET also provided links between researchers and remote computer centers, but was dismantled in 1990. Its successor, the Internet, continues to grow. The chapter continues with a discussion of the resources and various services offered by the Internet and its benefits to academics and academic institutions. This is followed by a literature review of Internet use by academics. It concludes with a summary of findings of previous studies, emphasizing how the present study will compliment the literature on Internet use for academic purposes.

Chapter Three focuses on the methodology of the study. It commences with the explanation of methodology and the impact of data type on the selection of methodology. The rest of the chapter is devoted to explaining why a quantitative path has been chosen under the heading

research design, and also the procedures that have been followed in the pursuit of this study. It discusses, among others, the selection of population, sampling design, data collection instrument and analysis of the data.

Chapter Four deals with data presentation and analysis of data.

Chapter Five begins with the discussion of results, with emphasis on how they relate to the findings of previous studies, followed by summary of findings and conclusions. The chapter ends with recommendations for a more effective use of the Internet.

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CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

The Internet was developed from work which was done for the United States Department of Defence which, during the cold war years, was concerned that in the event of a nuclear attack, the communications system could be knocked out by missiles hitting key communication centres. Consequently, they began to develop a distributed system, which could withstand the destruction of any number of its component nodes and still continue to function. (Dawson, 1997). Today the Internet is a global web of computer networks integrating together local area networks (LANs) located in schools, libraries businesses, government agencies, research institutes, and other entities into a single, large communication networks that spans the globe. (Sheldon, 1994).

2.2. Historical Background of the Internet

The Internet, according to Kahn et al (1997), was created by the United States Department of Defense to serve two main purposes:

1. To share research between the military, industry and university sources.
2. To sustain communication in the event of a nuclear attack (by the Soviet Union).

According to Khan et al (1997), the first recorded description of the social interactions that could be enabled through networking was a series of memos written by J.C.R. Licklider of Massachusset Institute of Technology (MIT) in August 1962 discussing his "Galactic Network" concept. Licklider envisioned a globally interconnected set of computers through which everyone could quickly access data and programs from any site. In spirit the concept

was very much like the Internet of today. Licklider was appointed the first head of the United States Defense Advanced Research Projects Agency or DARPA. (DARPA is an extension of the US Department of Defense assigned to fund basic research needed by the military, in universities, and commercial or non- profit organizations) Whilst there, he convinced his colleagues Ivan Sutherland, Bob Taylor, and a researcher from MIT called Lawrence G. Roberts of the importance of his networking concepts. Another MIT researcher, Leonard Kleinrock, who studied 'packet switching', proposed the feasibility of communications using packets instead of circuits. One of the main advantages for packets in the transmission of information is that, any errors on the communication link affect only a small part of the transmission and that is easily retransmitted (Sheldon, 1994). This proposition became a major step towards computer networking.

The next step was how to make computers talk together. This step was researched by Roberts and Thomas Merrill in 1965. They connected a TX-2 computer in Massachusettes to a Q-32 computer in California with a low speed dial-up telephone line. This became the first wide-area computer network ever built. The setback in this experiment was that, the circuit switched telephone system was found to be inadequate for the job. At this point Kleinrock's packet switching idea was considered as a better option. By 1967, Roberts had published a plan for the first packet-switched network called the 'ARPANET' or Advanced Research Projects Agency Network. In 1968, the overall structure and specifications for the ARPANET was refined. A key component of the ARPARNET called Interface Message Processors (IMP) which were packet switches was also released in the same year by a team from BBN (Bolt Beranek and Newman). Since Kleinrock was the one to bring the packet switching idea, his Network Measurement center at UCLA (University of California, Los Angeles) was selected as the first node on the ARPANET. In September 1969, the BBN team installed the

first IMP at UCLA and the first host computer was connected. Stanford Research Institute (SRI), which supported the Network Information Center, was selected as the second node for the ARPANET. In October 1969, SRI was connected to the ARPANET. This was followed by the transmission of the first host-to-host message from Kleinrock's Laboratory to SRI. By the end of 1969 two other host computers had been added to make four. In December 1970 Networking Group (NWG) under S. Crocker completed an initial ARPANET host-to-host protocol called the Net Control Protocol (NCP). Between 1970 and 1971, the NCP was implemented at all ARPANET sites. In October 1972, Bob Khan of DARPA, who played a leading role in the architectural design of the overall ARPANET, organized the very first and successful demonstration of the ARPANET to the public, at the International Computer Communications Conference (ICCC).

In March the same year, Ray Tomlinson, motivated by the need for coordination between the ARPANET developers, wrote the basic email message, send and read software. In July, Roberts expanded the utility of the email software by writing the first e-mail utility program to list, selectively read, file, forward, and respond to messages. It is from this point that email took off as the largest network application. The network was further improved when Khan introduced the idea of 'open architecture'. According to Kahn et al, (1997) the open architecture made it possible, among other things, for each individual network to be separately designed and developed, each with its own unique interface which it may offer to users and other network providers.

Khan also worked with Vint Cerf of Stanford to develop a new communications protocol to meet the needs of an open architecture network. This protocol is what is now known as the Transmission Control Protocol/Internet Protocol (TCP/IP). There was a smooth transition of

the ARPANET host protocol from NCP to TCP/IP on January 1st, 1983. This transition permitted the ARPANET to split into two, namely, MILNET to support military operation requirements and ARPANET to support research needs.

The usefulness of the ARPANET, especially electronic mail, was obvious to other communities and disciplines. Consequently many organizations started their own computer networks. The US Department of Energy (DoE) for example, established MFENet for its researchers in Magnetic Fusion Energy. The Corporation for Research and Educational Networking also built the 'Because It's Time Network' (BITNET) mainly for electronic mail services. The most important of these newer networks is the NSFNET funded by the National Science Foundation. It is based on the ARPANET''s TCP/IP technology and is meant to serve the entire higher educational community irrespective of discipline. Till that time, the earlier networks were restricted to few communities of scholars. In 1973, the first international connections were made with England and Norway. By 1977 many more international connections had been made, hence, the name Internet, i.e., 'International network'. The ARPANET was finally decommissioned in 1990.

2.3. Services and Resources Available on the Internet for Academics

For academics to make effective use of the Internet, they must know the services and resources available on it and what they are used for. These services are electronic mail, file transfer protocol (ftp), telnet, and newsgroups, talk services, private enhanced mail, and news among others. These services have been documented and discussed by many authors and researchers, among whom, are Ed Krol, (1992), Sheldon, (1994), Dawson, (1997) and Klobas, (1997). Some of these services are briefly explained below.

2.3.1. Electronic mail

This is a basic activity of the Internet and a substitute for postal communications. It links computers by wired or wireless connections and allows users, through

their keyboard, to post messages and read responses on their monitors. Email provides an excellent opportunity for the rapid and cheap exchange of ideas, questions and answers within moments rather than days.

2.3.2. File transfer protocol (Ftp)

Ftp is the program used to transfer files of data around the Internet. It enables a user to get copies of any text or article of interest by transferring it from a host computer to a personal computer. A user can also use ftp to access anonymous accounts, which are host accounts that are open to the public, usually without a charge. This procedure, referred to, as 'anonymous ftp' often requires, the provision of a password, usually a personal email address, in full. Then one can navigate through the directory structure of the host computer and access any required information.

2.3.3. Telnet

Telnet is used for logging into other computers on the Internet. It is used to access lots of public services, including library catalogues and other kinds of databases. There are various Telnet clients available with different local capabilities and options, but they all fulfill a basic function, that is, with telnet, a user is able to access whatever services the remote machine provides to its local terminals. A user needs to have an account and a password before he can log into these public services and library catalogues. However, a non-account holder may be able to log into some of these facilities as a 'guest' or use a special password to access a particular type of service from the facility. According to Dawson (1997), "there are many public access sites which allow anyone to use their facilities; and services such as Archie, ftp, and gophers at many sites also use a form of "standard log-in" for anyone who wants to use their resources". Computer files

containing textual documents, graphics, data, video, computer software, and any other digitized material can be transferred rapidly with a few simple commands.

2.3.4. News Groups

News groups are variously referred to as bulletin boards, open forums, discussion groups or electronic conferences (Klobas, 1997). A longstanding and widespread set of news group is Usenet. Usenet is a group of systems that exchange news. It encompasses universities, government agencies, businesses, and home users. Users post announcements, gossip and speculations; they also pose and answer questions, comment on issues and developments, and ask for comments on drafts of papers. There are seven major news categories, these are:

- *Comp-* Computer Science and related topics. This includes computer science "proper", software sources, information on hardware and software systems, and topics of general interest.
- *news-* Groups concerned with the news network and news software These include the important groups *news.newusers.questions* (questions from new users) and *news.announce.newusers* (important information for new users).
- *rec-* Groups discussing hobbies, recreational activities, and the arts.
- *sci-* Groups discussing scientific research and applications (other than computer science). *Sci* includes news groups for many of the established scientific and engineering disciplines, including some social sciences.
- *soc-* Groups that address social issues, where 'social' can mean politically relevant or socializing, or anything in between.
- *talk-* forums for debate on controversial topics. The discussions tend to be long-winded and unresolved.

- *misc*- Anything that does not fit into the above categories, or that fits into several categories

2.3.5. Information Discovery Services

The volume of information on the Internet is staggering. An April 1998 article in Science Magazine measured the size of the Internet and reported 320million pages at the time. This figure has grown to 380million pages in addition to hundreds of new databases. (Kassel, 1999). Consequently, the most difficult task for Internet users is navigation, that is, finding out what relevant files or databases exist and where they are located. Several Internet services have been designed to improve file location and transfer and also aid information retrieval in general. These retrieval services include directories, search engines, meta-search engines, and information gateways. A few of these services namely, Archie, Gopher, WAIS, WWW, among others, relevant to the study are discussed below.

2.3.6. Archie

Archie is a system which allows searching of indexes of what files are available on public servers on the Internet. It indexes over 1000 servers and 2.1million files worldwide. It is the place to start when searching for programs, data or text files. A user may ask Archie either to find file names that contain a certain search string or suggest files whose description contains a certain word. It then returns the filenames that meet the search criteria, and the name of the servers containing those files.

2.3.7. Gopher

Gopher was one of the first tools that made a big difference to information provision and retrieval on the Internet. It started out as a distributed campus information service at the University of Minnesota. Its primary function as

mentioned by Ed Krol (1992), is to "go fer" things and therefore the name *gopher* was coined. It is a menu-based system, and allows information providers to make their existing files of information accessible across the net. It also provides the Internet user with a simple interface to browse what is available and to retrieve any information of interest.

2.3.8. WAIS

WAIS stands for Wide Area Information Server. It is designed to access indexed data. It has servers that maintain indexes of Internet documents. The system works in the following way: a user selects his or her sources from a list held by the WAIS system, gives it the search instructions, and then that client server contacts other servers on which the user's selected resources reside. These servers are made to run the searches bringing back the results to the user.

2.3.9. The World Wide Web (WWW or W3, or the Web)

The web is the fastest growing part of the Internet. It is a vast collection of multimedia documents located around the world and it is based on hypertext documenting. A hypertext document is organized as a number of pages, each of which has parts of the text acting as pointers to other pages in the document. If users want to know more about one of these linked elements, they simply select it. They are then sent to the relevant page, which in turn contains both ordinary and linked text, from which they can proceed down a new path, or return to the previous page to take a different track.

2.3.10. Search Engines

Search engines are used to find specific information. They are web pages containing forms into which a user types search requests in the form of keywords. The search engine then scans its database and presents the user with a list of web

sites matching the search criteria. The search engine's database is created by spider crawlers/robots, software programs that scout the web looking for new sites. When the spider finds a new page it adds its Internet address or URL (Universal Resource Locator), title and usually the headers starting each section to an index in the search engine's database. Search engines like Lycos and Excite add index information every day.

The larger the index compiled by a search engine the greater the chance of a successful search. The sizes of three of the popular search engines as at April 6th, 2001 were as follows; AltaVista, 560million pages, Northern Light, 350 million and Excite 250 million (Searchenginewatch.com). Meanwhile, the size of the Internet was 2 billion pages as at July 2000. (Cyveillance.com). These figures show that, a large proportion of the web is not reached at all through search engines. Thus, it is important for users of the Internet, especially researchers, to learn about the size and features of the different search engines and use them appropriately for search requests. The key features of two of the largest search engines as recorded by Kassel (1999), are as follows:

AltaVista (http://www.altavista.com)

- Good for specific searches.
- Offers an advanced query feature with more search options.
- Allows for a natural language query.
- Provides a translator between English and five languages that is useful but has been criticized as not "too good".
- Offers Boolean and proximity searching.
- Includes field searching.

- AltaVista is not as user friendly as Hotbot, (another popular search engine) but once mastered is the favorite for many.

Northern Light (http://www.northernlight.com)

- Provides content that encompasses both the web and Northern Light's Special Collections, which are articles that can be purchased from more than 5,000 publications on a pay-as-you-go basis for $1.00 to $4.00 each. Some of these publications are not available from other commercial vendors.
- Advanced power, and industry searches narrow results by document type such as press release or product type.
- Automatically refines every search by creating Custom Search Folders with similar sites by subject, source, or type.
- Enterprise accounts for corporations and organizations are available.

2.3.11. Metasearch Engines

Metasearch engines are search tools that allow a user to use several search engines to track down information. Dogpile is an example of a metasearch engine; it allows one to search 1) large search engines such as Infoseek, Excite, Lycos etc., 2) Usenet: Reference.com, Dejanews, 3) More than 2 dozen online news services or other types of sources, all at once. Other metasearch engines are Metafind, Oneseek, Metacrawler, etc.

2.3.12. Directories

The Internet also offers online directories for example Yahoo. Yahoo is a directory or a catalogue of web sites and other Internet resources arranged in a complex hierarchy of categories and sub- categories, valuable for searching broad general topics. Queries, originally sent to Yahoo are forwarded to a major search

engine. This is especially useful since it is selective rather than as all encompassing as search engines.

2.3.13. Information Gateways

Information gateways are online catalogues of Internet resources that are used to locate high quality resources relevant to academic work on the Internet. They are produced by librarians or subject specialists. Some of the leading information gateways are:

- *Biz/ed: business and economics*
- *BUBL: library and information science*
- *EELS: computer science and engineering, cold region technology*
- *OMNI: health and biomedicine*
- *SOSIG: Social sciences.*

2.4. Benefits from Resources on the Internet for Academics

The Internet is a major information resource to all categories of organizations and individuals, including academic staff members and students, by virtue of the huge mass of information from computer networks, library catalogues, bibliographic databases, individuals, newsgroups, government organizations, industries, commercial sources etc., on it. In developed countries, it is commonplace to find both staff and students accessing information on the net for academic purposes.

For academics in developing countries, especially Sub-Saharan Africa, the Internet could not have come at a more opportune time. This is because of lack of current books and journals, which are needed for successful academic and research endeavors. In Ghana, for example, it is possible to undertake research in an academic institution without finding a single relevant

and/or current article from the library. A researcher has to depend on inter-library loan and other sources for materials for a good literature review.

With the advent of the Internet, it is now possible for academics to gain access to much needed information more readily for their various activities. All categories of academics, namely, lecturers, students, researchers, librarians, administrators etc., can benefit from the resources of the Internet.

Lecturers can subscribe to alerting services, news and discussion groups in their subject areas so as to remain current in their subject fields. For example, discussion groups of different subject areas can be identified by accessing a database called 'List of lists', News groups and Electronic serials (at WAIS list.src). This database contains all known electronic mail discussion groups. 'Scout report for social sciences' at (http://scout.cs.wisc.edu/scout/report/socsi/) is a USA Internet awareness service for academics, students and librarians in the social sciences. It offers an annotated list of new Internet resources that have been selected by librarians and content specialist working with the social sciences.

Academics can make professional contacts by accessing electronic mailing lists of different subject groups, online directories of professionals in various fields and organizational home pages, which feature, among other things, the peoples, who work there. For example, 'College and University home pages' (at http://geowww.uibk.ac.at/univ/) is a homepage of universities and colleges worldwide, which is arranged both alphabetically and geographically. A lecturer who needs to plan the content of a new course can access the websites of universities doing the same course for such information. In fact some lecturers are making their course plans and lecture notes freely available over the net. An example is

'The World lecture hall' (at http://www.utexas.edu/world/lecture). This site contains links to pages created by faculty staff worldwide who are using the web to deliver class material. The collection is managed by staff from the University of Texas to allow academics to share their resources.

For research, the net is most beneficial. With regard to student researchers, Kisiedu (1997) has stated that, "the net can aid students writing term papers to select research topics by browsing through databases". Library catalogues (which abound on the net) and online periodicals, (for example Ingenta (at http://www.ingenta.com) offer free searching of millions of academic and professional articles from about 25,000 journals. Abstracts are accessed free of charge and there are links to full text services on a pay per view basis. Mail archives, discussion groups etc., can be accessed by both lecturers and students for literature reviews. Bibliographic databases with abstracts can help researchers to decide quickly on articles to order. Those with full text articles are a bonus since the researcher can download articles of interest consequently saving cost and time.

Researchers can also contact specialists in their fields of interest by identifying their addresses from mailing lists, conference reports and electronic journal articles. The doctorate student can avoid duplication of a research topic by browsing databases of research in progress on the net. For example, 'Research libraries information network' (at telnet rlg. Stanford.edu) is one of the largest online catalogue of catalogues encompassing most major research libraries in the United States. It has, among other resources, a database of research in progress, (however one needs to register first before accessing it).

Students who want to pursue postgraduate courses abroad can identify the universities offering courses of interest on the net, (previously such information in most third world

countries was obtained from the British Council libraries and the United States Information services). Virtually all the correspondence with these universities can also be done by email. Information on academic conferences also abounds on the net. According to Kirkwood (1997), "the web is an excellent source of information on past and future conferences of all types". It is possible for an academic to ascertain the various conferences available in his or her subject area and select the one of interest to him or her and all the necessary information required. In fact some conference web sites make provision for registering online.

Academic librarians are also taking advantage of the net to offer good service. Reference librarians in the developed world are using the net actively as a reference source. Apart from the many online library catalogues and other databases, they also use BUBL (Bulletin Board for Libraries), which is an information service for library and information science professionals and the wider community they support. BUBL, according to McMahon (1995) "is an excellent reference tool which can help with all sorts of enquiries using Internet resources such as Archie". Subject librarians will find the 'BUBL Subject Tree particularly useful because it gives a wide range of resources on the Internet in each subject area. (BUBL can be accessed at Gopher:BUBL.BATH.AC.UK).

Acquisition departments in most academic libraries in the developing world are experiencing inadequate funds and increases in exchange rates coupled with higher monograph and periodical costs. Therefore, they are only able to acquire a very small portion of the world's publications. This has made access to information on the Internet very important (Hollis, 1998). The potentials of the Internet for acquisitions has been explored by Dunsire (1994). He discusses e-mail, ftp and the online checking of library catalogues and publishers' catalogues where distance is now irrelevant in checking online information. The British Library LIR

Report 102 (Vickers and Martyn, 1994) continues this theme and says that the future points to access to information rather than collection building and to sharing of resources.

The acquisitions librarian can use the Internet to access Publishers' catalogues and library catalogues, which will aid in the acquisition process in several ways. It can be used to check what will be published in the near future and whether a title is in print or in stock and how many copies are available. Book selection can be enhanced by the ability to check databases for information. Some library catalogues provide circulation details, which would indicate the popularity of a particular book (Hollis, 1998). Databases on the net can also be useful. For example, OCLC's Firstsearch. OCLC (Online Computer Library Catalog) is one of the best known network catalogues, originally American in membership but now international, spanning the Americas, Australia, New Zealand and most of Europe (Kisiedu, 1997). Its catalogues are available to users of every member library. Users of non-member libraries can only access OCLC by special arrangement. Firstsearch is a search mode established by OCLC to be used by libraries. The service is not directly accessible to individual users except through an OCLC library. The catalogues on Firstsearch consist of over 36million records citing material owned by libraries worldwide, for example the British Library Lending Division (BLLD) and the Library of Congress. Such databases can be used to check bibliographic information to ensure that order records are of a high standard and contain sufficient information for the supplier to identify the book. According to Hollis, (1998) most university presses and many commercial publishing companies in the United States and United Kingdom, have their catalogues online, some with the facility to order online, meaning a book can be ordered immediately. This could be very beneficial to libraries, as it is an efficient and fast means of obtaining material.

The Internet can be used to make course information available and to supplement classroom instruction. Entire courses are now being offered on the Internet (Perry et al, 1998) and some universities are offering both undergraduate and postgraduate courses online. Lohr (1996) cites University of Phoenix as an example. He notes also that in governors in ten western states in the United States of America have agreed to create a virtual university. He continues that, in this university; "there would be no ground, hallowed or otherwise... At Virtual U., there is no need for costly land, buildings or roads. There are no books, no protests, no students griping about food, parking, or surly roommates. And space is never a problem. In cyberspace, there is always room for more" (Lohr, 1996).

Africa is also a participant in the formation of virtual universities. The African Virtual University (AVU) started operating in July 1997 as a World Bank project but is presently an independent organization with its headquarters in Nairobi. AVU's mission is to bridge the digital divide and the knowledge gap between Africa and the rest of the world by dramatically increasing access to global education resources throughout Africa. It maintains a sophisticated, Internet-based digital library of journals, academic studies, and textbooks that allow both student and teacher alike access to the world database of information. One of the project's objectives is to reduce the brain drain by offering an attractive alternative to studying abroad, that is, quality education of international standards and with international accreditation at an affordable cost. Its focus is on areas of knowledge, which are critical to economic development namely, science, engineering and technology, management and health programs, but which are, inadequately catered for by local African institutions of higher learning. Courses are taught by world-renowned professors from universities in Africa, the United States, Canada and Europe. Courses are presently offered in English and French. AVU hopes to offer degree programs in Electrical and Computer Engineering, and Computer Science starting from October 2001. Presently, it is offering pre university courses, language

instruction, business training, and seminars on various subjects. Since the project was launched in 1997, it has accomplished the following:

- More than 12,000 students have completed semester-long courses in engineering and in the sciences.
- Over 2,500 professionals have attended executive and professional management seminars on topics such as Strategy and Innovation, Entrepreneurship, Global Competences, E-commerce and Y2K.
- 10,000 free e-mail accounts have been opened and can be accessed through the AVU web site.
- Students and professionals in 15 African countries have received over 2,500 hours of interactive instruction in English and French (Martey, 2001).

The AVU currently works with 25 partner institutions in 15 countries. The participating institutions in Sub-Saharan Africa are the:

- University of Ghana, Legon, Ghana.
- University of Cape Coast, Cape Coast, Ghana.
- Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- University of Addis Ababa, Ethiopia.
- Kenyatta University, Nairobi, Kenya
- University of Makerere, Kampala, Uganda.
- Uganda Polytechnic, Kampala, Uganda.
- Martyrs University of Uganda, Nkosi, Uganda.
- University of Zimbabwe, Harare, Zimbabwe.
- National University of Science and Technology, Bulawayo, Zimbabwe.

- University of Dar-Es-Salaam, Tanzania.
- Open University of Tanzania, Tanzania.

The benefits discussed so far show that the Internet indeed is a valuable resource to the Academic world and everything necessary should be done (especially third world countries) to make full use of its immense potentials.

2.5. Use of the Internet by Academics

The Internet became a feature of the scholarly information space in 1991 when WAIS online databases, PC- based email software, and gopher catalogs of links to information repositories and anonymous Ftp archives of data were introduced. (Ciolek, 1998). In September 1993 when the first modern software for hypertext navigation and display was introduced, the Internet became recognised as a worthwhile tool for productive scholarly work. Although the Internet is expected to have a significant impact on the way scholars or academics work, very few studies have been published in this regard. (Applebee et al, 1997 and Lazinger et al 1997). Majority of the published literature, according to Applebee et al, deals first with the development, general definitions and terms relating to the facilities provided by the Internet (Gould, 1990, Stix, 1994). A second category of literature relates to the impact of the Internet on libraries and library services, specifically how the Internet can improve library services (Elson, 1994; O'Brien, 1994). Other contributions, for example Klobas (1994), discuss the Impact on and opportunities for library staff.

In relation to academic use of the Internet, Newton-Smith and White (1995) have discussed how academics may more effectively use the Internet and how library staff might provide this assistance. Others, for example, Milne (1992); Mulvaney and Steel (1993); and McClure (1994); have conducted studies, which largely explore the impact of the Internet on scholarly communication patterns.

With regard to Internet use studies, Lazinger et al (1997) have grouped the literature into three. The first group deals with Internet use studies among library and information professionals (Croner and Johnson 1994, Tillman and Ladner, 1992). The second group is Internet use studies among the general population (Perry 1995), and among other sectors of the population, for example, commercial enterprises (Cronin et al 1994), and in specific professions like aerospace engineering (Bishop 1994). The third category deals with studies of Internet use among college or university faculty members.

This study is focusing on both faculty members and students of the University of Ghana.

Lazinger et al, (1997) have further observed that, most of the published studies on faculty use of the Internet, first of all deal with specific segments of the university faculty or with specific uses of the Internet. Secondly, they continue that, "nearly all of them analyze patterns of use only among the segment of the academic population which uses the Internet"

In other words, the studies are limited in scope. Very few of them, for example, include respondents from all academic disciplines and also academic use of the various services available on the Internet. These few include Abel et al (1996), and Lazinger et al, (1997). On the other hand, Chu (as cited in Lazinger et al, 1997) published an Email survey of two United States universities whilst Bane and Milhein (1995) conducted a survey of use by academics who subscribed to 231 randomly chosen discussion groups.

Abel et al just cited above, have also commented on the approaches that are taken to develop categories of users based on use of an information source, for example, the arbitrary assignment of users into frequent or infrequent user categories. They have argued that, "such a simple characterization is not very useful, since it does not consider the fact that, some services need more frequent use than others" Abel et al, 1996). Faculty members, they point

out, may tend to read their emails daily but may access remote computers for the purpose of running programs much less often. In the opinion of the researchers, classifying frequency of use for particular network services is much more illuminating.

This study is investigating frequency of use of the various Internet services and not just 'frequency of use of the Internet' in general. The Internet services included in this study are email, discussion groups, network news, telnet and file transfer protocol (ftp), among others. The sources consulted so far have shown that these services are the basic ones used by most academics.

2.5.1. Use of email by Academics

Email is the most basic function of the Internet. It is the one function common to all the networks and the most used. (Tillman and Ladner, 1992). This statement is also true of the academic environment, as demonstrated by the various studies discussed below.

Adele et al, (1995) published the results of an Internet use survey entitled "How Academics are using the Internet". The survey questionnaire was distributed by e-mail to 231 randomly selected discussion groups from a list of Scholarly Electronic Conferences. A total of 1,536 survey questionnaires were completed and returned to the researchers for analysis. Their results showed that 87% of the survey respondents were from educational institutions on the Internet. The survey was also international in scope in that, there were respondents from all the continents namely America, Asia, Africa, Europe, and Australia. One of the objectives of the survey was to ascertain the frequency of use of the various Internet services. According to the survey results, 90% of the respondents indicated that they used personal email more than once a week.

In another study by Liebscher et al, (1997) the involving Science and Engineering faculties in six (6) universities in the South Eastern United States, questionnaire were sent to 371 faculty members with a return rate of 59%. The results showed that email was the most used service with 75% of respondents indicating they used email, at least, once a day.

Chu, (1994) reported that an e-mail survey administered to faculty at two universities in the United States showed that the majority of faculty members (92%) included in the study, used email in scientific communication.

Studies conducted in individual universities elsewhere in the world also confirmed the high use of email by academics. At the University of Canberra in Australia, Applebee et al (1997) conducted a survey on academic use of the Internet. Out of a total questionnaire of 324 sent to an equal number of academic staff, 243 (75%) responses were received. The results indicated that, email was the most used service. In fact, one respondent reported receiving between 50-100 e-mail messages daily. Lazinger et al (1997) reported that, out of the 371 faculty Internet users who participated in a study at the Hebrew University of Jerusalem, 362 (97%) used the e-mail.

The predominant use of e-mail is also reflected in the results of studies conducted on individual professions. For example, in a study involving 431 aerospace engineers, Bishop (1994) reported that, electronic mail for one on one communication was the most used service (80% of them reported doing so).

Studies involving students also show high email use. Marklein (1997) wrote that use of email by college students in the United States is so common that for some of them, "it is like picking up a phone". In one study, researchers used survey data to extrapolate that 9.1 million college students use email regularly and 6.1 million use it almost daily. (Marklein, 1997).

Published studies on student use of the Internet reviewed so far excluded frequency of use of the various services. However, Kessler (1997) conducted a study at the Kennesaw State University entitled 'Nursing students computer needs study'. The study involved 199 students and the aim was to provide students and faculty with data on current level of computer availability, literacy, and usage among nursing students, and the computer needs of the students. The use of the Internet was also explored. The results showed that, although 82% of the students are familiar with email, only 15.6% used it daily, and 35.2% used it weekly. A percentage of 48.4% never used email at all. The researcher was surprised at the low frequency of use of email since 98% of the students questioned used computers and 64.2% also had an Internet service provider. A percentage of 50.8 of the students, however, indicated they used their computers for word processing only or specific class assignments. This may explain the low patronage of the email.

2.5.2. Use of Electronic Discussion Groups / Network News by Academics

It is generally accepted that participation in discipline oriented electronic discussion groups can alleviate a great deal of the professional isolation a faculty member at a small university may feel (Liebscher et al, 1997). This is because within a department, a faculty member may be the only one practicing a particular discipline. Therefore, it is expected that faculty members in small universities would take full advantage of this communication source. However, in a study involving six (6) small universities in the southern eastern United States, Liebscher et al, (1997) discovered that only a few faculty members used this source and less frequently too, than email.

Their results also supported the trend that, many more people participate in the discussion groups as "listeners" (passive participants) and seldom, if ever, contribute. Out of a total of 371 respondents 53% reported receiving up to 20 messages a week but none of the respondents reported sending up to 10 messages a week. The researchers explained that the

low participation in the discussion groups might be due to the fact that faculty members may prefer more traditional information sources like journals and colleagues to meet their needs. Secondly, lack of awareness by these faculty members of electronic discussion groups of interest to them was cited as a possible reason. Bishop (1994) also reported 50% out of 431 aerospace engineers using discussion groups compared to 80% who used e-mail. Other researchers like Applebee et al (1997) and Lazinger et al (1997) have also found that discussion groups are not used as widely as the email.

The results of a survey conducted by Adele et al (1995) however, showed that, about 75% out of a total of 1,536 respondents accessed discussion groups more than once a week. This result was not surprising since the survey was actually sent out through various discussion groups. The researchers reported that, net news and various electronic journals were accessed far less frequently. Only about 37% of the respondents accessed them more than once a week. An Australian study by Applebee et al 1997, reported that a quarter of respondents (out of a total of 243) participated in online discussion groups, and that about half of the respondents reported never using discussion groups.

The results of the studies above show that indeed, discussion groups are not as popular as email among academics.

2.5.3. Use of File Transfer and Telnet Services by Academic

Most, if not all, of the sources mentioned above include the use of ftp and telnet services in their surveys. Liebscher et al (1997), for example, observed that these services are also used by most academics, especially those with limited library and other information resources. In their study of network use in six (6) small institutions, the researchers just cited above reported that 65% of their respondents are using these services. Lazinger et al (1997), also reported a fair use of these services.

In the opinion of Adele et al (1995), however, file transfer is not that popular. In their study involving various discussion groups, they actually listed popular file transfer sites on their survey instruments. Their results revealed that these sites were accessed relatively infrequently. Only 5% of respondents out of a total of 1,511 indicated they used these sites several times a month. An average of 95.12% of respondents accessed these sites once a month or less. A small average of 2% respondents accessed these sites more than once a week.

The Australian study by Applebee et al, (1997) showed a higher usage of Telnet. They reported that in some respects usage was even higher than e-mail use; only 18% of respondents reported never using Telnet. Their result is rather contrary to the popular notion that most people use the Internet only to access email.

2.6. Purposes for which Academics use the Internet

There is very little on the purposes for which academics use the Internet in the literature reviewed so far. While some researchers report the purposes for Internet use by academics in general, others indicate the purposes for which academics use the different services of the Internet. In almost all cases, however, the focus is on the purpose for which academics use the email.

The limited literature on the purposes for which academics use the Internet indicate that, academics use the Internet for the following purposes; to look for information, to find out more about the Internet, to read news, send mail and for recreation. This was revealed in an online survey conducted at the University of Toronto, a major research university in Ontario, Canada, by Tillotson et al, (1995). The survey covered the whole university community and,

therefore, included academic staff, students, administrative staff, library staff, etc. The researchers further inquired about what respondents would do with the information obtained from the Internet. Majority of users (57% of 505 respondents) indicated they would use the information for personal interest. Other uses ranked in descending order included, research projects, professional purposes, educational assignments, and dissertations. The researchers explained that the high level of use for personal interest might be due the time the survey took place, which was between semesters and at the beginning of a semester. They also thought that, undergraduates were the most likely to say they would use the information for personal interest. Graduate students and faculty, whose work patterns are less affected by the end of a semester, were the ones likely to say that they would use the information for research, dissertation, or professional purposes. (Tillotson et al, 1995).

Applebee et al, (1997) employed both focus group discussion and a survey in their study. The results of the focus group discussion, which comprised of staff known to be Internet users, showed that academic staff used the Internet to access email, search for data, obtain routine information, such as conference announcements and job vacancies, and contact international colleagues involved in research.

Other uses are, to identify and approach experts in a field, and to access library catalogues for information to be used in teaching. The survey involved all academic staff (total, 324), and the researchers specifically wanted to find out whether respondents used the network to contact libraries and other document delivery services, distribute lecture notes or to receive assignments from students. The results showed that majority of the respondents did not use the network for these purposes, and that those who did, did them rarely. However, the majority of respondents used the network to access the University's campus-wide information service and to contact a variety of computer databases. The researchers sought to

find out what the respondents would have liked to use the Internet for. Some of the uses they mentioned were multimedia projects, distance supervision, and aspects of research and scholarship.

Klobas, (1997) has also described in great detail some of the ways in which Australian university staff used the Internet. The study involved staff from two Australian universities (the names of the universities were not provided). Staff members were selected from all the major subject areas, namely, the humanities, social sciences, science and technology. Thirty (30), semi- structured interviews were held with users in their own workplaces to ascertain, among other things, what they used the network for. Some of the patterns of use have been described below.

- A French linguist reviews electronic newsgroups every morning to identify news and comments, which might interest his students. He then prints and posts items of interest onto a conventional notice board for students to read.
- The linguist, like other staff, regularly logs into remote databases. He uses a French concordance on a computer in Chicago; a physiologist uses Genebank, a database describing genes including very recent discoveries, maintained on a computer in Washington, DC. The physiologist further described how information about new discoveries is posted on newsgroups and electronic conferences, and circulated by email. Information about new software and preprints of papers, including the location of ftp copies, is also disseminated this way.
- Several participants also reported they had used the network to help their children with homework, particularly in English literature and computing.
- A biomedical teaching associate locates textual information, software and multimedia databases, which might be suitable for use in the biomedical group's courses. Using

gopher and ftp, he copies the items located on to his desktop computer for evaluation and sends the evaluation to his colleagues by electronic mail.

- Two lecturers in a humanities discipline living a thousand miles apart jointly edit an international electronic scholarly journal. They communicate by email. The works submitted by authors include formal articles, commentaries, letters, conference announcements and other items normally found in scholarly journals. Authors retain copyright of the items they submit. When each issue is complete, subscribers receive an electronic mail message listing the issue's contents. Each item can be read, or copied to the user's desktop computer (or shared computer workspace) using gopher or copied by ftp. The copy arrives within seconds. The editors produced a quality, widely read journal on desktop computers, without the involvement of commercial publishers. Six months after its establishment, the journal had 320 subscribers and an estimated readership of 700 in 26 countries.

Another Australian study by Bruce, (1994, 1995) involving 13 universities, reported that, for academics in Australia, the Internet "represents a mechanism for overcoming the disadvantages to academic teaching which may arise from institutional amalgamation, geographic remoteness or the under representation of certain teaching disciplines in Australian universities". (Bruce, 1995). The report also observed that respondents used the Internet to enhance the efficiency, quality and productivity of their academic work.

The Internet is also used to support teaching and learning. Observers and researchers in this area have noted that this trend is growing at an exponential rate as more and more educational organizations are recognising the potential that it offers. In a study entitled "Using the

Internet as a teaching resource", Jefferies and Hussain (1998), reported as follows ways in which the Internet is being used in educational institutions:

1. Teaching faculty construct web pages to help structure student's data gathering and to provide access to a variety of other resources. These web pages have links to other sites with materials such as lecture notes, research papers, discussion documents, virtual environments, interactive tutorials, etc.
2. Students use email to communicate with their peers and with their tutors. In fact students prefer to send email to their tutors instead of the traditional face-to-face meetings with their tutors.

The literature also shows that, the use of electronic network in teaching is viewed by many as rather beneficial in distant education (Abel et al, 1996). Downing et al (1988), have also discussed the extensive use of email to supplement traditional means of instructor/student interaction in engineering classes at the University of Arizona. Young, (1995) has reported that faculty members at some universities have used the Internet to post course syllabuses and class announcements, while others have used the web to integrate charts, graphs, photographs, sound, and video for use in their classes.

With respect to the purposes for which academics used the individual Internet services, it has already been stated that researchers have focused on purposes for email use. This might be due to the fact that email is the most prevalent service of the Internet used by academics. As already noted, the bulk of email correspondence is research related although a substantial proportion is also social in nature (Abel et al 1996; Lazinger et al 1997). It is expected that email would be more heavily used in teaching, especially in small universities, because of emphasis on teaching over research (Liebscher et al, 1997). On the other hand, in a study involving six (6) small universities, the researchers reported a low frequency of use of email

for teaching purposes, while use for social purpose was high. This was followed by current awareness, research and administrative purposes. The researchers explained that network use for teaching might be less developed, with students having limited access to the Internet compared to faculty members. Most faculty members also indicated that they communicated with both international and departmental colleagues by email. In an interview with some of the respondents, the researchers found that, email, rather than telephone or fax, was preferred. This is because email reduced the language barrier in terms of having to deal with clerical and secretarial staff at the remote site in their own language before being connected to the appropriate person. Although the researchers did not probe for reasons why respondents communicated by email with departmental colleagues, they explained that, faculty members are often not in their offices for various reasons. This makes the e-mail a suitable medium of communication since it can be read at a time and place convenient to the recipient.

There seems to be little research done on Internet use involving African universities. Most of the sources consulted involved universities from developed countries. The only African source the researcher found was Moyo, (1996). The aim of his study was to find the impact of email on academic work among the staff of the University of Botswana. The results showed that majority of the respondents used the email facility solely for 'chatting' with international and local colleagues. Other uses in descending order are subscription to listservs, exchange of work related information, subscription to electronic journals and magazines, participation in collaborative research projects and participation in electronic conferencing.

The purposes for which students use the Internet have been explored in a study by Jefferies and Hussain (1998), within the Computer and Information Sciences Department at De

Montfort University in the United Kingdom. They reported that students mainly used the Internet for leisure purposes, with course related usage much less than they expected. Most of the students also indicated they were very likely to use the Internet in their future careers.

2.7. Limitations and Barriers to Academic Use of the Internet

Several factors have been identified in the literature, which prevent academics from using the Internet effectively. These include among others:

2.7.1. Size and Structure of the Internet

Although the net is a good information resource, some of the mass of information on it is not structured. As one researcher has put it, " it is something like a library already overflowing with books, with more arriving all the time, but there is nothing like an Internet Dewey Decimal System yet to help you find what you need" (Gilbert, 1994). Adele et al, (1995) have also commented that the most frustrating thing about the Internet, is the lack of a central directory to network resources. The above observations obviously suggest that, for one to benefit from the Internet, he or she must first be aware of its resources, learn to use it and have the time to use it. Adele et al, (1995) have said that, "many academics are still not aware of its (the Internet's) resources and possibilities". Adams and Bonk, (1995) have also said that, the most common obstacle to the use of Internet resources is the lack of knowledge of what is available.

2.7.2. Training

Training is paramount in making full use of the Internet, and user training is considered by faculty to be a high priority need. Many academics would want more training (Applebee et al (1997); and many are interested in learning about the most advanced protocols such as, gopher and WWW, and graphic interfaces such as Netscape and Mosaic. Other academics would also like a structured and continuous education course (Lazinger et al, 1997). A continuous education course is necessary since the Internet is changing all the time.

Abel et al, (1996) have noted that current training efforts are focused on the novice user and, therefore, only inexperienced users attend training sessions. In order to attract a broader audience, the above- cited researchers have proposed the following:

- Gearing programs to different levels of users.
- Focusing on specific subject areas.
- Concentrating on specific tools.
- Exploring the use of network services for specific tasks.

They also suggest the need to advertise effectively and expansion of training on the basis of faculty needs. In Africa, especially Sub-Saharan Africa, where Internet use is relatively recent in most academic institutions, the importance of effective advertising cannot be over emphasized since this will create awareness and encourage academics to take full advantage of the network. The need for systematic training has also, been emphasized by Moyo, (1996).

2.7.3. Time

Getting the most out of the Internet requires considerable investment in time, first, the time to learn (Klobas 1997), and then the time to make use of its services, especially the mass of information available on it (Applebee et al, 1997). Accessing email, for example, can take quite a lot of time, especially if one is an active member of a discussion group or a mailing list. As already noted, one respondent in a study reported receiving 50- 100 messages daily (Applebee et al, 1997).

2.7.4. Information Overload

There is a great deal of information on the Internet on different subjects. Consequently, more often than not, any information retrieval activity nets a lot of irrelevant information. The following comments from academic staff about retrieved information was reported by Applebee et al (1997):

- high recall / low precision
- too much trivia to sift through, and
- variable quality of data.

Students consider the data overload a serious problem given the time constraints for producing their assignments. The study published by Jefferies and Hussain (1998), explained that, "students are looking for answers rather than information and any detail which does not directly address a query is automatically assumed to be redundant and belonging to the 'data overload' section". The researchers further explained that security and quality control is less important to students. Their primary objective is to retrieve facts, and quality is assessed in terms of answers found and also how colourful a web site is. The situation is aggravated by the fact that there is no way of verifying the quality of data or information one finds on the net since anyone is free to put information on it, be it professional or not.

2.7.5. Speed of Data Transfer

Users of the Internet, both academics and the public have complained about the net's slow speed. The capacity and speed of a user's computer (i.e., speed of hard disc, size of RAM, speed of central processing unit, etc.) determine the rate at which data is transferred to and from the Internet (Applebee et al, 1997). The nature of a connection to the Internet may also determine the speed. Dedicated connections are always faster than dial up connections.

Students have also complained about the slow speed of data transfer (Jefferies and Hussain, 1998). According to the researchers, some of the students actually commented that they spent long hours, downloading information from the Internet only to find that, the information was not what they required. This situation is so frustrating that some have decided not to use the Internet (Jefferies and Hussain, 1998). One reason for the poor retrieval times identified by

the researchers was the inclusion of images, animation, audio, and sometimes video by website developers, a situation which traditional infrastructures are not able to cope with.

2.7.6. Poor search software

Poor search software has been reported by some researchers as a limitation to the use of the Internet for example, Applebee et al, (1997) and Jefferies and Hussain, (1998). Staff and students who may not be aware of good and effective search engines may resort to the use of primitive ones which may not meet their needs. According to Kassel (1999), "search engines are constantly changing, growing, and improving in their quality and capabilities for locating needed information, for example, Kassel (1999), further mentioned, that, AltaVista, one of the major search engines, remained unchallenged until September 1997. However, Hotbot, another search engine, began to compete and surpassed it in terms of number of pages indexed at that time. The larger the index compiled by a search engine, the more likely the chance of finding obscure material. Therefore, net users need to know the capabilities of the different search engines to ensure successful searches.

2.7.7. Cost

Cost was reported as the main barrier to Internet usage in a United States national survey (Katz and Aspden, 1992). The researchers further stated that one of the main reasons why former users stopped using the Internet was the servicing of high bills. For academics, who have to access the Internet outside university campuses using their own ISPs (Internet Service Providers), both connection and user fees can be high. Adele et al, (1995) mentioned that connectivity costs are an issue for those outside major universities.

Charging for access to networked information resources will have different impacts depending on how it is structured. In a research involving 15 staff members and research postgraduates of one academic department, not one respondent believed that, introduction of usage charges at departmental (rather than individual) level would change their use of the

Internet. (Klobas, 1994b). The respondents maintained that, transfer of charges to individuals or restriction by universities of access to specific network resources would impede use of the Internet. Obviously, if staff members cannot afford to pay the bills they would not use the Internet.

2.7.8. Gatekeepers

Gatekeepers are people who funnel information to nonusers and users alike. They can be knowledgeable faculty members who help colleagues within their departments or knowledgeable librarians known on campus to be willing to distribute network information to others. Their presence made it easier for some faculty members to avoid learning to manipulate the network environment but then receive some benefits from the Internet. (Libiescher et al, 1997).

2.7.9. Poor Telecommunication

In Africa, one of the reasons why the Internet is not prevalent is poor, obsolete and inadequate telecommunication infrastructure, including the public switching telephone network. Moyo (1996) noted that, "the spread of the Internet in Africa is only limited by the ability of the local telecommunications authorities to provide adequate and up to date communication facilities" (Moyo, 1996). Adams (1995), has also said that, although many universities in Africa have discovered the value of networks in their academic work, for example, in the area of research and development, they are unable to implement and sustain them for the following, reasons:

- Equipment is mostly obsolete.
- Networking plans are usually hampered by regulatory involvement of government and telecommunication authorities.
- Limited capabilities of telecommunication authorities create problems in moving from low bandwidth to high bandwidth.

- Lack of understanding of potential impact of electronic communication in research and development.
- Lack of culture of sharing information and resources (little inter/intra university cooperation leading to overall lack of networking.
- Cost of using computing technologies is usually more than the individual institutions can afford. Internet access to universities in Ghana is a project funded by the Danish government under DANIDA and also supported by the Ghana National Committee on Internet Connectivity (GNCIC). The GNCIC comprises representatives from the academic, research, government and private sectors. The representatives are from the Ministry of Environment, Science and Technology, the Ministry of Education and Communications, the five universities of the country, the Council for Scientific and Industrial Research (CSIR), the Ghana Commission for UNESCO, and the Association of African Universities. The work of the GNCIC is coordinated by the University of Ghana, Legon, Balme Library. This is partly because of the Library's extensive experience with email access based on the store-and forward FidoNet system (http://www.gncic.org.gh).

2.8. Effect of Discipline on Academic use of the Internet.

Personal and professional factors related to work have been found to influence information seeking behaviour. These factors include "academic discipline, task and perceived utility" (Abel et al, 1996). A number of studies have examined the effect of discipline on communication patterns (Fussler, 1949 and Garvey, 1979). With regard to use of the Internet by academic discipline, very few studies have been published. According to Lazinger et al (1997), majority of studies that have been published on academic's use of the Internet have dealt with specific segments of the university faculty or with specific uses of the Internet, and

have analyzed patterns of use only among the academic populations, which used the Internet. For example, Bane and Milheim, (1995) and Chu, (1994).

Abel et al, (1996) published a study, which explored factors that influence the adoption and use of electronic networks by science and engineering faculties in small universities. This study is very relevant and of particular interest to the current study in the following ways: First, it explored the use of a broad range of Internet services very similar to those being surveyed. Secondly, the target population included both users and non-users. Lastly among the conclusions reached with regard to the need for further research was the following: "Further knowledge of differences in the use of electronic network among faculty by discipline would assist in determining levels of connectivity, and services offered" (Abel et al, 1996). The categories of academic discipline in the above study were the Biological Sciences, Engineering, Health Sciences, Mathematics and Computer Sciences, the Physical and Earth Sciences and the Social Sciences. The results of the study under review showed that e-mail, was used by faculty members from all disciplines. However, the use of file transfer varied with discipline, the heaviest users being mathematicians and computer scientists. They also mentioned that, the information and data currently available for file transfer might be geared towards specific disciplines since comparatively it was the least used. They cautioned though, that the study did not consider whether or not all departments received equal opportunities of access to the network. An interview revealed that network access was not equitable throughout all departments of all the six institutions. Obviously, access can be a serious limiting factor to use of the Internet. Departments or disciplines with limited access in terms of proximity or shared workstations might use the network sparingly and those without physical access might not use it all.

Applebee et al (1997), hypothesized that, use of the Internet might differ according to faculty. The results of their study showed that, the faculties of Information Science and Engineering made heavier use of email, telnet and WWW. The two faculties also made greater use of email to contact colleagues overseas, and fewer of their staff members required more training to use the Internet effectively.

A study at the Hebrew University of Jerusalem conducted by Lazinger et al (1997), had as its primary objective to investigate the differences in usage, training and perceived importance of the Internet among two major groups of faculty members. The first group of faculty members comprised those from the sciences and agriculture (Sciagr) and the second from the humanities, the social sciences and law (Humsoc). The main conclusion of the study was that faculty members from the Sciagr group used the Internet more intensely than those from the Humsoc group. Other findings were as follows:

- All Internet users in both groups use email extensively, primarily for correspondence with colleagues about research issues and judge it the most important Internet service.
- Other services like file transfer, listservs/newsgroups, and search interfaces are used in descending order by all groups, with higher percentages of use and perceived need in the Sciagr group than in the Humsoc group.
- Majority of respondents from the Sciagr group learned to use the Internet services without the aid of a course.
- Faculty members in all disciplines perceived the primary influence of Internet use on their professional life to be the increase in cooperation with colleagues, especially distant colleagues, with improved access to databases and research updates seen as the next most important influence.

2.9. The Effect of Rank and Age on Academic use of the Internet.

A few researchers have explored how age and rank of faculty members affect the rate at which they used the Internet. The results of the study by Lazinger et al (1997), showed that the percentage of Internet users varies systematically according to rank; that is, the more senior an academic staff, the lower his Internet use tends to be. Senior lecturers were found to use the Internet most, followed by Associate Professors and then Professors. However, the researchers felt that this result was inconclusive since they had assumed that non-respondents are also likely to be non-users.

In another study, Applebee et al (1997), anticipated that, older staff might use the Internet less than their younger colleagues. Their results did not prove this assertion. The reason was that, most of the faculty staff members happened to be in their 40s, with fewer in their 50s and 60s, causing a cluster rather than an age-based difference.

A Ph. D. thesis by White, (as cited in Lazinger et al, 1997) examined Internet use among faculty members in organizations related to the study of mass communications and its related disciplines that is, consumer behaviour, advertising and public relations.. The aim of the study was to ascertain the impact of computer-mediated communication on faculty members. The results showed that younger faculty members made higher use of computer mediated communication. On the contrary, Chu (1994), reported a negative correlation between age and the use of email.

2.10. Gender Differences in Internet use by Academics

The Internet has been dominated by males since its inception. Several reasons have been given to explain the low Internet usage by females, some of which are the following:

- Females have higher levels of computer phobia and negative computer attitudes (Igbaria and Chakrabari, 1990).

- Females are more likely to be technophobic and less likely to be technophiles (Harmon, 1996).
- Females perceive less advantages for new technologies and have less experience with technology (Breakwell et al, 1986).
- Generally, the computer culture is male dominated (Kiesler et al, 1985), with for example computer games, considered the main channels for initiating and acclimating children to the culture of computers, often reflecting male themes of adventure, action, violence and competition (Griffiths, 1993).
- Offensive language and harassment online have also been found to deter some women from using the Internet (Resnick and Anderson 1995), and some female users have resorted to using a male or gender neutral names to prevent unwanted advances (Bruckman, 1992).

The results of the study by White, (cited in Lazinger et al, 1998) showed that, Internet use by female faculty members was significantly higher than the general population. It is interesting to note that women used the Internet more than men in this study. This finding is rather contrary to the trend in the literature, which maintains that females are only a small minority of Internet users worldwide. In an online study conducted by Yahoo Incorporated for example, reported that, 9% of European users were women (Boudette, 1997), and 40% Of users in the U.S. were women (Cyberdialogue, 1998). Additionally, females worldwide spend less time using the Internet, and use less applications than males (GVU, 1998). Other findings are that, males have used the Internet longer and use it more frequently than females do (Morahan-Martin and Schumacher, 1997). The most notable area, according to these researchers, where there are no differences in Internet use, at least from United States studies, is using electronic mail.

2.11. Motivations for use of the Internet by Academics.

People are motivated to do or use something if it is beneficial or useful to them in one way or the other. The most common motivation for increased use of the Internet, according to Klobas (1997), is access to more useful information resources. Most users defined usefulness in

relation to their work, for example, as something that would help them to find a particular piece of information more quickly than their current manual methods. He notes that better indexes, full text databases and more current information, among others, were cited as potential ways to increase usefulness of specific network information resources.

Respondents in a study by Adele et al (1995), are motivated to use the Internet because they find it as the best source of information in their field, very essential for their communication and crucial for access to research results and essential to their job.

Students at De Montford University in the United Kingdom have also stated that, their main attraction to the use of the Internet was the varieties of resources available on it and the fact that the data can be accessed online. The second attraction is the opportunity to communicate with colleagues by email (Jefferies and Hussain, 1998).

Results of a national survey at the US also revealed that, the main motivations for using the Internet are communicating with people, getting information on special interest, and keeping up to date (Katz and Aspden, 1997).

2.12. Summary of the literature review.

The literature reviewed has shown that, indeed the Internet is a valuable information resource actively being used by academics in the developed countries, especially, the United States and the United Kingdom, in their academic pursuits. The studies on academic use of the Internet have concentrated, among others, on the purposes for, limitations in, barriers to, and motivations for, using the Internet. The main purposes for which academics use the Internet are communication with friends and international colleagues, and seeking information in their subject fields and for research. The main limitations of the Internet reported are slow data transmission and Information overload. The main barrier to use of the Internet is the lack of adequate time on the part of academics to use all the facilities of the Internet. Academics are

motivated to use the Internet mainly because they are able to access more useful and current information in their fields of study.

The services of the Internet included in the studies reviewed are e-mail, discussion groups and net news, ftp, telnet and advanced search interfaces. However, only a few of these studies explored the use of all these services; the majority focused on the use of the e-mail service only. The e-mail service is the most popular and frequently used service by academics. Among the relationships investigated by the studies reviewed are, Internet use and discipline, age, gender, and position of academic staff. Their results indicated that generally academics from the Science faculty use the Internet more than those from the Arts and Social Science faculties; females use the Internet less than males, the young use the Internet more than the old. However there are conflicting observations about relationship between Internet use and position of staff.

The present study is focused on all the parameters on academic Internet use mentioned above and the awareness of Internet services like email, discussion groups, net news, email, ftp, telnet and advanced search Interfaces. Also included are the use of search engines, metasearch engines and information gateways. The relationships include Internet use and research activity, and computer usage apart from those mentioned above. These parameters are not included in the studies reviewed, for example, Lazinger et al (1997), Abel et al (1996), Adele et al, (1995). Also, only a few studies have focused on both academic staff and students. An example is Tillotson et al (1995). The purpose of this study is to compare the extent of awareness and use of the Internet and its services among academic staff and postgraduate students of the University of Ghana.

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CHAPTER THREE

3. METHODOLOGY

3.1. Introduction

A method according to Leedy, (1993) is a way of accomplishing an end result. He further mentioned that the word method is coined from two Greek elements: *meth-* and *odos*. The *meth* means "after"; *odos* means "way". "A method, is therefore, a following *after the way* someone found to be effective in solving a problem, or reaching an objective, in getting a job done" (Leedy, 1993). Another point he made was that, a research methodology is dictated by the nature of data and the problem of the research. If the data is verbal, the methodology is qualitative; if the data is numerical, the methodology is quantitative. This study employed a quantitative methodology.

3.2. Research Design

This study is a quantitative survey because some of the variables included in it will be manipulated to ascertain their relationships, and hypotheses that have been postulated will be tested by the employment of appropriate statistics (Leedy, 1993). Stainback and Stainback (1981) in contrasting qualitative and quantitative methodologies indicated, among other things, that the procedures employed in a quantitative research are highly structured and designed to verify or disprove predetermined hypotheses. On the other hand, the procedures used in a qualitative methodology are flexible, exploratory and discovery oriented. As the study progresses, a qualitative researcher can add to or change the types and sources of data gathered.

This study has chosen the quantitative path in order to verify the hypotheses that have been formulated (page 4). To this end specific variables have been identified and isolated, appropriate data have been collected on these variables, the data have been statistically analyzed so as to verify these hypotheses and also extract the meaning of the data. According

to Leedy, in a quantitative study, data is analyzed statistically so as to infer meanings that lie hidden within the data, or discern potential and dynamic forces that may be clues to areas that warrant further investigation. The survey technique was adopted for this study, since a large number of people are involved in the study. A number of writers, for example, Marshall (1997); Fraenkel and Wallen (1993); Alreck and Settle (1985), have recommended the survey method when information is to be gathered from a large number of people. As Fraenkel and Wallen (1993), have said, "the big advantage of survey research is that it has the potential to provide us with a lot of information obtained from quite a large sample of individuals". The samples sizes for this study as explained under 'sampling design' below, is a total of 175 staff members and 216 postgraduate students of the University of Ghana.

3.3. Selection of Population

The population for the study comprised all academic staff and postgraduate students of the University of Ghana during the 1998/99 academic year. Information obtained from the 'basic statistics' of the University showed that the total populations of these two groups were 584 academic staff and 1083 postgraduate students. Of these numbers, 20% of student population and 30% of the staff population were selected as samples for the study. Alreck and Settle (1985) have indicated that a sample size of 10% of a population is enough to obtain adequate confidence. They further explained that if the samples are to be divided into sub samples and analyzed separately, then the total sample size must be large enough to ensure adequate numbers within them. In this study, subjects, in the arts, the social sciences, and the sciences are analyzed separately. This is why 20% of the student population and 30% of the staff population where selected instead of the standard 10%.

3.4. Sampling Design

The sample design selected for the study is 'proportional stratified sampling design', i.e. a process in which certain subgroups or strata are selected for the sample in the same proportion, as they exist in the population. (Fraenkel and Wallen, 1993). This was selected on the basis of the sub samples to be analyzed in the study, and also so that, the data obtained would be reliable. Alreck and Settle (1985), have said, "The use of stratification dramatically increases the reliability and the confidence obtainable from survey data". The following procedure was followed to obtain the stratification of the chosen knowledge groups in both the student and the staff populations:

Total number of academic staff = 584

Sample selected = 175 (i.e. 30% of 584)

Total number of Social science Staff = 138

Proportion of Social science Staff needed for data collection = 41 (30% of 138)

Total number of Science Staff = 262

Proportion of Science Staff needed = 79 (30% of 262)

Total number of Arts Staff = 184

Proportion of Arts Staff needed = 55 (30% of 184)

Total number of staff for data collection = 175 (i.e. 41+79+55)

The same procedure was followed to obtain the proportional samples of students needed for data collection. The figures obtained are science students, (49), social science students, (146), and arts students, (22), making a total of 216 students.

This was followed by the selection of staff and students from whom data was collected. The method of selection is explained below.

- A list of the names of academic staff was compiled from the 'Annual Report of the University of Ghana, 1998. A list of students was obtained from the Data Processing Department of the University. Each list was grouped under its different strata i.e., arts, social sciences and sciences.
- A table of random numbers was used to select 20% from each stratum of the student population (this was done by following instructions provided by many authors on statistics and research methodology books. Two examples cited are Fraenkel and Wallen (1993) and Alreck and Settle, (1985).
- A table of random numbers was used to select 30% from each stratum of the academic staff population.

3.5. Instrument for Data Collection

The most common types of instrument for data collection used in survey research are the questionnaire and the interview schedule. The two instruments, according to Fraenkel and Wallen (1993), are virtually identical, except that the questionnaire is usually self administered by the respondent, while the interview schedule is administered verbally by the researcher or trained assistants.

A questionnaire was used for the collection of data for this study. Several authors have emphasized the importance of the questionnaire in survey research and have given suggestions for effective survey questions, some of which are listed below.

- "Effective survey questions have three important attributes: focus, brevity, and simplicity". (Alreck and Settle, 1985).
- The appearance of a mailed or self-administered questionnaire is very important to the overall success of the study. "It should be attractive and not too long, and the questions should be as easy to answer as possible" (Alreck and Settle, 1985).

- Floyd Fowler (cited by Fraenkel and Wallen, 1993) has pointed out four practical standards that all survey questions should meet. These standards pose the following questions to which all survey questions should respond.

    1. Is this a question that can be asked exactly the way it is written?
    2. Is this a question that will mean the same thing to everyone?
    3. Is this a question that people can answer?
    4. Is this a question that people will be willing to answer, given the data collection procedures?

Fowler has emphasized that all answers to each of the above question for every question in a survey should be 'yes', otherwise, the question should be rewritten.

The above suggestions were carefully considered in the construction of the questionnaire for this study. Apart from this, closed ended questions were also used instead of open-ended questions. A close ended or structured question is one that is followed by a list of alternative answers for respondents to choose from. An open ended or unstructured question is one expressed with no alternative answers listed for the respondent. Although open ended questions are easier to construct and also allow more freedom in responding, closed ended questions were used for the construction of the questionnaire, for the following reasons. According to Fraenkel and Wallen (1993), closed ended questions enhance consistency of response across respondents; they are also easier and faster to tabulate and more popular with respondents. The main disadvantage, however, is that, they represent not so much what the respondent wanted to say as what he /she was forced to choose from out of the alternatives given (Marshall, 1997).

The questionnaire was in two parts and items were grouped by content. For example, questions on computer usage and Internet awareness were grouped together under these two headings. The questions were made up of multiple choice, binary choice and "Likert" scale

items, (for example, useful, very useful, no opinion, not useful, not very useful). The questionnaire was meant to collect information on the following, among others:

- biographical information
- computer usage
- research activity
- Internet Awareness
- Internet use
- limitations of, and barriers to the use of the Internet
- motivation for using the Internet
- usefulness of the Internet
- Reasons for non-use of Internet

The questionnaire was pre-tested by distributing small samples of about 10 each to both staff and students. The purpose of the pretest was to reveal and correct ambiguous, poorly worded, unclear choices and instructions, etc.

3.6. Mode of Data Collection

Data collection requires contact with respondents and this can be accomplished by personal interviewing, telephone interviewing, direct mail surveys, and direct administration to a group (Fraenkel and Wallen 1993). The fundamental differences among the different data collection methods consist of the intensity of contact between the researcher and the respondents (Alreck and Settle, 1985). The personal interview method provides the closest contact while the most remote contact is obtained with the direct mail survey.

The questionnaire was distributed to both staff and students by the researcher, during the month of May 2000. Direct administration of the questionnaire, the method used, made it

possible for the study to be explained to respondents before they completed the questionnaire. This method of data collection was also chosen because during the pre-test of the questionnaire, it was observed that, academic staff completed the questionnaire only after meeting the researcher. Otherwise, questionnaires tended to be left unanswered in staff's pigeon- holes. To forestall this, the questionnaires were administered to academic staff in their offices. With regard to the students, the questionnaires were given to them in their lecture halls, departmental libraries, and computer labs for completion and return. The students, unlike the staff completed them immediately for collection.

3.7. Response Rate

Table 3.1 - Tabulation of response rates

STAFF Faculty	Copies of questionnaire distributed	Copies of questionnaire completed	Response rate of STAFF
Science	79	45	57%
Social Science	41	38	92.7%
Arts	55	40	72.7%
Total	175	123	70.3%

STUDENT Faculty	Copies of questionnaire distributed	Copies of questionnaire completed	Response rate of STUDENTS
Science	48	48	100%
Arts	22	22	100%
Social Science	146	51	34.9%
Total	216	121	56%

3.8. Analysis of Data.

The data was analyzed using the Statistical Package for the Social Sciences or SPSS/PC (Nie, et al, 1970) Windows Version 6.0. The SPSS was chosen for analysis of the data for a number of valid reasons provided by its author as follows:

- Students do not have to learn a system of elaborate code to tell a computer what analyses to conduct but, can simply enter their data into an easy-to-use data editor.
- Students can produce graphs of distributions of variables by simply selecting items from a pull-down menu to make appropriate transformations to variables and then clicking on options from another menu.
- Various statistical analyses can be selected by clicking on appropriate options.
- Researchers do not have to spend time reacquainting themselves with the ins and outs of a statistical software package, or learning new programmes for conducting analyses that take hours to master.
- Finally, SPSS is the most widely used statistical software in the social sciences (Healey, 1993).

Appropriate codes were assigned to all variables, and numerical labels were used to identify the categories of each variable. For example, the variable 'Faculty of staff' is made up of three (3) categories, i.e., arts, social science and science and code and value labels were assigned as illustrated below.

Code q1= Faculty of staff

1.00="Arts"

2.00= "Social Science"

3.00= "Science".

Cross-tabulations were used to ascertain the percentage of respondents who chose each alternative for each question based on the objectives of the study listed on page three (3). Relationships between Internet use and knowledge area, research activity, age, position of staff, access to computer, and gender were also ascertained by the Chi Square test. The Chi Square test is used to analyze categorical or nominal data. (Fraenkel and Wallen 1993). According to Healey, (1993) it is the most frequently used test of hypotheses in the social

sciences. He gave a number of reasons considered valid by the researcher for this popularity. Some of them are listed below:

- Chi Square is a non-parametric test of hypothesis and requires no assumption about the exact shape of the population distribution.
- It is useful in a wider variety of research situations than other tests of significance. For example, it can be used in the familiar 2-sample case; it is also applicable to research situations where the variables of interest have more than 2 categories and in situations with more than two samples.
- Two-sample tests are not readily adaptable to research designs with many samples, but Chi Square handles these situations easily and in a single set of calculations.

The results were discussed and interpreted based on the literature reviewed. The study ended with a summary of findings and a conclusion mentioning, among other things, the contribution of the study to knowledge and suggestions for future research. A complete bibliography and appendixes showing samples of questionnaires for staff and students were also provided.

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CHAPTER FOUR

ANALYSIS OF DATA AND FINDINGS

4.1. Introduction

This chapter presents the results of the survey on both academic staff and postgraduate students of the University of Ghana. The aim of the survey was to investigate the extent of awareness and use of the Internet and its services among academic staff and postgraduate students.

4.2. Awareness of the Internet and its Services

In order to make use of the rich resources of the Internet, prospective users have to be aware of the services available on the net and their benefits. Therefore, the first objective of the study was to investigate the awareness of the Internet and its services by staff and students. In this regard, it was postulated that staff and students are generally not aware of the Internet and its services. However, the results show that awareness of the Internet is universal. All the students who responded to the questionnaire and 99.2% of staff indicated they are aware of the Internet. Respondents were asked to indicate the various services they were aware of. The results for staff and student awareness of services are presented in Tables 4.1 and 4.2.

Table 4.1 - Staff awareness of the Services on the Internet by faculty

Internet Services	Staff Responses N =123 Arts			Social Science			Science			Grand Tota	
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No
Email	100 (40)	0.0 (0)	100 (40)	94.7 (36)	5.3 (2)	100 (38)	97.8 (44)	2.2 (1)	100 (44)	97.6 (120)	2.4 (3)
Discussion groups	55.0 (22)	45.0 (18)	100 (40)	52.6 (20)	47.4 (18)	100 (38)	73.3 (33)	26.7 (12)	100 (45)	61.0 (75)	39.0 (48)
Reading news	55.0 (22)	45.0 (18)	100 (40)	42.1 (16)	57.9 (22)	100 (38)	57.8 (26)	42.2 (19)	100 (45)	52.0 (64)	48.0 (59)
Ftp	40.0 (16)	60.0 (24)	100 (40)	47.4 (18)	52.6 (20)	100 (38)	60.0 (27)	40.0 (18)	100 (45)	49.6 (61)	50.4 (62)
Telnet	40.0 (16)	60.0 (24)	100 (40	26.3 (10)	73.7 (28)	100 (38)	44.4 (20)	55.6 (25)	100 (45)	37.4 (46)	62.6 (77)
Gopher	32.5 (13)	67.5 (27)	100 (40)	26.3 (10)	73.7 (28)	100 (38))	37.8 (17)	62.2 (28)	100 (45)	32.5 (40)	67.5 (83)
WAIS	12.5 (5)	87.5 (35)	100 (40)	15.8 (6)	84.2 (32)	100 (38)	26.7 (12)	73.3 (33)	100 (45)	18.7 (23)	81.3 (100)
WWW	52.5 (21)	47.5 (19)	100 (40)	57.9 (22)	42.1 (16)	100 (38)	86.7 (39)	13.3 (6)	100 (45)	66.7 (82)	33.3 (41)
Other	2.5 (1)	97.5 (39)	100 (40)	0.0 (0)	100 (40)	100 (40)	4.4 (2)	95.6 (43)	100 (45)	2.4 (3)	97.6 (120)

NB: The percentage response is stated above the number of respondents, in each cell

Table 4.2 - Students awareness of the services of the Internet by faculty

Internet Services	Student Responses N =121 Arts			Social Science			Science			Grand Tota	
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No
Email	90.9 (20)	9.1 (2)	100 (22)	98.0 (50)	2.0 (1)	100 (51)	95.8 (46)	4.2 (2)	100 (48)	95.9 (116)	4.1 (5)
Discussion groups	45.5 (10)	54.5 (12)	100 (22)	43.1 (22)	56.9 (29)	100 (51)	58.3 (28)	41.7 (20)	100 (48)	49.6 (60)	50.4 (61)
Reading news	45.5 (10)	54.5 (12)	100 (22)	49.0 (25)	51.0 (26)	100 (51)	41.7 (20)	58.3 (28	100 (48)	45.5 (55)	54.5 (66)
Ftp	22.7 (5)	77.3 (17)	100 (22)	33.3 (17)	66.3 (34)	100 (51)	37.5 (18)	62.5 (30)	100 (48)	33.1 (40)	66.9 (81)
Telnet	18.2 (4)	81.6 (18)	100 (22)	17.6 (9)	82.4 (42)	100 (51)	22.9 (11)	77.1 (37)	100 (48)	19.8 (24)	80.2 (97)
Gopher	27.3 (6)	72.7 (16)	100 (22)	33.3 (17)	66.7 (34)	100 (51)	20.8 (10)	79.2) (38)	100 (48)	27.3 (33)	72.7 (88)
WAIS	9.1 (2)	90.9 (20)	100 (22)	3.9 (2)	96.1 (49)	100 (51)	12.5 (6)	87.5 (42)	100 (48)	8.3 (10)	91.7 (111)
WWW	54.5 (12)	45.5 (10)	100 (22)	56.9 (29)	43.1 (22)	100 (51)	68.8 (33)	31.3 (15)	100 (48)	61.2 (74)	38.8 (47)
Other	0 (0)	100 (22)	100 (22)	0 (0)	100 (51)	100 (51)	6.3 (3)	93.7 (45)	100 (48)	2.5 (3)	97.5 (118)

NB: The percentage response is stated above the number of respondents, in each cell

These two tables show that, email is the most popular service among staff and students and this is also reflected among faculties. The percentage awareness is 97.6% and 95.9% for staff and students respectively. The next popular service is the WWW. Here 66.7% of staff and 61.2% of students indicated their awareness of this service. The popularity of these two services might be due to the media, especially CNN world service. Web-sites and email addresses are frequently mentioned after news broadcast. The least known service is WAIS. Only 18.7% of staff and 8.35% of students indicated their awareness of this service. Comparison of awareness of each individual service by faculty shows that, respondents from the sciences as revealed in the tables, are more aware of the different services than their counterparts from the arts and the social sciences, except for email. This difference is probably due to the fact that by the nature of their courses academics from the sciences tend to learn about or come into contact with new technology faster than their counterparts from the humanities. The results also show that, generally, staff respondents are more aware of the various services than student respondents. This is probably due to the fact that academic staff tend to travel abroad for conferences, courses etc., and also interact with colleagues through research collaboration and so come to know about some of these services faster than students.

4.3. Use of the Internet and its Services.

If staff and students are aware of the Internet and its services, the next logical objective is, to find out whether they are using them at all; which services they are using, and also to investigate any relationships that may exist between gender, research activity, computer usage among others and the use of the net. Tables 4.3 and 4.4 show Internet use among staff and students by faculty.

Table 4.3 - Staff Internet use by faculty

Responses	Staff Responses N =123 Arts	Social Science	Science	Total
Yes	65.0 (26)	63.2 (24)	80.0 (36)	69.9 (86)
No	27.5 (11)	34.2 (13)	17.8 (8)	26.0 (32)
Non-response	7.5 (3)	2.6 (1)	2.2 (1)	4.1 (5)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell

Table 4.4 - Students Internet use by faculty

Responses	Student Responses N =116 Arts	Social Science	Science	Total
Yes	18.2 (4)	52.1 (25)	82.6 (38)	57.8 (67)
No	77.3 (17)	47.9 (23)	17.4 (8)	41.4 (48)
Non- response	4.5 (1)	0.0 (0)	0.0 (0)	0.9 (1)
Total	100 (22)	100 (48)	100 (46)	100 (116)

NB The percentage response is stated above the number of respondents, in each cell

DF = 4, Chi-sq = 29.16675, p = .00001.

The results show that, staff generally used the Internet more than students. 69.9% of staff compared to 57.8% of students used the Internet. This is probably because staff has more access to the Internet than students. Access to Internet by faculty showed that, 25.4% of staff compared to 12.5% of students had an account on a computer that gives them access to the Internet. Another probable reason is cost of accessing the Internet. Staff can more likely afford to pay for accessing the Internet than students. Another finding is that, both staff and students from the Science faculty use the Internet more than those from the Arts and Social Sciences. This may also be explained in terms of computer use. Tables 4.5 and 4.6 show that

both staff and students from the Science faculty use the computer more than their counterparts from the Arts and Social Science faculties. This implies that Science faculty members are likely to use the Internet readily since it is computer mediated. Chi-square tests also proved that there is a significant relationship between Internet use and faculty in the case of the student respondents that is, the faculty of a student influences its Internet use. However, Chi-square in the case of the staff respondents did not show any significance. This difference is probably because the Science students after being exposed to the technology in their courses may want to experiment with it and use it as a source of information. Staff, irrespective of their faculties, may be forced to use it by virtue of their profession. When it comes to collaborating with international colleagues, especially, email becomes the cheapest and fastest means of communicating and, therefore, staff would want to use it.

Table 4.5 - Staff computer use by faculty

	Staff Responses N =123			
Responses	**Arts**	**Social Science**	**Science**	**Total**
Yes	80.0 (32)	78.9 (30)	86.7 (39)	82.1 (101)
No	15.0 (6)	18.4 (7)	13.3 (6)	15.4 (19)
Non-response	5.0 (2)	2.6 (1)	0.0 (0)	2.4 (3)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.6- Student computer use by faculty

	Student Responses N =121			
Responses	**Arts**	**Social Science**	**Science**	**Total**
Yes	36.4 (8)	62.7 (32)	85.4 (41)	66.9 (81)
No	59.1 (13)	35.3 (18)	10.4 (5)	29.8 (36)
Non response	4.5 (1)	2.0 (1)	4.1 (2)	3.3 (4)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell

4.4. Internet Use by Position or Rank of Staff

It was hypothesized that the higher the position of staff the less he/she uses the Ir

Table 4.7 below presents the results of Internet use by position of staff.

Table 4.7 - Internet use by position of staff

Status of Staff	Staff Responses N =123		Total
	Yes	No	
Assistant Lecturer	30.0 (3)	70.0 (7)	100 (10)
Lecturer	83.7 (41)	16.3 (8)	100 (49)
Senior Lecturer	64.7 (22)	35.3 (12)	100 (34)
Professor	60.0 (6)	40.0 (4)	100 (10)
Research Fellow	77.8 (7)	22.2 (2)	100 (9)
Non-response	63.6 (7)	36.4 (4)	100 (11)
Total	69.9 (86)	30.1 (37)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell.

Among the staff, the results show that, lecturers used the Internet the most. Eighty, (83.7%) of Lecturers use the net. The least Internet users were Assistant Lecturers. 30.0% of them indicated they use the Internet. Chi square analysis did not shov significant relationship between position of staff and Internet use but based on s percentages lecturers use it the most.

4.5. Internet Use by Gender

A review of the literature revealed that generally men use the Internet more than wc

Tables 4.8 and 4.9 represent Internet use by gender of staff and students.

Table 4.8 - Internet use by gender of staff

Responses	Staff Responses N =123			Total
	Male	Female	Gender not specified	
Yes	72.2 (52)	57.9 11	71.9 (23)	69.9 (86)
No	23.6 (17)	31.6 (6)	28.1 (9)	26.0 (32)
Non response	4.2 (3)	10.5 (2)	0.0 (0)	4.1 (5)
Total	100 (72)	100 (19)	100 (32)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.9 - Internet use by gender of students

Responses	Student Responses N =116			Total
	Male	Female	Gender not specified	
Yes	51.4 (36)	58.3 (14)	77.3 (17)	57.8 (67)
No	47.1 (33)	41.7 (10)	22.7 (5)	41.8 (48)
Non response	1.4 (1)	0.0 (0)	0.0 (0)	0.9 (1)
Total	100 (70)	100 (24)	100 (22)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell.

The results show that male respondents use the Internet more than female respondents with respect to staff. Female respondents in the case of the students use the Internet more than their male counterparts. Chi-square tests in both cases, however, did not show any significant relationships between Internet use and gender.

4.6. Internet Use by Age

The relationship between Internet use and age was also investigated. It was postulated that, the young use the Internet more than the old. Internet use by different age groups is shown in Tables 4.10 and 4.11.

Table 4.10 - Internet use by age of staff

Responses	Staff Responses N =123						Total
	20-30 Years	30-40 Years	40-50 Years	50-60 Years	Over 60years	Age not specified	
Yes	75.0 (6)	77.8 (21)	78.6 (33)	60.0 (18)	55.6 (5)	42.9 (3)	69.9 (86)
No	25.0 (2)	11.1 (3)	19.0 (8)	36.7 (11)	44.4 (4)	57.1 (4)	26.0 (32)
Non-response	0.0 (0)	11.1 (3)	2.4 (1)	3.3 (1)	0.0 (0)	0.0 (0)	4.1 (5)
Total	100 (8)	100 (27)	100 (42)	100 (30)	100 (9)	100 (7)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.11 - Internet use by age of students

Responses	Student Responses N =116					Total
	20-30 Years	30-40 Years	40-50 Years	50-60 Years	Age not specified	
Yes	0.0 (0)	92.9 (26)	53.3 (32)	28.0 (7)	66.7 (2)	57.8 (67)
No	0.0 (0)	7.1 (2)	45.0 (27)	72.0 (18)	33.3 (1)	41.4 (48)
Non – response	0.0 (0)	0.0 (0)	1.7 (1)	0.0 (0)	0.0 (0)	0.9 (1)
Total	0.0 (0)	100 28	100 (60)	100 (25)	100 (3)	100 (116)

NB The percentage response is stated above the number of respondents, in each cell.

DF = 6, Chi-sq = 24.81635, p = .00037

The results of students' Internet use by age, Table 4.11, clearly show that, among the age groups of 30-40years, 40-50years, and 50-60years, the young (age 30-40years) use the Internet more than the old that is rate of Internet use decreases with age. For example, percentage users of ages 30-40 years is 92.9%, almost 40.0% more than ages 40-50 years with a percentage usage of 53.3%. Chi square tests also showed a significant relationship between Internet use and age of student. In other, words Internet use is dependent on age of student. On the contrary chi square tests did not show any significance in the case of staff

Tables 4.12 and 4.13 show Internet use by computer usage of staff and student respondents respectively.

Table 4.12 - Internet use by staff who have access to computer

Computer use	Internet Use N =123 Yes	No	Non-responsive	Total
Yes	95.3 (82)	53.1 (17)	40.0 (2)	82.1 (101)
No	3.5 (3)	43.8 (14)	40.0 (2)	15.4 (19)
Non-response	1.2 (1)	3.1 (1)	20.0 (1)	2.4 (3)
Total	100 (86)	100 (32)	100 (5)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell

DF = 4, chi-sq = 39.65512, p = .00000

Table 4.13 - Internet use by students who have access to computer

Computer use	Internet Use N =116 Yes	No	Non-responsive	Total
Yes	89.6 (60)	35.4 (17)	100 (1)	67.2 (78)
No	7.5 (5)	62.5 (30)	0.0 (0)	30.2 (35)
Non-response	2.9 (2)	2.1 (1)	0.0 (0)	2.6 (3)
Total	100 (67)	100 (48)	100 (1)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell.

DF = 6, chi-sq = 41.53427, p = .00037

The results show that, staff used the computer (95.3%) more than students (89.6%). Chi square tests for students and staff showed that, there is a strong relationship between computer use and Internet use. Further analysis of the relationship between Internet use and number of hours spent using a computer showed a positive relationship, that is, those who spent more hours a week using a computer, also use the Internet more, than those who spent less hours a week with the computer. (See Table 4.14 and 4.15)

Table 4.14- Internet use by time staff spend on computers

Hours spent on computer	Internet Use N =123			Total
	Yes	No	Non-responsive	
0hrs.	1.2 (1)	15.6 (5)	0.0 (0)	4.9 (6)
1hr.	10.5 (9)	15.6 (5)	20.0 (1)	12.2 (15)
5hrs.	27.9 (24)	25.0 (8)	60.0 (3)	28.0 (35)
Over 10hrs.	57.0 (49)	15.6 (5)	0.0 (0)	43.9 (54)
Non computer use	3.5 (3)	28.1 (9)	20.0 (1)	10.6 (13)
Total	100 (86)	100 (32)	100 (5)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

DF = 8, chi-sq = 38.11921, p = .00001

Table 4.15- Internet use by time students spend on computers

Hours spent on computer	Internet Use N =116			Total
	Yes	No	Non-responsive	
0hrs.	7.5 5	37.5 18	100 1	20.7 24
1hr.	25.4 (17)	12.5 (6)	0.0 (0)	19.8 (23)
5hrs.	28.4 (19)	14.6 (7)	0.0 (0)	22.4 (26)
Over 10hrs.	35.8 (24)	8.3 (4)	0.0 (0)	24.1 (28)
Non response	3.0 (2)	27.1 (13)	0.0 (0)	12.9 (15)
Total	100 (67)	100 (48)	100 (1)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell.

DF =8, chi-sq = 42.07928, p = .00000

4.7. Internet Use by Research Activity.

It was assumed that because the Internet has a lot of information for research, staff and students engaged in research activity would use the Internet more than those who were not doing any research. The results showed in the case of students that, those who were engaged

in research activity used the Internet more than those who were not doing any research (Table 4.17). On the other hand staff respondents who were not doing research used the Internet more than those doing research (Table 4.16). However chi-square tests did not show any relationship between Internet use and research activity in both cases.

Table 4.16- Internet use by research activity of staff

Research Activity	Internet Use N =123			Total
	Yes	No	Non-responsive	
Yes	82.6 (71)	84.4 (27)	100 (5)	83.3 (103)
No	17.4 (15)	15.6 (5)	0.0 (0)	16.3 (20)
Total	100 (86)	100 (32)	100 (5)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell

Table 4.17- Internet use by research activity of students

Research Activity	Internet Use N =116			Total
	Yes	No	Non-responsive	
Yes	62.7 (52)	48.4 (15)	0.0 (0)	57.8 (67)
No	36.1 (30)	51.6 (16)	100 (2)	41.4 (48)
Non response	1.2 (1)	0.0 (0)	0.0 (0)	0.9 (1)
Total	100 (83	100 (31)	100 (2)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell

4.8. The Use of email

Respondents were asked to indicate whether they used email or not, the frequency and the purposes for which they used it. The use of email by staff and students is presented in Tables 4.18 and 4.19.

Table 4.18- Staff use of e-mail by faculty

Responses	Staff Responses N =122			Total
	Arts	Social Science	Science	
Yes	70.0 (28)	65.8 (28)	84.1 (37)	73.8 (90)
No	5.0 (2)	5.3 (2)	4.5 (2)	4.9 (6)
Non response	25.0 (10)	28.9 (11)	11.4 (5)	21.3 (26)
Total	100 (40)	100 (38)	100 (44)	100 (122)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.19- Students use of e-mail by faculty

Responses	Student Responses N =116			Total
	Arts	Social Science	Science	
Yes	18.2 (4)	50.0 (24)	82.6 (38)	56.9 (66)
No	133.6 (3)	12.5 (6)	6.5 (3)	10.3 (12)
Non response	68.2 (15)	37.5 (18)	10.9 (5)	32.8 (38)
Total	100 (22)	100 (48)	100 (46)	100 (116)

NB The percentage response is stated above the number of respondents, in each cell.

The results show that, staff used the email more than students. A percentage of 73.8 of staff as compared to 56.9 of student respondents used the email. Also in both cases, respondents from the Science faculty used the email more than those from the Arts and Social Science faculties. The least users were student respondents from the Arts faculty (18.2%) The results also show that staff respondents from the Arts faculty used the email more than those from the Social Science faculty. The opposite is the case with regard to students.

Frequency of use of email for staff and students is presented in Tables 4.20 and 4.21. The results show that generally both staff and students do not frequently use the email. Only the staff respondents from the Science faculty recorded an appreciable frequency of 45.5% daily, followed by staff respondents from the Art faculty (32.5% daily). The results also show that

staff used the email more frequently than students, considering the fact that 34.4% of the staff used it daily, compared to 19.8% students who used it daily.

Table 4.20- Frequency of staff e-mail use by faculty

Frequency	Staff Responses N =122			Total
	Arts	Social Science	Science	
Once a week	7.5 (3)	5.3 (2)	9.1 (4)	7.4 (9)
Twice a week	15.0 (6)	13.2 (5)	11.4 (5)	13.1 (16)
Daily	32.5 (13)	23.7 (9)	45.5 (20)	34.4 (42)
Occasionally	20.0 (8)	18.4 (7)	13.6 (6)	17.2 (21)
Not at all	25.0 (10)	39.5 (15)	20.5 (9)	27.9 (34)
Total	100 (40)	100 (38)	100 (44)	100 (122)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.21- Frequency of students e-mail use by faculty

Frequency	Student Responses N =121			Total
	Arts	Social Science	Science	
Once a week	4.5 (1)	7.8 (4)	18.8 (9)	11.6 (14)
Twice a week	0.0 (0)	7.8 (4)	16.7 (8)	9.9 (12)
Daily	4.5 (1)	27.5 (14)	18.8 (9)	19.8 (24)
Occasionally	9.1 (2)	9.8 (5)	22.9 (11)	14.9 (18)
Not at all	81.8 (18)	47.1 (24)	22.9 (11)	43.8 (53)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB: The percentage response is stated above the number of respondents, in each cell.

Respondents were asked to indicate the purposes for which they used the email. The results (Table 4.22) showed that majority of staff respondents (59.9%) used the service to contact

international colleagues involved in research, followed by social reasons (43.4%). The least purpose for use of email was corresponding with editors (18.2%).

Table 4.22- Purposes for staff use of e-mail by faculty

	Staff responses N =122											
	Arts			Social Science			Science			Grand Total		
Purposes	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Contact colleagues	45.0 (18)	55.0 (22)	100 (40)	39.5 (15)	60.5 (23)	100 (38)	77.3 (34)	22.7 (10)	100 (44)	54.9 (67)	45.1 (55)	100 (122)
Departmental exchanges	17.5 (7)	82.5 (33)	100 (40)	21.1 (8)	78.9 (30)	100 (38)	22.7 (10)	77.3 (34)	100 (44)	20.5 (25)	79.5 (97)	100 (122)
Contact editors	22.5 (9)	77.5 (31)	100 (40)	15.8 (6)	84.2 (32)	100 (38)	18.2 (8)	81.8 (36)	100 (44)	18.9 (23)	81.1 (99)	100 (122)
Send papers	22.5 (9)	77.5 (31)	100 (40)	13.2 (5)	86.8 (33)	100 (38)	25.0 (11)	75.0 (33)	100 (44)	20.5 (25)	79.5 (97)	100 (122)
Social reasons	65.0 (26)	35.0 (14)	100 (40)	31.6 (12)	68.4 (26)	100 (38)	68.2 (30)	31.8 (14)	100 (44)	55.7 (68)	44.3 (54)	100 (122)
Other	2.5 (1)	97.5 (39)	100 (40)	7.9 (3)	92.1 (35)	100 (38)	4.5 (2)	95.5 (42)	100 (44)	4.9 (6)	95.1 (116)	100 (122)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.23- Purposes for students use of e-mail by faculty

	Student Responses N =116											
	Arts			Social Science			Science			Grand Total		
Purposes	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Contact colleagues	4.5 (1)	95.5 (21)	100 (22)	20.8 (10)	79.2 (38)	100 (48)	43.5 (20)	56.5 (26)	100 (46)	26.7 (31)	73.3 (85)	100 (116)
Departmental exchanges	0.0 (0)	100 (22)	100 (22)	12.5 (6)	87.5 (42)	100 (48)	19.6 (9)	80.4 (37)	100 (46)	12.9 (15)	87.1 (101)	100 (116)
Contact editors	0.0 (0)	100 (22)	100 (22)	8.3 (4)	91.7 (44)	100 (48)	17.4 (8)	82.6 (38)	100 (46)	10.3 (12)	89.7 (104)	100 (116)
Send papers	0.0 (0)	100 (22)	100 (22)	2.1 (1)	97.9 (47)	100 (48)	4.3 (2)	95.7 (44)	100 (46)	2.6 (3)	97.4 (113)	100 (116)
Social reasons	13.6 (3)	86.4 (19)	100 (22)	43.8 (21)	56.3 (27)	100 (48)	63.0 (29)	37.0 (17)	100 (46)	45.7 (53)	54.3 (63)	100 (116)
Other	4.5 (11)	95.5 (21)	100 (22)	8.3 (4)	91.7 (44)	100 (48)	8.7 (4)	91.3 (42)	100 (46)	7.8 (9)	92.2 (107)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell.

The same trend is observed among faculties. Majority of students (Table 4.23), on the other hand used the email facility for social reasons (45.7%), followed by contacting international

colleagues involved in research (26.7%). The percentages recorded for the other purposes, (namely, exchange of departmental messages, corresponding with editors/publishers and sending papers to journals), are minimal, to the extent that in the case of the Arts respondents, none of them used email for any of these purposes. This is anticipated, since at this stage, most students are not yet professionals and are still pursuing their studies. Thus obviously these purposes are not relevant for students.

Staff respondents were asked to indicate the importance of the email service. The results are as follows; indispensable (32.5%), very important (31.7%), important (6.5%), slightly important (0.8%).

4.9. Use of Discussion Groups.

Respondents were asked to indicate the extent of their participation in discussion groups, that is, whether they were active, passive, former or non-members and also to indicate the frequency of participation. The results for use of discussion groups are presented in Table 4.24 and 4.25.

Table 4.24- Staff participation in discussion groups by faculty

User category	Staff Responses N =122			Total
	Arts	Social Science	Science	
Active	7.5	5.3	9.1	7.4
	(3)	(2)	(4)	(9)
Passive	5.0	7.9	15.9	9.8
	(2)	(3)	(7)	(12)
Former users	12.5	7.9	13.6	11.5
	(5)	(3)	(6)	(14)
Non-users	75.0	78.9	59.1	70.5
	(30)	(30)	(26)	(86)
Total	100	100	100	100
	(40)	(38)	(44)	(122)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.25- Students participation in discussion groups by faculty

User category	Student Responses N =116			Total
	Arts	Social Science	Science	
Active	0.0	2.1	6.5	3.4
	(0)	(1)	(3)	(4)
Passive	4.5	4.2	8.7	6.0
	(1)	(2)	(4)	(7)
Former users	0.0	8.3	4.3	5.2
	(0)	(4)	(2)	(6)
Non-users	18.2	50.0	65.2	50.0
	(4)	(24)	(30)	(58)
Non-response	77.3	35.4	15.2	35.3
	(17)	(17)	(7)	(41)
Total	100	100	100	100
	(22)	(48)	(46)	(116)

NB The percentage response is stated above the number of respondents, in each cell

The results show that, unlike email, only a few respondents participated in discussion groups. A percentage of 7.4 of staff, and 3.4 of student respondents use this service actively. The least participants are the student respondents from the Arts faculty. None of them was an active user and only 4.5% of them participated passively. This may be due to lack of interest on the part of the students. An appreciable percentage of staff (11.4%) indicated they were former users. An informal observation during the administration of the questionnaire revealed that some of the staff were active users while pursuing various courses abroad but are no more participating due to lack of access. Frequency of use of discussion groups and reading of net-news by staff and students as presented in tables 4.26 and 4.27 is also poor. Majority of the few participants used it occasionally. A percentage of 14.8 of staff and 11.6 of students indicated they used discussion groups occasionally.

Table 4.26-Frequency of staff use of discussion groups and reading of news by faculty

Frequency	Staff Responses N =122			Total
	Arts	Social Science	Science	
Once a week	0.0	0.0	6.8	2.5
	(0)	(0)	(3)	(3)
Twice a week	5.0	0.0	2.3	2.5
	(2)	(0)	(1)	(3)
Daily	0.0	0.0	4.5	1.6
	(0)	(0)	(2)	(2)
Occasionally	15.0	10.5	18.2	14.8
	(6)	(4)	(8)	(18)
Not at all	80.0	89.5	63.6	77.0
	(32)	(34)	(28)	(94)
Total	100	100	100	100
	(40)	(38)	(44)	(122)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.27-Frequency of students use of discussion groups and reading of news by faculty

Frequency	Student Responses N =121			Total
	Arts	Social Science	Science	
Once a week	0.0	3.9	8.3	5.0
	(0)	(2)	(4)	(6)
Twice a week	0.0	5.9	2.1	3.3
	(0)	(3)	(1)	(4)
Occasionally	0.0	11.8	16.7	11.6
	(0)	(6)	(8)	(14)
Not at all	100	78.4	72.9	80.2
	(22)	(40)	(35)	(97)
Total	100	100	100	100
	(22)	(51)	(48)	(121)

NB The percentage response is stated above the number of respondents, in each cell

4.10. Reading of News/Bulletin Boards.

Respondents were asked to indicate the extent to which they participated in the reading of news. The results for both staff and students (Tables 4.28 and 4.29) show little patronage of reading of news. It is only the student respondents from the Social Science faculty who recorded an appreciably active usage of 20.8%. Most of the few who participated did so passively. That is, they only read the news on bulletin boards without posting any information. However, the rate of usage is a little higher than use of discussion groups. For

example, 11.5% of staff read news actively compared to 8.3% of staff that participated in discussion groups actively.

Table 4.28- Staff reading of news by faculty

User category	Staff Responses N =122			Total
	Arts	Social Science	Science	
Active	12.5	13.5	9.1	11.5
	(5)	(5)	(4)	(14)
Passive	7.5	15.8	25.0	16.4
	(3)	(6)	(11)	(20)
Former users	15.0	15.8	22.7	18.0
	(6)	(6)	(10)	(22)
Non-users	62.5	55.3	40.9	52.5
	(25)	(21)	(18)	(64)
Total	100	100	100	100
	(40)	(38)	(44)	(122)

NB The percentage response is stated above the number of respondents, in each cell.

Table 4.29- Students reading of news by faculty

User category	Student Responses N =116			Total
	Arts	Social Science	Science	
Active	4.5	20 8	6.5	12.1
	(1)	(10)	(3)	(14)
Passive	4.5	2.0.8	19.6	17.2
	(1)	(10)	(9)	(20)
Former users.	4.5	6.3	10.9	7.8
	(1)	(3)	(5)	(9)
Non-users	13.6	16.7	47.8	28.4
	(3)	(8)	(22)	(33)
Total	100	100	100	100
	(22)	(48)	(46)	(116)

NB The percentage response is stated above the number of respondents, in each cell.

4.11. Purposes for Use of Discussion Groups and Reading of News.

Respondents were asked to indicate whether they participated in the reading of news for the following purposes; to be updated on research issues, for social issues, reading electronic journals, to receive information on funds/conferences and other. Tables 4.30 and 4.31 show that, the few staff and students who patronized these services use them mainly to be updated on research issues and also for social reasons.

Table 4 30- Purposes for staff use of discussion groups and reading of news by faculty

	Staff responses N =122											
	Arts			Social Science			Science			Grand Total		
Purposes	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Update on research	25.0 (10)	75.0 (30)	100 (40)	31.6 (12)	68.4 (26)	100 (38)	40.9 (18)	59.1 (26)	100 (44)	32.8 (40)	67.2 (82)	100 (122)
Social purposes	20.0 (8)	80.2 (32)	100 (40)	23.7 (9)	76.3 (29)	100 (38)	22.7 (10)	77.3 (34)	100 (44)	22.1 (27)	77.9 (95)	100 (122)
Information on funding	7.5 (3)	92.5 (37)	100 (40)	13.2 (5)	86.8 (33)	100 (38)	6.8 (3)	93.2 (41)	100 (44)	9.0 (11)	91.0 (111)	100 (122)
Reading electronic journals	12.5 (5)	87.5 (35)	100 (40)	10.5 (4)	89 5 (34)	100 (38)	27.3 (12)	72.7 (32)	100 (44)	17.2 (21)	82.8 (101)	100 (122)
Other	2.5 (1)	97.5 (35)	100 (40)	0.0 (0)	100 (38)	100 (38)	4.5 (2)	95.5 (42)	100 (44)	2.5 (3)	97.5 (119)	100 (122)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.31- Purposes for students use of discussion groups and reading of news by faculty

	Student responses N =116											
	Arts			Social Science			Science			Grand Total		
Purposes	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Update on research	9.1 (2)	90 9 (20)	100 (22)	20.8 (10)	79 2 (38)	100 (48)	23.9 (11)	76 1 (35)	100 (46)	19.8 (23)	80.2 (93)	100 (116)
Social purposes	9.1 (2)	90 9 (20)	100 (22)	29.2 (14)	70 8 (34)	100 (48)	26.1 (12)	73.9 (34)	100 (46)	24.1 (28)	75.9 (88)	100 (116)
Information on funding	4.5 (1)	95.5 (21)	100 (22)	8.3 (4)	91.7 (44)	100 (48)	13.0 (6)	87.0 (40)	100 (46)	9.5 (11)	90.5 (105)	100 (116)
Read electronic journal	4.5 (1)	95.5 (21)	100 (22)	6.3 (3)	93.7 (45)	100 (48)	10.9 (5)	89.1 (41)	100 (46)	7 8 (9)	92.2 (107)	100 (116)
Identify experts	0.0 (0)	100 (22)	100 (22)	18.8 (9)	81.3 (39)	100 (48)	13.0 (6)	87.0 (40)	100 (46)	12.9 (15)	86.1 (101)	100 (116)
Other	0.0 (0)	100 (22)	100 (22)	8.3 (4)	91.7 (44)	100 (48)	0.0 (0)	100 (46)	100 (46	3.4 (4)	96.6 (112)	100 (116)

NB: The percentage response is stated above the number of respondents, in each cell

A percentage of 32.8 of staff and 19.8% of students used them in order to be updated on research issues, while 22.1% of staff and 24.1% of students used them for social reasons. These observations are also reflected among faculties. It was anticipated that a reasonable number of respondents would read electronic journal because of the shortage of current journals in the university's library, but only staff respondents from the science faculty (27.3%), indicated they read electronic journals.

Staff respondents were asked to indicate the importance of these services. The results are as follows; indispensable (8.3%), very important (12.2%), important (12.2%), slightly important (3.3%), and not used (63.4%). The very few respondents who appreciated this service emphasizes the low patronage of this service.

Table 4.32- Staff use of Telnet and ftp by faculty

Service	Staff Responses N =122			Total
	Arts	Social Science	Science	
Ftp	7.5 (3)	13.2 (5)	9.1 (4)	9.8 (12)
Telnet	10.0 (4)	13.2 (5)	18.2 (8)	13.9 (17)
Both telnet and ftp	37.5 (15)	47.4 (18)	27.3 (12)	36.9 (45)
Non-users	45.0 (18)	26.3 (10)	43.2 (19)	38.5 (47)
Non response	0.0 (0)	0.0 (0)	2.3 (1)	0.8 (1)
Total	100 (40)	100 (38)	100 (44)	100 (122)

NB: The percentage response is stated above the number of respondents, in each cell

Table 4.33- Students use of telnet and ftp by faculty

User category	Student Responses N =116			Total
	Arts	Social Science	Science	
Ftp	0.0 (0)	8.3 (4)	10.9 (5)	7.8 (9)
Telnet	0.0 (0)	6.3 (3)	6.5 (3)	5.2 (6)
Both telnet and ftp	4.5 (1)	2.1 (1)	8.7 (4)	5.2 (6)
Non-users	18.2 (4)	39.6 (19)	52.2 (24)	40.5 (47)
Non-response	77.3 (17)	43.8 (21)	21.7 (10)	41.4 (48)
Total	100 (22)	100 (48)	100 (46)	100 (116)

NB The percentage response is stated above the number of respondents, in each cell

4.12. The Use of Telnet and ftp

Telnet and ftp services are relatively popular with staff (36.9%) as compared with students (5.2%). The results show that within the faculties quite a number of staff used both services (Table 4.32). The use of these services by students is relatively low, especially, students from the Arts Faculty. A high percentage of them, 77.3% did not respond to the question of use of these services probably because they did not know what it is used for (Table 4.33).

Table 4.34- Frequency of staff use of telnet and ftp by faculty

Frequency	Staff Responses N =122			Total
	Arts	Social Science	Science	
Once a week	0.0	5.3	2.3	2.5
	(0)	(2)	(1)	(3)
Twice a week	5.0	10.5	2.3	5.7
	(2)	(4)	(1)	(7)
Daily	0.0	0.0	4.5	1.6
	(0)	(0)	(2)	(2)
Occasionally	12.5	15.8	20.5	16.4
	(6)	(6)	(9)	(20)
Non-users	82.5	68.4	63.6	71.3
	(33)	(36)	(28)	(87)
Non-response	0.0	0.0	6.8	2.5
	(0)	(0)	(3)	(3)
Total	100	100	100	100
	(40)	(38)	(44)	(122)

NB The percentage response is stated above the number of respondents, in each cell.

Table 4.35- Frequency of students use of telnet and ftp by faculty

User category	Student Responses N =121			Total
	Arts	Social Science	Science	
Once a week	0.0	0.0	6.3	2.5
	(0)	(0)	(3)	(3)
Twice a week	0.0	2.0	4.2	2.5
	(0)	(1)	(2)	(3)
Daily	0.0	5.9	2.1	3.3
	(0)	(3)	(1)	(4)
Occasionally	4.5	9.8	12.5	9.9
	(1)	(5)	(6)	(12)
Non-users	95.5	80.4	75.0	81.0
	(21)	(41)	(36)	(98)
Non-response	0.0	2.0	0.0	0.8
	(0)	(1)	(0)	(1)
Total	100	100	100	100
	(22)	(51)	(48)	(121)

Frequency of use of these services was also low among staff and students. The few respondents who used them did so occasionally. See Tables 4.34 and 4.35.

Responses to the question of the importance of telnet and ftp to staff are as follows; indispensable (4.9%), very important (15.4%), important (8.9%), slightly important (3.3%), and not used (63.4%).

Table 4.36- Staff use of advanced search interfaces by faculty

Search Interface	Staff responses N =122									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Gopher	10.0 (4)	90.0 (36	100 (40	10.5 (4)	89.5 (34)	100 (38)	4.5 (2)	95.5 (42)	100 (44)	8.2 (10)	91.8 (112)	100 (122)
WWW	30.0 (12	70.0 (28)	100 (40)	44.7 (17	55.3 (21)	100 (38)	65.9 (29)	34.1 (15)	100 (44)	47.5 (58)	52.5 (64)	100 (122)
WAIS	5.0 (2)	95.0 (38)	100 (40)	5.3 (2)	94.7 (36)	100 (38)	0.0 (0)	100 (44)	100 (44)	3.3 (4)	96.7 (118)	100 (122)
Other	25.0 (10)	75.0 (30)	100 (40)	7.9 (3)	92.1 (35)	100 (38)	9.1 (4)	90.9 (40)	100 (44)	13.9 (17)	86.1 (105)	100 (122)

NB The percentage response is stated above the number of respondents, in each cell.

Table 4.37- Students use of advanced search interfaces by faculty

Search Interface	Student responses N =116									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Gopher	4.1 (1)	95.5 (21)	100 (22)	4.2 (2)	95.8 (46)	100 (48)	10.5 (5)	89.1 (41)	100 (46)	6.9 (8)	93.1 (108)	100 (116)
WWW	13.6 (3)	86.4 (19)	100 (22)	45.8 (22)	54.2 (26)	100 (48)	60.9 (28)	39.1 (18)	100 (46)	45.7 (53)	54.3 (63)	100 (116)
WAIS	0.0 (0)	100 (22)	100 (22)	0.0 (0)	100 (48)	100 (48)	4.3 (2)	95.7 (44)	100 (46)	1.7 (2)	98.3 (114)	100 (116)
Other	0.0 (0)	100 (22)	100 (22)	0.0 (0)	100 (48)	100 (48)	2.2 (1)	97.8 (45)	100 (46)	0.9 (1)	99.1 (115)	100 (116)

NB The percentage response is stated above the number of respondents, in each cell.

4.13. Use of Advanced Search Interfaces.

The study sought to explore the advanced search interfaces mostly used by staff and students. The results show that the WWW is widely used by both staff (47.5%) and students (45.7%).

Gopher and then WAIS were more used. Both staff and student respondents fro sciences used the WWW more than their counterparts from the other faculties. Table and 4.37 show the rest of the results.

Table 4.38- Frequency of staff use of advanced search interfaces by fac

Frequency	Staff Responses N =122			Total
	Arts	Social Science	Science	
Once a week	2.5 (1)	5.3 (2)	2.3 (1)	3.3 (4)
Twice a week	10.0 (4)	5.3 (2)	9.1 (4)	8.2 (10)
Daily	5.0 (2)	10.5 (4)	18.2 (8)	11.5 (14)
Occasionally	12.5 (5)	15.8 (6)	40.9 (18)	23.8 (29)
Not at all	70.0 (28)	63.2 (24)	27.5 (27.5)	53.3 (65)
Total	100 (40)	100 (38)	100 (44)	100 (122)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.39-Frequency of students use of advanced search interfaces by fac

Frequency	Student Responses N =121			Total
	Arts	Social Science	Science	
Once a week	0.0 (0)	2.0 (1)	8.3 (4)	4.1 (5)
Twice a week	0.0 (0)	7.8 (4)	8.3 (4)	6.6 (8)
Daily	4.5 (1)	15.7 (8)	6.3 (3)	9.9 (12)
Occasionally	13.6 (3)	17.6 (10)	29.2 (14)	22.3 (27)
Not at all	95.5 (18)	80.4 (28)	75.0 (23)	81.0 (69)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell.

The results also show that majority of staff and student respondents who used the advance search interfaces tend to use them occasionally, especially respondents from the sciences. Frequency of use is generally low in all cases, that is, for both staff and students. A high

percentage of students (81.0%) compared to 53.3% of staff indicated they did not use the search interfaces at all. This is an unexpected result since a successful search of the Internet requires use of one or more search Interfaces. Tables 4.38 and 4.39 show the rest of the results.

Table 4 40- Purposes for staff use of advanced search interfaces by faculty.

	Staff responses N =122											
	Arts			Social Science			Science			Grand Total		
Purpose	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Search library catalogues	15.0 (6)	85.0 (34)	100 (40)	2 6 (1)	97 4 (37)	100 (38)	15 9 (7)	84 1 (37)	100 (44)	11.5 (14)	88.5 (108)	100 (122)
Information for research	30.0 (12)	70.0 (280	100 (40)	31.6 (12)	68.4 (26)	100 (38)	61.4 (27)	38.6 (17)	100 (44)	41.8 (51)	58 2 (71)	100 (122)
Information for assignments	2.5 (1)	97.5 (39)	100 (40)	15.8 (6)	84.2 (32)	100 (38)	4.5 (2)	95.5 (42)	100 (44)	7.4 (9)	92.6 (113)	100 (122)
Job vacancies	5.0 (2)	95.0 (38)	100 (40)	13.2 (5)	86.8 (33)	100 (38)	15.9 (7)	84.1 (34)	100 (44)	11.5 (14)	88.5 (108)	100 (122)
Social reasons	15.0 (6)	85 0 (34)	100 (40)	15.8 (6)	84.2 (32)	100 (38)	18.2 (8)	81.8 (36)	100 (44)	16.4 (20)	83.6 (102)	100 (122)
Other	0.0 (0)	100 (40)	100 (40)	5.3 (2)	94.7 (36)	100 (38)	2.3 (1)	97.7 (43)	100 (44)	2.5 (3)	97.5 (119)	100 (122)

NB. The percentage response is stated above the number of respondents, in each cell

Table 4.41- Purposes for students use of advanced search interfaces by faculty

	Student responses N =121											
	Arts			Social Science			Science			Grand Total		
Purpose	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Email	13 6 (3)	86.4 (19)	100 (22)	35.3 (18)	64 7 (33)	100 (51)	45 8 (22)	54 2 (26)	100 (48)	35.5 (43)	64 5 (78)	100 (121)
Research information	9.1 (2)	90.9 (20)	100 (22)	31.4 (16)	68.6 (35)	100 (51)	47.9 (23)	52.1 (25)	100 (48)	33.9 (41)	66.1 (80)	100 (121)
File transfers	0.0 (0)	100 (22)	100 (22)	7 8 (4)	92.2 (47)	100 (51)	6.3 (3)	93 8 (45)	100 (48)	5.8 (7)	94.2 (114)	100 (121)
Routine information	0.0 (0)	100 (22)	100 (22)	5 9 (3)	94.1 (48)	100 (51)	20.8 (10)	79.2 (38)	100 (48)	10.7 (13)	89.3 (108)	100.3 (121)
Social reasons	4.5 (1)	95.5 (21)	100 (22)	9.8 (5)	90.2 (46)	100 (51)	8.3 (4)	91.7 (44)	100 (48)	8.3 (10)	91.7 (111)	100 (121)
Other	4.5 (1)	95.5 (21)	100 (22)	5.9 (3)	94.1 (48)	100 (51)	2.1 (1)	97.9 (46)	100 (48)	4.2 (5)	95.8 (115)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell.

Respondents were asked to indicate the purposes for which they used the advanced search interfaces. The staff was to indicate whether they used it to search library catalogues, information relevant to research, information to complete educational assignments, information on job vacancies or courses, databases for social reasons, and others. Table 4.40 shows that majority of staff (41.8%) used the search interfaces to look for information relevant to research. This is the trend in all faculties, especially respondents from the Science faculty with a response rate of 61.4%. The results for the students show that majority of them used the search interfaces for email (35.5%), followed by information for research (33.9%) (see Table 4.41). A minority of them used the search interfaces to look for information on job vacancies and conferences, (10.7%), social issues (8.3%), and to make file transfers (5.8%).

Table 4.42- Staff use of search engines by faculty

Search Tool	Staff responses N =123									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Yahoo	27.5 (11)	72.5 (29)	100 (40)	44.7 (17)	55.3 (21)	100 (38)	51.1 (23)	48.9 (22)	100 (45)	41.5 (51)	58.5 (72)	100 (123)
Info Seek	15.0 (6)	85.0 (34)	100 (40)	10.5 (4)	89.5 (34)	100 (38)	17.8 (8)	82.2 (37)	100 (45)	14.6 (8)	85.4 (105)	100 (123)
Alta Vista	10.0 (4)	90.0 (36)	100 (40)	10.5 (4)	89.5 (34)	100 (48)	26.7 (12)	73.3 (33)	100 (45)	16.3 (20)	83.7 (103)	100 (123)
Other	22.5 (9)	77.5 (31)	100 (40)	13.2 (5)	86.8 (33)	100 (38)	15.6 (7)	84.4 (38)	100 (45)	17.1 (21)	82.9 (102)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.43- Students use of search engines by faculty

Search Tool	Student Responses N =121									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Yahoo	9.1 (2)	90.9 (20)	100 (22)	31.4 (16)	68.6 (35)	100 (51)	52.1 (25)	47.9 (23)	100 (48)	35.5 (43)	64.5 (78)	100 (121)
Info Seek	0.0 (0)	100 (22)	100 (22)	3.9 (2)	96.1 (49)	100 (51)	22.9 (11)	77.1 (37)	100 (48)	10.7 (13)	89.3 (108)	100 (121)
Alta Vista	0.0 (0)	100 (22)	100 (22)	11.8 (6)	88.2 (45)	100 (51)	16.7 (8)	83.3 (40)	100 (48)	11.6 (14)	88.4 (107)	100 (121)
Other	13.3 (3)	86.4 (19)	100 (22)	17.6 (9)	82.4 (42)	100 (51)	16.7 (8)	83.3 (40)	100 (48)	16.5 (20)	83.5 (101)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell

4.14. Use of Search Tools.

Respondents were asked to indicate the types of search tools they used when lookin information. The results in Tables 4.42 and 4.43 show that Yahoo, a Directory, was the popular search tool used by both staff and students, with respondents from the Sc faculty in both groups using it more than those from the other faculties. Alta Vista Infoseek were also widely used by respondents from the Science faculty. The least users students from the Arts faculty. Although the user rates are not very high, the staff respon used these search tools more than the student respondents. Use of meta-search eng namely, Dogpile, Metafind, Oneseek, and Mamma (Tables 4. 44 and 4.45), was very lo fact student respondents from the Arts faculty did not use any of these meta-search eng Dogpile was not used at all by student respondents from any faculty.

Table 4.44- Staff use of meta-search engines by faculty

Meta-search engine	Staff Responses N =123			Total
	Arts	Social Science	Science	
Dogpile	7.5	7.9	6.7	7.3
	(3)	(3)	(3)	(9)
Metafind	5.0	7.9	15.6	9.8
	(2)	(3)	(7)	(12)
Oneseek	0.0	0.0	4.4	1.6
	(0)	(0)	(2)	(2)
Mamma	0.0	0.0	4.4	1.6
	(0)	(0)	(2)	(2)
Other	5.0	0.0	6.7	4.1
	(2)	(0)	(3)	(5)
Non response	82.5	84.2	62.2	75.6
	(33)	(32)	(28)	(93)
Total	100	100	100	100
	(40)	(38)	(45)	(123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.45- Students use of meta-search engines by faculty

Meta-search engine	Student Responses N =121			Total
	Arts	Social Science	Science	
Dogpile	0.0	0.0	0.0	0.0
	(0)	(0)	(0)	(0)
Metafind	0.0	9.8	2.1	5.0
	(0)	(5)	(1)	(6)
Oneseek	0.0	2.0	8.3	4.1
	(0)	(1)	(4)	(5)
Mamma	0.0	2.0	6.3	3.3
	(0)	(1)	(3)	(4)
Other	0.0	2.0	10.4	5.0
	(0)	(1)	(5)	(6)
Non-response	100	84.3	72.9	82.6
	(22)	(43)	(35)	(100)
Total	100	100	100	100
	(22)	(51)	(48)	(121)

NB: The percentage response is stated above the number of respondents, in each cell.

Respondents were also asked to indicate which of the following information gateways they used during searches, namely, AHS (Arts and Humanities data Service), Biz/Ed (Business and Economics information), SOSIG (Social Science Information gateway), and NOVA Gate (Forestry, Vertinary, and Agricultural Sciences Information gateway).

Table 4.46- Staff use of information gateways by faculty

Information gateway	Staff Responses N =123			Total
	Arts	Social Science	Science	
AHS	12.5 (5)	13.2 (5)	0.0 (0)	8.1 (10)
Biz Ed	2.5 (1)	7.9 (3)	8.9 (4)	6.5 (8)
SOSIG	2.5 (1)	5.3 (2)	8.9 (4)	5.7 (7)
NOVA Gate	0.0 (0)	0.0 (0)	6.7 (3)	2.4 (3)
Other	5.0 (2)	0.0 (0)	11.1 (5)	5.7 (7)
Non-response	77.5 (31)	73.7 (28)	64.4 (29)	71.5 (88)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell.

Table 4.47- Students use of information gateways by faculty

Information gateway	Student Responses N =121			Total
	Arts	Social Science	Science	
AHDS	0.0 (0)	2.0 (1)	2.1 (1)	1.7 (2)
Biz Ed	0.0 (0)	21.6 (11)	2.1 (1)	9.9 (12)
SOSIG	0.0 (0)	3.9 (2)	4.2 (2)	3.3 (4)
NOVA Gate	0.0 (0)	0.0 (0)	10.4 (5)	4.1(5)
Other	0.0 (0)	0.0 (0)	12.5 (6)	5.0 (6)
Non-response	100 (22)	72.5 (37)	68.8 (33)	76.0 (92)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell.

The results, (Tables 4.46 and 4.47) show that, AHDS was a little patronized by staff respondents from the Arts (12.5%), and Social Science (13.2%) faculties. The Business and Economics information gateway (Biz Ed) was also fairly patronized by student respondents from the Social Science faculty, but generally these gateways were poorly used especially with regard to the student respondents. It was anticipated that these search tools would be

highly used by respondents since they help in the speedy location of information. The generally low rate of use of these search engines may be due to lack of awareness, although this was not probed in the study.

4.15. Satisfaction with Information Found on the Internet

Respondents were asked to indicate the extent of satisfaction with search results. The results (Tables 4.48 and 4.49) show that most respondents sometimes get results (38.2% for staff and 43.0% for students).

Table 4.48- Staff satisfaction with information searches by faculty

Perceived satisfaction	Staff Responses N =123			Total
	Arts	Social Science	Science	
Always	7.5 (3)	10.5 (4)	15.6 (7)	11.4 (14)
Never	0.0 (0)	2.6 (1)	2.2 (1)	1.6 (2)
Sometimes	32.5 (13)	39.5 (15)	42.2 (19)	38.2 (47)
Inadequate	0.0 (0)	5.3 (2)	11.1 (5)	5.7 (7)
Non-response	60.0 (24)	42.1 (16)	28.9 (13)	43.1 (53)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.49- Students satisfaction with information searches by faculty

Perceived satisfaction	Student Responses N =121			Total
	Arts	Social Science	Science	
Always	4.5 (1)	2.0 (1)	8.3 (4)	5.0 (6)
Never	0.0 (0)	2.0 (1)	4.2 (2)	2.5 (3)
Sometimes	13.6 (3)	47.0 (24)	52.1 (25)	43.0 (52)
Inadequate	0.0 (0)	2.0 (1)	6.3 (3)	3.3 (4)
Non-response	81.8 (18)	47.0 (24)	29.1 (14)	46.2 (56)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB. The percentage response is stated above the number of respondents, in each cell.

Only 11.4% of staff and 5.0% of students indicated they always get the information they searched for. The poor rate of the use of the different search tools discussed above may

account for this low satisfaction rates. Majority of respondents from the Arts faculty (60% of staff and 81.8% of students) did not express any satisfaction, probably because they were not at all familiar with the use of search tools or they used the Internet for purposes other than searching for information.

Table 4.50- Staff motivation for use of the Internet by faculty

Motivation Factor	Staff Responses N =123			Total
	Arts	Social Science	Science	
Email	62.5 (25)	50.0 (19)	71.1 (32)	61.8 (76)
Ready access to information	10.0 (4)	10.5 (4)	11.1 (5)	10.6 (13)
Information for research	0.0 (0)	0.0 (0)	4.4 (2)	1.6 (2)
Social information	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Non-response	27.5 (11)	39.5 (15)	13.3 (6)	26.0 (32)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.51- Students motivation for use of the Internet by faculty

Motivation Factor	Student Responses N =121			Total
	Arts	Social Science	Science	
Email	13.6 (3)	45.1 (23)	62.5 (30)	46.3 (56)
Ready access information	0.0 (0)	2.0 (1)	0.0 (0)	0.8 (1)
Easy research	9.1 (2)	5.9 (3)	10.4 (5)	8.3 (10)
Non-responsive	77.3 (17)	47.1 (24)	27.1 (13)	44.6 (54)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB: The percentage response is stated above the number of respondents, in each cell.

4.16. Motivation for Use of the Internet

Respondents were asked to indicate their main motivation for using the Internet. The results show that for both staff and students, communicating with friends/colleagues is their main

motivation (see Tables 4.50 and 4.51 for the rest of the results). It was expected that ready access to information would also be a strong motivation factor because of the lack of current books and journals in the University's library, however only 10.6% of staff and 0.8% of students indicated ready access to information is their motivation factor for using the Internet. The results also show that, majority of students from the Arts Faculty (77.3%) did not seem to be motivated to use the Internet. This may be explained by the fact that, they had not used the Internet long enough to identify any benefits which might motivate them.

Table 4.52- Limitations in staff use of the Internet by faculty

Limitation	Staff Responses N =123									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Information overload	12.5 (5)	87.5 (35)	100 (40)	18.4 (7)	81 6 (31)	100 (38)	15 6 (7)	84 4 (38)	100 (45)	15.4 (19)	84 6 (104)	100 (123)
Difficulty in information location	17.5 (7)	82.5 (33)	100 (40)	15.8 (6)	84.2 (32)	100 (38)	2.2 (1)	97.8 (44)	100 (45)	11.4 (14)	88.6 (109)	100 (123)
Slow data transmission	32.5 (13)	67.5 (27	100 (40)	36.8 (14)	63.2 (24)	100 (38)	42.2 (19)	57.8 (26)	100 (45)	37.4 (46)	62.6 (77)	100 (123)
Poorly organized data	2.5 (1)	97.5 (39)	100 (40)	0.0 (0)	100 (38)	100 (38)	8.9 (4)	91.1 (41)	100 (45)	4.1 (5)	95.9 (118)	100 (123)
Other	5.0 (2)	95.5 (38)	100 (40)	0.0 (0)	100 (38)	100 (38)	6.7 (3)	93.3 (42)	100 (45)	4.1 (5)	95.9 (118)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.53- Limitation in students use of the Internet by faculty

Limitation	Student Responses N =121									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Information overload	0.0 (0)	100 (22)	100 (22)	15.7 (8)	84.3 (43)	100 (51)	29.2 (14)	70.8 (34)	100 (48)	18.2 (22)	81.8 (99)	100 (121)
Difficulty in locating information	18.2 (4)	81.8 (18)	100 (22)	31.4 (16)	68.6 (35)	100 (51)	29.2 (14)	70.8 (34)	100 (48)	28.1 (34)	71.9 (87)	100 (121)
Slow data transmission	0.0 (0)	100 (22)	100 (22)	17.6 (9)	82.4 (42)	100 (51)	35.4 (17)	64.6 (31)	100 (48)	21.5 (26)	78.5 (95)	100 (121)
Poorly organized data	0.0 (0)	100 (22)	100 (22)	0.0 (0)	100 (51)	100 (51)	6.3 (3)	93.8 (45)	100 (48)	2.5 (3)	97.5 (118)	100 (121)
Other	0.0 (0)	100 (22)	100 (22)	3.9 (2)	96.1 (49)	100 (51)	12.5 (6)	87.5 (42)	100 (48)	6.6 (8)	93.4 (113)	100 (121)

NB: The percentage response is stated above the number of respondents, in each cell.

4.17. Limitations in Use of the Internet

Respondents were asked to indicate what limitations they might have experienced in using the Internet. For the staff, 37.4% indicated slow data transmission as the main limitation [redacted] by information overload (15.4%). (See Table 4.52) This was the trend in all faculties. A percentage of 28.1 of the students indicated that their problem was difficulty in locating [redacted] lowed by slow data transmission (21.5%) (See Table 4.52). The

results suggest that, the staff seem to know their way about the Internet more than the students, since only 11.4% of the former indicated they had problem with locating information.

Table 4.54- Barriers to staff use of the Internet by faculty

	Staff Responses N =123									Grand Total		
	Arts			Social Science			Science					
Barrier	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Inadequate training	22.5 (9)	77.5 (31)	100 (40)	23.7 (9)	76.3 (29)	100 (38)	20.0 (9)	80.0 (36)	100 (45)	22.0 (27)	78.0 (96)	100 (123)
Inadequate time	32.5 (13)	67.5 (27)	100 (40)	26.3 (10)	73.7 (28)	100 (38)	11.1 (5)	88.9 (40)	100 (45)	22.8 (28)	77.2 (95)	100 (123)
Frequently disrupted Service	32.5 (13)	67.5 (27)	100 (40)	44.7 (17)	55.3 (21)	100 (38)	55.6 (25)	44.4 (20)	100 (45)	44.7 (55)	55.3 (68)	100 (123)
Internet not user friendly	0.0 (0)	100 (40)	100 (40)	0.0 (0)	100 (38)	100 (38)	0.0 (0)	100 (45)	100 (45)	0.0 (0)	100 (123)	100 (123)
Other	20.0 (8)	80.0 (32)	100 (40)	5.3 (2)	94.7 (36)	100 (38)	8.9 (4)	91.1 (41)	100 (45)	11.4 (14)	88.6 (109)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.55- Barriers to effective use of the Internet by faculty

	Student Responses N =123									Grand Total		
	Arts			Social Science			Science					
Barriers	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Inadequate training	13.6 (3)	86.4 (19)	100 (22)	15.7 (8)	84.3 (43)	100 (51)	37.5 (18)	62.5 (30)	100 (48)	24.0 (29)	76.0 (92)	100 (121)
Inadequate time	13.6 (3)	86.4 (19)	100 (22)	27.5 (14)	72.5 (37)	100 (51)	45.8 (22)	54.2 (26)	100 (48)	32.2 (39)	67.8 (82)	100 (121)
Frequently disrupted service	4.5 (1)	95.5 (21)	100 (22)	25.5 (13)	74.5 (38)	100 (51)	47.9 (23)	52.1 (25)	100 (48)	30.6 (37)	69.4 (84)	100 (121)
Poorly organized data	0.0 (0)	100 (22)	100 (22)	2.0 (1)	98.0 (50)	100 (51)	0.0 (0)	100 (48)	100 (48)	0.8 (1)	99.2 (120)	100 (123)
Other	4.5 (1)	95.5 (21)	100 (22)	11.8 (6)	88.2 (45)	100 (51)	20.8 (10)	79.2 (38)	100 (48)	14.0 (17)	86.0 (104)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

4.18. Barriers to Effective Use of the Internet

One of the objectives was to find out possible barriers to effective use of the Internet. Tables 4.54 and 4.55 show that, for both staff and students, the main barriers to effective use of the

Internet are frequently disrupted service (44.7% staff and 30.6% students), and inadequate time to use the Internet (22.8% staff and 32.2% students). Quite a few respondents also indicated inadequate training as barrier to the use of the Internet (22.0% staff and 24.0% students). The tables also suggest that both staff and students consider the Internet as user-friendly even at the faculty level. In all cases, the response rate was 100% positive, implying that once staff and students are adequately introduced to the use of the Internet, they would use the net effectively.

Table 4.56- Usefulness of the Internet to staff by faculty

Usefulness	Staff Responses N =123			Total
	Arts	Social Science	Science	
Not very useful	0.0 (0)	0.0 (0)	2.2 (1)	0.8 (1)
Useful	10.0 (4)	13.2 (5)	8.9 (4)	10.6 (13)
Very useful	62.5 (25)	57.9 (22)	71.1 (32)	64.2 (79)
No opinion	0.0 (0)	2.6 (1)	0.0 (0)	0.8 (1)
Non-response	27.5 (11)	26.3 (10)	17.8 (8)	23.6 (29)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB: The percentage response is stated above the number of respondents, in each cell.

Table 4.57- Usefulness of the Internet to students by faculty

Usefulness	Student Responses N =121			Total
	Arts	Social Science	Science	
Not very useful	0.0 (0)	0.0 (0)	2.1 (1)	0.8 (1)
Useful	4.5 (1)	9.8 (5)	20.8 (10)	13.2 (16)
Very useful	22.7 (5)	49.0 (25)	62.5 (30)	49.6 (60)
No opinion	59.1 (13)	37.3 (19)	6.3 (3)	28.9 (35)
Non-response	13.6 (3)	3.9 (2)	8.3 (4)	7.4 (9)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB: The percentage response is stated above the number of respondents, in each cell

4.19. Perceived Usefulness of the Internet.

Respondents were asked to rate the usefulness of the Internet on a Likert Scale and also to indicate the specific ways in which the Internet has helped them in their work. Tables 4.56 and 4.57 show that both staff and students from all faculties, especially those from the Science faculty, rated the Internet as very useful. Sixty four percent (64.2%) of staff and 49.6% of students perceived the Internet as very useful.

At the faculty level, 71.1% of staff and 62.5% of students from the Science faculty perceived the net as very useful. The high percentage rating from respondents of the Science faculty is probably the fact that they used the net more than their counterparts from the other faculties (Refer to Tables 4.3 and 4.4). The specific ways in which the Internet has helped staff and students in their academic work is the provision of information in their subject fields. Tables 4.58 and 4.59 show that 22.0% of staff, and 32.2% of students get information on the net in their subject areas. These percentages, however, are not very high suggesting that respondents get the bulk of their information from other sources, for example, the library. Respondents were asked to indicate the sources from which the get information for research and 75.6% of staff and 82.6% of students indicated they get information from library sources. This also explains why low percentages of staff (13.0%), and students (14.0%) indicated they used the net as a source of information for research. One had expected that staff and students would take greater advantage of the vast information resources on the net for their academic pursuits.

Table 4.58- Specific ways the Internet has helped staff by faculty

Specific way	Staff Responses N =123									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Information for lecture notes	10.0 (4)	90.0 (36)	100 (40)	13.2 (5)	86.8 (33)	100 (38)	8.9 (4)	91.1 (41)	100 (45)	10.6 (13)	89.4 (110)	100 (123)
Information in subject field	25.0 (10)	75.0 (30)	100 (40)	31.6 (12)	68.4 (26)	100 (38)	11.1 (5)	88.9 (40)	100 (45)	22.0 (27)	78.0 (96)	100 (123)
Information for research	2.5 (1)	97.5 (39)	100 (40)	18.4 (7)	81.6 (31)	100 (38)	17.8 (8)	82.2 (37)	100 (45)	13.0 (16)	87.0 (107)	100 (123)
Other	12.5 (5)	87.5 (35)	100 (40)	10.5 (4)	89.5 (34)	100 (38)	4.4 (2)	95.6 (43)	100 (45)	8.9 (11)	91.1 (112)	100 (123)

NB: The percentage response is stated above the number of respondents in each cell.

Table 4.59- Specific ways the Internet has helped students by faculty

Specific Way	Student Responses N =121									Grand Total		
	Arts			Social Science			Science					
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Information for lecture notes	0.0 (0)	100 (22)	100 (22)	5.9 (3)	94.1 (48)	100 (51)	6.3 (3)	93.8 (45)	100 (48)	5.0 (6)	95.0 (115)	100 (121)
Update lecture notes regularly	0.0 (0)	100 (22)	100 (22)	3.9 (2)	96.1 (49)	100 (51)	2.1 (1)	97.9 (47)	100 (48)	2.5 (3)	97.5 (118)	100 (121)
Information in subject field	13.6 (3)	86.4 (19)	100 (22)	33.3 (17)	66.7 (34)	100 (51)	39.6 (19)	60.4 (29)	100 (48)	32.2 (39)	67.8 (82)	100 (121)
Information for research	9.1 (2)	90.9 (20)	100 (22)	13.7 (7)	87.3 (44)	100 (51)	16.7 (8)	83.3 (40)	100 (48)	14.0 (17)	86.0 (104)	100 (121)
Other	0.0 (0)	100 (22)	100 (22)	7.8 (4)	92.2 (47)	100 (51)	16.7 (8)	83.3 (40)	100 (48)	9.9 (12)	90.1 (109)	100 (121)

NB: The percentage response is stated above the number of respondents in each cell.

4.20. Non-use of the Internet

Tables 4.1, 4.2, 4.3, and 4.4 show that awareness of the Internet by staff and students was universal and that some of the net's services, especially e-mail and the WWW, were well known to respondents. Therefore, it was expected that, staff and students would make use of these services in their academic endeavours. One of the objectives of this study was to find out why staff and students would not use them at all.

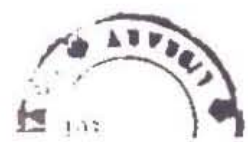

Table 4.60- Reasons for staff non-use of the Internet by faculty

Reason	Staff Responses N =123			Total
	Arts	Social Science	Science	
Lack of time	2.5 (1)	5.3 (2)	0.0 (0)	7.8 (3)
Lack of training	17.5 (7)	15.8 (6)	4.4 (2)	12.2 (15)
Obtain information from elsewhere	5.0 (2)	5.3 (2)	2.2 (1)	4.1 (5)
Not able to use PC	0.0 (0)	0.0 (0)	2.2 (1)	0.8 (1)
Other	10.0 (4)	5.3 (2)	2.2 (1)	5.7 (7)
Non-response	65.0 (26)	68.4 (26)	88.9 (40)	74.8 (92)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell

Table 6.1- Reasons for students non use of Internet by faculty.

Reasons	Student Responses N =121			Total
	Arts	Social Science	Science	
Lack of time	0.0 (0)	11 8 (6)	2 1 (1)	5.8 (7)
Lack of training	31.8 (7)	19.6 (10)	8 3 (4)	17.4 (21)
Obtain information from elsewhere	4.5 (1)	7.8 (4)	0.0 (0)	4.1 (5)
Not able to use PC	13.6 (3)	5.9 (3)	2 1 (1)	5 8 (7)
Other	27.3 (6)	2.0 (1)	4.2 (2)	7.4 (9)
Non-response	22.7 (5)	52.9 (27)	83.3 (40)	59.5 (27)
Total	100 (22)	100 (51)	100 (48)	100 (121)

NB The percentage response is stated above the number of respondents, in each cell

Tables 4.60 and 4.61 show that the main reason why some academics do not use the Internet at all is because they do not know how to use it. 12.2% of staff and 17.4% of students indicated they do not use it for lack of knowledge of how to use it.

4.62- Factors that will motivate staff non-users to use the Internet by faculty

Motivation	Staff Responses N =123			Total
	Arts	Social Science	Science	
Knowledge of benefits	0.0 (0)	2 6 (1)	0.0 (0)	0.8 (1)
Adequate time	10.0 (4)	0.0 (0)	0.0 (0)	3.3 (4)
After training	15.0 (6)	18.4 (7)	4.4 (2)	12.2 (15)
Easy access	7.5 (3)	21.1 (8)	6.7 (3)	11.4 (14)
Other	2.5 (1)	0.0 (0)	0.0 (0)	0.8 (1)
Non-response	65.0 (26)	57.9 (22)	89.9 (40)	71.5 (88)
Total	100 (40)	100 (38)	100 (45)	100 (123)

NB The percentage response is stated above the number of respondents, in each cell

Table 4.63- Factors that will motivate student non-users to use the Internet by faculty

Motivation	Student Responses N =121			Total
	Arts	Social Science	Science	
Knowledge of benefits	0.0 (0)	0.0 (0)	2.1 (1)	0.8 (1)
Adequate time	4.5 (1)	7.8 (4)	0.0 (0)	4.1 (5)
After training	22.7 (5)	19.6 (10)	10.4 (5)	16.5 (20)
Easy access	50.0 (11)	19.6 (10)	4.2 (2)	19.0 (23)
Non response	22.7 (5)	52.9 (27)	83.3 (40)	59.5 (72)
Total	(100 (22)	100 (51)	100 (45)	100 (121)

NB: The percentage response is stated above the number of respondents, in each cell

Non-users were further asked to indicate what would motivate them to start using the Internet. 12.2% of staff and 16.5% of students indicated they would use it after they received [redacted] (Tables 4.62 and 4.63), while 11.4% of staff, and 19.0% of students, indicated they would use it if they had easy access. Only 0.8% of staff and the same percentage for students indicated they would use it when they knew the benefits, implying that, majority of non-users

were aware of the benefits of the Internet but lack of training and access are indeed the reasons for non-use. The high non-response rate with regard to staff (74.8%) represented those who used the Internet.

Further discussions of these results in relation to the literature on Internet use by academics can be found in the next chapter.

CHAPTER FIVE

5. DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.

5.1. Discussion

5.1.1. Introduction

The Internet as revealed in the literature has a huge mass of accessible, retrievable information from millions of computer networks, library catalogues, bibliographic databases, government organizations, industries, commercial sources, newsgroups etc., from around the world.

The purpose of the study was to examine and compare the awareness and use of the Internet among academic staff and students at the University of Ghana by using the survey method. Other parameters investigated include the purposes for, limitations, barriers and motivations in using the Internet. Relationships between Internet use and age, gender, faculty, research activity and computer use were also investigated. Relevant data on the above parameters have been analyzed and the results are discussed below.

5.1. 2. Awareness of the Internet

The findings of the study indicate that, staff and students are fully aware of the Internet. With regard to the services, email is widely known, followed by the WWW, discussion groups, net-news and ftp in descending order. Generally the staff were found to be aware of the services than the students. Also both staff and students from the Science faculty were more aware of the services than their counterparts from the Arts and the Social Science faculties. For both staff and students the least known service was WAIS, with less than 20% of the respondents aware of it. The findings are inconsistent with the statements of Brown (1994) and Adele et al (1995). Brown (1999), for example states that,

"A widely quoted fact on the Internet is that, only 10% of the faculty with access to the Internet actually use it. And of those, only 30% use it for anything other than email. There are many possible reasons for this, one is lack of awareness of the information resources on the Internet and of the skills to locate the specific information required" (Brown, 1994).

Adele et al, (1995) have also said that "many academics are still not aware of its (the Internet's) resources and possibilities". The results clearly shows that, both staff and students are aware of Internet resources such as e-mail, WWW, net-news and discussion groups, among others. The result is also inconsistent with the findings of Moyo (1996). In an e-mail use study, he reported that, there is a low level of net awareness among academic staff of the University of Botswana.

5.1.3. The use of the Internet and its services.

The findings on use of the various Internet services revealed that, email is the most used service. This is consistent with the findings of previous studies on academics' Internet use, such as Lazinger et al (1997); Liebscher et al (1996); Adele et al (1995); and Bishop (1995). It must be emphasized that 73.8% of staff and 56.0% of students indicated they used the e-mail, which is inconsistent with the assertion made by Brown (1994) in his statement that, only 30% of academic Internet users used it for nothing other than e-mail. The study further showed a low frequency of use of email. Abel et al (1997) have, however, explained that, frequency of use of a service is not necessarily the same as the number of messages sent and received. This is because one user may log on infrequently, yet send and receive many messages during each session. Therefore, the low frequency of use of email may shield a high intensity of use. The study did not investigate the number of e-mail messages sent per week by each respondent.

Discussion groups and net-news are not as widely patronized as the e-mail. Only a few staff and students participated actively, or passively in discussion groups and in reading net-news. This is supported by the findings of Applebee et al (1997); Lazinger et al (1997), and Bishop (1994) who reported a low patronage of these services. It was anticipated that, many more staff would patronize these services, since they help to keep academics up to date in their subject fields, and list colleagues engaged in similar research for collaboration or consultation, among other benefits. The low participation may be due to either lack of awareness of electronic discussion groups of interest, or preference for more traditional information sources like journals and colleagues (Liebshcer et al 1997). Further investigation revealed that, most of the respondents (75.6% of staff and 82.6% of students) used the library as their main source of information. Only 34.1% of staff and 39.7% of students indicated they used the Internet as a source of information.

The study also showed a relatively low use of telnet and ftp services. This is inconsistent with the findings of Lazinger et al and Liebscher et al, who reported an appreciable use of these services. Liebscher et al (1997) have said that these services, are especially used by academics with limited library and other information services, which is the case at the University of Ghana. Therefore, the researcher expected many more staff and students to use these services to access much needed information for their academics work. The low use is probably due to inadequate training on how to use these services.

The analysis of data on the use of search tools namely, search interfaces, search engines and information gateways revealed that, apart from Yahoo, only a few staff and students employed them when looking for information. Lazinger et al, (1997) also investigated the use

of search tools but could not come to any conclusions because they claimed that some respondents used services they did not rank, while others ranked services they did not use. Knowledge of such search tools, however, is important, since they help Internet users to locate information with much less effort. Kassel, (1999) has emphasized that, in addition to learning the use of search tools, researchers should amass knowledge of resources useful for uncovering information not easily searchable by search engines such as Direct Search (https://gwis.circ.gwu.edu/~gprice/direct.htm). This contains links to resources like archives, library catalogues, books, news sources and ready reference.

The findings on awareness and use of the Internet and its services among staff and students have shown that, generally, academic staff are aware of the various Internet services and also use them more than the students. As already mentioned, this trend is probably due to more exposure of staff to the Internet and its resources through research collaboration with international colleagues and trips to international conferences compared to the students, who may or would not have had such an exposure. Secondly it may be due to better access to the Internet by staff compared to the students. A further investigation by the researcher into respondents' access to the Internet indicated that more staff (25.4%) than students (12.5%) have an account on a computer that gave them access to the Internet.

5.1.4. Relationships in academic Internet use.

The studies on academic Internet use include investigation into relationships that may exist between Internet use and parameters such as discipline, age, gender and status among others, of users'. The findings of the study, indicated a significant difference between student Internet use and faculty, with students from the Science Faculty, using the Internet more than those from the Arts and Social Science Faculties. This is consistent with the findings of Chu (as cited in Lazinger et al (1997), Abel et al (1996) and Applebee et al (1997. Abel et al,

(1996) have said that, the possible explanation for the differences in the adoption rate of electronic networks by discipline could be lack of appropriate networked resources for certain disciplines. Lazinger et al (1997) have also suggested that, the difference in use by faculty might be due to the extent of connectivity in the various departments. However, this was not probed by this study.

The result of Internet use by position of staff was found to be statistically insignificant. This is inconsistent with the findings of Lazinger et al (1997), who reported that, the percentage of Internet users varies systematically according to rank or position of user, that is, the more senior a person, the lower his Internet use.

The findings of this study indicated an insignificant relationship between Internet use and gender and therefore, it is difficult to comment on Internet use by gender with regard to academic Internet use. However, Boudette (1997) and Cyberdialogue (1998) reported that males use the Internet more than females. White (cited in Lazinger et al 1997), on the other hand, reported that, females used the Internet more than males. Ford and Miller (1996) have explained that the gender difference in Internet use might be due to the traditional male bias towards technology in general and computing in particular. They reported further that, men seem to enjoy browsing around the Internet, often with no clear plan, happy to plough through the irrelevant in search for personally interesting (as opposed to work- related) material" (Ford and Miller, 1996). On the other hand, women seemed relatively disoriented by and disenchanted with the Internet, and generally are unable to find their way around effectively. They also tend to use it for work purposes as opposed to personal interest.

The data on Internet use by age showed a significant relationship between Internet use and age of student, with the young using the Internet more than the old. This is supported by the findings of White (as cited in Lazinger et al, 1997), but inconsistent with that of Chu (as cited in Lazinger et al, 1997). Perry et al (1998) also reported a regular Internet use by University students with no differences among age groups.

The findings of this study demonstrated a positive relationship between Internet use and computer usage and the number of hours spent using the computer for both staff and students. Those who use the computer for other purposes and those who spend long hours using the computer were also found to be high Internet users. Lazinger et al (1997), reported that faculty members from the sciences have higher computer use and higher Internet use but did not investigate relationship between Internet use and computer use.

This study also found out that, students engaged in research activity used the Internet more often, than those who were not doing research. This result was anticipated since students would search for information relevant to their research on the Internet. However this results was not statistically significant.

5.1.5. Purposes for use of the Internet and its services.

This study investigated the purposes for which respondents use the email, discussion groups, advanced search interfaces and reading of news. Generally the response rate for the purpose for use of the email service is higher than that of the other services. The findings of this study showed that, academic staff used e-mail mostly to contact international colleagues (59.9%) involved i[redacted]ch followed by social reasons (43.4%). The students, on the other hand, used e-mail mos[redacted] for social reasons (45.7%). This is consistent with the findings of Abel et al 1996 and La[redacted]r et al 1997. They reported that, the bulk of e-mail correspondence is research- relate[redacted]d also social in nature. Other uses of e-mail by academic staff reported by

Moyo (1996) are chatting with international and local colleagues, exchanging of work-related information, and participation in collaborative research, among others. It must be emphasized that, studies on purpose for use of the Internet reviewed by the researcher mostly reported use of the Internet in general. For example Jefferies and Hussain, (1998) reported the use of the Internet by teaching staff in the construction of web pages to help structure students data gathering and to provide access to a variety of other resources, while students used it mainly for leisure purposes. Tillotson et al, (1995) reported that academics use the Internet in order to learn about the Internet, send mails and read news among others. However, researchers who investigated the purposes for use of the various Internet services focussed on the e-mail only.

5.1.6. Limitations in using the Internet.

The Internet, despite its rich resources and possibilities, has some limitations. The limitations of the Internet revealed by this study are; slow data transmission and Information over-load. This is supported by the findings of Jefferies and Hussain (1998) and Applebee et al (1997). Another limitation identified by students is difficulty in locating information. Applebee et al (1997) have, explained that, the capacity and speed of a user's computer determine the rate at which data is transferred. Thus, if the appropriate hardware were used by academics for Internet connections, this problem would be minimized. Slow data transmission may also be ascribed to the type of connection. Dedicated connections ensure faster data transmission than dial up connections. (Sheldon, 1994). Some studies have mentioned the unstructured state of most of the information on the net (Gilbert, 1994) and the lack of a central directory to network resources (Adele et al, 1995) which may account for the students difficulty in locating information. This finding also suggests that, students are probably inadequately trained, hence their inability to locate information.

5.1.7. Barriers to use of the Internet.

The results indicated frequently disrupted service, inadequate time to use the Internet and inadequate training in the use of the Internet, as the main barriers to the use of the Internet. Barriers to academic Internet use reported by researchers in this field include inadequate time to use it (Applebee et al and Klobas, 1997), inadequate training (Applebee et al and Adele et al) and poor infrastructure (Moyo). Frequently disrupted service is probably due to poor infrastructure, which is consistent with the general finding that the spread of the Internet in Africa is hindered by the existence of inadequate and obsolete communications facilities and computers (Moyo, 1996 and Adams, 1995). An informal discussion with some staff during the administration of the questionnaires, revealed that they do not use the Internet because they are unable to have their own personal accounts due to lack of telephone facilities.

Inadequate time with regard to staff is probably due to increased workload including handling large numbers of students per course. Exploiting the Internet gainfully indeed requires an investment of time. First, the time to learn what is available and secondly the time to use it for one's advantage. Other researchers like Katz and Aspden (1992), and Adele et al (1992), reported costs as a barrier to the use of the Internet. Although this was not formally investigated, comments from some staff and students revealed that Internet services by private Cyber Cafes and also establishing personal accounts with or obtaining one's own email address from an ISP are expensive. Liebscher et al, (1997) also mentioned 'gatekeepers' (that is, knowledgeable faculty members or librarians who distribute network information) as a barrier to Internet use, but this was not probed by this study.

5.1.8. Motivations for use of the Internet.

One of the results of the study indicated that, the main motivation for using the Internet for both staff and students is the ability to communicate with friends and colleagues by e-mail. This is consistent with the findings of Jefferies and Hussain (1998), Katz and Aspden 1997)

but inconsistent with Adele et al (1995). who reported information in subject field as a motivation for academic Internet use. Access to information was expected to be a motivation because of the lack of current books and journals in the University, but only few respondents indicated that as a motivation. Respondents probably get information on their subject fields from other sources and, therefore, do not consider access to information on the net as a motivation.

5.1.9. Non use of the Internet.

The results showed that the main reason why some staff and students do not use the Internet was because they do not know how to use it but that they would use it if they are adequately trained. The issue of training is very important, even among academics who are already users. Staff who participated in the studies of Lazinger et al, and Appleebee et al requested further training in more advanced search interfaces like gopher and the WWW, although they are Internet users. According to Liebscher et al, (1997) the reasons often expressed among non-users for not using the Internet, were the following:

- There was nothing much of interest on the Internet.
- Using the Internet was too much of a 'hassle'.
- Gatekeepers within the department or elsewhere kept them informed about information of interest on the net.

The above reasons suggest that if non-users are well informed of the benefits of the Internet to themselves and are trained they will probably be interested in using it.

5.2. Summary of Results

The results of the study discussed above are summarised as follows:

- Majority of academic staff and students of the University of Ghana are highly aware of the Internet.

- Majority of staff and students are most aware of the email service, followed by WWW, discussion groups, reading of news, ftp, gopher, telnet and WAIS.
- Staff and students from the sciences are more aware of the Internet services than those from the arts and the social sciences.
- Staff members are more aware of the Internet and its services and also use these services more than students.
- Staff and students from the sciences use the Internet more than those from the arts and the social sciences.
- There is no significant relationship between Internet use and status of staff
- Male staff members use the Internet more than female staff members, whilst female students use the Internet more than male students. However, no significant relationship was found between Internet use and gender.
- There is a significant relationship between Internet use and age of students (but not of staff members), with younger students using the Internet more than older students.
- There is a significant relationship between Internet use and computer usage. Those who spend long hours using the computer were found to be higher Internet users.
- There is no significant difference between Internet use and research activity, although students doing research were found to use the Internet more than those who were not doing any research. On the contrary, staff members who were not engaged in any research activity were found to be the most frequent Internet users.
- Email is the most used Internet service, followed by reading of news, discussion groups, ftp and telnet.
- The WWW is the most used search interface, followed by gopher and WAIS.
- Generally, frequency of use of Internet services other than email is very low.

- The main purposes for use of the various services by respondents were found to be the following:

email was for contacting of international colleagues and for social reasons, discussion groups and reading of news was for updating of research and social issues, and advanced search interfaces were for searching for information relevant to research.

- Yahoo is the most popular search tool used by both staff and students. Meta-search engines and information gateways investigated by the study enjoyed low patronage
- The results obtained on satisfaction with information found on the Internet show that majority of respondents sometimes found what they looked for. Only a few respondents said they always found what they wanted.
- The main motivation for using the Internet was to contact colleagues and friends.
- The main limitations of the Internet indicated by staff was slow data transmission and that for students was difficulty in locating information and slow data transmission.
- The main barriers to effective use of the Internet for both staff and students are frequently disrupted service, that is, the inability of respondents to access the server as often as they wanted due to problems with communication facilities and set-up of server, inadequate time at the disposal of respondents and inadequate training to use the Internet.
- Generally, both staff and students perceive the Internet as very useful especially in the provision of information in their subject areas.
- The main reason why some staff and students did not use the Internet at all is because they do not know how to use it. They would be willing to use it when they are trained adequately.

5.3. Conclusion

This study presented the results of a survey of the awareness and use of the Internet by academic staff and students of the University of Ghana. The summary above shows that both staff and students are well aware of the Internet and considered it very useful, but use it mostly for email. All other services investigated in this study were greatly under utilized, with participation in discussion groups the least. The main reasons for ineffective use are frequently disrupted service and inadequate time and training. Inadequate training also is the reason for non-use by some staff and students.

It is difficult to generalize the results of this study since it is the first of its kind in a Ghanaian university.. Furthermore, no study was found that examined all of the parameters involved in this study for both academic staff and students. Lazinger et al (1997), for example, examined most of these parameters but for academic staff only. Besides, the use of search engines, meta-search engines and information gateways, the relationship between Internet use and research activity, computer use and time spent with the computer were not investigated in their research. Since the University of Ghana is a major research university in a developing country with fairly recent Internet access, the results may reasonably apply to other research universities in Africa and the developing world,

This study provides data on patterns of use of the Internet by staff and students that will go some way in assisting administrators to make decisions which will lead to more effective use of the Internet at the University of Ghana.

5.4. Recommendations.

The researcher would like to make the following recommendations for a more effective use of the Internet for academic work.

- Administrators in charge of Internet access in the university must endeavour to provide uninterrupted Internet service by employing qualified technical staff to maintain the main Internet server. An informal discussion with some of the staff respondents in the course of the study revealed that, one of the reasons for frequent interruptions of the service was the lack of trained technical staff. Every effort should be made to secure dedicated Internet access to facilitate faster transmission of data. This will help reduce the time spent in looking for information as well as the cost.
- Well-advertised training sessions should be organised for both staff members and students. Abel et al (1996), have noted that most training efforts are focussed on the novice user, thus attracting only inexperienced users. The researchers above further made some useful suggestions that may also be very relevant to our situation, if a broader audience is to be attracted. These suggestions are; gearing of training programs to different levels of users, focussing on specific subject areas; exploring the use of network services for specific tasks, and concentrating on specific tools. Training staff and students to use specific tools is very important since the study revealed that apart from the e-mail, all the Internet tools included in this study, namely, discussion groups; net-news; ftp; telnet; WAIS; Gopher; search engines; information gateways etc., were not well patronized by majority of respondents. Apart from these tools, Mathews (1997) has also suggested the inclusion of Browsers and URL or uniform resource locator Practical-based training, that is training with hands-on activities followed by evaluation of training sessions, are highly recommended for effectiveness. Mathews has emphasised that, evaluation of training can ensure that problems are identified, strengths are maximized and trainees are given the opportunity to make constructive observations and suggestions.

- Since Internet use is fairly recent in Ghanaian universities in general there is a need to repeat this study at the University of Ghana after a few years to see whether the same trend would be obtained. Also, the research has to be conducted in all the other universities in Ghana to provide a basis for comparison. Another area for further study is to investigate the role of the Library in Internet use by academic staff and students.

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APPENDIX

Appendix A - Questionnaire for Staff

Awareness and Use of the Internet by Academic Staff and Students of the University of Ghana.
Questionnaire for Academic Staff.

The Internet is an international network of computers. It contains a vast amount of information on a wide range of subjects and is therefore a rich source of information for academics. I wish to assess the extent of awareness and use of the Internet in this university. Therefore I will be grateful if you complete this questionnaire with openness. All responses will be treated confidentially.

Thank you for your cooperation

Yours faithfully,

Evelyn Markwei

PART 1

Please tick as appropriate

1) Biographical Information:

Faculty/ School: (Please state):					
Position:	a) Asst. Lecturer	b) Lecturer	c) Senior Lec	d) Professor	e) Research Fellow
Age Group	a) 20-30	b) 30-40	c) 40-50	d) 50-60	e) ≥ 60
Gender	a) Male	b) Female			

Computer Usage:

2)	Do you work with a computer?		a) Yes	b) No		
3)	How much time do you spend using a computer each week?		a) None	b) 1 hr	c) 5hrs	d) over 10 hrs
4)	For what purposes do you use a computer?	a) Word processing	b) Database management	c) Spreadsheet	d) Statistical analysis	e) Other (Please state)

Research Activity

5)	Are you doing any research at the moment?	a) Yes	b) No	

6)	From which sources do you get information for research?	a) Library	b) Internet	c) Interlibrary loan	d) Other (Please state)

Internet Awareness:

7)	Have you heard about the Internet?	a) Yes	b) No	

8) Which of these Internet services are you aware of? (***Please tick all relevant answers***).

a) E-mail (i.e. sending messages over the Internet).	b) Discussion groups (i.e exchanging of information by e-mail among people with common interest or receiving E-journals in one's electronic mail box).	c) Reading of news (i.e discussion groups on a bulletin board)
d) FTP (i.e. file transfer between 2 computers or downloading information).	e) Telnet (i.e. connecting to remote computers e.g., Library of Congress catalogue)	f) Gopher (i.e. browsing for resources using menus)
g) WAIS (i.e. searching through indexed databases).	h) World Wide web or WWW (i.e. searching through hypertext documents).	i) Other (Please specify)

Internet Use:

9)	Do you use the Internet ?	a) Yes	b) No	

If No, please complete Part 2 of the questionnaire.

10) Where do you access the Internet?

a) I have a personal account on a computer that gives me access.	b) From the Balme Library.	c) From an Internet Café.	d) Other (Please specify).

11) How were you introduced to the use of the Internet?

a) I was taught by a friend.	b) I was taught by a family member.	c) I learnt it myself
d) Through formal training (Please state, e.g. at Balme Library)		

12)	Do you use e-mail?	a) Yes	b) No	

13) What do you use the e-mail for? (***Please tick all relevant answers***).

a) To contact international colleagues involved in research.	b) Sending and receiving departmental messages.	c) Corresponding with editors /publishers.
d) Sending papers to journals /conferences	e) Social reasons.	f) Other. (**Please specify**)

14) Do you participate in discussion groups through e-mail?

a) I participate actively.	b) I participate passively (I only receive messages).	c) I do not participate.	d) I used to participate.

15) Do you read news (discussion groups on a bulletin board)?

a) I read news actively.	b) I read news passively (do not send messages).	c) I do not read news.	d) I used to read news.

16) Why do you read news or participate in discussion groups?

a) To be updated on research issues.	b) To be updated on social issues.	c) To receive information on funds /conferences.	d) To read electronic journals.	e) To identify experts in my field.
f) Other reasons (Please state):				

17) Which of these explains why you stopped participating in discussion groups?

a) I became too busy	b) The topics were no more interesting.	c) I received too many mail messages	d) I didn't have the time to read all the news posted to me.
e) Other reasons (Please state):			

18) Do you use FTP or Telnet?

a) I use FTP only.	b) I use Telnet only.	c) I use both services.	d) I do not use either of them

19) Which of these advanced search interfaces do you use? (***Please tick all relevant answers***)

a) Gopher.	b) WWW.	c) WAIS.	d) I do not use any of them.	e) Other. (**Please specify**)

20) For what purpose do you use the advanced search interfaces?

a) E-mail (i.e sending messages over the Internet).	b) For searching for information relevant to my research(e.g. reading E-journals, obtaining information on funds, searching data bases specific to my field).	c) Transferring files/data to my account or personal computer.
d) To obtain routine information (e.g., conference announcements).	e) Searching in databases for social reasons (e.g., sports, trips).	f) Other reasons. (**Please state**)

21) How often do you use the different Internet services? (***Please tick the best answer in each row***).

	Once a week	Twice a week	Daily	Occasionally	Not at all
E-mail					
Discussion group /news groups					
Telnet, FTP					
WWW /Gopher /WAIS					
Other services					

22) Which of these search engines do you use when looking for information on the Internet? (***Please tick all relevant answers***).

a) Yahoo	b) Infoseek	c) Alta Vista	d) Other. (**Please specify**).

23) Which of these meta-search engines do you use to search for information. (They search sites with words or phrases across a variety of the main search engines)

a) Dogpile	b) Metafind	c) Oneseek	d) Mamma
e) Other (Please state):			

24) Which of these 'information gateways have you ever used in obtaining information?

a) AHDS (i.e., Arts and humanities data service)	b) Biz / Ed (i.e., Business and economics information gateway.	c) SOSIG (i.e., Social science information gateway).	d) NOVA Gate (i.e., Forestry, vertinary, and agricultural sciences information gateway)
e) Other (Please state):			

25) Do you always get the information you need from the Internet?

a) I always get the information I need.	b) I never get the information I need.	c) I sometimes get the information I need.	d) I get inadequate information

26) Which of the following describe your main motivation for using the Internet?

a) I communicate with colleagues and friends readily by e-mail.	b) Ready access to information for teaching.	c) Conducting research is now easier for me because of ready access to relevant literature.	d) I enjoy reading news and participating in discussion groups.
e) Other (Please state).			

27) Which of these describe the specific way/ways the Internet is helping you in your work?

a) I get information for my lecture notes.	b) I update my lecture notes regularly.	c) I get up to date information in my subject field.	d) I get all the information I need for research.
e) Other (Please state):			

from).	relevant information.	transmission rates.	organised data
state):			

u from using the Internet effectively?

aining	b) Inadequate time to explore full capabilities of the Internet.	c) Frequently disrupted Internet access services.	d) Internet is not user friendly.
state):			

he usefulness of the Internet?

	b) Not very useful.	c) Useful.	d) Very useful.	e) No opinion.

on the Internet awareness and use in the University·

PART 2 ------ NON - USERS

lains why you don't use the Internet?

	b) I don't know how to use it.	c) My information needs are met from other library resources.	d) I don't know how to use a PC.
tate):			

you to use the Internet?

is	b) When I have the time.	c) After I receive training.	d) If I have easy access.
ate):			

Appendix B - Questionnaire for Students

Awareness and Use of the Internet by Academic Staff and Students of the University of Ghana. Questionnaire for Students

The Internet is an international network of computers. It contains a vast amount of information on a wide range of subjects and is therefore a rich source of information for academics. I wish to assess the extent of awareness and use of the Internet in this university. Therefore I will be grateful if you complete this questionnaire with openness. All responses will be treated confidentially.

Thank you for your cooperation.

Yours faithfully,

Evelyn Markwei

PART I

Please tick as appropriate

1) Biographical Information:

Faculty/ School (Please state):					
Age Group	a) under 20	b) 20-30	c) 30-40	d) ≥ 40	
Gender	a) Male	b) Female			

Computer Usage:

2)	Do you work with a computer?		a) Yes	b) No		
3)	How much time do you spend using a computer each week?		a) None	b) 1 hr	c) 5hrs	d) over 10 hrs
4)	For what purposes do you use a computer?	a) Word processing	b) Database management	c) Spreadsheet	d) Statistical analysis	e) Other (Please state)

Research Activity:

5)	Are you doing any research at the moment?	a) Yes	b) No	

6)	From which sources do you get information for research?	a) Library	b) Internet	c) Interlibrary loan	d) Other (Please state)

Internet Awareness:

7)	Have you heard about the Internet?	a) Yes	b) No	

8) Which of these Internet services are you aware of? (***Please tick all relevant answers***).

a) E-mail (i.e. sending messages over the Internet).	b) Discussion groups (i.e. exchanging of information by e-mail among people with common interest or receiving E-journals in one's electronic mail box).	c) Reading of news (i.e.discussion groups on a bulletin board).
d) FTP (i.e. file transfer between two computers or downloading information).	e) Telnet (i.e. connecting to remote computers e.g., Library of Congress catalogue)	f) Gopher (i.e. browsing for resources using menus)
g) WAIS (i.e. searching through indexed databases).	h) World Wide web or WWW (i.e. searching through hypertext documents).	i) Other (Please specify)

Internet Use:

9) Do you use the Internet ?	a) Yes	b) No	

If No, please complete Part 2 of the questionnaire.

10) Where do you access the Internet?

a) I have a personal account on a computer that gives me access.	b) From the Balme Library.	c) From an Internet Café.	d) Other (Please specify)

11) How were you introduced to the use of the Internet?

a) I was taught by a friend.	b) I was taught by a family member.	c) I learnt it myself
d) Through formal training (Please state, e.g. at Balme Library)		

12) Do you use e-mail?	a) Yes	b) No	

13) What do you use the e-mail for? (*Please tick all relevant answers*).

a) To contact international colleagues involved in research.	b) Sending and receiving departmental messages	c) Corresponding with editors /publishers.
d) Sending papers to journals /conferences	e) Social reasons.	f) Other. (**Please specify**).

14) Do you participate in discussion groups through e-mail?

a) I participate actively.	b) I participate passively (I only receive messages).	c) I do not participate	d) I used to participate.

15) Do you read news (discussion groups on a bulletin board)?

a) I read news actively.	b) I read news passively (do not send messages).	c) I do not read news.	d) I used to read news.

16) Why do you read news or participate in discussion groups? *Please tick all relevant answers.*

a) To be updated on research issues.	b) To be updated on social issues.	c) To receive information on funds /conferences.	d) To read electronic journals.
e) Other reasons (Please state):			

17) Do you use FTP or Telnet?

a) I use FTP only.	b) I use Telnet only.	c) I use both services.	d) I do not use either of them.

18) Which of these advanced search interfaces do you use? (*Please tick all relevant answers*).

a) Gopher.	b) WWW.	c) WAIS.	d) I do not use any of them.	e) Other. (**Please specify**).

19) For what purpose do you use the advanced search interfaces?

a) To search library catalogues.	b) To search for information relevant to my research.	c) To search for information to complete educational assignments.
d) To search for information on job vacancies or courses.	e) Searching in databases for social reasons (e.g., sports, trips).	f) Other reasons. (**Please state**)

20) How often do you use the different Internet services? (*Please tick the best answer in each row*).

	Once a week	Twice a week	Daily	Occasionally	Not at all
E-mail					
Discussion group /news groups					
Telnet, FTP					
WWW /Gopher /WAIS					
Other services					

21) Which of these search engines do you use when looking for information on the Internet? (*Please tick all relevant answers*).

a) Yahoo	b) Infoseek	c) Alta Vista	d) Other (Please specify)

22) Which of these meta-search engines do you use to search for information. (They search sites with words or phrases across a variety of the main search engines)

a) Dogpile	b) Metafind	c) Oneseek	d) Mamma
e) Other (Please state):			

23) Which of these 'information gateways have you ever used in obtaining information?

a) AHDS (i.e., Arts and humanities data service)	b) Biz / Ed (i.e., Business and economics information gateway.	c) SOSIG (i.e., Social science information gateway).	d) NOVA Gate (i.e., Forestry, vertinary, and agricultural sciences information gateway).
e) Other (Please state):			

24) Do you always get the information you need from the Internet?

a) I always get the information I need.	b) I never get the information I need.	c) I sometimes get the information I need.	d) I get inadequate information

25) What importance do you attach to these Internet services? (*Please tick the best answer in each row*).

	Indispensable	Very important	Important	Slightly important	Not used
E-mail					
Discussion group news groups					
Telnet, FTP					
WWW /Gopher /WAIS					
Other services					

26) Which of the following describe your main motivation for using the Internet?

a) I communicate with colleagues and friends readily by e-mail.	b) I get needed information readily.	c) Conducting research is now easier for me because of ready access to relevant literature.	d) I get a lot of social information (e.g. sports, etc.).
e) Other (Please state):			

27) Which of these describes the specific way/ways the Internet is helping you in your studies?

a) I get information for my lecture notes.	b) I get up to date information in my subject field.	c) I get all the information I need for research.	d) Other (Please state):

28) What limitations have you observed in using the Internet?

a) Information overload (too much to choose from).	b) Difficulty in locating relevant information.	c) Slow data transmission rates.	d) Poorly organised data
e) Other (Please state):			

29) What prevents you from using the Internet effectively?

a) Inadequate training to use Internet facilities.	b) Inadequate time to explore full capabilities of the Internet.	c) Frequently disrupted Internet access services.	d) Internet is not user friendly.
e) Other (Please state):			

30) How do you rate the usefulness of the Internet?

a) Not useful.	b) Not very useful.	c) Useful	d) Very useful.	e) No opinion.

31) Do you expect to use the Internet in your career?

a) I will use it actively	b) I will use it when necessary	c) I will not use it
d) Other (Please state)		

32) Your observations on the Internet awareness and use in the University:

PART 2 ------ NON - USERS

33) Which of these explains why you don't use the Internet?

a) I don't have the time to use it.	b) I don't know how to use it.	c) My information needs are met from other library resources.	d) I don't know how to use a PC.
e) Other (Please state):			

34) What will motivate you to use the Internet?

a) When I know it is beneficial.	b) When I have the time.	c) After I receive training.	d) If I have easy access
e) Other (Please state):			