Investigating the Use of Internet in Promoting Education in the Main Campus of the Addis Ababa University

Wakshum Mekonnen*

Introduction

Addis Ababa University was established in 1950 embracing nine faculties and seventy one students. It's original name was *Trinity College* which was soon changed to *University College of Addis Ababa (UCAA)*. In 1961, the autonomous administrations of different colleges were brought under one central administration giving rise to the *Haile Selassie I University*. In 1974, right after the socialist revolution, the University was renamed *Addis Ababa University*. Currently the Addis Ababa University administers a number of colleges, faculties, institutes and schools offering several programs in its eight campuses. An average of 3,000 graduate and undergraduate students complete their studies every year. Thus, the University tries to meet the demand for skilled manpower required in the economic, social and other aspects of the nation.

Teaching and research are two of the primary tasks of the Addis Ababa University. According to Helen (1997), the specific objectives of the AAU in the social, cultural and economic development of Ethiopia are to:

- teach and promote research;
- maintain and upgrade its academic status at a global acceptance level;
- mature the human resources for meeting the nation's needs;
- revitalize the Ethiopian culture and avoid its misconception;
- improve teaching and research outputs;
- help alleviate the uneven development that occurs between sectors of the economies; and
- formulate a policy that will ensure the best productivity of research not only of the individual nationality, but also of the entire country.

At present, in the information age, educational systems like universities around the world are equipped with information technologies (ITs) in order to aid the advancement of education and research capabilities. Internet is supposed to be

* Ass. Lecturer, IER, Addis Ababa University.

one of these tools that is widely utilized for the accomplishments of such tasks. With this in view, the Addis Ababa University is connected to the vast resources of Internet.

In January 1997, the AAU was connected to the Internet right after the introduction of the services by the local Internet Service Provider (ISP), the Ethiopian Telecommunication Corporation (ETC). The Internet connectivity adopted in Ethiopia is a dial up connectivity. It enables users to access the system whenever they find it necessary using a normal telephone line, a high-speed modem and appropriate software. In contrast, the other type of connectivity is the dedicated (leased) line connectivity that allows users to access Internet without time limitation. However, the latter type of connectivity is much more expensive than the former one. The University subscribed to the ETC for the provision of Internet services for its various faculties, institutes and projects to aid in achieving its objectives that mainly emphasize the improvement of teaching and research.

The justification given for the need of an Internet connectivity in AAU includes, the need for more comprehensive and sophisticated research; the need for more quality research; the need for electronic mail services; the need for better dissemination of its results; and the need for the AAU to make use of research results for teaching, learning and other purposes.

Purpose of the Study

The main objective of the study is to investigate the application of Internet for the promotion of education in the Main Campus of the Addis Ababa University. More specifically, the paper is intended to seek answers for the following questions.

1. How many Internet connections are available in the Main Campus?
2. Which department/faculty/institute is connected to the Internet?
3. Who has the access to the Internet and who does not?

4. Is the Internet used to enhance the improvement of education in practical terms? If so how?
5. What are the factors that limit the Internet services to only few user groups?
6. How can the Internet services be expanded in the University for the equitable utilization for promoting education?

The Main Campus also known as *Sidist Kilo* Campus of the Addis Ababa University comprises of three colleges, four institutes and one school. The administration for the AAU is housed in this campus. The survey covers all the faculties, institutes, libraries and other offices that are connected to the Internet in the Main Campus. Accordingly, eleven accounts for the Internet connections are identified and surveyed in the Main Campus.

Method and Procedures

In the attempt to analyze the extent of utilization of the Internet to improve education, the interview method is used for gathering data. First, a brief survey was conducted to identify the location of the offices connected to the Internet. Various related literature on the Internet use on education and background information on the Addis Ababa University were reviewed.

The Interview method is chosen as it is a faster (relatively) method than others. The interview focuses on the size and type of users, the types of Internet services, and problems that hinder the application of Internet in the area of education. Interviews were held with two groups. The first is with individuals responsible (deans or directors, etc.) for the Internet accounts of their respective faculty/institute/school. The second group is some selected academic staff and students. Each site was visited at least twice - the first visit is for establishing initial communication, briefing the objectives of the study and for arranging appointments to administer the interview. The next visits were obviously for administering the interview.

The final step was the analysis and interpretation of the data. Then the findings were compiled and recommendations were given as possible solutions by paying attention to related problems.

Literature Review

A Move from Traditional Instruction to Information-age Teaching

Most societies have now found it appropriate to switch from traditional instruction to information-age teaching mainly due to the extensive application of information technologies. Information-age teaching entails heavy use of information technology and let students as the active participants of the process throughout the curriculum. In the information-age, the role of teachers is to empower students as thinkers and problem solvers (Harkness and Franklin, 1994). The traditional class room instruction method has been changed to the student-centered instruction in which the teacher coaches and the students become active participants.

Internet is defined as a network of networks based on the Transmission Control Protocol/Internet Protocol (TCP/IP); a community of people who use and develop those networks and a collection of resources that can be reached from those networks (Gains, et al., 1997). The network may have several dimensions that can be installed at the regional, national or institutional level. It refers to a computer network which is traditionally divided into Local Area Networks (LANs) and Wide Area Networks (WANs). LANs constitute a small group of computers, usually limited to one institution or company which are used for internal data exchange. WANs on the other hand, may cover wider geographical area and extend over long distances that can constitute several LANs. Internet is thus one of the biggest WANs to which groups of computers are linked together globally.

The other network technology that can easily be built on LAN and uses the Internet tools to provide access to internal as well as external resources is ***Intranet***. Intranets are internal corporate networks that use the infrastructure and standards of Internet and the World Wide Web (Sawyer, Williams and Hutchinson, 1997). It is a mechanism for sharing local information as well as information through the Internet. Intranet as one of the leading technological innovations of this era is said to contribute much to the advancement of education in teaching/learning and research activities.

The community of people could be governments, schools, universities, libraries, corporations, individuals and others that are connected through the Internet.

The resources on such networks have multi-nature that includes all kinds of information ranging from relatively simple information to the scientific findings. People, networks and resources are thus combined in such a way as to form the Internet system.

The Internet represents a highly cost-effective means for a country's educational community to access global data of all kinds - in effect bringing them into the world community (Kibruyisfa, 1997). Internet is one of the products of the new technologies that play significant roles in disseminating education efficiently. It has grown rapidly and has come to play a major role in supporting the teaching/learning activities.

Like the birth of digital computers that is attributed to the needs and funding of the 1940s arising out of the second world war, the appearance of Internet can also be attributed to the needs and funding in the 1960s arising out of the cold war (Gains et al, 1997). The United States of America started the project within the Department of Defense in the 1960s as Advanced Research Projects Agency (ARPA) in reaction to the former USSR launch of Sputnik in 1957. ARPA net (later renamed as Internet) was built originally for military purposes. It was mainly used for sharing information and for collaborative researches among military, industry and university sources in the USA. The network was also used to provide a system for sustaining communication among military units in the event of military attacks or any threats from the Eastern Block. Nevertheless, during those early days, only few education and research institutes of the USA were connected to the ARPA net. It was only in 1980s that several academic networks around the world were connected to the Internet (Igbinoba, 1997).

According to Igbinoba, among millions of computers connected to the Internet worldwide in 1995, about 48% of them were in research sector and 6% in education sector. With an estimated continuous growth rate of 10%, the number of connections in education area including universities and schools has shown tremendous increase since then.

Potential Use of Internet in Education and Research

Teaching/Learning uses of the Internet for this purpose have shown rapid growth since the appearance of Internet. Internet as a tool functions at all levels of education. Some of the teaching learning use of Internet includes access to the reference material discussion and/or mail, and provides interactive classroom environments.

Reference material - On the Internet, huge source of information in all disciplines (studies) is available which can be accessible by different communities and individuals who are connected to it. We can obtain resources of any variety over the Internet that supports the teaching/learning process including course outlines, course descriptions, curriculum, and programs of different universities. The whole content of journals, conference papers, proceedings and even that of books are available in electronic form for free or in some cases on charge basis.

Discussions and mail (with groups or individuals – anywhere) - Students can communicate with other students in the same university or with students in other universities located anywhere around the globe. They may also discuss about the lecture, or about specific topic with each other or with instructors. Debating on some vital issues could also be very convenient through email exchange, say with members of discussion groups.

Classroom assignments, advising and answering questions - Students may work on assignments interactively on the Internet. They may also request advice by writing to their teachers.

In general, the Internet allows an active rather than passive learning mode by stimulating team learning and team problem solving. In such an active learning environment, students are very considerate for their education and are more motivated to search further. Moreover, it is believed that students feel freer and more comfortable to express their views and discuss with professors/instructors using Internet facilities when they are out of classroom rather than when they are in classrooms.

Research It is indicated in the earlier sections that the research community (ARPAnet and the development of World Wide Web) developed Internet

originally. Many of the Internet features that seem restricted to the average person have roots in the research applications in the universities (http:/ www.ag.arizona.edu/change/tut2a.html).

Some of the uses of Internet for research are:

- Information Sharing (e.g., model results): Research products, scientific findings and articles of any kind are available in journals or in other periodicals in electronic form that can easily be obtained using search engines on the Web.

- Information discussions via electronic journals and discussion groups (e.g., on News)

- Collaborative research among academics of different universities using Internet communication facility is another interesting application of Internet. Collaboration among students, faculty, practitioners and other researchers is important for advancement of education. Harkness and Franklin (1994) argue that, collaboration benefits everyone because it promotes information sharing, guides learning, and helps integrate experience. Situations that call for collaboration efforts include collective problem solving, group decision making and collaborative design.

Discussion

Utilization of Services by the Connected Units

Eleven Internet connectivities (or accounts) have been identified in the Main Campus of the Addis Ababa University. These are: School of Information Studies for Africa (SISA), Faculty of Education, Main Library, Law Library, Institute of Development Research (IDR), Research and Publication Office (RPO), Institute of Educational Research (IER), Institute of Ethiopian Studies (IES), President Office, Academic Vice President Office and Demographic Training Research Center (DTRC). Some of the details obtained from the interviews are indicated in the Table below.

The Main Campus of AAU uses Internet for three major purposes. These are communication using e-mail facilities, web pages browsing and collaborative research. For convenience of discussion, the summary of the responses from the

interview together with the observation, are arranged and presented separately for each unit.

Actual and Potential Users of Internet by Work Unit of the Main Campus of AAU

No	Unit	Location of Internet in the Unit	Actual Users*	Potential Users*	Type of Application
1	President Office	President Office	The President	1	e-mail & Web search
2	Vice President	AVP Office	Acad. Vice President	1	e-mail & Web search
3	Faculty of Education	Dean's Office	Dean & some staff	57	-e-mail, -Web search and - collaborative research
4	IDR	Director's Office	Academic staff	1	-e-mail,
5	IDR	DTRC/CERTWID		18	-Web search and - collaborative research
6	RPO	Administrator's Office	The office	4**	e-mail
7	IES	Director's Office	The Director	15	e-mail
8	Kennedy Library	Computer Lab	Staff & graduate Students of the University	Many	e-mail & Web search
9	IER	Director's Office & Computer Lab	Staff	10	e-mail & Web search
10	SISA	All offices and Labs through LAN	Staff & Students	7 + (15 graduate Students)	e-mail & Web search
11	Faculty of Law	Law Library	Staff & students	15	-e-mail, -Web search and -collaborative res.

* Users refers to only academic staff in view of the direct involvement they may have with the education process.

** two of them are par-academics

School of Information Studies for Africa (SISA)

Through the local area network facility, every academic staff of SISA and graduating class of SISA students have access to the Internet. Within the allotted limited time, all the staff can access to the Internet from his/her office or from the computer laboratory. They utilize the e-mail services and document search to develop course material.

The graduate students (only graduating class) are entitled to use the Internet services on charge basis that is to be paid from project funds allocated to the graduate student. Mainly, the students are searching Web sites to obtain relevant material for their master's thesis.

Some of the first year students who were interviewed complained that, as information science students, they should have access to the Internet at least on cost sharing basis, if not free.

The Libraries

The Law library and the Kennedy library are trying their best to accommodate the request of students in addition to giving services (e-mail & Web search) for their respective staff.

The law library renders service to the graduating class (5th year students) by providing hard/soft copy of related search results in their areas of interests.

Such big issues like the Rwanda Genocide and the associated prosecution process was downloaded and made available for teaching and research purposes in the Faculty of Law. Collaborative research on the development of Law Curriculum is also undertaken with a certain university in the USA.

The Main Library uses Internet for two different purposes, namely electronic mail and file transfer (document search). The Internet connection in the Main Library provides services to the staff and graduate students of all the faculties of the University. E-mail services are given to the academic staff in addition to document search on the web pages. The Graduate students are given search services for information related to their disciplines of study.

The 40 hours allotted time is shared among the faculties based on the number of programs and size of the students and staff. Relevant materials are searched in CD-ROMs for the user at Reference Section prior to browsing the web pages to economize the limited allotted time. Due to shortage of printer toner and papers, the students/staff are given the soft copy of the searched material.
Although undergraduate students are not allowed to use the Internet services directly due to the problems discussed, it is believed that, these students may be

receiving the resources on the web through their teachers in the form of lecture or from teaching materials distributed or loaned from the library.

The informants from the two libraries were strongly commenting on the under-utilization of the Internet and suggested the use of LAN for increased services to support the education system.

Institute of Educational Research (IER)

The Institute of Educational Research utilizes the Internet for Communication, and for browsing Web pages. Access is possible from two terminals - one from the Director's office and the other from the Computer Laboratory by using the same account. All the staff of the Institute have access to it. The Internet resources are used for developing research and course materials. The Institute is currently facing problem with the intermittent working condition of telephone line to which the modem is connected.

Institute of Development Research (IDR)

There are two Internet accounts in IDR - one in the Director's office and the other in the offices of its two main units (DTRC and CERTWID, or Demographic Training and Research Center and Center for Research Training and Information for Women in Development respectively) that share one of the accounts using one telephone line by parallel connections. The staff of both units have access to it, but only for e-mail and for collaborative research activities. The connection in the Director's office is commonly used for e-mail services.

The staff of IDR heavily use the Internet for e-mail but very rarely use for searching of web pages. DTRC utilizes the Internet for collaborative research with some sister universities abroad. Because of the large number of staff in the Institute, the shared time is so short that they are forced to limit the service to e-mail.

Faculty of Education

The Faculty of Education uses the Internet facility for communication, for collaborative research and very often for searching resources. The service is given to the staff through intermediaries when they come up with their queries. The Faculty expects the likely problem of over-usage if everyone is directly using the Internet due to the large number (about 60) of the Faculty's academic staff.

Research and Publication Office (RPO)

The main objectives of RPO is to coordinate the overall management of research activities in the university. It strives to look for local and international sponsors for research projects and publications. The office, therefore, extensively uses the Internet for communicating with funding agents and individuals. RPO has found the e-mail service very helpful as it enhances their efficiency in their search and links.

The office also searches and provides brief information on various addresses of sponsors, patents, books, journals and other related materials for researchers on request. However, the office has not actually used the resources of the Internet so far for conducting researches.

Presidential Offices

The President and the AVP of the University utilize the Internet for Web pages search and for communication.

Institute of Ethiopian Studies (IES)

The Institute is using the Internet merely for e-mail services.

Utility and Usability

The collected data was not found suitable for quantitative as well as qualitative analysis. However, some approach was devised to make a general assessment of the objective of the study qualitatively.

Two conceptual tools were used in the investigation to assess the degree to which the application of Internet promotes education. The tools employed as a measure are 'utility' and 'usability'. Based on the definitions of Gaines et al; (1997), an attempt has been made to make some indications and draw conclusions although it was difficult to measure information/service in this regard. From the purpose of the objectives of the study, utility is defined as the degree to which technology is utilized. Its emphasis is on quantity rather than on how much information/knowledge is gained. Accessibility of a system is one of the considerations of utility. Similarly, usability is defined as the high proportion of effective users. Here, the phrase 'effective users' is ambiguous as it is difficult to measure such attributes and as its usage is relative. In very crude terms, utility corresponds to the massive growth in users while usability emphasizes the gain from use.

There is high variation in the degree of utility from one connection to the other. When the number of the actual users is great and the service is more or less accessible to all potential users, the extent of utilization is high. On the other hand, the connections that entertain few individuals have low utility. On the average, every connection has one hour and 20 minutes for free everyday within the limit of the fixed charge for 40 hours per month. It might be such time limitations that hinder some offices from using the Web search facilities. Even those heavily used connections are not fully utilizing the total time for fear of using in excess of the allotted time. The University would not pay for any extra hours used. If exceeded the person in charge of the connections will be held responsible for failure to control the time within the 40 hours limit in a month.

Based on the definitions established for the tools, the degree of usability may increase with utility, but it does not necessarily depend on it. The hard copy of a single document for instance, down loaded from a certain web site in a month by an instructor and distributed for students may be more usable than hundreds of different materials obtained from the web page during the same month and kept for none. On the other hand, some connections are highly utilized yet the service - dominated is electronic communication that may contribute little or nothing in promoting education. In this regard, the usability of Internet in enhancing the education process is minimal. These may be attributed to the fact that, measuring or evaluating information/service is very difficult as different people have different tastes and different degree of satisfaction for given services or information. Generally, it is difficult to standardize satisfaction.

The other problems are lack of data on the time Internet is used in a given month, the number of the actual users and the respective time of utilization each individual and the time utilized for each kind of service (e-mail, document search, etc.). None of the informants have replied to these questions, as they have no such records at all. Therefore, due to problems in obtaining the relevant data, it is difficult to analyze quantitatively.

To sum up, by referring utility in terms of the size of the actual users relative to the size of the potential users, it can be said that the Internet services in the Main Campus of the Addis Ababa University is not equitable and also underutilized. It may be because most of the actual users are utilizing the Internet for communications that contributes nothing or little to the advancement of education. And the other fact is that the extent of utilization of Internet services of the main campus of AAU relative to the proportion of the actual users to that of potential users irrespective of usability factor, were found to make little contribution for promoting education.

Findings

There are several related problems of utility and accessibility of the Internet in the Main Campus of AAU. The most important ones are discussed below.

There is little awareness by the majority of staff and students about Internet and the vast resources in it. Most of them regard Internet merely as a tool for communication purposes. Moreover, they lack the skills and techniques of searching for the resources on the Internet. The majority of the staff is computer illiterate. As a result, some of the users prefer to rely on secretaries or intermediaries who have very limited skills to utilize the Internet.

There is also high traffic in Internet that will cause very long delays. Almost all of the respondents complain about the time spent to get connection to the Internet. One has to dial-up for hours before getting connected.

The time allotted (40 hours per month) by ETC for the fixed charge is very short. In some institutes and faculties where the number of staff is large, the share of the time is found to be very small. As a result document search and file transfer are very rarely used.

There is limited or no access for the majority of the staff. It is indicated that most of the Internet connections are located in the offices of the respective dean/director/head/administrator that make access very inconvenient for staff. According to some of the individuals in-charge of the accounts, restricting the connection to such location was adopted as a mechanism for controlling any over-use that may result in additional charge for any extra time which the University will not pay.

File transfer (downloading) is a very slow process, which may be attributed to the traditional telephone lines in use and the narrow bandwidth over which transfer takes place.

Sometimes, the server at ETC could be down that makes connection impossible. The telephone lines also fail very often.

The Internet connections are made to the telephone lines, which also serve, for other office activities. This makes difficult the use of Internet during working hours.

Conclusion and Recommendations

The Internet services in the Main Campus of the Addis Ababa University are commonly used for communication and very often for Web pages searches and collaborative researches. However, the impact of the application of the Internet in changing the overall teaching/learning cultures is very minimal due to the scope and limit of the services. In general, the contribution of Internet in enhancing the improvement of education in the Main Campus of the Addis Ababa University is found unsatisfactory.

It is so important for the Addis Ababa University to reconsider its position in relation to the rest of the world (universities) and try hard to cope up with them. With the current status of the Addis Ababa University, it can be said that with the world moving ahead, AAU will not only stand still but also stay behind in the generation and exchange of information.

The University must optimize Internet use to promote education and research. If so, the focus should be on how to make available the Internet access for the University community in general and for the students in particular. The other

concern is to empower staff and students with computer literacy and information search skills on the Internet. Literacy helps to devise a search strategy and utilizes Internet for the advancement of education. To improve the status of Internet use by the University some recommendations are given below.

1. Building Local Area Network (LAN): By building LANs in faculties, institutes and campuses, all the respective members can easily access to the local information and databases. Moreover, by using a single Internet account, every PCs connected to the LAN are able to access information on the Internet simultaneously. SISA has already implemented such technique to promote equitable services for its staff.

   Having a LAN in an Institute/Faculty, the monopoly of Internet by an individual or by few could be eliminated thereby equitable services can be rendered. Recently the AAU has proposed to build and launch the Local Area Network/Intranet that covers the entire university. This potential if implemented will be a big jump for the University.

2. Building institutional *Intranet* is another mechanism for increasing user accessibility to the resources on the Internet within the given limited conditions using the Internet tools. It also enhances the campus-wide information distribution. Intranet is capable of providing access to databases with a minimum cost of linkage to the Internet. Intranet, therefore, provides users with the access to share local information as well as information through Internet and Web browser.

3. Building LAN may be expensive which the university can not afford under the current budget allocation. As an immediate solution, faculties and institutes can use *telephone line sharing* techniques. This can be achieved by connecting two or more modem together with PCs in parallel across a single telephone line to use the same Internet account. The limitation of this technique is that the separate stations (PCs) can not log in/use the Internet simultaneously. IER and DTRC are currently using such simple technique to make available the Internet services for their respective staff.

4. Subscribing a separate dedicated telephone line for the Internet so that other activities of offices can be run smoothly.

5. Training staff and students to develop capacity building to utilize Internet. Such training should include hardware, software and information systems in general. It is recommended that incorporating at least one introductory course on computers as compulsory in the curriculum will give background on information technology for the students. The training should also aim at changing the attitudes of heads/deans/directors.

6. The best solution that covers the entire University is to subscribe for a leased (dedicated) line from the ISP. The leased line has a separate gateway (gateway allows two net works to 'talk' with each other) that links with the Internet. By using the dedicated line, there is no limit in time of service. Every member of the community could utilize as much as he/she needs to use the Internet ones the University has built LANs/Intranet.

7. Problems that result from narrow band width, high traffic and in general problems associated with speed and capacity believed to be solved with development of the telecommunication infrastructure of the country.

All the campuses of the Addis Ababa University are under the same administration and have similar trends. Therefore, the findings, the problems of equability and other associated problems are of the same nature. The recommendations given are also applicable to other campuses as they are used to be for the Main Campus as possible solutions to alleviate the problems identified as obstacles to the access and utilization of Internet in promoting education.

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