How the Internet's Features Could be Used in Distance Education:

Simulating face-to-face Interactions

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1. Introduction

Many books and references give details and a full description of the Internet and its tools, functions, and different applications. Therefore, this article is not proposing to or aiming at discussing these issues in detail, it just describes *briefly* some of the main functions of the Internet, and how it could be used to simulate the face-to-face interactions in Distance Education. In other words, this article aims to introduce the wider audience coming from areas not related to the Distance Education and Educational Technology fields to the use of Internet technologies in DE.

The backbone of the Internet was originally a series of high-speed links between major super-computer sites and educational and research institutions within the U.S. and throughout the world. Some writers link the Internet establishment to a U. S Defense Department project in the 1960's which aimed at linking research institutes, universities, military bases, and the Pentagon by a network that could not be destroyed by even multiple atomic attack (Glossbrenner, 1995, 2).

The fact is that, the Internet consists of thousands of computers connected by Local Area Networks (LAN) which combined to make larger networks called Metropolitan Area Network (MAN). These MANs are linked by Wide Area Networks (WAN) which are communications networks that cover a wide geographic area, such as a state or country. The networking of these WANs forms the Internet. These computers and networks (the components of the Internet) communicate primarily on the UNIX networking components, which consists of a combination of TCP/IP, NFS and NIS where:

· TCP/IP is (Transmission Control Protocol/Inter-

net Protocol) a communications protocol developed under contract from the U.S. Department of Defense to inter-network dissimilar systems.

· NFS (Network File System) is a distributed file system from SunSoft that allows data to be shared across a network regardless of machine, operating system, network architecture or protocol. This de facto UNIX standard lets remote files appear as if they were local on a user's machine.

· NIS (Network Information Services) is a naming service from SunSoft that allows resources to be easily added, deleted or relocated.

These three de facto UNIX standard protocols now are supported on almost all platforms, which allow the transmission of data between the participants of the Internet (*Tech Encyclopaedia*, 1999; Hahn, 1993, p.175-186).

Moreover, TCP/IP includes three sub-protocols, FTP, SMTP, and Telnet. FTP is a File Transfer Protocol, which allows files to be downloaded and uploaded between TCP/IP sites. SMTP, Simple Mail Transfer Protocol, is TCP/IP's own messaging system for electronic mail, and the Telnet protocol provides terminal emulation. This allows any personal computer or workstation to emulate a variety of terminals connected to mainframes and midrange computers.

In other words, we might define the Internet by combining the two words International and Network. So, it is an international network composed of many smaller networks around the world.

Although it is very difficult to know the exact number of computers connected to the Internet because of its rapid growth, the latest statistics show that the Internet is made up of more than 109, 574,429 hosts in over than 200 countries.(as for

January 2001,) Surfers or users of the Internet have access to unpublished data and journals on a huge variety of subjects from different commercial, academic and government networks.

2. The Internet's Main Functions
2.1 E-mail, Mailing List/LISTSERV

E-mail: is an abbreviation for Electronic mail, which technically means using network protocols to send messages on that network. In the case of the Internet the protocol is SMTP. Usually *e-mail* software such as Outlook and Eudora, compatible with SMTP, are used to perform this task.

The standard Internet mail protocol supports only text. However, most e-mail software has the ability to *attach a file* to the text-message, which means that all types of files (program, graphics, spreadsheet, etc.) can be transmitted along with the text message. In order to transmit non-text files, an encoding method such as MIME (Multipurpose Internet Mail Extensions), UUencoding or BinHex is used by the e-mail program to convert binary files/8-bit characters into the 7-bit ASCII text format, which is supported by SMTP protocols. When the files are received, they are decoded by the receiving mail program. The main technical problem with this method for transferring information is that a mail gateway is set up to limit the total length of an e-mail message (the size of the file in bytes). If attached files exceed this limit, they must be broken up into several files before they are delivered. These files can be manually combined and decoded; however, this is a technical chore beyond the scope of most e-mail users.

Mailing list: An automated e-mail system on the Internet, which is maintained by subject matter. There are more than 10,000 such lists. New users generally subscribe by sending an e-mail with the word "subscribe" in it and subsequently receive all new postings made to the list automatically. One un-subscribes by sending an e-mail with the word "unsubscribe". Mailing lists are also called "list-procs" and "listservs"; the latter named after the popular LISTSERV package, a popular public domain mailing list program (*Tech Encyclopedia*, 2000; Glossbrenner, 1995, p. 5).

Use of E-mail in Distance Education

Correspondence Education supporters claim that nearly all distance education is still organized through the post (Sewart, Keegan & Holmberg.,
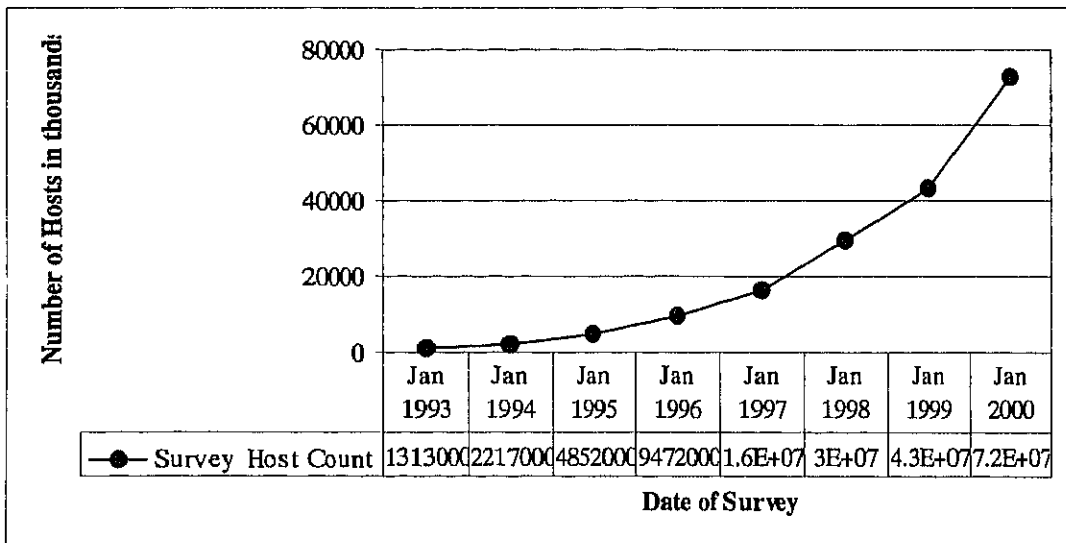

Figure 1: The Rapid Growth in Number of Computer (hosts) Connected to the Internet
* (Source: Internet Software Consortium (http://www.isc.org/).

1988, p.31). Even when the main teaching media is not the *Print*, correspondence is the main communication method. For example, in Japan, NHK and University of the Air, where TV and Radio are considered to be the main teaching media, the main communication media between the teacher and student are the post services.

E-mail and mailing lists are challenging this situation. By using the e-mail technology, the teacher and student can communicate much faster and more efficiently. The teacher can send the assignments directly to the students and instantly receive a confirmation on whether the messages reached the student's mailbox or not. The students also can directly send the teacher their assignments or any other homework as soon as they finish it, without worrying if it will arrive on time or not. This is important not only because it makes the communication faster and more reliable, but also because it allows all the students have the same time to finish their assignments. To explain further, suppose that there are two students studying same course in a Japanese *Distance Education Institute* (DEI). One of them resides in Tokyo, however, and the other resides in Bahrain. If the teacher posts the assignment to both at the same time, then it will reach Tokyo the next day and Bahrain after one or two weeks. The same will be true when the students want to send the assignment back and the same for correction and so on. In other words, in the case of the postal mailing services, the physical distance affects the reaction time directly, but in the electronic mailing service, the reaction time is almost constant and extremely short as shown in Figure 2.

Another advantage of this service is its relatively cheap and fixed cost. For example, in the previously supposed situation, the cost of sending a 10 Gram letter to Bahrain is ¥150 by airmail and ¥80 inside Japan; but sending the same letter by e-mail will cost only ¥10 to anywhere in the world. Actually, you can send up to 225 KB of data by the same price. If this data is plain text, then it can be about 65 pages, which could be augmented to up to 312 pages by using some compressing software.

Using the mailing list, the teacher or the course manager can divide the students into groups and sub-groups and so on. Then he can send different messages to each sub-group or a different message to each student or one message to all the students as he considers necessary. Of course, this is also possible by using the manual mailing system, but it would be much more difficult.

Another advantage of the e-mail is that the student, teacher or any person involved in the DE process does not have to worry about keeping an archive of the addresses, or copies of the received and sent mail; all this will be part of the mailing program.

Moreover, the teacher or the DEI can provide the students of each course or group with a list of all the participants' e-mail addresses which makes it very easy for any member of the group to contact other participants.

Simply using E-mail can make the *correspondence* or communication faster, cheaper, easier, and more dependable.

One of the disadvantages of e-mail, as well postal mail, is that it is an end-to-end service. That means it is the sender who decides who will receive this mail, supposing he knows the receiver's address. Moreover, as a receiver, you cannot decide what to receive and when. In other words, the learner has to wait until the teacher decides to send him this information. Of course, he can ask for this information, but the receivers of the request can answer him when they want. The learners cannot go to the office as in the conventional education institutes and take the information they need; someone has to send it to them, which increases their dependency.

Another disadvantage of this is that it is not *real-time*. The learners cannot talk or interact/react with the teacher, or any other user, instantly. This problem could be solved by using the Internet command (a Unix command) *talk*.

By using the talk command, learners (any Internet user) can type messages back and forth in real time. That is, as a user types a message, it echoes, not only on his screen, but also on the other end (the other user's) screen, no matter what the "distance" is between them.

This also has two disadvantages. First, the two participants must be available at the same time on the Internet, which decreases the student's independence. Second, the written words, most of the time, cannot be as real as sound where feelings can be transmitted more easily.

2.2 Newsgroups, Discussion Groups.

Newsgroups, like many of other facilities available on the Internet, are run voluntarily and cooperatively by people. A Newsgroup is centered around a discussion topic such as a society, computers, distance learning music and business.

Within these Newsgroups, several discussions or "threads" take place on themes within the discussion topic. A newsgroup devoted to educational technology may have a thread on it that is using educational television. If you are having a problem getting something specific to work in a spreadsheet, there will definitely be a news group to which you can pose your problem and it will not take long to get many responses. In the Distance Education field, one of the most active newsgroups is related to Online Education Delivery Applications (OEDA). These newsgroups discuss the different problems of OEDA users, (i.e. students, teachers and course managers). If you have any question concerning using, understanding, or upgrading any of these applications, you just place your question in the right place and you will get many suggested answers and solutions.

Some of common categories of Newsgroups are:
    rec: recreational activities
    biz: business related groups
    comp: computers including technical discussion & support
    soc: social issues
    sci: scientific discussions
    alt: Alternative groups

Some of the Education's newsgroups are:

alt.education.alternative	alt.education.disabled	alt.education.distance
alt.education.research	alt.teachers.lesson-planning	clari.news.education
misc.education	misc.education.adult	misc.education.multimedia

The main problem of newsgroups is that each system's administrator decides which newsgroups will be carried on the system. Since newsgroups take up valuable hard drive space and transmission bandwidth, administrators may choose not to carry some hierarchies at all. To illustrate, the administrators of emile (the Master of Education Program server at University of Tsukuba) choose the following newsgroups, which may not include some students' interests. For example, it does not include any of the above mentioned international education newsgroups (figure 3).

The Use of Newsgroups in Distance Education

Newsgroups can be used in Distance Education very well. For example, the DEI can create a newsgroup for each subject, and each subject's newsgroup might be divided into sub-newsgroups (Threads) for each topic. The students can discuss, share their interests, raise questions and find answers by joining the related group.

This Internet tool has similarities to "mailing lists" objectives where the students can discuss, ask for help and exchange their experiences. However, they differ in the way they work. In the "mailing list", the students choose which group they subscribe to and when they subscribe and unsubscribe. Yet, while they are subscribing to mailing list, they will receive all messages, no matter whether they want them or not.

On the other hand, in the case of newsgroups, the server's administrators choose the newsgroup the server holds but the students can choose which

group they read, receive and write to.

Another difference is that in mailing lists, you always send your messages to the list's manager only (unless you are the manager) and he/she resends it to everyone or to a specific person[1]. For example, if one of the participants asks a question, the other participants who want to answer him should send the answer to the list's manager who will, often automatically, send it to the whole mailing list, to those who need the answer as well those who do not. In contrast, in newsgroups the participant places his message in the specified newsgroup, including his e-mail address. Then, if another participant wants to comment on this message, he has two options. Either reply to the person who placed the first message only, or place the message in the server so that all the participants can read it if they want to.

Another obstacle of the newsgroup is that the newsgroup is not accessible without log-ing onto the server that hosts it in order to read the messages. This is very simple if you are studying or teaching "on-campus", where you can access the server that host the newsgroup, but what if you are thousands of miles away? It is still possible by using other Internet commands such as *telnet* and *rlogin*.

2.3　Telnet

Telnet is a terminal emulation protocol commonly used on the Internet. It allows a user to log onto and run a program from a remote terminal or computer. Telnet was originally developed for ARPAnet[2] and is part of the TCP/IP communications protocol. Although most computers on the Internet require users to have an established account and password, there are many that allow public access to certain programs, typically, search utilities, such as Archie or WAIS.

For example, anyone can access Tsukuba University Library via telnet and search its online card catalogue by using the Unix command *telnet opac. tulips.tsukuba.ac.jp* or any PC's "telnet-ing" software. This site does not require a password because it is public. There are many such sites like the Library of Congress *locis.loc.gov* and UKOU library *lib.open.ac.uk*.

Distance Education Systems and institutes can use this tool in many ways. For example, Deakin University in Australia provides book home delivery and collection to students. In this case, the students can search the university's library online catalogs by using the telnet command and then order the book by e-mail (Moran 1990, 68).

Another way to use this tool is to allow the DL to use the different programs, e.g. CAI, CBL and computer programming languages compilers, which are available on the university's servers. For example, the SPSS and many other programs and databases are available in one of the Tsukuba University servers (*kiku.cc.tsukuba.ac.jp*). For a long time, the students had to go to the university information processing center 筑波大学学術情報処理センター. By using the telnet applications, learners can login to this server from any computer connected to the Internet, even outside Japan, and perform the same process they used to perform at the university information center.

2.4　Remote Login

Remote Login (*rlogin*) is a UNIX command that

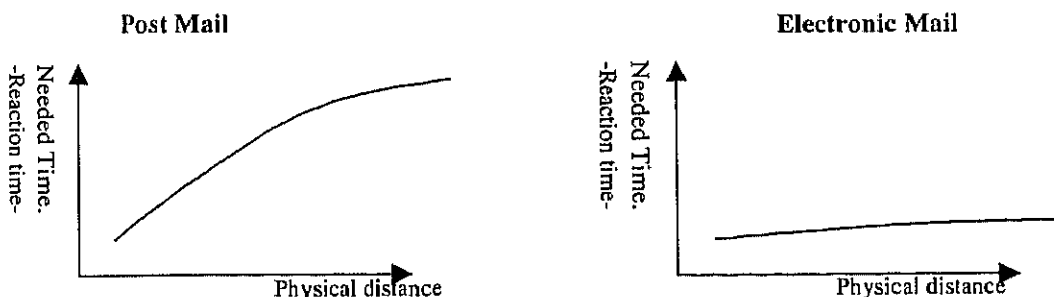**Post Mail**

Electronic Mail

Figure 2: Comparing the Needed Time to Send/receive Messages by Post Mail and Electronic Mail
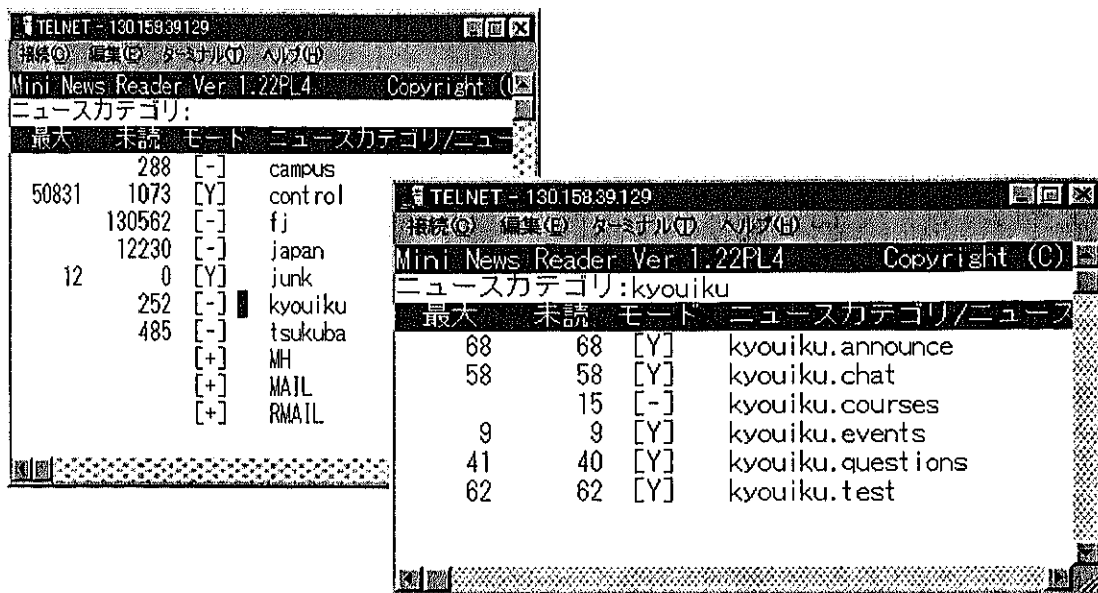
Figure 3:　Examples of the Newsgroups Available at kyouiku.tsukuba.ac.jp Server

allows users to remotely log onto any server in the network as if they were at a terminal directly connected to that computer. Rlogin is similar to the Telnet command, except that rlogin also passes information to the server about the type of client machine, or terminal, used.

2.5 Finger

Finger is A UNIX command widely used on the Internet to find out information about a particular user, such as telephone number or to determine whether he is currently logged on or the last time he logged on. The person being "fingered" must have placed his or her profile into the system. Profiles can be very elaborate either as a method of social introduction or as a statement of particular job responsibilities. Fingering requires entering the full user address, (i.e., the user full e-mail address including the computer that hosts this mail account). For example, the e-mail addresses of Tsukuba University Master of Education students are in *user @kyouiku.tsukuba.ac.jp* form, but the full address is *user@emile.kyouiku.tsukuba.ac.jp* since the computer (domain) that hosts the students accounts is called "emile". Therefore, if a person wants to finger someone on this server you have to use the

second form.

When the finger used command without username arguments, will be shown the default information about each logged-in user in multi-column format, In most cases, the default information includes:

· The user log name and the user's full name;

· The user's home directory and login shell;

· Time the user logged in if currently logged in, or

· The time the user last logged in and the host from which the user logged in;

· The last time the user received mail, and the last time the user read mail;

· The first line of the $HOME/.project file, if it exists;

· The contents of the $HOME/.plan file, if it exists.

Fingering someone and getting this information can be very helpful if you know what it means. For example, when a learner sends his assignment to the teacher by e-mail, he will receive an instant confirmation that the teacher received the assignment. By using finger, he can know if the teacher already has read his assignment or not, and alternatively the teacher can check on the students.

Another situation in which to use this command is that when you want to *talk* to or *chat* with someone on the Internet, you have to be sure he is online. To do so, you simply *finger* him. This also will inform you from where he logged in last time.

This command also let the users, teaches, managers, directors, and students, know each other's plans and projects before they contact each other.

2.5 File Transfer Protocols (ftp)

File Transfer Protocol is a protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). It includes functions enabling logging onto the network, listing directories and copying files. Copying a file means transferring a copy of that file to (*Uploading*[3]) and from (*Downloading*[4]) a remote network site.

The client host with which ftp is to communicate (remote host or computer) may be specified on the command line. If this is done, ftp immediately attempts to establish a connection to an FTP server on that host; Otherwise ftp enters its command interpreter and awaits instructions from the user. When ftp is awaiting commands from the user, it displays the prompt: ftp.

These FTP functions can be performed by typing commands at a command prompt of UNIX or via an FTP utility running under a graphical interface such as Windows.

FTP Utilities like WS_FTP Pro for Windows and Fetch for Macintosh make FTP-ing easy. After logging on and switching to the appropriate directories (folders) on the local and remote systems, transferring requires only highlighting the files and clicking the designated buttons.

Internet users can also hock-on FTP anonymous sites. Anonymous FTP sites on the Internet are those servers and hosts that contain files that can be downloaded by anyone. The anonymous FTP directory is isolated from the rest of the system and will generally not accept uploads from users.

FTP is designed to handle binary files, in both ASCII and EBCDIC[5] character codes, directly and does not add the overhead of encoding and decoding the data like the case of the attached files to e-mails.

The FTP also can be adopted for use in DE easily. The teacher or the DEI can make an FTP folder for each course or subject. These folders can hold subjects' related files such as applications, CAI programs and any other information like video or audio files. The learners can then download these files and use them in their learning. Of course this can be done by sending these files by mail on disks or CD-ROM. However, whenever any file is updated or upgraded, the DEI's have to send it to all users again, which is not convenient when you have a large number of students. Moreover, FTP gives the students more autonomy and independence.

The students can also download programs and files from other anonymous FTP sites to use them in their study.
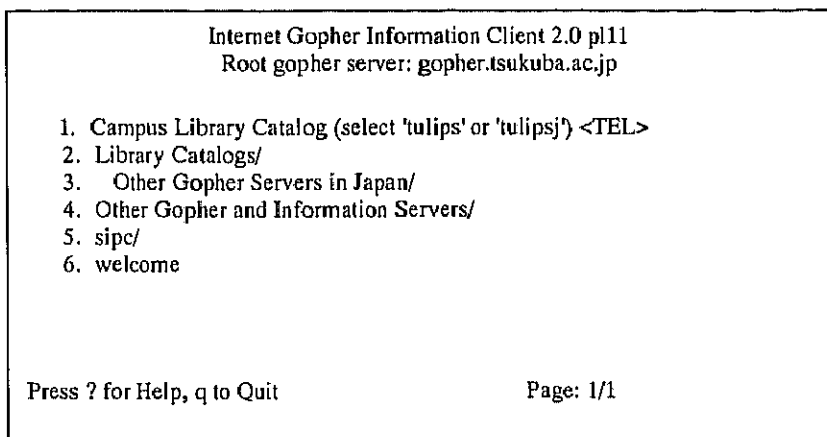
There are thousands of anonymous FTP sites covering almost any topic one might think of. The question is how to reach to the right site. The answer is by using the Internet *"Archie"* utility.

(ARCHIvE) is an Internet utility used to search for file names. There are approximately 30 computer systems throughout the Internet, called "Archie servers" that maintain catalogs of files available for downloading from various FTP sites. Periodically, Archie servers search FTP sites throughout the Internet and record information about the files they find.

For example, suppose a DE student wants to find a file called "arabic" for teaching the Arabic language. He may do the following simple steps.

Command	Result
(what the students do)	(what may the students get if he is using emile[6])
Archie	Usage: archie [-acelorstvLV] [-m hits] [-N level] string
	-a : list matches as Alex filenames
	-c : case sensitive substring search
	-e : exact string match (default)

Command	Result
	-r : regular expression search
	-s : case insensitive substring search
	-l : list one match per line
	-t : sort inverted by date
	-m hits : specifies maximum number of hits to return (default 95)
	-o filename : specifies file to store results in
	-h host : specifies server host
	-L : list known servers and current default
	-N level : specifies query niceness level (0-35765)
Archie -L	Known archie servers:
	archie.ans.net (USA [NY])
	archie.rutgers.edu (USA [NJ])
	archie.sura.net (USA [MD])
	archie.unl.edu (USA [NE])
	archie.mcgill.ca (Canada)
	archie.funet.fi (Finland/Mainland Europe)
	archie.au (Australia)
	archie.doc.ic.ac.uk (Great Britain/Ireland)
	archie.wide.ad.jp (Japan)
	archie.ncu.edu.tw (Taiwan)
	*archie.kyoto-u.ac.jp is the default Archie server.
	*For the most up-to-date list, write to an Archie server and give it the command 'servers'.
Archie -c arabic	Host ftp.win.or.jp
	Loction: /pub/word/mule/fonts/ETL
	FILE -r--r--r-- 754 Oct 25 1994 etl16-arabic0.bdf.gz
	FILE -r--r--r-- 1823 Oct 25 1994 etl16-arabic1.bdf.gz
	FILE -r--r--r-- 2258 Oct 25 1994 etl16-arabic2.bdf.gz
	Location: /pub/word/mule/fonts/non-cjk
	FILE -r--r--r-- 754 Oct 25 1994 etl16-arabic0.bdf.gz
	FILE -r--r--r-- 1823 Oct 25 1994 etl16-arabic1.bdf.gz
	FILE -r--r--r-- 2258 Oct 25 1994
ftp ftp.win.or.jp	220- THIS ARCHIVE IS PROVIDED "AS IS" WITH NO WARRANTIES.
	220-Complaints and questions should be sent to \<ftpadmin@ftp.win.or.jp\>.
	220-
	220 FTP.WIN.OR.JP FTP server (Version wu-2.4.2-academ [BETA-15] (SAINT/NYX) Sun No
	v 30 07:00:00 JST 1997) ready.
	Name (ftp.win.or.jp:aradi): anonymous
	Password: e-mail address
cd/pub/word/mule/fonts/ETL	Move to the targeted directory
get etl116-arbic2.bdf.gz	Copy the etl16-arabic2.bdf.gz to local host or computer.

```
                    Internet Gopher Information Client 2.0 pl11
                    Root gopher server: gopher.tsukuba.ac.jp


     1.  Campus Library Catalog (select 'tulips' or 'tulipsj') <TEL>
     2.  Library Catalogs/
     3.    Other Gopher Servers in Japan/
     4.  Other Gopher and Information Servers/
     5.  sipc/
     6.  welcome




     Press ? for Help, q to Quit                         Page: 1/1
```

2.6 Gopher

Gopher is a program that searches for file names and resources on the Internet and presents hierarchical menus to the user. As users select an option, they are moved to different Gopher servers on the Internet, where links have been established.

For example, Tsukuba University runs a gopher server called gopher.tsukuba.ac.jp.
Its first menu looks like:

Choosing "1" from the six options available in the first menu will take you to another menu or text page. For example if you chose "4" this will link you to other gopher service providers which may lead you to other menus until you reach where you want.

Gopher has been largely superceded by the World Wide Web (WWW), a similar document system that includes access to Gopher documents as one of its access schemes.

2.7 World Wide Web

The World Wide Web, also called "WWW", "W3", or "Web" for short, is a hypertext-based service that allows the user to retrieve and find different information based on keyword searches. It links documents locally and remotely. Each one of these documents is called a Web page. Fundamentally, these pages' format is a text document embedded with HTML[7] tags that provide the layout of the page as well as the hypertext links (URLs[8]) to other pages. These links (hypertext links) in the page let users jump from page to page around the world

without noticing any difference. These pages are accessed and read via a Web browser such as Netscape Navigator, Internet Explorer, and Mosaic which put the Web on the Internet's map.

Like *gopher*, *e-mail* and *newsgroups*, the Web used to handle text only, but with the improvement of browsers, it is now capable of carrying many types of files. Most of the browsers (Navigators) have a built-in function and "Plug-in[9]" software that make them able to show/retrieve almost any type of data.

In addition, new versions of browsers can use their built-in functions and plug-in software to perform other Internet functions like FTP, Gopher, Telnet, e-mail, and reading newsgroups as well as running Java[10] programs and applets.

Having these features, the Web can perform all operations we discussed before and more. By using the Java programming language the DEI can design CAI, CLB and any other applications that can be run independent of the platform the LD are using. Moreover, they can update and upgrade this software continuously.

3. A Short Comparison Between the Different Internet Tools

It is very difficult to decide which tool should be used in DE more. Deciding this depends mainly on the service the DEI want to provide. However, the statistics show that the Web is growing much faster
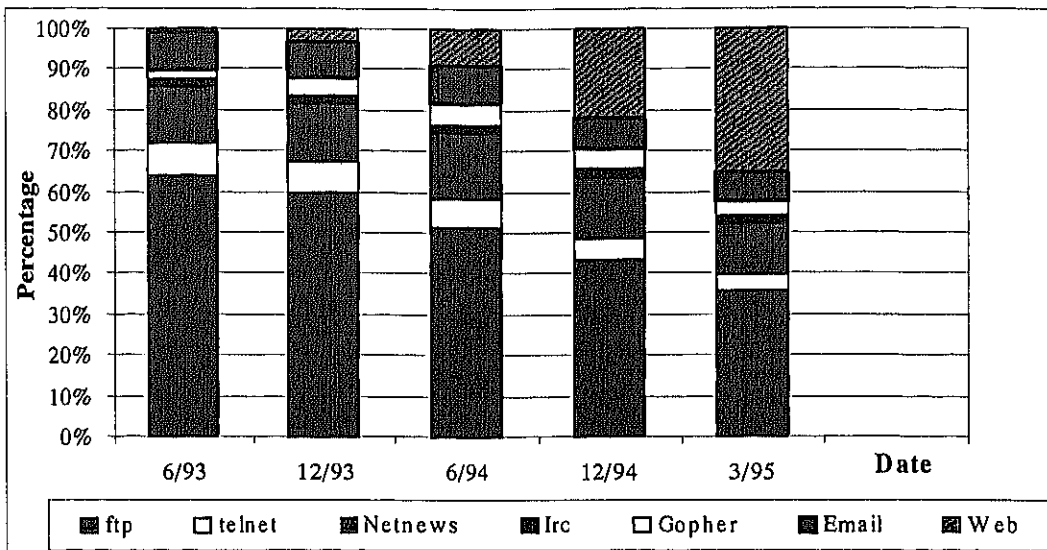
Figure 4:　Changes as Quota of the Different Functions of the Internet (93-95)
Source: Web Growth summary: http://www.mit.edu/people/mkgray/net/web-growth-summary.html;

than other Internet services and is taking them over.

For example, the available statistics about the data transmitted over the NSFNET's,, which was the primary backbone for the Internet before 1995, show that the Web has been taking over the other tools portions since it started in late 1993. Since the NSFNET stopped running the backbone in April of 1995, new data are not available, but the early growth is clearly visible in Figure 4.

A wide range of related data and statistics is available from the Merit's site at (http://www. merit.edu/merit/archive/nsfnet/statistics/.index. html/)

4 . Internet Applications in Distance Education

There are many Web applications that can be used in distance education. In this section, I will try to introduce three examples. As in the previous section, the aim of this section is not to provide a complete technical anatomy of these applications, but is rather to explain the purposes and uses of these applications in DE.

4 . 1 Desktop Conferencing

Many Internet applications allow the users to interact in real-time sessions. The simplest and

oldest is the Unix **talk** command. More sophisticated applications provide tools to transmit sound and images in addition to text. These applications allow audio/video communication sessions between three or more people who are dispersed geographically. This form of conferencing started with room systems where groups of people would meet in a room with a wide-angle camera and large monitors and conference with other groups at remote locations.

The idea is very similar to satellite conferencing sessions. However, the differences in quality are great with satellite conferencing being far superior and therefore far more expensive. This technology depends mainly on digitizing the data (sound/images/text) and compressing it as much as possible and then transmitting it to the receiver as the other side of the Internet. Desktop conferencing systems may have all or any one of the following three components; audio conferencing, video conferencing and data conferencing. Digitized data can be transmitted over LANs, ISDN as well over standard telephone.

This technology is expected to take over from ones using expensive satellites in DE. Using this

technology, the students can initiate real-time inter-actions with the teacher, other students, and admin-istrators. This could increase the students' indepen-dence, as well as their autonomy.

It is important to note that text and partially sound quality are acceptable when using slow modems; however, there is still a need for further improvements before moving pictures, which would be extremely effective in DE, reaches acceptable standards. (Don, 1996a, p. 43,44 & Tech Encyclope-dia)

4 . 2 Broadcasting

Broadcasting is another feature of the Internet now available using a new technology called "streaming". This technology delivers a continuous

"stream" of audio/video information to the Internet user, decompressing and decoding it as it arrives, and plays it almost instantly. In other words, the students do not have to download the audio or video files, or decompress and decode them before playing them. All this is done simultaneously. The broadcast signal is digitized, compressed, transmitted, decom-pressed and decoded and then played in such extremely short intervals that the students will not even notice any delays (Don, 1996b, p. 3).

This technology will help DEIs to extend their areas of broadcasting without having to use expen-sive satellite technology, and thus would have the advantage of reaching only the students who want to receive the broadcasts. Moreover, if the univer-

Table. 1 : Summary of Strengths and Weaknesses of Different Technologies for
Open and Distance Education. (Bates)

Media	Access	Costs student nos.		Teaching		Interactivity		Organiza-tion	Speed
		Large	Small	Presenta-tion	Skills	Learning materials	Social		
One-way- media									
Print	Good	Good	Average	Average	Average	Average	Poor	Poor	Poor
Radio	Good	Good	Poor	Poor	Poor	Poor	Poor	Average	Good
Audio cassettes	Good	Good	Average	Average	Good	Good	Poor	Good	Average
Educational broadcast TV	Average	Poor	Poor	Good	Average	Poor	Poor	Poor	Poor
Pre - recorded ITV	Poor	Good	Poor	Average	Average	Average	Average	Average	Poor
Video cassettes	Good	Average	Poor	Good	Good	Good	Poor	Average	Poor
Computer-based learning	Average	Poor	Poor	Average	Average	Good	Poor	Poor	Poor
Multimedia	Poor	Poor	Poor	Good	Good	Good	Poor	Poor	Poor
Two-way media									
Audio conferencing	Good	Poor	Good	Poor	Average	Poor	Good	Good	Good
Live-interactive TV	Poor	Poor	Poor	Poor	Poor	Poor	Average	Average	Good
Video Conferencing	Poor	Poor	Average	Poor	Average	Average	Average	Average	Good
Internet-technologies based*	Average?	Average?	Average?	Good?	Good?	Good?	Good?	Good?	Good?

*This item was added by the researcher, and therefore still needs further research and investigation.

sity stored the educational programs on an audio/ video server connected to the Internet, then any student with access to the Internet could use the educational programs anytime, anywhere.

4.3 Online Educational Delivery Applications

These are complete packages devoted to providing the DE participants with a wide range of tools for using all of the discussed features of the Internet and many more, in very friendly environments. These tools may be classified into:

1. Learner tools such as Web browsing, asynchronous sharing, synchronous sharing, self-assessing, progress tracking, motivation building, and study skill building.

2. Instructor tools such as:
   a. <u>Course tools</u> that include tools to help the instructors in planning, managing, revising and monitoring their courses.
   b. <u>Lesson tools</u> that include tools to help the instructors in designing instructional materials, presenting information and testing the students.

3. Technical administrator tools such as:
   a. <u>Installation tools</u> with tools to help the administrator in installing software and applications used by the instructors and learners.
   b. <u>System tools</u> that include authorization and security tools, resource monitoring tools, remote access tools and crash recovery tools.
   c. <u>Help disk tools</u> that include tools to support both students and instructors.

For detailed information about different OEDA, I would suggest visiting the homepage of Dr. Bruce Landon, Douglas College, at (http://www.ctt.bc.ca/landonline/). He describes and compares most OEDA currently in use in terms of technical specifications, instructional design values, media capabilities, tools, ease of use, potential for collaboration and connectivity, as well as providing contact information related to the compared OEDA vendors.

5. Conclusion

An appropriate selection and use of technologies will depend on the particular context in which they are to be used. However, as Tony Bates has suggest-ed, the decision-making process should be based on an analysis of the answers to a set of questions that every institute needs to ask, which can be grouped by the following criteria:

A　Access: How accessible is a particular technology for the learners? How flexible is it for the particular targeted group?

C　Cost: What is the cost structure of each technology? What is the unit cost per learner?

T　Teaching and learning: What kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?

I　Interactivity and user-friendliness: What kind of interaction does this technology enable? How easy is it to use?

O　Organizational issues: What are the organizational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organization need to be made?

N　Novelty: How new is this technology?

S　Speed: How quickly can courses be mounted with this technology? How quickly can materials be changed? (Bates, 1995, p. 2-17)

Bates also made a comparison between the different technologies used in DE and open learning as shown in (Table-1), which suggests the suitability of Internet technologies for distance education and open learning.

References:

Bates, T. (1995). <u>Technology, Open Learning, and Distance Education</u>. London ; New York: Routledge.

Don, D. (1996.a). Internet Telephone. <u>TE-CHRENDS</u>, March 1996, Pp. 3, 4.

Don, D. (1996.b). Audio Streams onto the Internet. <u>TECHRENDS</u>, April/May 1996, Pp. 43, 44.

Glossbrenner, A. (1995). <u>Internet 101: a college student's guide</u>. New York: Windcrest/ McGraw-Hill.

Hahn, H. (1993). <u>A Student's Guide to Unix</u>. Singapore: McGraw-Hill.

Moran, L (1990). Deakin University, Australia. In Koul, B. N. And Jenkins (ed.), Distance Education: A Spectrum of Case Studies (Pp. 67-78). London: Kogan Page Ltd.

Online Educational Delivery Applications: a Web tool for Comparative Analysis. URL: http://www. ctt.bc.ca/landonline/ [2001. April 25].

Sewart, D., D. Keegan, and B. Holmberg. (1988). *Distance Education: International Perspectives*. London: Routledge.

Teach Encyclopedia. URL: http://www.techweb. com/encyclopedia/. [2001. April 25].

Web Growth summary. URL: http://www.mit.edu/ people/mkgray/net/web-growth-summary.html. [2001. April 25]

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1 Usually the manager of any mailing list will use an automation application to send messages to all the list members.

2 (Advanced Research Projects Agency NETwork) The research network funded by the U.S. Advanced Research Projects Agency (ARPA).

3 Uploading: is transferring data from the local host (the computer you are using) to the remote computer (host). Usually, this done by using the Unix command "put" to upload one file and "mput" to upload many files at once.

4 Downloading is transferring data from the remote host to the local computer. Usually this done by using the Unix command "get" for downloading one file and "mget" for downloading many files at once.

5 ASCII: American Standard Code for Information Interchange and EBCDIC: Extended Binary Coded Decimal Interchange Code.

6 emile: is the domain name for the Master of Education in Tsukuba University.

7 HTML : Hyper-Text Markup Language

8 URL (Uniform Resource Locator) is the address that defines the route to a file on the Web or any other Internet facility.

9 Plug-ins are software programs that extend the capabilities of Navigators in a specific way-giving you, for example, the ability to play audio samples or view video movies from within Navigator. (source: Netscape help)

10 JAVA is a simple, general-purpose and platform-independent programming language developed by Sun Microsystems in 1995.

How the Internet's Features Could be Used in Distance Education:

Simulating face-to-face Interactions

Shaker Hasan Aradi

In this article, the author briefly describes some functions and features of the Internet, and their use in simulating face-to-face interactions. It aims at introducing the wider audience of educators, from areas not related to the Distance Education (DE) and Educational Technology fields, to the use of Internet technologies in DE.

Among the Internet's features discussed and explained in this article are: Email, Finger, Newsgroup, Telnet, rlogon, FTP, Gopher, and Online Educational Delivery Applications.