

Telematics: A Multi-dimensional Approach in Education

Nishant Gunjan

Asst. Professor

Department of Education

M.L.T. College, Saharsa (Bihar) India

ABSTRACT:

Education at all levels has been significantly impacted by the tremendous innovations in Information and Communication Technologies (ICTs), especially in the field of telecommunications and multimedia applications. A few decades ago, technological devices like radio, television, film strips, and overhead projectors, audio and video cassettes were used to make teaching effective and enhance learning. But now-a-days, teaching and learning has been enhanced by a vast array of ICT based technologies in the form of interactive radio, teleconferencing, web based and satellite based services, etc.

The advent of telecommunications has opened up many opportunities to reduce the distance and time in communication. It has also led to constant research in developing more effective ways of information sharing, training and education. As a result, the growth in teleconferencing technologies has made such technologies more versatile and cost-effective (Walsh & Reese, 1995). With the help of new technologies it has become easier to exchange ideas and collaborate on projects. The use of information technology in education is synonymous to the use of telematics in education, especially in open and distance learning. Open and distance learning uses a variety of information and communication technologies to deliver content as well as instruction to the learners at a distance. This paper focuses on telecommunication tools and techniques used in education and training. It also attempts to discuss on different educational technology applications used in online and virtual education.

KEYWORDS: ICT in education, Educational Technology, Web Based Learning, Virtual Learning, Collaborative Learning. Computer Based Training

INTRODUCTION:

Historically the term telematics has been used to refer to the combination of telecommunications and informatics. In the beginning this form of combination was used more to enhance the functionality of motor vehicles but gradually it has become a good source of sharing information. It is used mainly for sending, receiving and storing information via telecommunication devices. Interestingly, Internet, the important tool for accessing information today, is an example of telematics. Similarly, e-mails, websites and videoconferencing are also some examples of telematics. Today online resources and learning online are common. Information is uploaded, downloaded, stored, processed and retrieved when needed using information and communication technology. Learners can chat or send e-mails with files attached to exchange information with their peers and teachers and also other experts. Video and computer conferencing facilities are revolutionizing seminars, conferences and meetings wherein the participants need not be physically present. Countries with highly developed infrastructure needed for Information and Communication Technology (ICT) and networks to support education and training are set to gain from the use of telematics for distance education and training.

TELEMATICS DEFINED:

Telematics can be defined as the combination of information and communications technology and telecommunications. It is the use of telecommunications and the power of computers together to disseminate information to a wider audience in a useful way. Telematics are used in variety of field and some examples include Global Positioning Systems, Automotive Navigation Systems etc. Both these systems used information technology to gather the information and deliver the message to the user through the telecommunications network. Now- a-days when we talk about telecommunications, wireless technologies takes a wider role. Hence, telematics is broadly defined as the blending of information technology (or computers) and wireless technologies to efficiently deliver information to wider networks. Internet itself can be regarded as an example of telematics where information is provided to wider audiences efficiently using telecommunication, especially wireless technologies. Telematics was introduced and largely used within the automotive industry in solutions like global positioning systems and navigation systems. However, it is no more limited to automotive applications. Telematics applications have been used in monitoring water and air pollution, medical informatics, and open and distance learning. Many European countries are developing uniform policies to integrate telematics applications into government, business and education.

TELEMATICS AS AN INFORMATION SOURCE:

Information is probably the biggest advantage, which internet is offering. The Internet is a virtual treasure trove of information. Any kind of information on any topic under the sun is available on the Internet. The search engines like Google, Yahoo is at our service on the Internet. We can almost find any type of data on almost any kind of subject that we are looking for. There is a huge amount of information available on the internet for just about every subject known to man, ranging from government law and services, trade fairs and conferences, market information, new ideas and technical support, the list is endless. Students and children are among the top users who surf the Internet for research. Today, it is almost required that students should use the Internet for research for the purpose of gathering resources. Teachers have started giving assignments that require research on the Internet. This is possible due to integration of technologies, especially communication technologies in the form of Telematics.

TELEMATICS TECHNOLOGIES:

I. AUDIO CONFERENCING

Audio conferencing is an audio only system, which is the most common and least expensive method of teleconferencing. Audio conferencing can occur in three modes: simplex, half-duplex, and duplex. Simplex systems allow communication in one direction at a time while half-duplex with faster switching allows the parties to interrupt and change direction of the flow of communication. Duplex allows communications in both directions at the same time as in a telephone conversation.

II. Audio Graphics

Audio graphics systems allow visual and data transmission in addition to voice communications. The data and visual images supplement the voice communication and are transmitted through the telecommunication system. Audio graphics systems are suitable for courses that require a lot of illustrations hence they are very popular in science and engineering classes.

In addition to the telephones audio graphic peripherals are used in communicating the data and images to the different locations. These peripherals include facsimile machines, electronic blackboards, video images, and computers.

1. FACSIMILE MACHINES:

While the audio conferencing is going on, facsimile machines are used to send images between the locations. Facsimile machines are widely used for these purposes for their availability, low cost, and speed compared to

mail. However facsimile machines can cause delay in transmission and also the quality varies between machines.

2. ELECTRONIC BLACKBOARDS:

Electronic blackboards transmit anything written or drawn at one site to television screens at other sites. Interaction can occur with students responding using electronic blackboards.

3. VIDEO IMAGES:

Video Image Systems capture snapshots of video using a video camera at one location and transmitting the image to video screens at other locations through a separate telephone line. The images can be transmitted in black and white as well as in colour.

4. COMPUTERS

Computer-based systems transmit any images, data or even programs from one site to another. They use a graphics tablet to draw the images on computer screen and it appears on the screens at other locations. In some cases these systems include a digitizing camera that produces an image of anything that is placed in front of the camera on the screens at other locations.

III. VIDEO CONFERENCING:

Video Conferencing allows people at two or more sites to see and talk to each other simultaneously using communication technology. Videoconferencing can also allow sharing of computer applications. Normally videoconferencing requires broadband satellite connections, which can be very expensive. Using “slow scan” or compressed video which reduces the cost by using standard telephone lines to transmit the video. “Slow scan” transmits the picture in 20 to 30 seconds chunks making it as cost- effective as audio conferencing. Compressed video sends messages through the normal telephone lines by compressing the analogue signals into digital signals reducing the cost considerably. As a result of this compression the picture quality of the video images is not as good as the normal television transmission. During 1990s this technology, coupled with ISDN, became more widely available and produced better quality picture using a 128 kbps of data transmission. This technology, also known as video telephony, costs the same as standard telephone calls and with the use of fibre-optic cable makes the video transfer at a higher rate. Video telephony allows individuals and groups of learners to have conversations using their own personal computers.

IV. INSTRUCTIONAL TELEVISION FIXED SERVICE:

Instructional Television Fixed Service (ITFS) technology uses microwave transmission and special antennae to receive the signals. Normally these transmission towers are located on high grounds as the signal can only be transmitted in direct line-of-sight. ITFS originated in 1961 and is a low-cost, low-power, over-the-air distribution system which transmits instructional video over small areas.

V. SATELLITE POINT-TO-MULTIPOINT DELIVERY:

Unlike ITFS, satellite technology is not limited to small geographical area. Satellite technology allows video and audio signals from an uplink located on earth to be bounced to any number of downlink earth stations. The transmission costs do not increase with the number of downlinks. Mid 1970s saw the first use of satellite technology in education. Satellites like INTELSAT, PEACESAT, and ATS have been widely used for educational purposes.

VI. COMPUTER NETWORK:

Networks make the delivery of computerized distance education more easy and effective. Two types of computer networks exist, they are Local Area Networks(LANs) and Wide Area Networks(WANs). LANs are

computers connected through wire or radio circuit while WANs rely on telephone circuits for their connections. Several advantages can be gained from having a network such as resource sharing, reliability through redundancy, decentralization, and providing a powerful communication tools. Communication tools draw most attention from a distance education perspective. Some of the tools that distance education developers used include E-mail, Bulletin Boards, Computer Conferencing, Internet and the World Wide Web (WWW).

VII. E-MAIL:

E-mail is a computer messaging system where a person could send a mail to another. This is an asynchronous mode of communication where messages are left in one person's mailbox without any real-time dialogue. E-mail is used widely in distance education for tutoring purposes making the contact time that much faster.

VIII. BULLETIN BOARDS:

Bulletin boards are based on e-mail where the learners can post anything on it. It can be referred as an e-mail conference. Anything who has access to the bulletin board can post anything on it and it has no order unless someone takes time to organize the material posted on it. Moderated bulletin boards will have editors who determine the content that will be posted on them and can make the communication useful, interesting, long-distance, and ongoing.

IX. COMPUTER CONFERENCING:

Computer conferencing allows the students and teachers to communicate both asynchronously or in real time using computers to deliver a variety of different media. Computer conferencing offers the following features:

- Electronic mail between the participants in the system
- Conferences where the participants can read and write messages
- Sub conferences
- User information of all the participants
- Level of privileges of the participants
- Synchronous communication by means of chat facilities

X. WEB BASED INSTRUCTION:

World Wide Web (WWW) is increasing its role in delivering distance education. Web combines text, audio, video and graphics and also allows interactive audio and video. More and more institutions are engaging themselves in developing and delivering online courses. Several universities in USA are already providing online education where the processes from registration to graduation are all available online. Institutions in the developing world are following suit, for example Indira Gandhi National Open University in India has launched its virtual campus initiative and the World Bank has invested on the use of computer technology to establish an African Virtual University.

EDUCATIONAL TECHNOLOGY AND ITS USES IN EDUCATION & TRAINING:

Educational technology is extensively used in open and distance learning. In addition, blended learning uses different techniques and tools of educational technology. Originally open and distance learning was focused on providing content to the learners. However, with the advent of educational technology more focus is given to the learning than the content.

SOME IMPORTANT TOOLS USED TO ENHANCING LEARNING IN OPEN AND DISTANCE LEARNING:

❖ E-MAIL LIST:

E-mail list or electronic mailing list is the use of e-mail that allows sending information to wider distribution of Internet users. An e-mail list is similar to a traditional mailing list where a publication is sent to a list of members. The names and addresses of the list of members will be kept and when a publication needs to be sent these names and addresses are used. Similarly, in e-mail lists, a publication message is sent to a given set of e-mail addresses. In an e-mail list we will have a set of subscribers. These are the people to whom the publications will be sent. As we subscribe to an e-mail list our e-mail address will be added to the list which will have a reflector. A reflector is a single e-mail address that will act as the gateway to send multiple addresses to the subscribers. We need to send any publications to the reflector e-mail address and it will automatically copy it to all the subscribers. Listserv is the first and one of the most common software used for e-mail lists.

● ONE-WAY E-MAIL LIST:

E-mail lists are used for different purposes in education and training. One way to use e-mail list is to send notices to the students. This will be a one way e-mail list where all the students are subscribed to the e-mail list and the counselor/tutor will be sending the notices to the students. However, the students will not be able to reply to these messages. This is a powerful method of communication for notices, announcements, and newsletters.

● DISCUSSION E-MAIL LIST:

Another way to use e-mail list is for asynchronous discussions. Students and lecturers will be subscribed to the e-mail list and both the students as well as counselor/tutor will be able to send e-mails to the list. Any e-mail sent to the list will be copied to the rest of the group automatically. Hence, the counselor/tutor can start a discussion on a particular topic and the students can add to the discussion by sending their viewpoints. In most cases, it is important for the counselor/ tutor to moderate these e-mails to avoid spam e-mail reaching the list.

❖ DISCUSSION FORUM:

Discussion forum is a system using Internet that is a collection of threads. Forums are similar to bulletin boards where multiple learners can leave their messages. Forums allow us to organize our discussions into different topics and separate them. These are known as threads. In education, discussion forums are used by the lecturers for many purposes. Lecturers define a problem or open a discussion with a question and the students will respond to it. The difference between an e-mail list and a discussion forum is that a discussion forum will show the full discussion within the forum organized in threads.

According to Wikipedia the rules of discussion forum are:

- ✓ No swearing or otherwise vulgar language
- ✓ No insulting or harassing fellow members
- ✓ No advertising or spam
- ✓ No double posting no multiple accounts
- ✓ No links or information on warez or copyright infringing material
- ✓ Do not resurrect dead threads

❖ ONLINE CHAT:

As opposed to e-mail lists and discussion forums, online chat allows the learners to meet others at the same time and discuss issues. Online chat allows the learners to log into a chat system and talk to each other synchronously. Normally for educational purposes online chat needs to use in an organized manner. The counselor/tutor will organize a chat session and inform all the students that a particular chat session will be at a certain time. The students will then have to log on to the chat system during the prescribed time and discuss the issues that were agreed upon. Online chat is widely used for social communication. Some of the most common software used for online chat includes MSN Messenger, Yahoo Messenger, etc. In addition, all the popular learning management system come with a built in chat tool.

❖ BLOG:

BLOG Web LOG is a journal kept on the internet. This journal can be updated daily and may contain all information that the person maintaining the BLOG(Blogger) wishes to share with the world. Also applies to websites dedicated to a particular topic and being updated with the latest news, views and trends. A blog is a website usually maintained by individuals, and as described above, with regular updates or the individual's views and other materials one of the common aspects of a blog is that the entries are displayed in reverse chronological order. Blogs can consist of text, images, other media, and links to websites and other blogs. In addition to the blog content from the individual blogs allow the readers to write their comments allowing interactivity between the blogger and the readers. A blog can be used in education where the teacher can create a blog and students add comments to the blog. In addition, blogs can be a collaborative tool for communication between peers

❖ WIKI:

Wiki is server software that allows a group of users to create and edit web pages using any web browser. Wiki is a collaborative tool where the communication between the users is done through a website which can be edited by a number of authors. In addition, Wikis allow the organization of the content to be edited as well as the content itself. The multiple authoring of wikis is sometimes referred as "open editing". Wikis are used to create collaborative websites for a community of users. One of the largest and most commonly used Wikis is Wikipedia.

ONLINE AND VIRTUAL EDUCATION:

Online learning is where the students learn using Internet and technology without attending face to face classroom sessions. The increased usage of Internet in education has led to the popularity of online learning in the field of open and distance learning. Although some online learning courses involve some classroom participation most of the learning is done online without attending classes. In Online learning the students work with course materials online at their own pace, and use collaborative tools to communicate with rest of the classmates. Virtual education is a form of online learning where instruction is given to the students through a learning environment and the students and the teacher are physically separated from each other. The content of the course is uploaded in to the learning environment and all the communication is also done through the learning environment.

Online learning and virtual education are popular amongst full time working population as it allows flexibility in time and space of learning.

➤ LEARNING MANAGEMENT SYSTEM:

A learning management system is computer software designed for the Internet to manage learning. It allows:

- ✓ management of content within a course,
- ✓ tracking of the students involvement within the course,

- ✓ tracking of the students progress within the course,
- ✓ manage students collaborations, and also
- ✓ manage students progress.

According to Wikipedia a learning management system should:

- ✓ manage users, roles, courses, instructors, and facilitates and generate reports,
- ✓ course calendar,
- ✓ student messaging and notifications,
- ✓ assessment/testing capable of handling student pre/post testing,
- ✓ display scores and transcripts,
- ✓ grading of coursework and roster processing, including wait listing, and also
- ✓ Web based or blended course delivery.

Some common learning management systems include Black Board and MOODLE.

CONCLUSION:

Intensive development of electronics, computers, telecommunications, information technology, ICT and other sciences provide the pedagogical innovation of technology that contributes to the improvement in quality of teaching, motivates student's learning, raising better learning. The use of Internet in education has led many advances in education and training. Internet has opened many doors for open and distance education where the reach and accessibility to the learners have been widened. The advances in online learning and virtual education have led to many developments in education and training. It has made educational institutions a global institutions rather than local or national institutions. Several virtual universities have been set up that go beyond the country's boundaries and several national universities are offering there courses outside their countries with the use of online and virtual education. This is only possible due to emergence of Telematics in education. This technology has proven beneficial in our personal as well as professional life. Multimedia in education has the potential to go beyond the boundaries of interaction and explorative learning. The actors in the education community could establish a 'Virtual Education Space'(VES). In recent years intensively developing didactic materials in the web environment gives the opportunity of better study of certain areas, which corresponds to the individual interests of students and all others who use these teaching materials for formal or informal education.

REFERENCES:

1. Hiltz, S.R. and B. Wellman, "Asynchronous Learning Networks as a Virtual Classroom", Communications of the ACM, 1997
2. Pomales-Garcia& Liu (2006). Web-based distance learning technology: The impacts of web module length and format. The American Journal of Distance Education.
3. Hathaway, W.E.1995.Education and Technology at Crossroad, Choosing a New Direction, Campus Press Inc., North York Canada.
4. Chopra, H.S.2006. Digital Divide: An Indian Scenario. In: Proceeding of the 2nd ICDL, 5-8 Dec2006,New Delhi, pp.232-239.
5. Tomei, L. 2007. Integrating Information and communication technologies into the classroom. Information Science Publishing.
6. National Mission on Education through Information and Communication Technology, Mission Document.
7. Mohanty, J., 1992. Educational Technology, Deep and Deep Publication, Delhi.
8. Introduction to Information Technology, 1st Edition, 2007, Pearson Education.
9. [http:// www.2learn.ca/teachertools/](http://www.2learn.ca/teachertools/)
10. [http:// en.wikipedia.org/wiki/Managed-learning-environment](http://en.wikipedia.org/wiki/Managed-learning-environment)
11. Indira Gandhi National Open University.2009.IGNOU Profile 2009.New Delhi: IGNOU.