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## **Impact of digital technology on education**

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### **Abstract**

Traditionally education is centred on sources such as schools, teachers and print media. The learners reached the information sources by enrolling with schools, teachers and libraries. Prior to the digital era, information was not accessible by the majority of people, and even those accessed were unable to obtain current information with respect to today's context. The modern society wants to know the information as it happens and when it happens, and the world is moving from an information society to a knowledge society. Thus education is given the highest priority and brainpower is becoming the most valuable asset of an organisation.

Advances in digital technology have opened up many avenues of learning. Technology has made information accessible / transmittable from anywhere and by / to all groups of people. Education has reached most parts of the world and ICT has become an integral part of human life.

This paper describes the process of generation, creation and acquisition of knowledge through the technology. The use of ICT to manage and organize explicit knowledge is highlighted. The paper also describes how technology is used to access and apply such knowledge. The paper relates how these technologies have been used in education and its impact in general. Using examples the paper highlights some of the changes that has taken place in the Indian education sector.

**Keywords:** digital technology, education

### **Introduction**

#### **Supporting technologies and applications**

There are a number of technology components available to built knowledge management systems. Local area networks, Internet and throughout their entire life cycle, from creation to eventual archiving. Its functions include document creation, storage and retrieval, management, version control, workflow and multiple-delivery formats.

EDMS allows managing the documentation of an entire process. With respect to education this task is achieved through an enhanced and more effective process called e-learning. Although some organisation in Indian uses systems for their daily activities, most are not looking at these possibilities. When considering educational institutes in Indian the use of e-learning has been around for the last two decades. The external degree programme of School of University Computing has allowed private institutes to expose their students to e-learning

#### **Media for Explicit Knowledge**

Explicit knowledge could be represented using different media. Text, graphics, animation, sound and video are the media to represent them. Unlike the traditional media in forms of books information stored digitally can be preserved without any forms of distortion and they can be accessed easily and quickly from any part of the world.

#### **Internet**

Internet provides a cost effective global network backbone. It connects users from anywhere, as long as they have access to the web. This has allowed users to host information on their

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computers and make them available for others. Such computers need to be dedicated for that purpose as users will be searching for information at different times. These sites are called web sites and they are connected to the web on 7x24. This technology intends to provide unrestricted access to information. An educational institute will publish all information relevant to the public through their web sites. This technology has made information accessible as it happens and people access them at any time they want to do so.

### **Search Engines**

Search Engines are very effective powerful tools that allow text based information retrieval. Web based search engines deploy different types of navigation strategies. Meta searching, hierarchical searching, attribute searching and content searching are among them. This facility is now widely used by most users of the Internet. This has helped researchers, teachers and students to reach the required information and acquire the knowledge.

### **Sharing Knowledge**

Knowledge sharing is done among a network of people. Communication among people could be done through paper mail, fax and telephone. However these techniques are synchronous and less effective across geographical boundaries. IT provides more effective solutions through the use of e-mail, video conferencing, virtual meeting, and document collaboration<sup>[1, 2]</sup>. Combined use of knowledge sharing techniques will allow reaching them beyond geographical boundaries and performing businesses and services more effectively.

### **E-mail**

E-mail allows sharing knowledge asynchronously. An individual could share knowledge with a community by sending a message to a group of people. Distribution list eliminate the need for everyone to remember the names of the community and also ensure everyone gets the message. Creating student groups, teachers and well as students share knowledge and this is practised to some extent in Indian as well. At UCSC we use distribution lists to communicate with current and past students.

### **Video Conferencing**

Telephone allowed voice communication among distant personnel. This has evolved not only to view a live video of the person but also to connect to a number of people. Although the technology is costly it is been used for scheduled meetings involving people internationally. Universities having campuses spread over a larger geographical locations have their staff meetings through such technology. This saves travel time of individual. If the time saved and it is used effectively the organisation and society will benefit in the long run.

### **Virtual Meeting**

Virtual meetings allow people from different locations connect with each other to conduct meetings and share knowledge as if everyone were in the same room. Applications such as presentation graphics, spreadsheets and word processing can be shared in real time. Such activities are being used in Indian and the extent of it varies among users.

### **Document Collaboration**

Document collaboration lets team members' work together with many other participants with documents or information in real time. Everyone can manage and use information in real time. Documents in digitised form can be transmitted to a remote place in the exact form and reproduced any number of times. Digital information leads to tremendous saving of space, time and maintenance, while providing easy access, storage, management and retrieval of information. Chances of non-availability, losing or misplacing of documents is rare and documents that fall under this category are accessible even after many years of isolation.

### **Changes taken placed**

Availability of vast amount of information on the web has provided access to all types of learning material. The teacher's lecture notes are no longer the primary focus of a learning process, and the teacher's role and the student's learning process is changing.

### **Classroom Level**

Use of technology at classroom level was not possible until the teachers delivery mechanisms were aided with technology. Originally delivery mechanism was through verbal communication and then through the introduction of written media such as blackboards. Later through overhead projectors teachers were able to do the writing in advance and project them directly. Use of overhead transparencies allowed them to reuse written material but without improving them. With the invention of projection through a computer, a teacher can easily update his material as well. The same material can also be printed and the students are able to obtain it without having to copy them. This technology has now evolved not only to project text and figures, but also animations, video clips etc. Thus the teachers are now equipped with tools to teach effectively.

### **Teacher's Role**

In the modern global learning environment teacher's role shifts from "dispenser of information" to "facilitator of learning" as he has only to guide the active students who are involved in using the e-learning material. Classrooms have been fully equipped with permanent multimedia projectors and computers and the facilitator needs to access the e-learning system through the Intranet. Teachers should not control the learning process as well as they should allow students to perform collaborative work and make some decisions on their own.

The changes that are happening in teaching and learning were discussed in with the aid of two case studies. The key technologies and practices of e-learning at University of Western Sydney were highlighted there and it was compared with the activities of the external degrees program at UCSC.

### **Student's Role**

Some classrooms are equipped with computer access to all students. In such cases students interactively participate in the learning process. Now the student's focus is totally on the learning process than on copying note as the learning material can be accessed at a future time. Teachers should ensure that knowledge and skills are not presented to students directly, but are constructed by them in response to information and learning tasks. Teachers need to consider how these learning experiences could be encouraging to

students who are performing this type of mental work. Thus student who used to learn facts and skills by absorbing the content presented by teachers and media resources should move towards creating personal knowledge by acting on content provided by teachers, media resources, and personal experiences. The focus should be on acquiring higher order skills like problem solving and critical thinking.

### **Curriculum Characteristics**

In order to change the teacher's and student's role the curriculum also needs to be revised. Traditional curriculum would focus on fragmented knowledge and disciplinary separation. However now we should focus on multidisciplinary themes as future generation will need the ability to move through several different jobs. Thus establishment of basic literacy and focusing heavily on job specific skills is pointless, as one has to change jobs or manage many jobs by themselves. Therefore it is important to emphasise on thinking skills, knowledge integration and application. Depth of understanding will be required than breath of knowledge.

### **Assessments**

With changes to the learning process the assessment methods should also change. Instead of measuring a student on fact knowledge and discrete skills, assessments should focus on application of knowledge. This will allow testing of problem solving skills of a student. Students should also be given tasks to demonstrate understanding and creativity.

### **Language Barriers**

Most Indian learner's first language is not English. Hence some find it difficult grasp the concepts through reading. Hence there is a need for supplementary material in native languages. This could be supported through Unicode. Learning computing has now been introduced at schools as well. Currently it is targeted only at advanced level students. However with time this facility should be available for students at the ordinary level like in the western countries.

### **Society**

Using computers for public services is gradually wide spreading. Although these benefits are currently enjoyed by a small fraction of the population the availability will encourage others to join and enjoy the benefits of technology. For example, some banks have moved towards providing most of their services through the web. This includes managing their accounts, placing standing orders and settlement of bills. This allows the customer to make a virtual visit to his bank at anytime he wish and obtain the required service. Other services such as withdrawing cash, depositing cheques etc. can be done through the teller machines which are also accessible at anytime. Wireless local area networks allow users to access shared information without looking for a place to plug in their laptops. This technology is being made available in some public places and Organisations. Educational centres such as Universities and Libraries should have such facilities, as future generation will be carrying mobile equipment to access facilities. Information users now carry their laptops, PDA, smart phones, CDs, thumb drives with them for fast and precise access to their day to day material. A public library is a knowledge centre. To provide services through technology it should not only allow members to view

available books, but should also allow viewing of content pages and abstracts. In the case of research papers the facility to download papers, journals and thesis is provided. User must also have a facility to interact with the librarian, suggest procurements, interact with publishers, receive alters on outstanding books, late fees and collection of books reserved.

### **Infrastructure Facilities**

Educators confront with the issue of equity when they consider introducing technology to learn. To develop a country and provide everybody equal facilities is impossible with the existing free education system and the policy implementation processors. Trying to solve the equity problem and introduce technology at classroom level will result in the country going backward compared to others as well as encourage migration as people are always looking for better learning opportunities and living standards. Every student must have computer access to successfully implement above ideas. Thus student to computer ration must increase. It is recommended that all education institutions must have computers with a minimum ratio of 1:5 with those teaching computing with a minimum ratio of 1:3. All teachers must be provided with unlimited computer access so that they could prepare their educational material. Word processing is the most frequently reported application. The most frequently mentioned categories of use are word processing, Internet research, and CD-ROM research. Thus the percentage of schools with Internet access needs to be raised and ultimately all users should have access to the Internet. Lower Internet bandwidth and high usage cost is a bottleneck. The education system has been producing graduates without any exposure to computers. When these graduates take teaching assignments they are not equipped to use technology for education. Technology and educational reforms has to be done taking these into consideration.

### **Conclusion**

Over the last five years computers have been introduced to most educational institutes although its ratio to a student is very high. By making the educators aware of the available technology and some taking initiatives to implement them, some forms of reforms may take place. Whatever Indian do with respect technology requirements the world will be flooded with information and some people will use them effectively. They would be the people who have developed their skills to the level of finding problem-relevant information and interpreting and applying them in solving of problems.

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