EFFICIENCY IN HIGHER EDUCATION

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Prof. Dr. Mrs. Chandrakantha Jeyabalan

FOREWORD

'The discovery of agriculture feeds the hunger of mankind; the discovery of Education feeds knowledge of mankind'. Agriculture and Education are the two Ferris-wheels that keep the magnum mankind smooth sail and co-live with amity and amicability. Of these binary wheels, it is the education that boasts the upper hand and leads the cart for the today's society is governed by knowledge and so it is often said 'we are living a knowledge society; knowledge is power; knowledge is strength'.

We are living a digital knowledge era and the competing and competitive struggle for the survival of the fittest, beyond doubt the winner is the one who lifts the crowns of knowledge and s/he will stand atop with prides and smiles on the victory stand. The success and failure, the win and fall, the prosperity and darkness of the modern society at the macro-level and the individual at the micro-level depends on the seeds, roots, growth, blossoming and fruits of education and in short it rightly said 'Education is life' and 'Without education, there is no life'. Education is a continuum that meets not the end; an ever-revolving earth and its facets, stages and levels are many; it is sowed at the primary school, nurtured at the high school, and prepared for life-fruit at the higher education level.

Higher education is vital and of greater importance for it decides the rest of life and the prosperity of the nation. If we say the success of a nation depends on the higher education and its successful applications to solve the problems of the nations, it is not a faux-brick wall, rather true in all its aspects. Thus the stakeholders of higher education at all levels and all those who are engaged in education, direct and indirect, are shouldered with an inescapable responsibility of to uphold the quality of education and it is our moral and social commitment and duty, that we move towards this vision and mission of 'Quality Education' by our personal and collective efforts and tasks.

It is for this embedded and valued rationale, this two-day International Conference on 'Enhancing Excellence, Equity and Efficiency in Higher Education' is organized by our Tamil Nadu Open University on 7th and 8th November 2014. It is a moment of pride and felicity. I do appreciate all those who have toiled night and day for the success of this international conference and those who have brought this beautiful book at the right time with ISBN. I congratulate all the recourse personnel, delegates and participants for your enthused participation and co-operation.

Date: 21.10.2014 **Prof. Dr. Mrs. Chandrakantha Jeyabalan**

EDITORIAL

"A society full of love, non violence, truth and justice; only in such society one can completely develop his/her potential and spiritual development" says Mahatma Gandhi. This envisaged vision to developing the individual's potential and spiritual development, which is vital for universal and personal harmonious and self-fulfilled living, could become a reality only through education. When we say through education, it depends on the type of education and the quality of education imparted from primary to higher education. The mantra of winning over the neck-to-neck competitive world is nothing but to enhance the quality in the acquired knowledge, nurtured values and developed skills, and anyone who is of quality or who fulfills the pre-determined quality parameters is at the better half of winning the game.

Higher Education, the much emphasized sector in these recent days, is at a compulsive and obligatory state of upgrading its quality to face the challenges due to the already-arrived concepts of LPG. The monopoly of Indian higher education that has been enjoyed in the yester years would be a mirage in the upcoming years and to survive and to thrive upon, all the higher education institutions of teaching-and-learning have to plough through and sow the seeds of quality that has to bloom and bear quality fruits.

To do something positive over the fathomed cognitions and to move a step ahead in this benign direction, Tamil Nadu Open University (TNOU) has organized a relevant, timely, meaningful and value-added a two-day international conference on 'Enhancing Excellence, Equity and Efficiency in Higher Education' on 7th and 8th November 2014. The prime objective is to provide a platform for the educationists, teachers and research-scholars at different levels from all over the state, nation and the globe to interact, to exchange thoughts and deliberations and to strengthen the professional bond to working together for excellence, equity and efficiency in education.

The response to this call for the international conference is overwhelming and it straightens our nerves and twists our muscles to work harder not only in this seminar but in all our efforts. More than 300 papers are received

and they are compiled, classified, edited and published meticulously in three books with ISBN, namely Excellence in Higher Education, Equity in Higher Education and Efficiency in Higher Education, covering the related sub-themes. We are happy that the Editorial team and the peer-reviewing committee have toiled so much that these books are on time in your hands. We thank sincerely all the good hearts that worked for us and specially the APH Publishers.

Dr. C. Barathi
Dr. P. Pandia Vadivu
Dr. A. S. Arul Lawrence

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ABOUT THE BOOK

Efficiency in Higher Education is a sub-system within the total education system in a country. Higher Education contributes a major role in the national development, enriching the human potential. At the same time, climbing on the pinnacles of higher education and enjoying its benefit is not an easy task to achieve for a large number of people in the country. The objectives of the national education system is the attainment of competency of large majority of the people, appropriate skills and desirable attitude that ensures establishment of a viable socio-economic base for consolidating national freedom and advancement in the quickly progressing world. Hence, the issue of excellence, equity and efficiency assume great importance in higher education. Higher education worldwide is in a period of transition, affected by globalization, the advent of mass access, changing relationships between the university and the state, and the new technologies, among others. Global Perspectives on Higher Education provides cogent analysis and comparative perspectives on these and other central issues affecting postsecondary education worldwide. A good higher education system is required for overall development of a nation. A remarkable growth in the higher education sector had made the administration of higher education institutions intricate. Many researches reveal that the integration of technologies helps to reduce the intricacy and enhance the overall efficiency and effectiveness of higher education.

Effectiveness, relate mainly to the relevance of higher education to the labour market. Efficiency, concerned mainly with quality and throughputs. Efficiency as the functional aspect which is defined as obtaining the maximum possible performance for any given expenditure of resources. An education system may be called efficient what it attains the maximum level of results for a minimum level of investment. Investments and results in this context must be evaluated, aggregated, measured, and marked. Efficiency has been perceived and measured in different yardsticks. The efficiency of the higher education depends on the efficiency of the higher educational institutions. Excellence, equity and efficiency are interlinked

and go hand-in-hand to the extent that one affects the other, in its positivity and negativity. In the present education system, there are so many reasons challenging and thwarting this smooth-sailing process.

This book offers an international and comparative view on efficiency in higher education, ranging from policies to practices, mainly based on research results and empirical evidence, aiming at questioning the concept and its uses which are not only social constructions but also political ones. Far from being a neutral or technical concept, efficiency is heavily infused with values which must be traced, analysed and made critical to understand its impacts, backlashes and unintended outcomes on higher education systems, institutions, academics and students. The book is addressed to an international audience and in particular to higher education scholars and professionals. Those who are involved in higher education assessment, members of professional bodies and organizations in the higher education field, students in education, but also policy makers and the public opinion at large will profit from the works of a selected group of scholars coming from a variety of countries. A sense of disquietude seems ever present when discussing new digital practices. The transformations incurred through these can be profound, troublesome in nature and far-reaching.

Dr. C. Barathi
Dr. P. Pandia Vadivu
Dr. A. S. Arul Lawrence

Chapter 1

E-LEARNING AND ITS IMPACT IN HIGHER EDUCATION

T. A. Anbazhaugan*

INTRODUCTION

E-Learning is a hot topic in higher education and has been growing as a popular topic since the inception of the first web based courses in the mid to late 1990's. However defining e-Learning is an exercise in frustration for many. There is disagreement as to whether e-Learning encompasses online learning, distance learning, hybrid learning, blended learning, all of the above or not necessarily any of the above, and even these terms which are said to constitute e-learning, are difficult to define.

TYPES OF E-LEARNING

E-Learning can be divided into several different types.

Internet

It is the world's biggest network. Users can connect to the Internet via direct connections, online information services, and Internet service providers. Its features include e-mail, mailing lists, Telnet, World Wide Web, file transfer, vast information resources, interest group membership, interactive collaboration, multimedia display, real time broadcasting, breaking news, shopping opportunities and much more. Internet is an international network connecting approximately 1, 40,000 smaller networks in more than 200 countries. Computers on the internet use client/server architecture. This means that the remote server machine provides files and services to the user's local client machine

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E-Mail

The main attraction of the Internet is electronic mail otherwise called as e - mail. E-mail links computers by wired or wireless connection and allows users via electronic mailboxes to send and receive messages. E-mail is the most frequently used service on the internet for many reasons. One can send a message anytime, anywhere and the recipient can read it at his or her convenience. One can send the same message to several people at the same time. One can forward information to co-workers without retyping it. E-mail is fast, usually taking not more than a few minutes. An Internet e-mail address looks like this 'user name @ domain name'. E-mail is sent and received through electronic "post offices" known as mail servers. Once you enter the address of the recipient, compose your message and click send, your email software handles the delivery.

Usenet Newsgroup

Usenet Newsgroups are electronic discussion groups that focus on a specific topic. Mailing lists are a combination of e-mail and newsgroups. Mailing lists are also called as list servers. It allows anyone to subscribe to an e-mail mailing list on a particular subject or subjects or most messages.

Telnet

Telnet is a programmed that allows one to log into computers on the Internet and use online databases, library catalogues, chart services. Telnet is a terminal protocol that allows one to connect to remote computers.

World Wide Web

World Wide Web consists of interconnected system of sites or servers, all over the world that can store information in multimedia forms, sounds, phones and video as well as text. The sites share a form consisting of a hypertext series of links that connect one's words and phrases.

Electronic Data Interchange

Electronic organization of data interchange is the direct electronic exchange business between organizations, computer systems of standard business documents such as purchase orders and shopping documents.

Electronic data interchange is the direct electronic exchange of standard business documents between organizations and computer systems.

Voice mail

Voice mail digitizes incoming voice messages and stores them in the recipient's voice mailbox in digitized form. It then converts the digitized versions back to voice messages when they are retrieved.

Intranet

An Intranet is a private network that is contained within an enterprise. Typically an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences. Companies can send messages which are private through the public network using the public network with special encryptions, decryptions and other security safeguards to connect one part of the intranet to another

APPROACHES TO E-LEARNING

Computer-Based Learning: CBL is the use of computers as a key component of the educational environment. While this can include the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes.

Computer Based Trainings are self-paced learning activities accessible via a computer or handheld device. CBTs typically present content in a linear fashion, much like reading an online books or manual. For this reason they are often used to teach static processes, such as using software or completing mathematical equations. The term computer-based training is often used interchangeably with web-based training (WBT) with the primary difference being the deliver method. Where CBTs are typically delivered via CD-ROM, WBTs are delivered via the internet using a web browser. CBTs can be a good alternative to printed learning materials since rich media, including videos or animations, can easily be embedded to enhance the learning. Another advantage to CBTs is that they can be easily distributed to a wide audience at a relatively low cost once the initial development is completed.

Computer-Supported Collaborative Learning (CSCL) is one of the most promising innovations to improve teaching and learning with the help of modern information and communication technology. Most recent developments in CSCL have been called E-Learning, but the concept of collaborative or group learning whereby instructional methods are designed

to encourage or require students to work together on learning tasks has existed much longer. It is widely agreed to distinguish learning from the traditional "direct transfer" model in which the instructor is assumed to be the distributor of knowledge and skills, which is often given the neologism E-Learning.

Technology Enhanced learning (TEL) has the goal to provide socio-technical innovations, and also improving efficiency and cost Effectiveness for e-learning practices, regarding individuals and organizations, independent of time, place and pace. The field of TEL therefore applies to the support of any learning activity through technology.

COMMUNICATION TECHNOLOGIES USED IN E-LEARNING

Communication technologies are generally categorized as asynchronous and synchronous.

ASYNCHRONOUS FORMAT (DIRECTED STUDY FORMAT)

In Asynchronous format learners rely on some structured plan that directs the learner through learning experiences without real-time interaction from an instructor. Self-study may be supplemented by asynchronous interaction with the instructor, for instance through email, voice mail, comments from threaded discussions. The majority of today's 'online learning' is in the 'directed study' format. 'Self-study' requires the learner to have a highly developed internal self-motivation characteristic. Failure to have such internal drive leads to higher dropout rate of correspondence learner compared to traditional residential learners on most campuses.

Synchronous Format ('Live, Real-time' Learning)

In Synchronous format learners rely on the instructor. Hence, some commonly shared experience or event, generally occurring in real-time with highly interactive and structurally dynamic, is led by the instructor. Instructor-led events have the capability to dynamically react to real-time environments and change the plan of study or flow of learning to meet the needs of learners at that particular time. This engagement style helps sustain learner interest and probably contributes to reduction of dropout rate.

Learning management system and learning content management system is software used for delivering tracking the managing training education. LMSs range from systems for managing training educational records to software for author content courses, reusable content object.

Computer-aided assessment ranging from automated multiple-choice tests to more sophisticated systems is becoming increasingly common. With some systems, feedback, can be geared towards a student's specific mistakes on the computer can navigate the student through a series of questions adapting as what the student appears to have learned or not learned.

E-LEARNING IMPROVE THE QUALITY OF HIGHER EDUCATION

E-Learning can also be seen as a promising way for improving the quality of higher education and effectiveness of learning. It can give increased flexibility of learning experience to student, enhances access to information resources for more students; the potential to drive innovative and effective ways of learning and teaching at very low marginal cost among the teachers and learners. E – Learning could also lead to the enhancement of quality in higher education by leading to innovative pedagogical methods, new ways of learning and interacting by the easy sharing of the new practices among learners and teachers communities, as well as by more transparency and easier comparison and cross fertilization of materials and methods.

CONCLUSION

The e-learning system not only provides learning objectives, but also evaluates the progress of the student and credit can be earned towards higher learning institutions. The Internet allows for learning to be directed at one's current objectives. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching. Luskin says that the "e" should be interpreted to mean exciting, energetic, enthusiastic, emotional, extended, excellent, and educational in addition to "electronic" that is a traditional national interpretation. This broader interpretation allows for 21st century applications and brings learning and media psychology into the equation. Hence, the students no longer want to just learn about but want to learn to be, by constructing content instead of absorbing. Students require interactivity and using modern technologies like e-learning, M-learning, virtual learning and web learning as a teaching device allows this interactivity to occur. With the emergence Social networking, blogging, and You Tube, students expect to be able to utilize modern technology on the fly to connect everything.

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Chapter 2

GOOGLE APPS FOR MODERN EDUCATION

Ani Vadakke Purayil*

INTRODUCTION

Google Apps for Education is a suite of free, secure tools that includes Gmail, Calendar, Sites & Documents. Use it for collaboration and communication no matter where you are or which device you're using. Over 30 million students, faculty, and staff in schools around the world have gone Google with Google Apps for Education. Google Apps for Education includes dozens of critical security features specifically designed to keep the data safe, secure and in your control. **Your data belongs to you,** and Apps tools enable you to control it, including who you share it with and how you share it, Everything is backed up, You own and control your data, Increased security and reliability, Strong encryption and authentication, Our team is constantly improving your security and Your privacy is respected.

With Google Apps for Education, everything is automatically saved in the cloud - 100% powered by the web. This means that emails, documents, calendar and sites can be accessed - and edited - on almost any mobile device or tablet. Anytime, anywhere on your Android, iPhone , Blackberry, Windows Phone, or on any phone with a browser bring students, teachers and teams together. Fast, easy collaboration is what makes Google Apps unique. The website and document creation tools offer real-time editing, powerful sharing controls, and seamless compatibility – an ideal environment for learning in the 21st century.

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Google Apps for Education can help streamline academic tasks like essay writing and class scheduling. A group of students can work together on a piece of work in Google Docs, seeing changes in real time rather than waiting for versions to be sent via email. Students can see exactly when their professors are available and vice versa with Google Calendar. By removing these time-consuming bottlenecks, Apps frees you up to spend more time on learning and teaching. Spend less time managing IT infrastructure. The students, teachers and administrators always have access to the latest software, including the newest features and security updates. You don't need to buy or maintain servers and everything can be managed from a single interface. And yes, it really is free. Google Apps helps reduce both organization's overall expenses and its environmental impact. Apps are powered by Google's energy-efficient data centers, so it's less energy and carbon- intensive than on-premise servers. Google Apps provide the following tools that the students want

GMAIL

More than email it offers: Use the email address that matches your school's name and web address: you@yourschool.edu. You can also pick your own colors and logos to suit your institution.

Email on the go: Gmail works natively on popular mobile phones such as Android, iPhone, BlackBerry, and Windows Phone and can send and receive email from any device with a web browser.

Space for everything and no ads: Google Apps for Education comes with up to 30GB of email storage for every user. And students and faculty will not see adverts. Not one.

Offline support: The Offline Google Mail app for Chrome lets users read and write email without an internet connection. Drafted messages are sent next time there is an Internet connection. Get your day started on the train before you even arrive in school.

Designed for security and reliability: Gmail is designed for security and reliability with features like two-step authentication, attachment viewing in the browser, encrypted connections to Google's servers, simultaneous replicated storage for your email, built-in disaster recovery, spam filtering and sender authentication

Work fast, save time: Gmail is designed to make everyone more productive. Up to 30GB of storage means no need to delete anything, powerful search means everything is in each reach, and labels and filters help your users stay organized. Gmail is securely powered by the web, so

students and faculty can be productive at home, on the road, or on their mobile devices.

Connect with people, according to your rules: The inbox isn't just about messages, it's about people too. Text, voice, and video chat mean that students and teachers can see who is online and connect instantly. Don't want your students using chat? Want to limit who can send emails to whom? It's all in the administrator's control.

CALENDAR

Help your students and faculty organize their time. Shared calendars make it easy to see when students/colleagues are free. Creating a new event is as easy as typing a sentence. When you're having trouble scheduling a meeting or class, Calendar can suggest a time that works for everyone.

Easily schedule lessons and meetings: Overlay multiple calendars to see when people are available - a great way to manage staff schedules, for example. Google Calendar sends invitations and manages RSVPs.

Integrated with your school's email: Google Calendar is integrated into Gmail and interoperable with popular calendar applications.

Share with classes, teams and clubs: Calendars can be shared school-wide or with select colleagues. A range of sharing permission controls help maintain security and privacy.

DRIVE

Store everything, share anything. All your files are accessible from any web browser. Students can work together to create beautiful documents and work together on the same doc at the same time. Share lists, track projects and analyze data with powerful spreadsheet care great for school administration.

Access your files anywhere: Google Drive on your Mac, PC, Android or iOS device gives you a single place for up-to-date versions of your files from anywhere.

Bring your files to life: Share individual files or whole folders with specific people or your entire team or even contractors, partners and constituents. Create and reply to comments on files to get feedback or add ideas.

Store everything for next to nothing: Get started with up to 30GB of free space for each user. Need more? Starting at $5/user/month for 100GB, your IT team can provide up to 16TB per user.

DOCS

Create rich documents with images, tables, equations, drawings, links and more. Gather input and manage feedback with social commenting.

SHEETS

Keep and share lists, track projects, analyze data and track results with our powerful spreadsheet editor. Use tools like advanced formulas, embedded charts, filters and pivot tables to get new perspectives on your data.

SLIDES

Create beautiful slides with our presentation editor, which supports things like embedded videos, animations and dynamic slide transitions. Publish your presentations on the web so anyone can view them, or share them privately.

SITES

Shared workspaces for classes, faculties and clubs. Build custom project sites that include videos, calendars, documents and more. Great for e- portfolios, Building a project site is as easy as writing a document, no coding skills required. Share your project sites with the right people, inside and outside your company.

Easy to build: Students can build project sites without writing a single line of code. It's as easy as writing a document. And, to save even more time, you can provide them with hundreds of pre-built templates.

System and site-level security controls: Administrators can manage site sharing permissions across the school, and authors can share and revoke file access at any time.

Works across operating systems: Google Sites works in the browser on PC, Mac and Linux computers. Teachers, students, and parents don't need buy or download software.

VAULT

Add archiving and e-discovery to Google Apps for Education. Vault is optional and adds archiving, e-discovery and information governance capabilities. Google Apps Vault helps protect your school from legal risks. Search the archive for relevant email and chat messages. Preserve messages beyond their standard retention periods.Export messages for further review and analysis.

CLASSROOM

Classroom is a new tool coming to Google Apps for Education. Classroom weaves together Google Docs, Drive and Gmail to help teachers create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease. Classroom is available to anyone with Google Apps for Education, a free suite of productivity tools including Gmail, Drive and Docs. Classroom is designed to help teachers create and collect assignments paperless, including time-saving features like the ability to automatically make a copy of a Google Document for each student. It also creates Drive folders for each assignment and for each student to help keep everyone organized. Students can keep track of what's due on the Assignments page and begin working with just a click. Teachers can quickly see who has or hasn't completed the work, and provide direct, real-time feedback and grades right in Classroom.

BENEFITS FOR CLASSES

Easy to set up: Teachers can add students directly or share a code with their class to join. It takes just minutes to set up.

Saves time: The simple, paperless assignment workflow allows teachers to create, review, and grade assignments quickly, all in one place.

Improves organization: Students can see all of their assignments on an assignments page, and all class materials are automatically filed into folders in Google Drive.

Enhances communication: Classroom allows teachers to send announcements and start class discussions instantly. Students can share resources with each other or provide answers to questions on the stream.

Affordable and secure: Like the rest of our Google Apps for Education services, Classroom contains no ads, never uses your content or student data for advertising purposes, and is free for schools.

CONCLUSION

Google Apps for Education help students and faculty organize their time. Google Apps for Education can help streamline academic tasks like essay writing and class scheduling. A group of students can work together on a piece of work in Google Docs, seeing changes in real time rather than waiting for versions to be sent via email. Students can see exactly when their professors are available and vice versa with Google Calendar. By removing these time-consuming bottlenecks, Apps frees you up to spend more time on learning and teaching. Spend less time managing your

IT infrastructure. Google Apps for Education is one of most prominent education technology to make education more easy and comfortable.

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Chapter 3

COMPUTER LITERACY OF RURAL WOMEN TEACHER TRAINEES

D. Antoney Sujatha*

ABSTRACT

For the modern day's women teacher trainees computer literacy is central to her own learning as well as for her own future job profile. Lack of computer literacy can seriously hamper her own growth as well as the growth of teaching and learning environment. However, there are socio-economic and cultural issues that prevent groups of people from acquiring this much needed teaching and learning tool. This paper aims to discuss the role and impact that information technology (IT) has on the existing and future style of learning and teaching. The focus is put on certain areas related to Computer such as Basic knowledge about computer usage, Internet literacy, Mobile Net usage, Hardware literacy and multimedia literacy of B.Ed women trainees in rural areas. The computer literacy level of the rural women B.Ed trainees seem to be very low according to the interpretation of this study. Suggestions were given to improve the prevailing status. In summary, this paper delivers a message that computer literacy is the key to today's empowerment of rural women and that educating them is the best foundation for it.

Keywords: *Computer literacy, Internet l, Hardware, Multimedia.*

INTRODUCTION

Computer Literacy among teacher trainees is often perceived as a catalyst for change; change in teaching styles, change in learning approaches and change in accessing information. It is obvious, that usage of computers have emphatically demonstrated that they offer great opportunities for

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teachers and students in various disciplines. Use of computers in our day to day life has changed our conventional ways of teaching and learning and has opened up the flood gates of knowledge in an unimaginable manner. The use of computers enable teachers to access the necessary information on learning instruction materials through the internet and deploy diverse methods in delivering content. The shift from teacher-centred education to learner-centred education has brought to the centre stage the use of ICT (Information and Communication Technology). As the world continues to revolve around technology, teachers need to continue incorporating these new technologies into their teaching. With the increased use of information and communication technologies in education, students entering teacher training institutes need basic computer skills.

RATIONALE OF THE STUDY

The use of computers is reflected in many areas of human activities today, such as medicine, engineering, architecture, and education. It is imperative to note that the use of computers is central in the school education programs also. However, use of computers in the educational sector necessitates that all the stakeholders in the field of education to be computer literate. This becomes all the more relevant if the present day schools are to cope with the challenges of the emerging information age. For the education to be effective and complete, computer literacy should be demonstrated through computer availability, computer utilization, and content competencies in the teacher education colleges. Computers play a vital role in enhancing the Teachers' effectiveness in the areas of record keeping, supporting student academic performance, teachers job performance, school discipline, and community services. Hence computer literacy for the teacher trainees has become quite significant. Keeping this in mind the researcher is investigating as to know how far the rural women teacher trainees have trained themselves in computer literacy to face this techno-challenge which is posed ahead to them.

REVIEW OF LITERATURE

Review of existing literature showed that computer literacy (Furst-Bowe, 2005) among undergraduate students showed considerable variations. In Nigeria, these variations were viewed from the gender perspective, socio-cultural settings, economic status of parents, and the environment with which the student was brought up. Idowu (2004) noted that traditionally, girls tend to be interested in computers, but use them less often in their spare time

but they have more negative attitude towards computer. Okebukola (2003) further stated that girls are often less computer literate than boys. These studies highlighted that there are socio-Economic and cultural issues that determined the quantum as well as quality of access rural women students had to computers. This situation is widely prevalent in Indian context too. Rural women from economically poorer backgrounds have very limited access to computers. This being the ground reality, for women teacher trainee's computer literacy remains a major challenge.

AIMS OF THE STUDY

The main objectives of the study are

1. To identify the level of basic computer knowledge possessed by the B.Ed rural women trainees.
2. To highlight the various IT skills acquired by the students.
3. To offer suggestions in enhancing computer literacy among rural women teacher trainees.

METHODOLOGY

The researcher has adopted a survey method for the present study. A questionnaire was designed and administered to a sample of hundred students in order to assess the computer literacy level of teacher trainee students. The survey method was complemented through observation of the women B.Ed students on their basic computer knowledge. Focus Group discussions were also conducted to elucidate qualitative information from among the trainees. Hence, the response rate of the study was 100 percent. Data were analyzed by using statistical techniques and results were represented with the help of tables and different figures.

A questionnaire was devised with 30 statements divided into five dimensions such as 1) Basic Computer literacy 2) Internet Literacy 3) Multimedia literacy 4) Hardware literacy and 5) Mobile Net literacy, and administered to 100 girl students coming from different blocks and villages. This is a 3 point scale with options like confident/ to some extent /Not at all. All the items are positive items. Each statement was given 3 for 'confident', 2 for 'to some extent' and 1 point for 'not at all' according to the choice of their responses.

A stratified random sampling technique was used to select 100 women teacher trainees from few blocks of villages in and around Thiruvannamalai District.

DATA ANALYSIS AND RESULTS

Data Analysis was done to interpret the results. Percent analysis was done to find out the level of computer literacy, internet literacy, multimedia literacy, hardware literacy and mobile internet literacy of the rural women B.Ed trainees in and around the villages of Thiruvannamalai District. The tables showing the results and their interpretation are as follows.

Table Showing The Basic Computer Literacy Level Of Rural Women B.Ed Trainees

Sl. No	Category	Percentage	Level
1.	Confident	31	Average
2.	To Some Extent	36	Average
3.	Not At All	33	Average
		100	

- 31% of the rural women B.Ed trainees are confident in their basic computer literacy knowledge which shows their computer literacy is average.
- 36% of rural women B.Ed trainees have some knowledge which shows their level of computer literacy to be average.

Table Showing The Internet Literacy Level Of Rural Women B.Ed Trainees

Sl. No.	Category	Percentage	Level
1.	Confident	20	Low
2.	To Some Extent	31	Average
3.	Not At All	49	Average
		100	

49% of the women B.Ed trainees are totally ignorant about the internet literacy and only 20% of the trainees are confident in internet usage. This shows the overall position of internet literacy level of rural women B.Ed trainees is Low.

Table Showing The Multimedia Literacy Level Of Rural Women B.Ed Trainees

Sl. No	Category	Percentage	Level
1.	Confident	17	Low
2.	To Some Extent	20	Low
3.	Not At All	63	High
		100	

63% of the trainees are not at all familiar with the usage of multimedia and only 17% of the students are familiar with the multimedia literacy level which depicts very low level of multi media literacy among the women trainees in and around Thiruvannamalai District.

Table Showing The Hardware Literacy Level Of Rural Women B.Ed Trainees

Sl. No	Category	Percentage	Level
1.	Confident	24	Low
2.	To Some Extent	31	Average
3.	Not At All	45	Average
		100	

45% of the B.Ed trainees do not have any knowledge about the hardware literacy and only 24% of the trainees are confident about hardward literacy. This shows the hardware literacy of the women B.Ed trainees is low.

Table Showing The Mobile Net Literacy Level Of Rural Women B.Ed Trainees

Sl. No	Category	Percentage	Level
1.	Confident	12	Low
2.	To Some Extent	31	Average
3.	Not At All	57	Average
		100	

57% of the B.Ed trainees do not have touch with mobile internet usage. Only 12% of the trainees are confident in using internet in mobile phones which shows the mobile net literacy of women B.Ed trainees is low.

CONCLUSION

Based on the data collected it may be concluded that there is a low level of computer literacy prevailing amidst the rural women B.Ed trainees amidst Thiruvannamalai district villages. The present study also has come out with some interesting facts that the women B.Ed trainees are also ignorant of some more ICT skills such as online literacy, mobile net usage, multimedia usage and hardware literacy. This reveals that the computer knowledge of the village students need to be improved by all means.

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Chapter 4

A STUDY ON INNOVATIVE TEACHING LEARNING PRACTICES IN COLLEGES IN PALAYAMKOTTAI, TIRUNELVELI DISTRICT, TAMIL NADU

Dr. M. Arockia G. Ruban*

ABSTRACT

Education is a light that shows the mankind the right direction to surge. The purpose of education is not just making a student literate but adds rationale thinking, knowledgeably and self sufficiency. When there is a willingness to change, there is hope for progress in any field. Creativity can be developed and innovation benefits both students and teachers.

The purpose of this paper is to evaluate the traditional methods of teaching as well as multimedia teaching and to suggest other useful teaching methods that can be attempted in imparting knowledge to the students. Basically teaching must include two major components sending and receiving information. Ultimately, a teacher tries his best to impart knowledge as the way he understood it. So, any communication methods that serve this purpose without destroying the objective could be considered as innovative methods of teaching. The use of innovative methods in educational institutions has the potential not only to improve education, but also to empower people, strengthen governance and galvanize the effort to achieve the human development goal for the country. Here this paper highlights what is the Innovative Teaching learning practices are in practice in the colleges in Palayamkottai in Tirunelveli District and how many teacher know the innovative methods and how many teachers are using the

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innovative teaching methods in the colleges in Palayamkottai in Tirunelveli District, Tamil Nadu.

Keywords: *innovative teaching, innovative learning, teaching-learning practices*

INTRODUCTION

Education is an engine for the growth and progress of any society. It not only imparts knowledge, skills and inculcates values, but is also responsible for building human capital which breeds, drives and sets technological innovation and economic growth? In today's era, information and knowledge stand out as very important and critical input for growth and survival. Rather than looking at education simply as a means of achieving social upliftment, the society must view education also as an engine of advancement in an information era propelled by its wheels of knowledge and research leading to development. In and around, Tirunelveli District, there are approximately 5 Arts and Science colleges and 10000 teachers are working. Among them how many teacher know the innovative methods and how many teachers are using the innovative teaching methods in the colleges in Palayamkottai in Tirunelveli District, Tamil Nadu.

OBJECTIVES OF THE STUDY

The proposed study has the following objectives.

1. To study Basic Informative profile of the teachers working in the colleges.
2. To study the Number of teachers is aware of the ICT Teaching and learning practices and how many teachers are using this Innovative teaching methods.

SCOPE OF THE STUDY

This study was conducted in 5 Arts and Science colleges in Palayamkottai in Tirunelveli District, Tamil Nadu, because Palayamkottai is the Oxford of South India. The socio-economic profile of the teachers working in the colleges and the Number of teachers are aware of the ICT Teaching and learning practices and how many teachers are using this Innovative teaching methods were considered for this study.

METHODOLOGY OF THE STUDY

The traditional or innovative methods of teaching are critically examined, evaluated and some modifications in the delivery of knowledge are suggested. As such, the strengths and weaknesses of each teaching methodology are identified and probable modifications that can be included in traditional methods are suggested.

Primary data were collected from the teachers working in the colleges. Secondary data were collected from published reports, journals and magazines. The researcher used random sampling method to select 100 sample Teachers who are teachers working in the colleges in Palayamkottai in Tirunelveli District, Tamil Nadu, for this study. For the collection of primary data the researcher used the structured interview schedule prepared for this purpose.

INNOVATIVE METHODS OF TEACHING

When we come to innovative methods of teaching we can think of Multimedia Teaching. Multimedia, is the combination of various digital media types such as text, images, audio and video, into an integrated multi-sensory interactive application or presentation to convey information to an audience.

These are some of the Innovative teaching methods that are:

- PowerPoint through LCD
- Audio Visual Aids
- SMART Classroom

DATA INTERPRETATION

The Collected data were interpreted using simple percentage method and presented in the form of Tables.

AGE WISE CLASSIFICATION

Table-1. Age wise classification of Teachers

Age (in Years)	Number of Teachers	Percentage
25 – 35	78	15.6
36 – 46	235	47
47 – 58	187	37.4
Total	**500**	**100**

Source: Primary data
(Figures in the parentheses indicates percentage)

It could be inferred from the above Table 1 that out of 500 Teachers, 47 per cent are in the age group of 36 to 46 years followed by 37.4 per

cent are in the age group of 47 to 58 years, while 15.6 per cent are in the age group of 25 – 35 years.

GENDER WISE CLASSIFICATION OF TEACHERS

Table-2. Gender wise classification of Teachers

Gender	Number of Teachers	Percentage
Male	250	50
Female	250	50
Total	500	100

Source: Primary data

(Figures in parentheses indicates percentage)

From Table 2 it could be inferred that out of the 500 Teachers, 250 Teachers (50 per cent) are female and the remaining 250 Teachers (50 per cent) are male. To give equal weightage I have selected the gender in equal basis

EDUCATIONAL QUALIFICATION WISE CLASSIFICATION

Table-3. Educational Qualification wise classification of Teachers

Literacy	Number of Teachers	Percentage
Ph.D	108	21.6
M.Phil	258	51.6
M.Phil with NET/SET Passed	134	26.8
Total	**500**	**100**

Source: Primary data
(Figures in parentheses indicates percentage)

Table 3 shows that out of 500 sample Teachers, 51.6 per cent are M.Phil holders, 26.8 per cent of the Teachers are M.Phil with NET/SET passed teachers and remained 21.6 per cent of the teachers are Ph.D holders.

It is evident from the study that among the 500 Teachers majority of the teachers are M.Phil holders working in the colleges.

MARITAL STATUS WISE CLASSIFICATION

Table-4. Classification of Teachers according to marital status

Marital Status	Number of Teachers	Percentage
Married	445	89
Unmarried	55	11
Total	**500**	**100**

Source: Primary data (Figures in parentheses indicates percentage)

The above Table 4 shows that out of 500 Teachers majority of the Teachers (89 per cent) are married and the remaining (11 percent) Teachers are Unmarried. It is found that most of the Teachers are married.

DESIGNATION WISE CLASSIFICATION

Table-5. Classification of Teachers According to Designation

Designation	Number of Teachers	Percentage
Professor	56	11.2
Associate Professor	196	39.2
Assistant Professor	248	49.6
Total	**500**	**100**

Source: Primary data (Figures in parentheses indicates percentage)

The Table 5 shows that out of 500 Teachers, around 49.6 per cent of the Teachers are working as Assistant Professors and 39.2 per cent are working as Associate Professors. Only 11.2 per cent of the Teachers are working as Professors in the colleges.

METHOD OF TEACHING WISE CLASSIFICATION

Table-6. Method of teaching wise classification

Method of Teaching	Number of Teachers	Percentage
Traditional	56	11.2
Innovative Method	221	44.2
Both the Method	223	44.6
Total	**500**	**100**

Source: Primary data (Figures in parentheses indicates percentage)

It is clearly understood from Table 6 that out of 500 Teachers, 223 (44.6 per cent) Teachers are using both the method of Traditional and Innovative method of teaching, 44.2 per cent teachers are using the innovative method to teach the subject in the class room and only 11.2 per cent of the Teachers are using the Traditional method only to teach the subjects in the class room.

Among the Teachers 500 teacher majority (44.6 per cent) of the teachers are using both the method like Traditional method and Innovative method in their teaching to taught the subject in the class room in the colleges in Palayamkottai in Tirunelveli.

AWARENESS OF INNOVATIVE TEACHING LEARNING PRACTICE WISE CLASSIFICATION

Table-7. Awareness of Innovative Teaching Learning Practices wise classification

Awareness	Number of Teachers	Percentage
Yes	444	88.8
No	56	11.2
Total	**500**	**100**

Source: Primary data
(Figures in parentheses indicates percentage)

From the above Table 7, it is seen that out of 500 Teachers, 88.8 per cent of the Teachers are aware of Innovative Teaching Learning Practices and remaining 11.2 per cent of the Teachers are not awaring of Innovative Teaching Learning Practices or not ready to carry out the Innovative Teaching Learning Practices because they are Professors in the age of 47 – 58 and they are in the retiring age. So they are not ready to adopt Innovative Teaching Learning Practices in their teaching career.

INNOVATIVE METHOD OF TEACHING WISE CLASSIFICATION

Table-8. Innovative Method of teaching wise classification

Innovative Method	Number of Teachers	Percentage
Power Point through LCD	222	50
Audio Visual Method	174	39.2
Through SMART Class room	48	10.8
Total	**444**	**100**

Source: Primary data
(Figures in parentheses indicates percentage)

The Table 8 shows that out of 500 Teachers, 50 per cent of the teacher are using the Innovative method of Power Point through LCD, 39.2 per cent of the teachers are using the Innovative method of Audio Visual Method and the remaining 10.8 per of the teachers are using the Innovative method of Through SMART Class room, they taught the subject to the students in the colleges in Palayamkottai in Tirunelveli District.

HANDING OF INNOVATIVE TEACHING LEARNING PRACTICE WISE CLASSIFICATION

Table-9. Handing of Innovative Teaching Learning Practice wise classification

Handing	Number of Teachers	Percentage
Easy	444	88.8
Difficult	56	11.2
Total	**500**	**100**

Source: Primary Data

From the above Table 9, it is seen that out of 500 Teachers, 88.8 per cent of the Teachers feel that Innovative Teaching Learning Practices is the easiest method of teaching to teach the subjects to all the students and remaining 11.2 per cent of the Teachers feel that Innovative Teaching Learning Practices is a difficult method to adopt in their teaching career, because they are Professors in the age of 47 – 58 and they are in the retiring age. So they feel that it is difficult to adopt Innovative Teaching Learning Practices in their teaching career.

FINDINGS OF THE STUDY

- Majority (47 per cent) of the Teachers are in the age group of 36 – 46 years.
- For this study I have selected 250 Male teachers and 250 female teachers to give the equal weightage to the Gender.
- Majority (51.6) of the teachers are M.Phil holders are working in the colleges in Palayamkottai in Tirunelveli District.
- Majorities (89 per cent) of the teachers working in the colleges are married and this includes male and female teacher.
- Most (248 per cent) of the teachers are working as a Assistant Professor in the colleges

- More number of teachers (444) is aware of Innovative Teaching Learning Practices and follows this method and remaining 56 teachers are not aware of Innovative Teaching Learning Practices.
- Majority (50 per cent) of the teachers are using the Innovative Teaching method such as Power Point.
- Majority (88.8 per cent) of the teachers feel that it is easy to use the Innovative Teaching Learning Practices and remaining 11.2 per cent teacher's feels that it is difficult for them to handle Innovative Teaching Learning Practices.

CONCLUSION

At present, Education plays a vital role in all over the world including India. Now days an effective teaching and learning is important so that only teachers would attract the student and make them to learn. For that purpose Innovative Teaching Learning Practices is need. Now the e-publishing plays a predominant role in education. Teacher can get their information by sitting in front of computers i.e., world wide web.Nowadays teachers need not spend much more time for research work and data collection because e-publications indirectly motivate teacher. Learning today could be supplemented by new techniques based on data communication between teachers and students.

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Chapter 5

ENHANCING HIGHER EDUCATION THROUGH THE FLIPPED TEACHING

Dr. R. Arumugarajan*

INTRODUCTION

In a traditional lecture, students often try to capture what is being said at the instant the speaker says it. They cannot stop to reflect upon what is being said, and they may miss significant points because they are trying to transcribe the instructor's words. By contrast, the use of video and other prerecorded media puts lectures under the control of the students: they can watch, rewind, and fast-forward as needed. This ability may be of particular value to students with accessibility concerns, especially where captions are provided for those with hearing impairments. Lectures that can be viewed more than once may also help those for whom English is not their first language. Devoting class time to application of concepts might give instructors a better opportunity to detect errors in thinking, particularly those that are widespread in a class. At the same time, collaborative projects can encourage social interaction among students, making it easier for them to learn from one another and for those of varying skill levels to support their peers.

The notion of a flipped classroom draws on such concepts as active learning, student engagement, hybrid course design, and course podcasting. The value of a flipped class is in the repurposing of class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities. During class sessions, instructors function as coaches or advisors, encouraging students in individual inquiry and collaborative effort.

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FEATURE OF THE FLIPPED CLASSROOM

Educational technologies are an important feature of the flipped classroom as they can be used to:

- **capture key content** for students to access at their own con venience and to suit their pace of learning (e.g. lecture material, readings, interactive multimedia),
- **present learning materials** in a variety of formats to suit different learner styles (e.g. text, videos, audio, multimedia),
- **provide opportunities for discourse** and interaction in and out of class (e.g. polling tools, discussion tools, content creation tools),
- **convey timely information,** updates and reminders for students (e.g micro-blogging, announcement tools),
- **provide immediate and anonymous feedback** for teachers and students (e.g. quizzes, polls) to signal revision points,
- **capture data** about students to analyse their progress and identify 'at risk' students (e.g. analytics)

KEY ELEMENTS OF THE FLIPPED CLASSROOM

1. **Provide an opportunity for students to gain first exposure prior to class:** The mechanism used for first exposure can vary, from simple textbook readings to lecture videos to podcasts or screencasts.
2. **Provide an incentive for students to prepare for class:** Students completed a task associated with their preparation and that task was associated with points. The assignment can vary; the examples above used tasks that ranged from online quizzes to worksheets to short writing assignments, but in each case the task provided an incentive for students to come to class prepared by speaking the common language of undergraduates: points. In many cases, grading for completion rather than effort can be sufficient, particularly if class activities will provide students with the kind of feedback that grading for accuracy usually provides.
3. **Provide a mechanism to assess student understanding:** The pre-class assignments that students complete as evidence of their preparation can also help both the instructor and the student to assess understanding. Pre-class online quizzes can allow the instructor to practice Just-in-Time Teaching, which basically means that the instructor tailors class activities to focus on the elements with which students are struggling. If automatically graded, the quizzes can also help students pinpoint areas where they need help. Pre-class worksheets can also help focus student attention on areas with which they're struggling, and can be a departure point for class activities, while pre-class writing assignments help students clarify their thinking about a subject, thereby producing richer in-class discussions.
4. **Provide in-class activities that focus on higher level cognitive activities:** If the students gained basic knowledge outside of class, then they need to spend class time to promote deeper learning. Again, the activity will depend on the learning goals of the class and the culture of the discipline. In other contexts, students may spend time in class engaged in debates, data analysis, or synthesis activities. The key is that students are using class time to deepen their understanding and increase their skills at using their new knowledge.

FLIPPED CLASSROOM BENEFITS

The flipped classroom experience makes optimal use of instructor and student time, provides increased access to the instructor's expertise and enables better scalability of instructional resources to support high-enrollment demands. From the instructor's perspective, key benefits of the flipped classroom include:

- increased classroom time to present content, discuss complex topics and work with students — either individually or in small groups;
- reduced time spent answering basic and repetitive questions — due to students' ability to review lectures online;
- the ability to use recorded lectures in multiple course sections — year over year, with easy tools for updating content; and
- quick adaptation of lecture content to respond to new learning needs.

DISADVANTAGES

The flipped classroom is an easy model to get wrong. Although the idea is straightforward, an effective flip requires careful preparation. Recording lectures requires effort and time on the part of faculty, and out-of-class and in-class elements must be carefully integrated for students to understand the model and be motivated to prepare for class. As a result, introducing a flip can mean additional work and may require new skills for the instructor, although this learning curve could be mitigated by entering the model slowly.

CONCLUSION

The flipped classroom is a strategic direction that helps higher education meet the expectations of today's students while optimizing teaching and classroom resources. The blended learning approach of the flipped classroom can be leveraged for both individual courses and on an organizational level to improve instructional delivery and enhance student achievement and satisfaction.

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Chapter 6

ROLE OF MUTIMEDIA IN MODERN EDUCATION: ISSUSES AND CHALLENGES

V. Chitra Devi*

INTRODUCTION

Multimedia is a buzz word that seems to get the attention of students and teachers alike. With our complex and multi-faceted life style, students seem to be curious about the creation of productions that involve images, video, sound and more. This lesson is intended to capture the curiosity of the students while they learn content that is meaningful and important to citizens living in this complicated world. Students will become engaged with the content as they present it visually with voice and music to enhance the final product. Multimedia projects should be designed to engage the students more deeply by choosing the best visuals to compliment the content. This requires more thoughtful consideration than simply regurgitating it on paper. According to ISTE, the International Society for Technology in Education, students claimed they learned the material at a much greater depth than in traditional writing projects when the means of communication involved multimedia productions.

MULTIMEDIA

Media is defined as "all means of communication, whatever its format". In this sense, media includes symbol system as diverse as print, graphics, animations, audio and motion pictures.(Ramesh Chandra,2005,p20) Multimedia can be defined generically as any combination of two or more media such as sound, images, text, animation, and video. For educational

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technology purposes, multimedia refers to computer-based systems that use associative linkages to allow users to navigate and retrieve information stored in a combination of text, sounds, graphics, video, and other media. It refers to materials on both CD-ROM and available on the Internet. The term is also applied to multiple media such as a series of books and audio cassettes tied to a television or video programme.

HISTORY OF MULTIMEDIA

The term "multimedia" was coined by Bob Goldstein (later "Bobb Goldsteinn") to promote the July 1966 opening of his "Light Works at L'Oursin" show at Southampton, Long Island (Susil Chandra Pachauri, 2011, p243).

MULTIMEDIA ELEMENTS

Text

Text is the basic element of multimedia. It involves the use of text types, sizes, colours and background colour. In a multimedia application, other media or screen can be linked through the use of text. This is what you call Hypertext. To produce an effective multimedia program there are three things that need to be considered. They are:

- The position of the text on the screen.
- Length of the message
- And legibility of the text.

Graphic

Graphics make the multimedia application attractive. They help to illustrate ideas through still-pictures. There are two types of graphics used: bitmaps (paint graphics) and vector (draw graphics).

Audio

A multimedia application may require the use of speech, music and sound effects. These are called audio or the sound element. There are two basic types of audio or sound: analog and digital audio.

Video

Video provides a powerful impact in a multimedia program. In multimedia applications, the digital video is gaining popularity because of the following reasons: Video clips can be edited easily. The digital video

files can be stored like any other files in the computer and the quality of the video can still be maintained. The video files can be transferred within a computer network and it allows non-linear editing in any part of the video. However, these digital video files are large in size. Transferring these files can take a long time especially when using the Internet.

Animation

Animation is a process of making a static image look like it is moving. In multimedia, digital animation is used. Digital animation can be categorized into two broad areas: 2D (2 Dimension) and 3D (3 Dimension) animations.

CHARACTERISTICS OF MULTIMEDIA SYSTEM

A multimedia system has four basic characteristics:

- Computer is an intrinsic part of the multimedia system. As a result, multimedia has become interactive. In multimedia, computer allows the user to interact with the media and thus manipulate it by controlling what is to be communicated and when. Multimedia has resulted in the creation of many new possibilities—(1) the computational power of computer is utilized for multimedia applications, (2) the telecommunication network (Internet, WWW) along with the computer enables transmission and distribution of information, and, (3) the use of computer facilitates design and creation of a variety of new applications.
- The different elements of multimedia are combined and integrated into a single multimedia system. Special software is required for the integration of different media element files.
- The use of computer in multimedia requires all elements of multimedia to be in digital format. In a digital multimedia system, the media streams are digital and are produced, processed, stored, represented and transmitted using computers. The digital nature of multimedia requires special treatment of the multimedia elements. The hardware and software are needed to convert multimedia elements from analog to digital format and vice versa. There is a need to decide about the resolution versus quality of output required, during storing of data in the computer. Storing multimedia files on computer hard disk takes large amount of disk space, so compression technologies and file formats for storing the different media elements is required. Moreover, special programs are required to play the compressed files. Similarly, special software is required to edit the different media element files, and to combine and integrate the different elements of the multimedia into a single multimedia system.

- Multimedia system is interactive. The user is active and can manipulate whatever is being communicated. Multimedia allows two-way communication. The user can use devices like keyboard, trackball or joystick to interact with the multimedia system. Interactive multimedia is non-linear. The user is able to follow the links and jump from one part of the document to the other. Hypermedia enables a user to gain or provide access to text, audio and video, and computer graphics using links in a non-linear way, using computers. World Wide Web (WWW) is an example of hypermedia application. The user is able to respond and control what to see or hear and when to do it.

SPECIFIC USES OF MULTIMEDIA

1. Drill and practice to master basic skills the development of writing skill problem solving.
2. Understanding abstract mathematics and Science concepts
3. Simulation in science and mathematics manipulation of data
4. acquisition of computer skills for general purposes, and for business and vocation training
5. Access and communication to understand and populations and students
6. Access for teachers and students in remote locations
7. Individualized and cooperative learning
8. Management and administration of classroom activities
9. Multimedia can stimulate more than one sense at a time, and in doing so, may be more attention-getting and attention-holding.

USE OF MULTIMEDIA IN AN EDUCATIONAL SETTING

1. The features of interactive multimedia. Training can thus take place individually at

   (*a*) the learner's pace and on his/her own time.
2. Medical procedures, first-aid training and instruction of paramedics or even surgeons are made both simple and interesting through the use of multimedia.
3. The doctor or paramedic can run through a complete procedure on videodisc and analyze all the possible outcomes and can evaluate the possibilities before treatment of the real life patient starts.

4. In all the above instances, the user can and normally does work individually and in an

   (*a*) Interactive mode with the medium.
5. In the next section we look at the hardware and software required for development of educational multimedia.
6. Multimedia can be used in instruction in a variety of creative and stimulating ways. Applications include teacher presentations, student projects, and discovery learning. Although teachers are encouraged to develop their own materials, many excellent educational multimedia products are also available.
7. When developing original multimedia applications, educators should be aware of copyright issues and infringements, especially when incorporating video, images, and sound from other sources. The chapter concludes with a discussion of media distribution systems.

REASONS TO USE MULTIMEDIA IN THE CLASSROOM

Facilitate and develop a community of learners through online ice-breaker activities.

1. Help students visualize difficult concepts or procedures more easily.
2. Scaffold learning through activities enhanced by videos and online games.
3. Make language and culture come alive through the viewing and creation of audio and video instruction.
4. Provide a "menu" of authentic assignment options for students to complete, allowing them to explore and identify their passions and talents.
5. Enhance accessibility through the use of powerful multimedia software tools.
6. Enable visualization of concepts and their connections through collaborative construction and discussion of concept maps.
7. Encourage collaboration and feedback by integrating assignments with tools that support conversations and comments.
8. Make learning situated and personal with easy to access information from you and the rest of the world.
9. Help students document and present their learning through authentic assessments.

BENEFITS TO TEACHERS

1. Allows for creative work
2. Saves time for more challenging topics
3. Replaces ineffective learning activities
4. Increases student contact time for discussion.

CONCLUSION

Every day, we are exposed to different media, from the time we get up in the morning to the time when we go to sleep. Think about the different media and list them into categories of "old" and "new". Multimedia has become the backbone of today's fast growing economy.

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Chapter 7

A STUDY ON OPEN EDUCATIONAL RESOURCES

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INTRODUCTION

Higher education institutions around the world have been using the Internet and other digital technologies to develop and distribute teaching and learning for decades. Recently, Open Educational Resources (OER) have gained increased attention for their potential and promise to obviate demographic, economic, and geographic educational boundaries and to promote life-long learning and personalised learning.

This paper attempts to understand the background of the current development of and future trends OER aimed at adding to our understanding, stimulating and developing a research agenda. This study tries to know what is Down's model.

CONCEPT AND CONTEXT OF THE OPEN EDUCATIONAL RESOURCES (OER) MOVEMENT

The Concept of "Openness" and the Open Initiatives

The concept of 'Openness' is based on the idea that knowledge should be disseminated and shared freely through the Internet for the benefit of society as a whole. The two most important aspects of openness are free availability and as few restrictions possible on the use of the resource, whether technical, legal or price barriers. Openness exists in different forms of domain and has different meaning in different contexts.

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Openness in the technical domain is characterised by access to source code and/or access to interoperability standards or the standards process. According to Tuomi (2006) a higher level of openness is about the right and ability to modify, repackage and add value to the resource. However, most existing initiatives offer the most basic level of openness-"open" means "without" but it does not mean "without conditions".

In April 2003, a meeting at the Howard Hughes Medical Institute in Maryland resulted in the Bethesda Statement on Open Access Publishing – free access to scholarly journals. It provided a working definition of open access publishing and agreed a set of principles that all parties (scholars, research institutions, publishers and librarians) could adopt to ' promote the rapid and efficient transition to open access publishing'.

Defining Open Educational Resources

There is no authoritatively accredited definition for the term OER at present; the most often used definition of OER is, "digitised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research" (OECD, 2007).

Visions and Goals

"Educators worldwide are developing a vast pool of educational resources on the Internet, open and free for all to use.

- Encourage educators and learners to actively participate in the emerging open education movement.
- Open educational resources should be freely shared through open licences which facilitate use, revision, translation, improvement and sharing by anyone.
- Government, school boards, colleges and universities should make open education a high priority. Ideally, taxpayer-funded educational resources should be open educational resources.

Drivers/enablers:

- International organisations' promotion and funding available
- Competition among leading institutions in providing free access to educational resources as a way to attract new students
- Success of open access initiatives and repository projects;
- Rapid development and wide use of social software tools and services and emergence of personal learning environment;
- Licensing open content will become easier as plug-ins for widely used authoring software packages become available.

Inhibitors

- Growing competition for scarce funding resources
- Difficulty in finding a balanced approach to open and commercial educational offerings;
- Copyright issues
- Fears of low recognition for OA publications, particularly among young researchers
- Lack of policies for the development and use of repository at institutional level
- Lack of communication and cooperation between system and tool developers and educators;

Long-term Drivers/enables

- Policies emphasise educational innovation and organisational change in educational institutions
- ICT-based lifelong learning and personalised learning needs
- Opportunities for co-operation and collaboration between institutions around the world
- Global competition in Higher Education and decline in student numbers in Europe due to demographic trends;
- Creative commons licensing is firmly established and is being used increasingly.
- New systems for creating and handling group-based Learning Designs may become more widely used;
- Semantic applications will provide new ways to access knowledge resources.

Inhibitors

- Business models in OER will remain tricky
- Lack of institutional policies and incentives for educators to excel in OER
- Models that build on teachers in the creation and sharing of OER will need to invest considerable effort in training and support;
- Creation of educational metadata will remain costly
- Need more advanced tools and services for educational repository;

MODELS FOR OPEN EDUCATIONAL RESOURCES

Funding models from Downes (2006)

There are many funding models currently used by an open educational resources initiative. Downes (2006) summarised these models as follows:

Endowment Model: the project obtains base funding and a fund administrator manages this base funding and the project is sustained from interest earned on that fund. For example, the Stanford Encyclopedia of Philosophy, where funds were raised from a variety of charitable foundations, generating in interest the service's operating budget.

Membership Model: a coalition of interested organizations is invited to contribute a certain sum, either as seed only or as an annual contribution or subscription; this fund generates operating revenues for the OEM service. For example, the Sakai Educational Partners Program, is a for -fee community that is open to educational institutions.

Donations Model: a project deemed worthy of support by the wider community requests, and receives donations. Numerous open source and open content projects are funded in this manner, including Wikipedia and the Apache Foundation. Donations can take the form of money or content/code.

Conversion Model: by given something away for free and then convert the consumer of the freebie to a paying customer. This model has proven popular in the educational community, having been adopted by Elgg and LAMS.

Contributor – Pay Model: a mechanism that contributors pay for the cost of maintaining the contribution, and the provider thereafter makes the contribution available for free. For example, the PLOS Open Access, research articles and supporting documentation will be made freely available online to view immediately upon publication. The charges for this process will be met by funding bodies.

Sponsorship Model: this model underlies a form of open access that is available in most homes: free radio and television. In online educational initiatives, various companies have supported OER projects on a more or less explicit sponsorship basis, often in partnership with educational institutions. Examples include the MIT iCampus Outreach Initiative and the Stanford on iTunes project.

Institutional Model: an institution will assume the responsibility itself for an OER initiative and the most well known of known of these is MIT's Open Course Ware project.

Governmental Model – funding for OER project are directly come from government agencies, including the United Nations.

Because OER initiatives have different goals and exist in different institutional contexts, no single funding model fit every project.

OER – CALLS FOR RESEARCH, ACTIONS AND THE FUTURE

The policy issues raised by OER are interlinked with general organisational, cultural and pedagogical issues within an institution. It is generally agreed that OER is primarily an institutional innovation, not a technical one. However, institutions do need to have a well-reasoned ICT strategy and clear e-learning policies in order to adequately deal with the opportunities (and threats) posed by the OER movement. There will be the need for many more institutional innovations in order to promote a culture of sharing and re-using content within the institution. The following areas should be addressed:

- Curriculum development
- Financial support
- Intellectual property
- Culture of sharing
- Assessment and accreditation
- Quality assurance
- Staff development
- Student support
- Technical infrastructure/software
- Institutional model

Social, cultural and pedagogical concerns

Community building is becoming an important theme in open educational resource initiatives. In fact, the notion of community of Practice implies that members of such communities, who are interested in certain subjects and opportunities for collaborative teaching practice and learning activities, want to further develop an understanding of certain issues and resources such as tools and content. The existing community-driven nature of the OER movement is evidence of possibilities for transformation towards a new culture of learning.

Technical concerns

The proposed OPLI seeks to enable a decentralised learning environment that:

- Permits distributed participatory learning;
- Provides incentives for participation (provision of open resources, creating specific learning environment and evaluation) at all level; and
- Encourages cross-boundary and cross cultural learning.

Infrastructure building is a dynamic process; from technology-based services, various systems merge to allow dissimilar systems to be linked into networks. In this process, standardisation and inter-organisational communication techniques are critical. It is important to devise a compatible infrastructure so that there is ready transferability between the system provider, content creator and the user.

The new set of low –barrier and easy-to-use social software tools and service which promote connections, exchanges and collaboration among people who share common goals and interests provide opportunities for OER innovation.

CONCLUSION

Developing open and sustainable communities of practices should be central to any OER funding model. The successful management of this process is a key challenge. There are a number of established models and communities in the open educational content movement. However there is a lack of research evidence relating to the effectiveness and sustainability of these models. Any funding of OER should include parallel research studies to support communities, validate processes and enable the sharing of best practice and inform future developments.

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Chapter 8

EXCELLENCE IN INDIAN HIGHER EDUCATION: SWOT ANALYSIS AND STRATEGIES

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INTRODUCTION

Higher Education defined as "Education beyond the secondary level, especially education at the College or University level" (The American Heritage Dictionary of the English Language, 2000) is of prime importance to national and human resource development. The University Grants Commission Report (2012) on "Higher Education at a Glance" indicates that the there has been a manifold increase in the number of Universities, Colleges, Teaching Staff, Gross Enrolment Ratio and so on in the recent past. For instance, the number of Universities has jumped from 256 in 2000-2001 to 634 in the year ending December 2011. The Task Force on Higher Education and Society (convened by World Bank and UNESCO) in its report entitled 'Higher Education in Developing Countries: Peril and Promise" (2000) has traced the positives and negatives of higher education in various developing countries including India. The report rightly points out that in India, despite the volume of students enrollment, only a small proportion is enrolled in truly high quality programmes. Some of the concerns showcased include faculty quality, problems faced by students, insufficient resources and autonomy and so on.

However, given the importance of higher education per se, excellence in education is also mandatory. In India, though a lot of impetus has

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been given for quality assurance in higher education, it is still a work in progress. It requires a lot more of planning and execution to instill and to reverberate a culture of excellence in the Indian Higher Education System. This paper seeks to address the opportunities and challenges in Indian Higher Education and also measures to uphold academic excellence.

SWOT ANALYSIS OF INDIAN HIGHER EDUCATION SYSTEM

SWOT analysis, developed by Albert Humphrey, Stanford University in the 1960s and 1970s is a strategic planning tool as it maps the strengths, weaknesses, opportunities and threats that are relevant to the situation. The term 'strengths' refer to the internal attributes that are helpful to the organization to achieving its objective and 'weaknesses' refer to the internal attributes that are harmful to the organization to achieving its objective. While 'opportunities' mean external factors that help the organization achieve its objective, 'threats' mean external factors that are harmful to the organization to achieving its objective (Chen and Bruneski, n.d.).

STRATEGIES FOR EXCELLENCE IN INDIAN HIGHER EDUCATION SYSTEM

Despite the weaknesses and threats faced by the contemporary Indian Higher Education system, Excellence as an inherent attribute of higher education in India needs to be instilled. In this section, an illustrative list of innovative strategies that could be adopted to enhance excellence in Indian Higher Education System has been presented.

1. **Policy Formulation:** National policies are vital for academic excellence and all institutions are required to be aligned to these policies. Hence, policies should be responsive and timely. The Government of India through its various bodies and structures related to higher education like the UGC, AICTE and so on need to lead and inspire excellence in both letter and spirit. The Planning Commission in its 12th Five Year Plan document (Planning Commission of India, 2013) acknowledging excellence as an important parameter for higher education is a point in this regard. Similarly, the UGC document on "Inclusive and Qualitative Expansion of Higher Education 12th FYP, 2012-17" (University Grants Commission, 2011) spelling out Strategies for Enhancing Quality and Excellence in Higher Education is welcome. However, mere acknowledgement of the importance of excellence or the prescription of strategies would not suffice. These sentiments should be accepted and executed by all concerned in right earnestness. This calls for institutional leadership at all levels to avoid bureaucratic inertia or myopic interpretation of clauses.
2. **Nation-wide assessment of skill requirements:** A nation-wide assessment of skill requirements needs to be carried out and based on these assessments, the starting of institutions / courses should be permitted. These assessments need to be scientific and periodic. Such an assessment would give direction to the starting of courses. Consequently, the demand for a course would not be at the mercy of raw market forces, but would be purposefully directed based on reason and the nation's growth designs. Such a measure will address anomalies like flooding of engineers in the society.
3. **Synchronisation between various bodies of Ministry of Human Resource Development:** The various bodies of the Ministry of HRD may come up with their unique schemes. However, the provisions that are most advantageous to the beneficiary should be made common. There should be uniformity / similarity in the various schemes of the different bodies of Ministry of Human Resource Development. Also, schemes of various bodies (ex: UGC and ICSSR) but with the same scheme objectives should be treated on par. In some States, it is a matter of interpretation that sometimes could be disadvantageous to the beneficiaries – Ex: Post-Doctoral Fellowship rules. Further, as a nation there should be one voice in terms of policy formulation and these should be accepted by all States.
4. **E-governance:** Technology has become the order of the day. Hence e-governance should become a true reality. It should not only make available policies online but a host of other learning resources and resources for career progression. ICT should be used to facilitate knowledge management. Investment in infrastructure development / enhanced use of ICT should be encouraged; all efforts need to be taken to bridge the digital divide. All Colleges should be made to have links to learning resources, open e-resources etc on their institutional websites.
5. **Quality sensitisation:** Quality is a journey, not a destination. All stakeholders of the higher education framework need to be sensitised to quality in all processes and outcomes. There should be the presence of internal checks and balances. It would not suffice to rely merely on time-bound accreditations. However, accreditations / audits should be robust, multi-faceted, not merely based on self-study reports / documents or

one-time inspection / interaction. Continuous improvement through measures like benchmarking should be promoted at the individual and institution level. This calls for quality-oriented institutional leadership that is realistic and accountable.

6. **Faculty competence:** Faculty members are the link pin in realising the dream of excellence in education. The importance of teachers in the context of academic excellence can never be underestimated. Hence, all care needs to be taken to recruit competent faculty members. Competence refers to Knowledge, Skills and Abilities. Thus, at the stage of recruitment, apart from factors like education qualifications, experiences, social justice norms due care should be given to aptitude / attitude towards teaching. Attitude is equally important because teachers need to constantly interact with learners and can end up either making or marring their learning experiences. Every learner is a precious human resource that cannot be taken for granted. Further, learners when not moulded properly will not be able to contribute their best to the mainstream society. Thus the cost of not recruiting competent faculty members will be too dear.
7. **Knowledge Sharing (Gyan Dhaan) Initiatives:** Faculty members from Tier-I institutions should be compulsorily made to serve in non-Tier I institutions (in backward areas) at least for one semester in every three years. The visiting faculty could serve as the master trainer and help spearhead a host of measures geared towards academic excellence. This will create a ripple effect in terms of academic innovations and excellence in the host institution.
8. **Curriculum Design:** The curriculum at all costs should be learner-centered. It should be customised to suit the various learning styles of the learners. Cafeteria approach in curriculum should be adopted that is, a battery of courses (for the same discipline) should be made available to the clientele (student community). For example, Under-graduate degree in English with different concentration areas ex: drama, poetry and so on. Also, Under-graduate degree in English in different streams could be made available by customising courses based on IQ / EQ / aptitude of the candidate. The curriculum should be wholistic, responsible and responsive. The importance of wholistic well-being of individuals can never be negated. In the same vein, the curriculum should focus on work-life integration paving way for

scope for excellence in curricular, co-curricular and extra-curricular activities including sports.

9. **Knowledge management:** Knowledge management is "the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge" (Frost, 2010). Higher education as part of the knowledge industry should strive to harness the unique blend of indigenous and global knowledge by establishing communities of practice. This will pave way for effective utilisation of resources.
10. **Innovision:** Innovision (Innovation + Vision) vis a vis academic excellence should become the order of the day. Practices that are unconventional and challenging should be promoted. For instances, reverse mentoring could be adopted. This will bridge the gap between Gen X and Gen Y and serve as an effective feedback mechanism for the teachers. The institutional rules should also recognise fast learners and good performers. For instance, there should be opportunities for bright learners to complete their course even before the prescribed period of study. Similarly, there should be opportunities for high performing teachers for fast track growth.

    (*i*) **Initiatives to realise human potential:** There is no dearth of talent in India. The problem lies in effective channelization of this talent. This could be addressed through proper career guidance. Apart from the existing one on one career guidance possible, the Ministry of Human Resource Development could develop internet portals / knowledge kiosks wherein all information on recognised universities, colleges, courses and so on are made available. This way the public may not become victims of advertisements or findings of half-baked surveys. Also, videos covering the entire life cycle of a profession / career (including positives and negatives), tracing the requirements of the job and so on may also be made available. Prospective candidates throng niche, job-oriented courses though they may not be having the aptitude for those venues. Sensitisation through these measures could help. Ministry of Human Resource Development authorised e-counselling mechanisms (ex: Toll-free numbers, web chats) for student coaching and mentoring could also be attempted.

(*ii*) **Open House:** A bi-annual 'Academic Excellence Fest' should be initiated at the National Level. It should serve as a platform to present academic excellence-oriented programmes and practices of the various Universities, Colleges, and Teachers. Also, it should have scope for wild card entries to showcase innovations towards academic excellence. Wild card entries could individuals without any great institutional banner / big qualification but with great ideas. Such sessions will help widen horizons and broaden perspectives.

CONCLUSION

Academic Excellence is a journey. Academic Excellence for India with its wide potentials and opportunities should not be a distant dream. The strengths of the existing Indian higher education framework should be continually honed, the effect of the weaknesses should be mollified, opportunities should be optimised and threats should be faced. Thus, with a little more focus and concerted effort, academic excellence will surely become a dream come true.

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Chapter 9

ATTITUDE TOWARDS E-LEARNING OF POST GRADUATE STUDENTS IN KERALA STATE

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ABSTRACT

Computers and computer-assisted instruction are being used with increasing frequency in the area of higher education. Post graduate students' students' attitudes towards the use of e-learning technology and computer-assisted instruction have received limited attention in the empirical literature to date. The objective of this study was to determine post graduate students' attitudes towards e-learning. A survey was conducted to elicit PG students' attitudes towards E-learning using a standardized attitude scale. Random sampling was used and data collected from 1000 PG students from different colleges of Kerala state. The study revealed that Post graduate students of Kerala differ in the levels of Attitude towards E learning. Majority of PG students i.e., 63 percent has only Moderately favourable attitude towards E learning. 20.5 percent showed highly favourable attitude and 16.5 percent showed less favourable Attitude towards E learning. Male Post graduate students showed more favourable mean Attitude than female students. Rural students , Commerce students , Arts students and students belonging to Aided colleges showed more favourable mean Attitude among the subsamples selected.

Measures should be taken to increase the awareness of post graduate students in E learning which the recent trend in education is. In the present century of online education, our Post graduate students should have more favourable attitude towards E learning.

Keywords: *E-learning; Post Graduate students, attitude, Kerala*

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RATIONALE OF THE STUDY

Students learning in tertiary institutions all over the world have undergone tremendous

transformation, especially since the advent of information and communication technology

(ICT) .There is a shift from traditional approach of teacher directed to modern methods where computer technology plays a significant role. ICT has promoted learning and made it more meaningful, where students can stay even in their homes or Classrooms and receive lectures without seeing the lecturer. The aspect of ICT that has brought about this revolution in students' learning is E-learning.

Due to the ever-changing nature of information and communication technologies, there is a constant demand and expectation for universities to incorporate increasing levels of technology into the design and delivery of their curriculum. This has placed academic staff in a sometimes difficult situation with expectations of significant change within a very short and often unrealistic time-frame. E learning in its broadest sense refers to any learning that is electronically enabled. Successful implementation of a system and adoption by learners requires a solid understanding of user acceptance processes and ways of persuading students to engage with these technologies (Abbad, 2009).

The integration and use of educational technology and e-learning strategies are being utilized with increasing frequency in the higher education sector. While this integration is simply to avoid falling behind in a world where computers have become ubiquitous; the implementation of such teaching methods should be carefully considered. Understanding students' attitudes towards E-learning facilitates the development of appropriate educational initiatives. Post graduate students' attitudes towards E learning has received limited attention in the research literature and hence the present study.

OBJECTIVES

1. To find out whether the levels of Attitude towards E- Learning of Post Graduate students for the total sample and subsamples based on gender and subject of study of the students , Locality and management category of the colleges will be different or not.
2. To find out whether there exist any significant difference in the mean Attitude towards E learning of PG students for the subsamples based on gender and the subject of study of the students, Locality and management category of the colleges .

METHODOLOGY

Survey was employed for the collection of data required for the study. Post graduate students in Arts and Science colleges of Kerala state was selected as the population of the study. 1000 PG students of Arts and Science colleges from different districts of Kerala state constitute the sample of the study. Due care was taken to include the representation of Arts, Science and Commerce students from different colleges. Random sampling technique was employed for the selection of the sample. Scale on Attitude towards E learning prepared and standardized by the investigators was used for the collection of data. Percentage analysis and Test of significance for difference between means were used as Statistical techniques.

DATA ANALYSIS

In order to find out the level of Attitude towards E learning, the students were categorized based on the scores obtained on their Attitude towards E learning. For that purpose, Mean+1 S D and Mean-1SD are taken as the limit for classifying the PG students into three groups ,i.e., Highly favourable , Moderately favourable and Less favourable Attitude towards E learning.

LEVELS OF ATTITUDE TOWARDS E LEARNING OF PG STUDENTS IN KERALA-FOR TOTAL SAMPLE

Total sample consists of 1000 Post Graduate students The sample is divided into three categories based on their attitude towards E learning.

Table-1. Classification of students based on levels of Attitude towards E learning

Category	Number of students	Percentage
Highly favourable	205	20.5
Moderately favourable	630	63.0
Less favourable	165	16.5

Table 1 shows that, of the total sample of PG students, 63 percent has Moderately favourable attitude towards E learning. 20.5 percent has

Highly favourable attitude and 16.5 percent has Less favourable Attitude towards E learning. It shows that most of the students showed Moderately favourable Attitude towards E learning

COMPARISON OF MEANS AMONG THE SUB-SAMPLES

Mean Attitude towards E learning was compared for the subsamples selected for the study. Details are presented below.

(i) Gender wise comparison

Mean attitude towards E learning was compared to know the gender difference.

Table-2. Comparison of gender groups for the Attitude towards E-learning

Gender	N	Mean	S D	CR
Male	424	52.4	8.95	17.66**
Female	576	45.6	9.23	

(** indicates significance at 0.01 level)

Table 2 shows that there exists significant gender difference between Post graduate students in their attitude towards E learning at 0.01 level. Male Post graduate students showed more favourable mean Attitude than female students.

(ii) Comparison between Rural-Urban PG students

Mean attitude towards E-learning was compared to know the Rural-Urban

Table-3. Comparison of mean Attitude towards E learning between Rural and urban Post graduate students

Category	N	Mean	S D	CR
Rural	612	54.6	8.86	8.99**
Urban	388	49.3	9.25	

(**indicates significance at 0.01 level)

Table 3 shows that there exists significant rural-urban difference between Post graduate students in their Attitude towards E learning at 0.01 level. Rural Post graduate students showed more favourable mean Attitude than urban students.

(iii) Comparison between Science and Commerce Students

Mean attitude towards E learning was compared to know the difference between Science and commerce PG students .

Table-4. Comparison of mean Attitude towards E learning between Science and Commerce Post graduate students

Category	N	Mean	S D	CR
Science	402	47.43	8.73	6.71**
Commerce	274	51.86	8.23	

(** indicates significance at 0.01 level)

Table 4 shows that there exists significant difference between Science and Commerce Post graduate students in their attitude towards E learning at 0.01 level. Post graduate students in Commerce showed more favourable mean Attitude than Science students.

(iv) Comparison between Science and Arts students

Mean attitude towards E learning was compared to know the difference between Science and Arts students .

Table-5. Comparison of mean Attitude towards E learning between Science and Arts Post graduate students

Category	N	Mean	S D	CR
Science	402	47.43	8.73	1.869*
Arts	324	48.72	9.66	

(*indicates significance at 0.05 level)

Table 5 shows that there exists significant difference between Science and Arts Post graduate students in their attitude towards E learning at 0.05 level. Post graduate students belonging to Arts subjects showed more favourable mean Attitude than Science students.

(v) Comparison between Commerce and Arts students

Mean attitude towards E learning was compared to know the difference between Commerce and Arts post graduate students.

Table-6. Comparison of mean Attitude towards E learning between Arts and Commerce Post graduate students

Category	N	Mean	S D	CR
Arts	324	48.72	9.66	4.295**
Commerce	274	51.86	8.23	

(** indicates significance at 0.01 level)

Table 6 shows that there exists significant difference between Commerce and Arts Post graduate students in their attitude towards E learning at 0.01 level. Post graduate students belonging to Commerce subject showed more favourable mean Attitude than Arts students.

(vi) Comparison between PG students in Aided and Unaided colleges

Mean attitude towards E learning was compared to know the difference between post graduate students in Aided and unaided colleges.

Table-7. Comparison of mean Attitude towards e-learning between Post graduate students in Aided and Unaided colleges

Category	N	Mean	S D	CR
Unaided	527	49.54	8.26	2.271*
Aided	473	50.78	8.95	

(*indicates significance at 0.05 level)

Table 7 shows that there exists significant difference between Post graduate students in Aided and Unaided colleges in their attitude towards E learning at 0.05 level. Post graduate students belonging to aided colleges showed more favourable mean Attitude than students in unaided colleges.

FINDINGS

The study revealed that Post graduate students of Kerala differ in the levels of Attitude towards E learning

- 63 percent of the total sample showed Moderately favourable attitude towards E learning. 20.5 percent has Highly favourable attitude and 16.5 percent has Less favourable Attitude towards E learning.

- Majority of the students showed Moderately favourable mean Attitude towards E learning.
- Male Post graduate students showed more favourable mean Attitude than female students.
- Rural Post graduate students showed more favourable mean Attitude than urban students.
- Commerce Post graduate students showed more favourable mean Attitude than Science students.
- Post graduate students belonging to Arts subjects showed more favourable mean Attitude than Science students.
- Post graduate students belonging to Commerce subject showed more favourable mean Attitude than Arts students
- Post graduate students belonging to Aided colleges showed more favourable mean Attitude than students in unaided colleges.

EDUCATIONAL IMPLICATIONS

Since the study revealed that only about 63 percent of the post graduate students showed Moderately favourable Attitude towards E learning. Students who expressed high levels of Attitude is minimum. Measures should be taken to increase the awareness of post graduate students in E learning which is the recent trend in education. In the present century of online education, our Post graduate students should have more favourable attitude towards E learning. It was also found that Girls, Rural, Commerce and Arts students and students belonging to aided colleges have more favourable attitude than their counterparts. Science students showed significantly lower attitude towards E learning. This may be due to the nature of their subject , which is more laboratory oriented .Teachers in higher educational level should also try to motivate students for using the immense treasure of knowledge resources available in the internet and getting through E learning.

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Chapter 10

WEB BLOGS IN HIGHER EDUCATION INSTITUTIONS: OPPORTUNITIES AND CHALLENGES

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INTRODUCTION

Appearance of new technologies has an enormous effect on all levels of human life and education also has been affected by these technologies. Internet and its facilities have the most effect in relation to other technologies. Weblogs are one of the popular technologies that have been developed in these years. Applications of these technologies have encountered higher education with new challenges, anymore it is not sufficient that course curricula and syllabus are covering the right topics and students pass their courses and got the mark (Du&Wagner, 2005). Students need to learn "How to learn" instead of "learning certain subjects and materials" and using weblogs in higher education have a potentials to achieve this aim by providing students to write and publish their ideas, read other experts writings, create a cooperative and collaborative environments and so on.

WEB BLOGS

Weblogs are personal web pages written in chronological order and maintained through a specific software that helps their administration. From an educational point of view, weblogs are the development of traditional learning logs for students and teachers, whether as a

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complement to traditional lectures or as an e-learning tool. Rosenbloom (Rosenbloom, 2004) mentioned that weblogs are becoming a new form of mainstream personal communication. Weblogs are the possibility to write and publish personal messages to the web very easily. By hyper linking and using methods like trackbacks a big network of blogs, the so called blogosphere has been emerged (Helen & Wagner, 2006). At the first sight weblogs seem to be very simple tools. But they are maybe the first version of a very special possibility to contribute to the Worldwide Web by anyone, to become an active part of the internet (Farmer & Bartlett-Bragg, 2005)

WEB BLOGS AS LEARNING SPACES IN HIGHER EDUCATION

Learning is started when the condition is ready; according to constructivism learning is made by students not transmitted by teachers. Weblogs provide this opportunity for college students. The intention of a blog is to share with others and to draw them into a conversation about what the blogger has written. In essence they are inviting feedback on their thoughts, ideas and reflections. The blogger just views the blog as a form of publishing, but over time this view changes as it begins to resemble a conversation (Dovnes, 2004).

WEBLOG AS A COOPERATIVE LEARNING TOOL IN HIGHER EDUCATION

It is not unclear for everybody that cooperating with other students is better than competition, and this is supported by constructivism. Sharing the ideas with other students provide opportunity to criticize ideas and improve the ideas and this lead to develop new ideas. Weblogs are the best tool to provide the condition that students work with each other while they are separate. Learning is cooperative when it involves a group of people working together on a particular issues or task and it arises from collaborative interaction between participants. Research has shown that cooperative learning has benefits over and beyond those of more traditional models, which tend to be more individualistic and competitive; among these are higher levels achievement and greater productivity (Johnson & Johnson,1994), as well as outcomes that are generally not considered academic, such as competence in working with others, self- confidence, and personal insight (McConnell,2000).

WEBLOGS AND EDUCATIONAL RESEARCH IN HIGHER EDUCATION

Weblogs could have a main role in university student's learning by providing them opportunity to engage with course materials and supplementary materials. Weblogs could be used at all level, that it could be more effective at university. Using weblogs in blended education could help to students to get suitable information about their course materials. Weblogs are a dynamic place that students could make communities on it with their friends and other students and experts from other countries.

ADVANTAGES

- Weblogs are easy to setup and administrate in contrast to other technologies.
- Weblogs makes easier to publish all types of resources (text, images, video, etc.)
- Weblogs allow instant publishing with just one click.
- Weblogs can be updated easily, from anywhere without having to worry about FTP connections, web authoring software, etc.
- Weblogs have the ability to reach a large audience without losing information quality and allowing for different levels of detail.
- Weblogs break the trade off between reach and richness of information.
- 24/7 (anytime, anywhere) access to information posted in weblogs.
- No special blogging software is needed to create a weblog

BENEFITS

- The first and foremost benefit of weblogs in higher education institutions is their use as e-learning tools. This way, the teaching-learning process can continue outside the classroom.
- Weblogs features (linking, replying, and tracking) make easier sharing knowledge and information.
- Discussions in weblogs promote higher levels of thinking, because people can think before answering back.
- Collaborative weblogs support team work and group learning.

- Because of its format similar to that of a personal diary, weblogs encourage informal communication, creativity and self-expression.
- Accuracy of project outcomes increases due to the continuous flow of feedback from the teacher and fellow students from the weblog.
- Also, teachers may benefit from the possibility of monitoring projects in real time, thus indicating improvements before it is too late for the students to incorporate them.
- Final grading is faster and easier: instructors are able to review how students have participated and developed over the course.
- For non-computer science students, weblogs provide the chance of learning about web page creation, hyper linking and other www topics.
- Writing in weblogs is attractive in the sense that teens and college students, and people in general, want an opportunity to share their experiences and feelings, and weblogs provide them with the chance to do it in a easy, interactive way.
- The use of weblogs (new technologies) prepares students better for the current labour market.
- In those courses where there are many instructors and students, weblogs improve coordination and allow interaction to a far greater extent.
- Different instructors and students from different parts can share a weblog and teach and learn together.

CHALLENGES

1. Instructors may have difficulty in assessing student participation in the weblog. There are several indicators to take into account: group grading, individual posting, quality of posts, etc., as well as subjectivity vs. qualitative appreciations.
2. The use of technology-based tools may be another barrier. It can be of a structural nature, for instance lack of computers, or difficult access to the Internet (as happens in Spain where the Internet connection is quite expensive and slow). Another source of disadvantage would be computer illiterate users, especially in those countries with a wide digital divide.
3. Even though most weblogs are hosted in public, free ASPs, learning weblogs should be hosted in private servers, so that they do not show neither advertisements nor banners (which are the most common method of ASPs financing).

4. System administrators tend to be restrictive in installing new software.
5. If the weblog is public, it may suffer troll infestations, people that intentionally try to cause disruption by posting messages that are inflammatory, insulting, incorrect, inaccurate, or off topic, with the intent of provoking a reaction from others.

CONCLUSION

Positive impacts on learning through blogging, such as active knowledge construction and reflective writing, have been reported. Actually, many benefits can be sought for both teachers and students, although a careful use of these resources is needed in order to avoid technology misuses. For instance, the use of weblogs may increase the time spent in managing the course compare to traditional courses. The lesson learnt is that technology is a tool, not a goal.

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Chapter 11

BLENDED LEARNING

*Lydia J. David**

INTRODUCTION

Time has taken its toll on almost everything. Right from the gadgets that have made its absence unimaginable, up to the areas where its impact was not predicted until it so happened, education is one such field which has taken its lead parallel to most fields that are techno-driven. Comparing to the conventional methods of education, the progressive pattern of tutoring is by all means technophile. By definition, learning in itself is a complex amalgamation, classification or itemisation of the acquired knowledge and transfer of skill, along with experience which in turn projects in behaviour initiating a varied choice in preferences and values. An individual inevitably partakes either consciously or unconsciously in this learning process through education attained in schooling, communication with peers and elders, or self-obtained education through the process of observation and experimentation. An average learner would construct on materials put together to form content and bits of information transforming raw and unsubstantiated information into furnished matter. The innovative advancements made towards the field of education is extensively inclined towards bringing the internet into the picture. Apart from checking mails or surfing the web for information, the World Wide Web is used to serve purposes that can be made to conduct combined studies in a classroom set up just as similar as an actual classroom environment. This is where blended learning comes into the picture turning the tables from teacher-centred educating to student-centred form of education.

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LEARNING METHODS OF BLENDED LEARNING

1. Face-to-Face Model: Of all the blended learning models, face-to-face method is one that matches most to a typical classroom learning environment of the traditional learning method. By this model, only those who excel above the average grades and those who require supplementary notes apart from what they receive in class, get awarded by this method.
2. Rotation Model: In this form of blended learning, students rotate between working online or spending face-to-face time at a physical classroom. This model may not seem so likely in India but has wide prevalence within US and other developing parts of the world.
3. Flex Model: Content is purely delivered online by this model. Teachers are present online to produce help and clarification. Learning is primarily self-guided and thus students are given liberty to enhance their learning in self pace.
4. Online Lab Model: As schools face increasingly tighter resource constraints, the online lab model of blended learning is a complementary option for helping students complete courses, including those that are elaborated on in the school syllabi. Adults monitor the lab and this way the students are given an opportunity to make the best use of their labs and attain extra information in order to complete their lab portions which in turn gives them an edge over other students who fail to look it up in the net.
5. Self-Blend Model: The self-blend model of blended learning gives students the opportunity to take classes beyond what is already delivered at their school. While these individuals will attend a traditional school environment, they also opt to supplement their learning through online courses. Self-blend model helps students who prefer to attain course online for placement.
6. Online Driver Model: Although face-to-face check-ins are not mandatory, students have the privilege to consult with their tutors for any online check-ins if necessary. This model of blended learning is ideal for students who need more flexibility and independence in their daily schedules.

The table states the use of students falling under different blended learning methods used in various scenarios and their outcomes, respective to the student's responses and the added benefits of the models. (The data for the below table is collected through the interview method).

Type of blended learning methods used	% of students utilizing the method	Response (positive, negative or neutral)	Reasons for response and use	Major advantage Of the method
Face to face method	100%	positive	It is the traditional mode of educating and cannot be abolished completely; It is made mandatory in almost all schools and universities	Deliver most of the content in person within a physical environment
Rotation method	80%	neutral	It is somewhat recognized in the current educating pattern for assignment submissions and so on.	Provides with self attained information and gives opportunity to collect information through research
Flex method	5%	negative	It is not that prevalent and needs to be made aware of to the students	Lets the students attain further notes if not received through classroom lectures for possible further in depth study
Online labs method	10%	positive	It is very effective and helps make lab experience enriching	It is made to facilitate the students with hands- on knowledge as well as theoretical knowledge for lab works
Self blend method	45%	positive	It gives the student extra insight into the traditional classroom curriculum	Gives the students a chance to make extra marks and get better insight into the courses delivered in the traditional classroom

Type of blended learning methods used	% of students utilizing the method	Response (positive, negative or neutral)	Reasons for response and use	Major advantage Of the method
Online drive	3%	Neutral/ negative	It is not necessary needed in the current scenario as face to face method is widely prevalent	Permits students to work remotely as well as have face to face check ins if necessary

Types of Learning and Teaching Patterns Integrated In Blended Learning

Face to face	Live online	coaching	Collaboration and communication	multimedia	Web-based coaching	performance
Physical classroom	Virtual classroom	Coaching	Portal site	Video streaming	Internet/ intranet	Knowledge management
Field trips	webinars	mentoring	blog	podcasts	Self-paced tutorial	Mobile and wireless
lab			wiki	Distance learning	games	
			Chat/IM	CD/DVD		
			Threaded discussion			

*(source taken from languageteachingtips.wordpress.com)

OBJECTIVE

The aim for conducting a study on the effect of blended learning is to discover its reach within the student community and evaluate its worth in the current teaching perspectives. After completing the survey we will get an insight into the overall strength of the students using ICTs for attaining interactive and logical education compared to that of the traditional methods of educating. With information and communication technology making its strides into the realms of present education, this form of convergence makes the students receive one of the best forms of innovative instructing. The integration of ICT or educational technology which is "the study and ethical

practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources." According to a Wikipedia reference. It is most likely that many schools and universities promote the use of such technological evolution to blend with education in mainstream instructing mechanisms so as to engineer a sense of developing independency among the 21st century students equipping them with skills to self assess and explore information from large knowledge banks.

METHODOLOGY

The method used here is an objective method of interviewing students and handing out questionnaires for further evaluation. Students of various age groups and of different fields have been selected. Each student has been asked 10 questions for which their responses are cumulated and put in the form of a tabular representation. it gives an insight into how the students learn and what are reasons behind the usage of these methodologies. A three point questionnaire made to investigate their study cycle and academic fulfilment will be made and later analysed. The questions were all closed ended questions without the need for any elaboration. The focus for the research will be on a variety of handpicked students pursuing different courses and with varied learning methods who have also attained high grades in their academics.

FINDINGS AND RESULT

1. Does the traditional teaching method deliver holistic knowledge on subjects that you pursue?
   Yes - 40%
   Somewhat - 40%
   No - 20%
2. Can online courses make up for the lack of notes delivered in classes?
   Yes - 80%
   Somewhat - 20%
   No - Nil
3. Is there acceptance by the staffs who provide traditional modes of instructing to promote one to focus their attention on online studies?
   Yes - 50%
   Somewhat - 30%
   No - 20%

4. Are the courseware that supplement to the regular study material enriching and disqualify the need for a face to face classroom environment?
   Yes - 80%
   Somewhat - 10%
   No - 10%

Major online courses suggestion	Activities for online study	(least used-YES-3)	(somewhat used-2)	(most used-NO-1)
REFLECTIONS	blog	40%	30%	30%
	Participant self evaluation	60%	30%	10%
CHAT	Q and A	nil	30%	70%
	Private small discussions	nil	20%	80%
	Scavenger hunt	80%	10%	10%
	Guided discussion	20%	20%	70%
COLLABORATIVE PROJECTS	Voice threads	90%	10%	nil
	Research projects	nil	10%	90%
	Collaborative paper	nil	20%	80%
VISUAL MEETING	Examples, eliminate	nil	nil	100%
	Discussing collaborative	40%	30%	30%
	Project work	nil	nil	100%

CONCLUSION

While blended learning makes its mark on the current education front, it is undeniable that there is strong need for tutors and lectures to make the best of these blended learning mechanisms. Students have a strong urge to build up on the facts and knowledge they receive through self gained exploration and this way they enter a dimension where the education that is sought to better their lives can be delivered in means that

caters to giving them holistic satisfaction. Installing a few dozen or more computers into classrooms will not bring blended learning into effect. It needs to be brought about by student's self motivation along with tutors and lectures who are willing to take extra efforts to build up tutorials and courseware online, supplementing the student's academic performance in a general classroom and also give them the independency and interest to explore information as a commodity that can be self attained and not merely ingested through authoritative methods.

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Chapter 12

A STUDY ON AWARENESS ABOUT E-LEARNING AMONG ARTS COLLEGE TEACHERS IN ERODE DISTRICT

Dr. T. Malliga* and M. Arunasalam,**

ABSTRACT

E – learning is a combination of content and instructional methods delivered by media elements such as words and graphics on a computer intended to build job – transferable knowledge and skills linked to individual learning goals. Present study states the identification of the level of awareness of arts college teachers about E- learning and its effective implementation in teacher's profession in a relatively short period to make developing country to a well-developed technology oriented country in education through e- learning. The investigator used normative survey in this study to collect data from arts college teachers in Erode district in the selected colleges. E- Learning perceptual survey questionnaire was framed with 35 items on yes or no scale and used for collecting data with random sample of 300 academic staff of Erode district. The researcher recommended that the teacher should be well-trained in handling internet and they should avoid fear in use of new technology for interaction.

INTRODUCTION

E-learning is the future of learning. The significant impact of E- learning is still being explored. Educators are constantly seeking new approaches to capture the attention of students, where as students are motivated and

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have the thirst for continuous learning using different tools of E-learning. To have an optimistic look towards E-learning, teachers are expected to work competently and confidently with new technologies. E- learning has emerged as an essential requirement to meet the challenges trodden by the development of information technology and its potential for greater access to knowledge.

DEFINITION OF E-LEARNING

E-learning is defined as, 'electronic learning through an electronic interface by a software which acts as a platform where learning material is shared'. Also it can be defined as, 'learning facilitated and supported through the use of information and communication technology. It is an interactive learning concept in which the learning content is available online and provides automatic feed back to learning activities.

SIGNIFICANCE OF E- LEARNING

E – learning is a combination of content and instructional methods delivered by media elements such as words and graphics on a computer intended to build job – transferable knowledge and skills linked to individual learning goals. It is dynamic, operates in real time, empowering, comprehensive, effective and quick. It covers a wide set of applications such as web based learning, computer based learning, virtual classroom and digital collaboration.

NEED FOR THE STUDY

With the growth of mass education and international markets, institutions are finding there is a real need to review the infrastructures and methods that support both teaching and student learning. The growth in information technologies and the development of a whole new communication media and culture, impacts on all aspects of society via the internet and world wide web with E- learning students will learn up to twice as much as in half the time that they would do in classroom. In general learning, every instructor has his or her own style, which may not be best for student learning. But with E-learning, the course is software driven and each student receives the same high quality content.

STATEMENT OF THE PROBLEM

The problem is **"A STUDY ON AWARENESS ABOUT E-LEARNING AMONG ARTS COLLEGE TEACHERS IN ERODE DISTRICT".**

OBJECTIVES OF THE STUDY

1. To find out the awareness of arts college teachers about E- learning
2. To find out the difference in the awareness about E-learning among arts college teacher with regard to locality of the residence
3. To find out the difference in the awareness about E-learning among arts college teacher with regard to gender.
4. To find out the difference in the awareness about E-learning among arts college teacher with regard to subject handled.
5. To find out the difference in the awareness about E-learning among arts college teacher with regard to internet connection in their home.
6. To find out the difference in the awareness about E-learning among arts college teacher with regard to experience in college.

HYPOTHESIS OF THE STUDY

1. There is no significant difference in the awareness about E-learning among arts college teacher with regard to locality of the residence
2. There is no significant difference in the awareness about E-learning among arts college teacher with regard to gender.
3. There is no significant difference in the awareness about E-learning among arts college teacher with regard to subject handled.
4. There is no significant difference in the awareness about E-learning among arts college teacher with regard to internet connection in their home.
5. There is no significant difference in the awareness about E-learning among arts college teacher with regard to experience in college.

METHODOLOGY IN BRIEF

The investigator used normative survey in this study to collect data from arts college teachers in Erode district in the selected colleges. E-Learning perceptual survey questionnaire was framed with 35 items on yes or no scale and used for collecting data with random sample of 300 academic staff of Erode district.

SAMPLE

A total of 300 teachers were selected as a sample from 5 arts college in Erode district, for the study .Out of this teachers 103 teachers were male, 197 teachers were female. 180 teachers were coming from urban area,

120 were coming from rural area. The following table gives the details of teachers selected for the study.

For the present study, the investigator selected the sample using one of the restricted sampling procedures namely "**Random Sampling".**

STATISTICAL TECHNIQUES USED

The statistical techniques applied in this research were Descriptive measures (Mean and Standard deviation) and Differential measures (t) test and (F) test.

ANALYSIS AND INTERPRETATION OF DATA

Table 1 Difference Between Mean Scores of Awareness About E-Learning Based on Eleven Sub-Samples

Variables	Category	N	Mean	SD	't' value	Significance at 5% level
Location	**Rural**	**159**	**19.08**	**4.51**	**12.12**	**Significant**
	Urban	**141**	**25.41**	**4.52**		
Gender	**Male**	**52**	**25.71**	**3.90**	**6.93**	**Significant**
	Female	**248**	**21.25**	**5.49**		
Internet Connection in their home	**Yes**	**126**	**25.62**	**4.55**	**11.45**	**Significant**

Table 2 Difference Between Mean Scores Of Awareness About E-Learning Based On Subject Handled And Experience In College

Variables	Sources of Variance	df	SS	MSS	F value	Remarks
Subject Handled	Between Groups	4	1987.14	496.79	15.42	Significant
	Within Groups	295	9504.77	32.22		
Experience in College	Between Groups	2	2272.466	1136.233	48.48	Significant
	Within Groups	297	6961.201	23.43839		

FINDINGS

1. There is significant difference in the awareness about E-learning among arts college teacher with regard to locality of the residence. Compared to rural, urban teachers have better awareness about e-learning.
2. There is significant difference in the awareness about E-learning among arts college teacher with regard to gender. Compared to male, female teachers have better awareness about e-learning.
3. There is significant difference in the awareness about E-learning among arts college teacher with regard to subject handled. Computer science teachers have more awareness than other subject teachers like English, Tamil, Mathematics and Commerce.
4. There is significant difference in the awareness about E-learning among arts college teachers with regard to internet connection in their home.
5. There is significant difference in the awareness about E-learning among college teachers with regard to experience in college. Teachers having less than 5 years experience have more awareness than those who have more than 5 years and 10 years experience.

RECOMMENDATIONS

1. From the analysis of the present study, the investigator wishes to recommend the following.
2. Exposure of Information Technology is very much essential for the teachers in all classes.
3. Internet using must not be the optional one in curriculum, but it should be compulsion.
4. Use of internet latest information in preparation of modules.
5. All educational institutions should have the provision for Net based learning environment.
6. The teacher should be well-trained in handling internet.
7. Teacher should avoid fear in use of new technology for interaction.
8. Teachers should encourage the students to use technology for learning.
9. E-Learning would develop the teacher to know to gain more knowledge and help them to do analysis in deep.

CONCLUSION

As E-learning is definitely a growing field in educational and training market and E-learning standard is a new emerging area, there are many challenges in implementation of undergoing technological change and development. The present study found that the arts college teachers have a favorable awareness about E-learning. However, supporters of E-learning are always looking forward some new development as student's expert from teachers. Technology advancement will continue to reshape learning over the internet with increasing use of advanced tool and techniques which will make the system more attractive and interactive for learner that will help to build a learner centric platform in this environment.

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Chapter 13

DESIGNING QUALITY E-LEARNING ENVIRONMENTS IN HIGHER EDUCATION

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INTRODUCTION

Higher educational institutions are increasingly moving toward the use of the Internet for delivery of their courses, both on-campus and at a distance (Ally, 2004, p. 5; Kim & Bonk, 2006). The Internet provides significantly different and interesting possibilities for computer-meditated communication and learning from other forms of educational technologies (Weller, 2002, p. 34). Some lecturers utilise the class website for the teaching of specific skills and knowledge through automated pre-programmed online activities that can provide specific feedback to students' answers. There are, therefore, ways in which e-learning environments may be utilized based upon pedagogical needs.

PEDAGOGICAL PHILOSOPHY AND INSTRUCTIONAL STRATEGY FOR E-LEARNING

Ally (2004) argued that in order to promote higher-order thinking through technology-based learning environments, instructional strategies which promote learners to make connections with new information to old, acquire meaningful knowledge, and employ metacognitive thinking skills are required within the e-learning environment. This requires an analysis of the learner, the learning context and the learners' specific learning needs. Students may be required to learn a set of principles within a discipline area and integrate previously learned knowledge with new knowledge by

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employing techniques such as advanced organizers, worked-out examples, and elaborative questions.

DIMENSION FOR UNDERLYING PEDAGOGICAL PHILOSOPHY INSTRUCTIONAL DESIGN PROCESSES FOR E-LEARNING

Caplan (2004) and Davis (2004) described how, in an ideal world, educators, instructional designers, e-learning media developers and graphic designers all work together to create pedagogically effective learning environments that are grounded in sound learning theories. In many cases, however, the lecturer is often left without this team support and resources. There are, however, aspects of the instructional design process that the lecturer needs to consider when creating pedagogically effective e-learning environments regardless of the available resources.

INSTRUCTIONAL DESIGN ANALYSIS

The development of online learning environments needs to draw upon the vast body of knowledge relating to instructional design models for the analysis of instruction, the learners (background, prior knowledge, motivation, etc.), the learning context, development of an instructional strategy, and evaluation. A lecturer requiring students to learn a particular concepts will take into account the learning environment in which this understanding will be demonstrated, the students' characteristics (e.g., their prior knowledge and motivation to learn). The lecturer will then develop an instructional strategy which will employ online learning technologies to assist with achieving this instructional goal, or he/she may adopt a constructivist learning environment where students combine new learning with existing knowledge and the learning experiences are authentic depictions of existing practices. The lecturer may develop formative and/or summative evaluations to identify how to improve the instruction and to determine the overall effectiveness of the instruction.

DIMENSION FOR INSTRUCTIONAL DESIGN ANALYSIS CONTENT

The detail and extent of the content provided to students may vary depending upon the students' pedagogical needs. Students studying entirely online must have access to all of the unit content including the learning outcomes, assignment requirements and relevant resources. Students attending face-to-face classes may receive the content in class and additional content on the supplemental class website. Students studying

a first year undergraduate unit in mechanical engineering need to have an understanding of the underlying principles and, therefore, the content needs to be complete, relevant and accurate.

PEDAGOGICAL DIMENSION FOR CONTENT PROVIDED ONLINE INFORMATION AND DELIVERY MODEL DIMENSION FOR ONLINE UNIT INFORMATION AND DELIVERY MODE STUDENT MOTIVATION IN E-LEARNING

The amount of information to provide on a class website may be determined by the delivery mode. If a unit is to be delivered entirely online, then the website must include all the information needed for students' successful completion of the unit including appropriately detailed content, learning activities, assignment requirements, and supporting materials. Students in remote locations with unreliable Internet access may need to receive a copy of the entire unit's information in paper-based and possibly CD-ROM format as a backup.

PEDAGOGICAL DIMENSION FOR STUDENT MOTIVATION LECTURER'S ROLE IN E-LEARNING

Students enrolled in higher education courses come from a variety of backgrounds and have different reasons for studying. While it is generally accepted that online learning designers should use intrinsic motivation strategies, extrinsic motivation may also be used. A university student may be extrinsically motivated in only doing what is required in order to pass units without a significantly deep interest for the subject. Students studying in distance mode need to feel that they are part of a group of learners and are able to obtain assistance with the unit's requirements and technical difficulties.

LECTURER'S ROLE AND AVAILABILITY

The lecturer's role is an important factor in the design of technology-based environments in that various roles can be supported. While there is much written about how e-learning technologies can facilitate greater interaction and collaboration for students and their lecturer in the teaching and learning process (e.g., Maor, 2003), there are several facets of the role of the lecturer that can impact upon how e-learning environments are developed and delivered. The following discusses the considerations that developers and lecturers need to take into account for each of these facets when designing e-learning environments.

DIMENSION FOR LECTURER'S ROLE AND AVAILABILITY

The lecturer's role is an important factor in the design of online learning environments in that various roles can be supported (Reeves & Reeves, 1997). A lecturer with a unit of first year undergraduate students may need to assume a didactic role in order to guide students' learning. This lecturer needs to be available at regularly scheduled times to assist students with the learning activities and for clarifying concepts. For students not required to attend face-to-face delivered classes, lecturers may consider scheduling face-to-face sessions depending upon the students' needs to discuss the content and assignment requirements. A lecturer with postgraduate students studying entirely online may assume a facilitative role and be available to assist students as required either through online communication facilities or via telephone. Lecturers should routinely check the online communication facilities for new postings and provide prompt and adequate replies to student questions.

LECTURER'S PERCEPTION OF IMPORTANCE TOWARDS ONLINE LEARNING

How lecturers perceive the importance of online learning will influence how online learning is utilized and integrated into their teaching practices. Lecturers with a low perception of the importance of online learning may not fully consider how to apply online strategies to enhance their students' learning. Lecturers with high perceptions of the importance of online learning may explore integrating learning strategies utilizing online technologies such as automated interactive activities. Learning strategies may be developed for encouraging students to utilize online communication facilities such as conducting discussions about specific topics and discussion based on issues relating to their assignments. Lecturers may also encourage students to maintain a reflective journal to record what they have learned through collaborative learning.

DEVELOPMENT OF LEARNING STRATEGIES

Instructional design decisions can influence and encourage different learning strategies that can be used by students. The development of content for online learning may include specific learning strategies for building new knowledge upon previously learned knowledge. A lecturer with a first year undergraduate group of students may encourage students to work collaboratively in finding specific information on the Internet and report their findings to the rest of the class via the bulletin board. Students

may also be encouraged to share their thoughts regarding the content and assignments via communication facilities. If students are working in an on-campus computer laboratory, they may be encouraged to interact with each other through online chat while solving particular problems. A lecturer with postgraduate students may encourage them to develop their own learning strategies for a particular problem, and to encourage them to maintain a reflective journal to record their successes and barriers to their learning. The lecturer may develop discrete strategies for observing successful online learning strategies developed by students. Observational strategies may include observing students as they study in the on-campus computing laboratories and monitoring the bulletin board messages.

FEEDBACK

Students are increasingly expecting more reliable and valid assessment with prompt feedback on their performance. The amount and type of feedback students require will vary depending upon student need and level of engagement with the learning materials. A postgraduate student working on a doctoral thesis will usually ask for feedback as required and may initiate online contact with other postgraduate students regarding issues relating to their enquiry. A first year student studying an undergraduate unit will require feedback relating to the subject matter and more likely, assignment requirements. The lecturer, through the encouragement of specific learning strategies, may control the feedback provided to these students.

CONCLUSION

This model accommodates the various students' pedagogical and delivery needs which occur in higher education. While the IDOL model is presented within a typical instructional design format including the analysis, strategy development and evaluation phases, it is not designed to replace any particular instructional design model. It is designed to work alongside other instructional design models in order to ensure that decisions made at the instructional design phase take into account decisions which are specific to the development of pedagogically effective e-learning environments. While the development and utilization of online learning technologies continues to grow to include more sophisticated virtual environments for learning, the pedagogical dimensions presented here will undoubtedly need ongoing revision that is informed by ongoing research into quality e-learning.

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Chapter 14
E-LEARNING

T. Mariselvam*

INTRODUCTION

E-learning refers to the use of technology in learning and education. There are several aspects to describing the intellectual and technical development of e-learning, which can be categorized into discrete areas. These are addressed in turn in the sections of this article:

1. e-learning as an **educational approach** or tool that supports traditional subjects;
2. e-learning as a **technological medium** that assists in the communication of knowledge, and its development and exchange;
3. e-learning itself as an **educational subject**; such courses may be called "Computer Studies" or "Information and Communication Technology (ICT)";
4. e-learning **administrative tools** such as education management information system (EMIS).

EDUCATIONAL APPROACH

The extent to which e-learning assists or replaces other learning and teaching approaches is variable, ranging on a continuum from none to fully online distance learning. A variety of descriptive terms have been employed (somewhat inconsistently) to categorize the extent to which technology is used. For example, 'hybrid learning' or 'blended learning'

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may refer to classroom aids and laptops, or may refer to approaches in which traditional classroom time is reduced but not eliminated, and is replaced with some online learning. 'Distributed learning' may describe either the e-learning component of a hybrid approach, or fully online distance learning environments.

SYNCHRONOUS AND ASYNCHRONOUS

E-learning may either be synchronous or asynchronous. Synchronous learning occurs in real-time, with all participants interacting at the same time, while asynchronous learning is self-paced and allows participants to engage in the exchange of ideas or information without the dependency of other participants′ involvement at the same time.

Synchronous learning involves the exchange of ideas and information with one or more participants during the same period of time. A face-to-face discussion is an example of synchronous communications. In e-learning environments, examples of synchronous communications include online real-time live teacher instruction and feedback, Skype conversations, or chat rooms or virtual classrooms where everyone is online and working collaboratively at the same time.

Asynchronous learning may use technologies such as email, blogs, wikis, and discussion boards, as well as web-supported textbooks, hypertext documents, audio video courses, and social networking using web 2.0. At the professional educational level, training may include virtual operating rooms. Asynchronous learning is particularly beneficial for students who have health problems or have child care responsibilities and regularly leaving the home to attend lectures is difficult. They have the opportunity to complete their work in a low stress environment and within a more flexible timeframe. In *asynchronous* online courses, students proceed at their own pace. If they need to listen to a lecture a second time, or think about a question for a while, they may do so without fearing that they will hold back the rest of the class. Through online courses, students can earn their diplomas more quickly, or repeat failed courses without the embarrassment of being in a class with younger students. Students also have access to an incredible variety of enrichment courses in online learning, and can participate in college courses, internships, sports, or work and still graduate with their class.

Both the asynchronous and synchronous methods rely heavily on self-motivation, self-discipline, and the ability to communicate in writing effectively

COLLABORATIVE LEARNING

Computer-supported collaborative learning (CSCL) uses instructional methods designed to encourage or require students to work together on learning tasks. CSCL is similar in concept to the terminology, "e-learning 2.0".

Collaborative learning is distinguishable from the traditional approach to instruction in which the instructor is the principal source of knowledge and skills. For example, the neologism "e-learning 1.0" refers to the direct transfer method in computer-based learning and training systems (CBL). In contrast to the linear delivery of content, often directly from the instructor's material, CSCL uses blogs, wikis, and cloud-based document portals (such as Google Docs and Dropbox). With technological Web 2.0 advances, sharing information between multiple people in a network has become much easier and use has increased. One of the main reasons for its usage states that it is "a breeding ground for creative and engaging educational endeavors."

Using Web 2.0 social tools in the classroom allows for students and teachers to work collaboratively, discuss ideas, and promote information. According to Sendall (2008 blogs, wikis, and social networking skills are found to be significantly useful in the classroom. After initial instruction on using the tools, students also reported an increase in knowledge and comfort level for using Web 2.0 tools. The collaborative tools also prepare students with technology skills necessary in today's workforce.

Classroom 2.0

Classroom 2.0 refers to online multi-user virtual environments (MUVEs) that connect schools across geographical frontiers. Also known as "eTwinning", computer-supported collaborative learning (CSCL) allows learners in one school to communicate with learners in another that they would not get to know otherwise, enhancing educational outcomes and cultural integration. Examples of classroom 2.0 applications are Blogger and Skype.

E-learning 2.0

E-learning 2.0 is a type of computer-supported collaborative learning (CSCL) system that developed with the emergence of Web 2.0. From an e-learning 2.0 perspective, conventional e-learning systems were based on instructional packets, which were delivered to students using assignments. Assignments were evaluated by the teacher. In contrast, the new e-learning places increased emphasis on social learning and use of social software such as blogs, wikis, podcasts and virtual worlds such as *Second Life*. This phenomenon has also been referred to as Long Tail Learning.

In addition to virtual classroom environments, social networks have become an important part of E-learning 2.0. Social networks have been used to foster online learning communities around subjects as diverse as test preparation and language education. Mobile Assisted Language Learning (MALL) is the use of handheld computers or cell phones to assist in language learning. Traditional educators may not promote social networking unless they are communicating with their own colleagues.

Audio

The radio has been around for a long time and has been used in educational classrooms. Recent technologies have allowed classroom teachers to stream audio over the internet. There are also webcasts and podcasts available over the internet for students and teachers to download. For example, iTunes has various podcasts available on a variety of subjects that can be downloaded for free.

Video

Videos allow teachers to reach students who are visual learners and tend to learn best by seeing the material rather than hearing or reading about it. Teachers can access video clips through the internet instead of relying on DVDs or VHS tapes. Websites like YouTube are used by many teachers. Research on the use of video in lessons is preliminary, but early results show an increased retention and better results when video is used in a lesson.

COMPUTERS, TABLETS AND MOBILE DEVICES

Computers and tablets allow students and teachers' access to websites and other programs, such as Microsoft Word, PowerPoint, PDF files, and images. Many mobile devices support m-learning.

Blogging

Blogs allow students and teachers to post their thoughts, ideas, and comments on a website. Blogging allows students and instructors to share their thoughts and comments on the thoughts of others which could create an interactive learning environment.

Webcams

The development of webcams and webcasting has facilitated the creation of virtual classrooms and virtual learning environments. Virtual classrooms supported by such technology are becoming more and more popular, especially since they are contributing as a main solution to solving problems with travel expenses.

Whiteboards

Interactive whiteboards, similar in use to "smartboards", allow teachers and students to write on the touch screen, so learning becomes interactive and engaging.

Screen Casting

Screen casting is a recent trend in e-learning. There are many screen casting tools available that allow users to share their screens directly from their browser and make the video available online so that the viewers can stream the video directly. The advantage of such tools is that it gives the presenter the ability to show his ideas and flow of thoughts rather than simply explain them, which may be more confusing when delivered via simple text instructions.

Virtual Classroom

Virtual Learning Environments (VLE), also known as learning platforms, utilize virtual classrooms and meetings which often use a mix of communication technologies. One example of web conferencing software that enables students and instructors to communicate with each other via webcam, microphone, and real-time chatting in a group setting, are GoToTraining, WebEx Training or Adobe Connect, which are sometimes used for meetings and presentations. Participants in a virtual classroom can raise hands, answer polls or take tests. Students are able to 'write on the board' and even share their desktop, when given rights by the teacher. Other communication technologies available in a virtual classroom include text notes, microphone rights and mouse control.

The virtual classroom also provides the opportunity for students to receive direct instruction from a qualified teacher in an interactive environment. Students have direct and immediate access to their instructor for instant feedback and direction. The virtual classroom also provides a structured schedule of classes, which can be helpful for students who may find the freedom of asynchronous learning to be overwhelming.

ELECTRONIC PERFORMANCE SUPPORT SYSTEMS (EPSS)

An Electronic Performance Support System is, according to Barry Raybould, "a computer-based system that improves worker productivity by providing on-the-job access to integrated information, advice, and learning experiences" (Raybould, 1991).Gloria Gery defines it as "an integrated electronic environment that is available to and easily accessible by each employee and is structured to provide immediate, individualized on-line access

to the full range of information, software, guidance, advice and assistance, data, images, tools, and assessment and monitoring systems to permit job performance with minimal support and intervention by others." (Gery, 1989).

ADVANTAGES OF E-LEARNING

- Improved open access to education, including access to full degree programs
- Better integration for non-full-time students, particularly in continuing education,
- Improved interactions between students and instructors,
- Provision of tools to enable students to independently solve problems,
- Acquisition of technological skills through practice with tools and computers.
- No age-based restrictions on difficulty level, i.e. students can go at their own pace.

DISADVANTAGES OF E-LEARNING

- Ease of cheating,
- Bias towards tech-savvy students over non-technical students,
- Teachers' lack of knowledge and experience to manage virtual teacher-student interaction,
- Lack of social interaction between teacher and students,
- Lack of direct and immediate feedback from teachers,
- Asynchronic communication hinders fast exchange of question,
- Danger of procrastination.

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Chapter 15

INSTRUCTIONAL PHASES OF COLLABORATIVE LEARNING - AN INTRODUCTION

Navaneetham. S.*

EDUCATION

Education is the process to develop the mind to use the past and present knowledge to solve the problems met by the human being. In the olden days, education was considered only as the transformation of knowledge from the teachers to the students. But nowadays it is believed to be the modification of behavior through learning experiences provided by the teacher both inside and outside the school environment.

COLLABORATIVE LEARNING

Collaborative learning is a situation in which two or people learn or attempt to learn something together. More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing and take on asymmetry roles. Collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other.

Collaborative learning is heavily rooted in Vygotsky's views that there exists an inherent social nature of learning which is shown through his theory of zone proximal development. Often, collaborative learning is used as an umbrella term for a variety of approaches in education that involve

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joint intellectual effort by students or student teachers. Thus, collaborative learning is commonly illustrated when groups of students work together to search for understanding, meaning, or solutions or to create an artifact or product of their learning. Further, collaborative learning redefines traditional student-teacher relationship in the classroom which results in controversy over whether this paradigm is more beneficial than harmful.

Collaborative learning is a philosophy of interaction and personal lifestyle whereas cooperation is a structure of interaction designed to facilitate the accomplishment of an end product or goal. Collaborative learning (CL) is a personal philosophy, not just a classroom technique.

ELEMENTS OF COLLABORATIVE LEARNING

There are five elements of collaborative learning:

1. Clearly perceived positive interdependence
2. Considerable interaction
3. Individual accountability and personal responsibility to achieve group goals
4. Use of the relevant interpersonal and small group skills
5. Frequent and regular group processing of current functioning to improve the group's future effectiveness

PHASES IN COLLABORATIVE LEARNING

Instructional Phases of Collaborative Learning

In the Collaborative Learning Model described by Reid et al. (1989), there are five phases for designing instruction for collaborative learning: engagement, exploration, transformation, presentation, and reflection.

In the "engagement" phase, the teacher sets the stage by providing the class with a collaborative activity. It is important that this task be designed in such a way that it not only provides the basis for ensuing necessary group activities, but also brings home a sense of ownership to its learners.

In the "exploration" phase, students work on the initial exploration of ideas and information. Teachers have to decide how much input should be given for the learning task, and how much should be left to the resourcefulness of the students. To encourage group interdependence at this stage, teachers can ask students in teams to demonstrate their learning using different response modes. K-W-H-L-S is one of many strategies that can be used with students of all ages and levels to help insure that every

student pursues goals that are individually beneficial and yet congruent with the group's common goal in the learning activity. The basic components of the K-W-H-L-S strategy are:

K: What I know (e.g., information on what I already know about advertisements)

W: What I want to learn (e.g., information on advertising strategies)

H: How I will learn it and work with others to attain mutual goals (e.g., bring in information, share ideas and compare perspectives)

L: What I learned (e.g., evaluating what I have found out and how I can use this information)

S: How I shared, or will share what I have learned from others (e.g., writing up a joint report or opinion piece for publication in a magazine)

The third phase has to do with the "transformation" of knowledge. This is where students in their learning groups engage in activities to "reshape" the information by organizing, clarifying, elaborating, or synthesizing learning concepts. It is crucial for this stage of learning that tasks require discussion and contribution from all group members.

In the "presentation" phase, student groups have the opportunity to present their findings to an interested and critical audience. It is possible to structure the main activity in a way that would entail having different student groups contribute their findings to make up a bigger learning outcome (e.g., different sections of a proposal). A significant consideration at this stage is to ensure that the audience for the presentation is authentic and can provide responsive feedback to the information generated by the groups' efforts. This can be done with critical peer groups or with expert groups that have a genuine interest in the findings of the presentation. In the above example, the reading group that reviews sales literature and analyzes advertising strategies can now write an article for a consumer awareness magazine on what they have collaboratively learned about the influence of advertising on public buying.

The last phase of the group learning activity is "reflection." Here, students analyze what they have learned, identify strengths and weaknesses in the learning processes they went through, and offer constructive ideas on how their learning can be improved. Student reflection should be done both individually and collaboratively, and they need to analyze individual as well as group learning processes. For that purpose, teachers may construct individual and group guidelines.

CHARACTERISTICS OF COLLABORATIVE LEARNING

Research indicates successful learning also involves an interaction of the learner, the material, and the teacher. This is the framework of collaborative learning in the educational setting.

The characteristics of a collaborative classroom that you could benefit from are the sharing between teacher and students, sharing planning responsibilities, grouping of students, and the roles of the students and teacher.

BENEFITS OF COLLABORATIVE LEARNING

- Develops higher level thinking skills
- Promotes student-faculty interaction and familiarity
- Increases student retention
- Builds self-esteem in students
- Enhances student satisfaction with the learning experience
- Promotes a positive attitude toward the subject matter
- Develops oral communication skills
- Develops social interaction skills
- Promotes positive race relations
- Creates an environment of active, involved, exploratory learning
- Uses a team approach to problem solving while maintaining individual accountability
- Encourages diversity understanding
- Encourages student responsibility for learning
- Involves students in developing curriculum and class procedures
- Students explore alternate problem solutions in a safe environment

USES OF COLLABORATIVE LEARNING

- Develops higher level thinking skills
- Promotes student-faculty interaction and familiarity
- Increases student retention
- Builds self-esteem in students
- Enhances student satisfaction with the learning experience
- Promotes a positive attitude toward the subject matter

- Develops oral communication skills
- Develops social interaction skills
- Promotes positive race
- Creates an environment of active, involved, exploratory learning
- Fosters team building and a team approach to problem solving while maintaining individual accountability
- Encourages diversity understanding
- Encourages student responsibility for learning
- Involves students in developing curriculum and class procedures
- Students explore alternate problem solutions in a safe environment
- Stimulates critical thinking and helps students clarify ideas through discussion and debate
- Enhances self-management

CONCLUSION

Collaborative learning is a situation in which two or more people learn or attempt to learn something together. Unlike individual learning, people engaged in collaborative learning capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.). More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetry roles. Put differently, collaborative learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other. These include both face-to-face conversations and computer discussions (online forums, chat rooms, etc.). Methods for examining collaborative learning processes include conversation analysis and statistical discourse analysis.

Alternatively, collaborative learning occurs when individuals are actively engaged in a community in which learning takes place through explicit or implicit collaborative efforts. Collaborative learning has often been portrayed as solely a cognitive process by which adults participate as facilitators of knowledge and children as receivers.

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Chapter 16

ROLE OF CODING AND ENCODING PROCESSES IN LEARNING THROUGH NEUROCOGNITIVE BASED CONCEPT MAPPING

Dr. Pandia Vadivu P.* and Sridhar Ramachandran*

INTRODUCTION

Neurocognition is a constellation of cognitive processes such as the linking and appraising of information and incorporates speed of processing, attention, verbal and visual learning, problem solving, working memory and reasoning abilities **Schmidt, Mueller & Roder (2011).** The process of cognition associated to one or more specific areas of the brain is referred as Neurocognition. It involves complex neural pathway in human. The basic anatomy and function of brain and learning process are the two important aspects in Neurocognition.

INFORMATION PROCESSING THEORY (Schunk, 1996)

Information processing theory is otherwise called Cognitive Information Processing (CIP) theory **(Schunk, 1996).** It correlates with theoretical aspects related to sequence and execution of various cognitive related events. CIP is mainly focusing on

(*a*) Attention to the events taking place in the environment.

(*b*) learning the information by brain and compare it to knowledge of memory for encoding purpose.

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(*c*) New information stored in brain

(*d*) Whenever the information is needed, it should be retrieved from the memory.

NEUROCOGNITIVE LEARNING THEORY (Roger Anderson O, 2009)

Three important areas in Neurocognitive Learning Theory

(*a*) Neurophysiology-related to the biological aspects of brain and neural activity

(*b*) Cognitive science –representing the information processing at mental level

(*c*) Learning theory –explains the various strategies of learning principles and methodology

HUMAN LEARNING PROCESS IN THE BRAIN

In the Twenty first century educational system is still struggling to apply the brain researches to human learning in the classroom. Hence first to understand how the human brain learns, what are the results of brain researches on learning, which are the learning principles derived from brain researches and what are the strategies to implement these brain researches in the class room.

BASIC BUILDING BLOCKS OF HUMAN BRAIN

The chemical building blocks of the human brain

Our brain is composed of a multitude of simple chemical building blocks. If our eyes could look at, say, the very atoms and molecules composing our brains, we would see how the most abundant chemical substance in the human brain is water. The second most abundant chemical substance is protein, then comes the inorganic salts (a chemical mixture of metals and non-metals), lipids (mainly fats), carbohydrates (molecules having only carbon, hydrogen and oxygen in their chemical structure and which act as a source of energy for the brain), and nucleic acids.

These chemical substances come together to form the fundamental biological building blocks in the human brain called *neurons* or *nerve cells*.

Neurons are categorized into three main types

1. ***Sensory neurons*** convey to other neurons information about the external environment i.e. they produce the sensation of sight, sound, smell, taste and touch;

2. ***Motor neurons*** utilize information from other neurons to activate muscle cells and biochemical reactions; and
3. ***Integrative neurons*** transmit information from sensory neurons to motor neurons or other integrative neurons.

The two most important functions every neuron plays in the body are (i) to monitor and relay information or messages from one neuron to another using a combination of what are called *Nerve impulses* and *neurotransmitters*; and (ii) to 'learn', as it were, by forming sophisticated networks of neuronal patterns with other cells of its type as though they were simple mini-brains.

Nervous impulses are merely the flow of charged ions moving through the nerve cell. A charged ion is simply a chemical molecule that has lost an atom or two from its structure (usually temporarily), causing the molecule to develop a strong electrical charge. Neurotransmitters, on the other hand, are uncharged chemical molecules sent out by one nerve cell to the next to help with the transfer of information.

BIOLOGY OF LEARNING THROUGH NEUROCOGNITION

Rich sensory inputs enriched environment cause the nerve cells to get fired due to which they discharge electrical impulses and certain chemicals by creating and bridging synaptic connections: these cause dendrites to grow and create the capacity for new learning.

NEUROCOGNITIVE BASED CONCEPT MAPPING

What is Neurocognitive Based Concept Mapping?

Neurocognitive based concept mapping is an advanced tool for representing knowledge and gathering information by neuronal pathway in human brain. This advanced approach can be inculcated among the learners through keyword repetition techniques, brain based learning, Learning by doing method, information processes model, whole brain technique, color coding method etc. for the enhancement of long term memory.

Need for Neurocognitive Based Concept Mapping

In general, cognitive learning approaches to enhance memory among the learners. It also elevates the problem solving and creative skills among the learners. Cognition means acquisition of knowledge. But acquisition of knowledge is a process that involves a series of mental skills. Hence**, Ulric Neisser** (1967) defined cognition as the process by which the sensory

input is transformed, reduced, elaborated, stored, recovered and used. More recently, cognition is identified as synonymous to human information processing (**Haber,** 1969). NBCM is needed for the present generation teachers as well as learners in order to subsist their subjects effectively.

Significances for Neurocognitive Based Concept Mapping

i. NBCM stimulates long term memory.

ii. It upraises the learning ability among learners.

iii. Mainly involved in the easy way of learning the content.

iv. Information can be easily retrieved by the brain.

v. It develops creative and thinking skills.

DISCUSSION

The different brain related processes coding, encoding, attention, consolidation, retrieval etc. are involved in learning process of human through various aspects of Neurocognitive processes. Each process is interlinked to store the information in the human brain. This review article is to initiate the researchers to conduct further studies pertaining to complex processes of human brain and its learning strategies through neurocognition. The neurocognitive based instructional strategies can be developed for teacher educational programmee and the same will be communicated to the student teachers. This interventional method using neurocognition will help the present teacher to renovate in their future teaching to the learners.

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Chapter 17

THE EFFECT OF CONCEPT MAPPING STRATEGIES TO LEARNING BIOLOGICAL SCIENCE SUBJECTS TO B.ED. STUDENT TEACHERS

Dr. P. Pandia Vadivu*

ABSTRACT

The present study is to investigate the effect of Concept mapping as teaching / learning strategies compared to Lecture method among B.Ed Biology Students in Learning Biology. Concept maps help to identify, understand and organize the concepts. They also help the learners comprehend their existing knowledge and aid them in relating new concepts to those they already know. When students are able to relate the new concepts to their previous knowledge meaningful learning takes place. One of the primary goals of education is to help B.Ed student to develop effectively on all levels of thought (Knowledge, understanding, application, analysis, synthesis, evaluation and cognition). This forms the central theme of implication on concept mapping intervention in teaching learning program will enhance their planning Lessons and will reach to students in the form of brain based education. Learning through concept mapping methods creates more enthusiasm and consecutively make the student to learn easily, quickly and retain knowledge for long time and it can be applied at right time at right place to right person.

PRELUDE

Concept - Centered teaching in Biological Science

Concepts are defined as patterns or "regularities" in events or objects are simply defined as "things" and events as "happenings" Concepts are

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denoted by names, symbols or signs of our languages. We use concepts when we observe or interpret events and objects. They help us describe and explain the way the world works. We cannot see a concept the way we see an object or experience an event. The object "my dog" evokes an image of a particular dog. The concept "dog" reveals an image of the characters or regularities that identify the concept of dog. Each person's concept (of dog) may differ slightly from everybody else's concept to some extent depending on experience, context or perspective. There are usually enough shared regularities among people's concepts so that they can communicate. We think with concepts. Meanings of our concepts of events and objects change over time as we learn about a wider variety of examples and as we relate concepts to other concepts in new ways.

Biology of learning

Rich sensory inputs enriched environment cause the nerve cells to get fired due to which they discharge electrical impulses and certain chemicals by creating and bridging synaptic connections: these cause dendrites to grow and create the capacity for new learning.

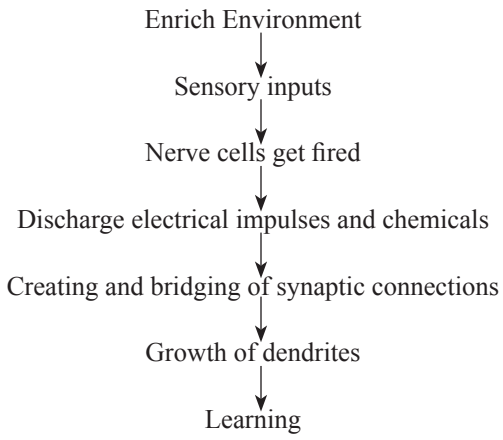


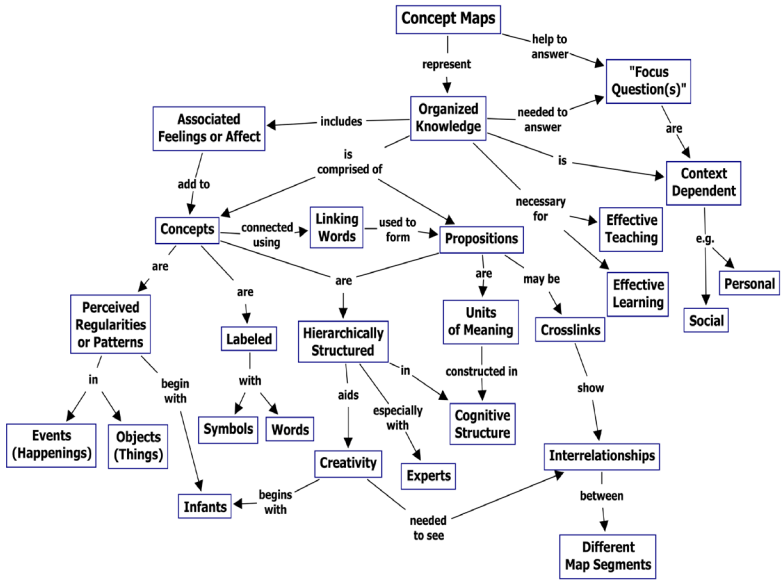
Fig 1. Biology of Learning

Concept Mapping

The Concept Map is a device for representing the conceptual structure of a subject discipline in a two dimensional form, which is analogous to a road map. A concept, as defined by **Novak**, is a regularity in objects

or events designated by specific label. Concept Mapping is a technique for representing knowledge in graphs. Knowledge graphs are networks of concepts. Networks consist of nodes (points/vertices) and links (arcs/edges). Nodes represent concepts and that of links represent the relations between concepts.

The knowledge that we have about a subject areas consists of a construction of the concepts of that knowledge area into a coherent hierarchical system. These concepts are linked together, forming propositions that are distinctive for each individual. This system can be symbolized by concept mapping. Concept mapping is a visual representation of the relationships between concepts held by an individual, materials of a lecture, textbook, or laboratory exercise. By concept mapping even old and familiar material, we often recognize new relationships and meaning. The attached **figure: 2** show examples of concept maps:



EXPERIMENTAL STUDY

Experimental Design: To study the effectiveness of three teaching methods, the investigator need to study three groups namely CG (control group) EG-I (Experimental Group-I) and EG-II (Experimental Group-II). The B.Ed students are used as samples in control group, Experimental group –I in the second method and as an Experimental group –II in the third. In

this study Control Group is taught through Lecture method, Experimental Group-I is taught through Concept mapping method and Experimental Group-II is taught through Metacognitive strategies applied on Concept mapping method.

The concept maps are developed in Biology by the B.Ed Biology students (EG-I &EG-II) Groups after completion of the units. The same concept maps were used for the purpose of evaluating the concept maps of the students. In developing these concept maps, concurrence from experts in the field of Biology was obtained for validation.

A. Administration

The investigator taught the units to the B.Ed Biology students(CG&EG-I). These group of students were exposed to teaching the units by traditional Lecture method. The investigator adopted the following procedure in teaching concept mapping Technique to EG-I The performance in concept mapping was scored on basis of the scoring of Novak and Gowin.

B. Scoring Key

1. **Propositions:** Concept maps are intented to represent meaningful relationships between concepts in the form of propositions. Propositions are two or more concept labels linked by words in as semantic unit. For each meaningful, valid proposition in the concept map, a score of '1'was given.
2. **Hierarchy:** Concept maps should be hierarchcal that is, the more general, more inclusive concepts should be at the top of the map. With progressively more specific, less inclusive concepts arranged below, so for each valid of hierarchy, a score of '5' was given.
3. **Cross Links:** For each cross links that is valid and significant a score of 10 was given. For each cross links that is valid but does not illustrate a synthesis between sets of related concepts or propositions, a score of '2' was given.
4. **Examples:** Specific events or objects that are valid instances of those designated by the concept label can be scored by giving 1 point to each.

The investigator scored on the basis of scoring of Novak and Gowin mentioned above. The concept maps drawn by the students (EG-I & EG-II) were evaluated by the investigator. The concept mapping performance score for each map of the students was obtained and multiplied by 100. It

was also pointed out by the authors, Novak,Gowin and Johansen (1984). In the most well – established scoring scheme, 1 point is given for each correct relationship(i.e., concept – concept linkage): 5 points for each valid level of hierarchy: 10 points for each valid and significant cross link: and 1 point for each example

Hence, Concept mapping is a tool for visualizing the interrelationships between concepts in an integrated, hierarchical manner. It has been used successful in many disciplines, particularly in Biological science to promote meaningful learning and effective teaching.

HYPOTHESIS – 1

2.a There is no significant difference in the gain scores of pretest among the three groups (CG, EG-I and EG-II) of B.Ed. Biology Students.

2.b There is no significant difference in the gain scores of all six posttest with similar blue print among the three groups of B.Ed. Biology Students taught through three different teaching methods. (CG: Lecture method, EG-I: Concept mapping method and EG-II: Metacognitive strategies applied on concept mapping method.)

Table-1.Results showing difference in gain score among three groups

Achievement test	Group						F Value	p Value
	Control Group		Experimental Group-I		Experimental Group-II			
	Mean	SD	Mean	SD	Mean	SD		
Pretest	56.15	7.71	56.80	7.30	57.30	12.52	0.074	NS
Posttest -I	55.00 **(a)**	10.77	63.60**(b)**	5.57	69.60**(c)**	8.92	14.258	.000**
Posttest -II	56.80 **(a)**	7.76	63.40 **(b)**	5.72	70.20**(c)**	8.95	12.939	.000**
Posttest -III	59.40 **(a)**	7.82	65.80 **(b)**	5.75	71.00**(c)**	7.95	12.880	.000**
Posttest -IV	59.40 **(a)**	8.44	68.20 **(b)**	4.58	74.20**(c)**	6.80	24.008	.000**
Posttest -V	62.60 **(a)**	6.26	72.60 **(b)**	5.24	76.60**(c)**	5.84	30.965	.000**
Posttest -VI	62.80 **(a)**	6.37	74.50 **(b)**	5.50	79.20**(c)**	6.30	38.692	.000**

**Denotes significance at 0.01 % level * Denotes significance at 0.05 % level 'CG' taught through Lecture method, ' EG-I' taught through Concept mapping method and EG-II taught through Metacognitive strategies applied on concept mapping method. Different alphabets between groups denote significant at 1% level.(a,b & c)

Inference

Table–1.1 shows that there is no significant difference among the three groups namely CG, EG-I and EG-II in their pretest mean scores revealing that all the three groups are similar in their prior knowledge of Biological Science. Whereas significant difference was found among the three groups in all six posttests. The obtained 'F' values for all three groups in all six posttests are greater than the table values and are significant at 1% level. **The table shows variation among the three groups based on their mean scores in the post tests.**

Further it reveals that EG-II is better than EG-I in their performance due to effect of metacognitive strategies. This EG-I is better than CG in their performance, which shows the difference between Traditional Lecture method and Concept Mapping method.

Hence, **Hypothesis 2.a is accepted.**

HYPOTHESIS 2.B IS REJECTED.

Result

1.a There is no significant difference in the gain scores of pretest among the three groups (CG, EG-I and EG-II) of B.Ed. Biology Students.

1.b There is significant difference in the gain scores of all six posttest with similar blue print among the three groups of B.Ed. Biology Students taught through three different teaching methods. Finally it is evident that EG-II in performance is better than EG-I and in turn EG-I in performance is better than CG.

HYPOTHESIS –2

There is no significant difference between EG-I and EG-II B.Ed Biology Students in their ability to use the following aspects of Concept maps:

1. Proposition. 2.Hierarchy. 3.Linking words. And 4. Examples.

Table-2: Results Showing difference of concept mapping performance between EG-I and EG-II

Aspects of Concept map	Experimental Group -I		Experimental Group -II		Mean	't' value	p value
	Mean	SD	Mean	SD			
Proposition	69.50	8.87	89.00	7.88	19.500	7.35	0.000**
Hierarchy	66.25	14.68	82.50	16.42	16.250	3.30	0.002**

Linking Words	85.00	17.01	91.67	14.81	6.666	1.32	NS
Examples	70.63	10.16	87.50	13.45	16.875	4.48	0.000**
Over all %	72.84	6.57	87.67	5.81	14.822	7.56	0.000**

Inference

Table – 2. shows the result of 't' test computed to compare the ability of EG-I and EG-II B.Ed. Biology Students in preparing concept maps. The above table reveals that there exists a significant difference between EG-I and EG-II B.Ed. Biology Students in the use of Proposition, Hierarchy, and Examples while preparing concept maps. Whereas there is no significant difference between EG-I and EG-II B.Ed. Biology Students in the use of Linking words/cross words while preparing concept maps. But comparison of overall ability of EG-I and EG-II B.Ed Biology Students in preparing concept maps shows the significant difference between EG-I and EG-II.

Hence, the formulated hypothesis, that there is no significant difference between EG-I and EG-II B.Ed. Biology Students in their ability of preparing Concept Map, is rejected.

Result

In preparing concept maps there is a significant difference as a whole between EG-I and EG-II in their ability to use the following aspects of Concept maps:

1. Proposition
2. Hierarchy
3. Linking words and
4. Examples

HYPOTHESIS –3

There is no significant difference between mean ranks of different aspects of concept mapping among EG-I B.Ed Biology Students taught through concept mapping:

1. Proposition.
2. Hierarchy.
3. Linking words. and
4. Examples

Table 3. Results showing difference between mean ranks of different aspects of Concept Mapping among EG-I

Aspects of Concept map	Mean rank	Chi-square	p value
Proposition	2.47	3.2700	NS
Hierarchy	2.22		
Linking words	2.92		
Examples	2.38		

Inference

Table – 3. shows the result of 'Chi-square" Value computed to compare the difference within EG-I in the use of different aspects of Concept maps namely viz. Proposition, Hierarchy, Linking words and, Examples. It reveals that there is significant difference between Mean Ranks of EG-I B.Ed Biology Students taught through concept mapping method. The obtained 'p' value 0.3518 is lesser than the table't' value and is not significant.

Hence, the formulated hypothesis, that there is no significant difference in the Mean ranks of different aspects of Concept maps among EG-I B.Ed Biology Students taught through concept mapping is accepted.

Result

There is no significant difference between mean ranks of EG-I B.Ed Biology Students in different aspects of concept maps namely viz. Proposition, Hierarchy, Linking words and Examples.

CONCLUSION

The application of concept mapping method helped to improve the performance of B.Ed Biology Students to a great extent. Similar findings were reported by the earlier studies Novak (1975 to 1977), Robertson Taylor(1985), Rajammal (1994) Shave son, richerd (2005) Amundsen (2010), Tzeng, Jeng-yi (2010). Concept maps help to identify, understand and organize the concepts. That also help the learners comprehend their existing knowledge and aid them in relating new concepts to those they already know. When students are able to relate the new concepts to their previous knowledge meaningful learning takes place.

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Chapter 18

IMPACT OF VISUAL IMAGES IN E-LEARNING CONTENT DESIGN WITH REFERENCE TO HIGHER EDUCATION

S. K. Rajasekaran*

INTRODUCTION

The importance of visual images has a tremendous growth all over the world and creates a greater impact in every one's life. Media and technology plays a greater role to the society. We have certain issues in presenting information. For example telling travel directions to someone. It requires expression of three or more dimensions of information like latitude, longitude, direction, time. The main problem is visualizing and representing such high-dimensional information is needed. But we only have low resolution display surfaces such as paper & display monitors of course we have digital media today. Visual media is not limited only to the entertainment, news, reports and education etc. Mainly it has the social responsibility to enrich the younger minds in the right way for their better understanding and retention. Greater role played by the visual images in delivering the content effectively to the learner. Here we refer to the visual elements that specifically illustrate or aid learning towards the subject matter. We are talking about visuals that directly illuminate, illustrate and enhance the comprehension of content.

Visuals like Graphs, Illustrations, Line Drawing, Colour Drawing, 2D, 3D graphics; Real Picture and Photographs are the 2D forms with illusions to explain the content in a Design. Normally the Drawings and

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Designs are in abstract and simplified in character. In animation, visuals are showed in continuous stages in motion and the cross section details to support the content with necessary details to learn. Norman McLaren suggests 'Animation is not the art of drawings that move, but rather the art of movements that are drawn'. On the other hand animation and movies are 3D forms with time and movements are the other dimensions. Animation is omnipresent and it is still challenging to other forms of visual media.The audience has demanded that the movies they watch take them to new world of entertainment and impossible actions. Today the animation in movies is three dimensional, fully interactive animated characters that dominate the screen. The joy of Designed Animation has attracted all kinds of audience. Its real effects make the people delighted. A great Filmmaker Marjane Satrapi states "The reason we used animation instead of real images is because drawings have an Abstract Design quality"

OBJECTIVES

To identify the influence and impact of the visual images and characters in e–learning content among the target audience that is the Younger Minds. The visual supports are varied in forms. Examples like Drawing, Graphics, Illustrations, Real Picture, Line Drawing, Colour Drawing, 2D, 3D, Photographs and Animation.

METHODOLOGY

In our research, we have used an Experimental Design. An analysis has been done with a self-administered questionnaire as a tool and field observation. Sample size was 100 in the age group of 17 to 21 from Chennai. To study the influence and impact of visual images and characters, the above are grouped into two major categories as listed:

1. Control Group: [Drawing, Graphics, Illustrations, Photographs, Real Picture, Line Drawing, Colour Drawing, 2D, 3D]
2. Experimental Group: [Animation, Video and Walk through]

OBSERVATIONS OF THE STUDY & FINDINGS

The selected visuals and animations with reference to Art and Design were prepared for two groups.

One was the Control Group comprises of Drawing, Graphics, Illustrations, Photographs, Real Picture, Line Drawing, Colour Drawing, 2D, 3D in still form.

The other one was the Experimental Group comprises of Animation, Video and Walk Through in animated form.

Table- 1 Observation of the Control Group

Clippings of the [Drawing, Graphics, Illustrations, Photographs, Real Picture, Line Drawing, Colour Drawing, 2D, 3D] Art and Design visual images were shown without animation to the Control group.	
Students - Boys	• Visuals were boring to watch for a long time. • The drawings were good and monotonous. • Colours were not that interesting. • Real pictures were complicated to understand than the drawings. • Visual needs to be explained.
Students – Girls	• It is still and not entertaining the viewer. • Real pictures were confused. • Visuals were not interactive in terms of content delivery. • Expected to explain.

Table-2: Observation of the Experimental group:

Clippings of the [Animation, Video and Walk through] Art and Design visual images were shown with animation to the Experimental group.	
Students-Boys	• Easy to understand the process. • It is more attractive, entertaining and colorful than normal visuals. • Easy to recall the frames. • It was realistic and influencing the audience. • The visual are really effective and informative. • Makes us vigilant. • Visuals are interactive in terms of content delivery. • Created and focused towards the content. • Extra information conveyed, rather than animation of the information. • Animation is attractive and exciting.
Students - Girls	• It is attractive. • It is acceptable and entertaining and gets register in our minds. • It is something thing unusual and affects our mind. • The colours presented in the visuals are comfortable. • The choice of colours were good. * Visuals were self explanatory.

Table-3: Detailed analysis of the control group:

Clippings of the [Drawing, Graphics, Illustrations, Photographs, Real Picture, Line Drawing, Colour Drawing, 2D,3D]Art and Design visual images were shown without animation to the Control group.		
Description	**Yes %**	**No %**
1. Learning is better with visuals and text than with text alone.	96%	–
2. In general, learning is better in a face-to-face class than with visual drawing?	60%	28%
3. It's better to explain visual drawings with text and audio than with text alone	98%	–
4. Visuals and stories to add interest and improve Learning content	100%	–
5. Are all graphics effective?	22%	70%
6. Retention level of images with subject content	66%	30%
7. Few colours are more comfort with clarity than the basic colours	70%	24%
8. It's better to place visuals with necessary background	74%	22%

Table-4: Detailed analysis of the Experimental group

Clippings of the [Animation, Video and Walk through] Art and Design visual images were shown with animation to the Experimental group.

Description	**Yes %**	**No %**
1. Drawing based animation is better than real picture animation to learn	86%	14%
2. Retention level of images with subject content	87 %	16 %
3. Animations are better than stills to illustrate and to work	93 %	
4. Animated drawings should have maximum content in short time	90 %	6%
5. Effect of 3D, is more required in animation.	88 %	22 %
6. Animations are more effective for learning than still graphics?	79 %	12 %
7. Should text or audio or both to explain between animated visuals?	82 %	22 % 14 %
8. Animation helpful in learning than real pictures?	82 %	16 %

Comparative analysis between Control group and Experimental group:

Description	Yes %	No %
1. Control group (Drawing based visual images)	73.3 %	21.8 %
2. Experimental group (Animation based visual images)	85.8 %	15.2 %

Due to the tremendous change and advancement in technology, animation has become one of the major element penetrates in to day today context of the younger minds. Animated forms are influencing the audience to participate and make them emotionally fell to the screened visuals. Since the animation is abstract and easy to understand by all types of audience with reference to education, it will definitely change the way of storytelling or the content delivery in a more realistic way. The impacts of the visuals images are very higher in terms of clarity in understanding and retention level.

Effective Visuals

Before you can achieve any of your presentation goals, you must capture and hold your audience's attention. The average adult attention span is only eight seconds. So it is essential that you continually engage your audience with new ideas and visual images. Research shows that 87% of information stored in the brain is received visually. When done well and appropriately, visual aids will also boost your credibility with your audience. The most important rule when creating a multimedia presentation is to keep it simple to make sure your audience understands and follows the presentation. Computer generated presentations have the advantage of being easily edited and customized. According to a study done by the University of Minnesota, visual aids increase the chances that your audience will be persuaded by your position by 43%! The amount of information and the way it is presented to the audience has a great effect. Simplicity and continuity throughout the entire presentation enables the audience to grasp your message and content. A good visual image should have few colours, clarity and detail with reference to content, creating eager to involve are most essential. It is important that the audience is not overloaded with too much information on one visual.

1. Content / Text: • Limit to 3-6 bullets per slide • Limit each bullet to six words • Left-align (don't center) lists and bullets • Be concise with words
2. Font: • Use 24 point or larger • Use no more than 2 fonts per visual • Times Roman is ideal for headings • Arial provides easier reading

when used in the body of the visual • Use mixed case for legibility • Save CAPS for emphasis but never more than 7 words per visual• Italics are hard to read in large bodies of text – reserve for emphasis.

3. Check for: Spelling errors & grammatical errors inconsistent punctuation
4. Psychology of Colours:

- RED – stimulating, motivates action, increases expectations, heightens sense of realism, urges to achieve results and succeed, impulse, desire, passion, used to increase enthusiasm and induce quick decisions
- BLUE – calming, therapeutic, credibility, increases sensitivity, tradition, lasting values, loyalty, security, contentment - used when credibility and trust need to be established
- BLACK – direct, forceful, in the past, powerful, strong, uncontrollable, negates emotions, formal, without choice- used in financial reports
- GREEN – life, energy, faith, opinionated and self-assertive, discussion, needs to impress and exercise control- used in presentations requiring feedback
- YELLOW – bright, cheerful, stimulating, attractive, initiates actions and ideas, seeks change, creates anxiety- used for text against dark background - NEVER used as background color!
- GRAY – neutrality, lack of commitment - used when audience is to make a decision. NEVER used when showing information critical to establishing objectives

5. Tables and Charts: Bar charts compare things that you can quantify. Line charts represent changes over time. Pie charts show parts of the whole. Tables illustrate timetables, schedules, lists, etc. Determine the best background color to convey your message. Label your chart or table with a specific title. Format tables and charts to maximize readability
   - o bar charts – use different colors (dark to light) to distinguish bars
   - o line charts – limit lines to 4 per chart (from dark to light)
   - o pie charts – limit slices to 10 per pie (from dark to light)

   Use arrows to emphasize and eliminate the need to point at the screen. Enliven charts by adding clip art to bar graphs. Direct the eyes of the audience by highlighting significant data. Charts should be readable and have logical flow when reading: • Left to right • Dark to light • Top to bottom.

6. Qualities of Effective Visuals:

- Purposeful – Each visual should have a specific purpose. If slides constructed only to help you read your way through the presentation, make all movement meaningful unless the audience will be bored.
- Accurate – The value of the information depends on the integrity and care with which the data was collected and analyzed.
- Selective – Avoid the temptation to overwhelm the audience with too much detail. They can only remember so much and will tune you out if they feel overwhelmed.
- Concise – Present the data only once. Do one thing at a time. Time is limited, so choose and design visuals that convey the data quickly and accurately.
- Consistent – Display similar data in a similar form. Slides should be prepared so that all words, lines, colors, styles, and other elements are consistent.
- Focused – Tables and graphs should make a point. The point should be apparent from the design of the visual and should be stated in the title.
- Clear and Simple – Abbreviations, awkward word choices, and confusing details make a visual ineffective and difficult to understand. Arrangements of design elements, such as graph labels and legends, may cause distraction if not simple and clear.
- Effective – Keep words to a minimum. Visuals should be immediately understandable. Smoothly expand and compress detail.
- Convincing – Make sure the message you are trying to convey is made quickly and clearly.
- Independent – A good visual speaks for itself. A table, with its title and footnotes, and a graph, with its legend, should be understandable without extensive explanation.
- User friendly, editable, file size and format have to take care.

CONCLUSION

Success of Visual Images including animation due to advantages of more relevant information conveyed, rather than animation of the information. Visual Images and Animations interacts closer with the learner. The structure of the visual representations and content representation should be readily and accurately perceived and comprehend by the learner.

Animations should be made little easier to perceive. Universally preferred and often require expertise for understanding. Interactivity in visuals may be key to overcome animations' drawbacks. Never the less the visual images and animations are creating greater impact in understanding the content delivery with high retention level with reference to learning through e-learning. Still need to find an animated presentation tool that is both very general and easy to use.

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Chapter 19

INTEGRATION OF MOBILES IN THE LEARNING PROCESS – AN ANALYSIS

*Dr. K. S. Ramakrishnan**

INTRODUCTION

Mobile devices and technologies are pervasive and ubiquitous and alter the nature of learning, the ways that learning can be delivered and the balance between training and performance support. This means that mobile is not merely the timeless concept of learning; rather, mobile learning is emerging as an entirely new and distinct concept alongside the mobile workforce and the connected society. Mobile devices create:

- New forms of knowledge;
- New forms of art and performance;
- New forms of commerce and economic activity; and
- New ways of accessing them.

The need to organize and navigate through bite-sized pieces of mobile learning content also impacts on these notions of knowledge and learning and perhaps individual learners may create their own ontologies on-the-fly as they navigate through a personalized learning journey. One can also focus on the nature of mobility in order to explore the nature of mobile learning. For each learner, the nature of mobility has a variety of connotations and these have affect mobile education. It may mean learning whilst traveling, driving, sitting, or walking; it may be hands-free learning or eyes-free learning. These interpretations impact on the implementation and hence the definition of mobile learning.

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FRAMEWORK FOR THE RATIONAL ANALYSIS OF MOBILE EDUCATION MODEL (FRAME MODEL)

It is the abbreviation of **F**ramework for The **R**ational **A**nalysis of **M**obile **E**ducation. It is a comprehensive model that covers different aspects of mobile learning including the learner and device usability. It explains the pedagogical issues of information overload, knowledge navigation, and collaborative learning. It involves convergence of mobile technologies, human learning capacities, and social interaction in mobile learning. It helps educators and trainers to develop mobile learning materials and to use effective teaching and learning strategies for mobile education. It also helps guide the development of mobile devices for mobile learning. This model consists of three components, namely **Device (D), Learner (L),** and **Social (S) aspects.** The attributes of the device usability (DL) and social technology (DS) intersections describe the affordances of mobile technology **(Norman 1999)**. The intersection labeled interaction learning (LS) contains instructional and learning theories with an emphasis on social constructivism. Hypothetically, the primary intersection, the convergence of all three aspects, defines an ideal mobile learning situation. By assessing the degree to which all the areas of the FRAME model are utilized within a mobile learning situation, practitioners may use the model to design more effective mobile learning experiences.

Wireless, networked mobile devices can shape culturally sensitive learning experiences and the means to cope with the growing amount of information in the world. By using a mobile device, the learner can consult a web page, access audio or video tutorials, send a query via text message to a friend, or phone an expert for practice or guidance. She may use one or several of these techniques. But, how can such a learner take full advantage of the mobile experience? How can practitioners design materials and activities appropriate for mobile access? How can mobile learning be effectively implemented in both formal and informal learning? The FRAME model offers some insights into these issues.

FRAME MODEL

The three circles represent the **Device (D), Learner (L),** and **Social (S) aspects.** The intersections where two circles overlap contain attributes that belong to both aspects. The attributes of the device usability (DL) and social technology (DS) intersections describe the affordances of mobile technology **(Norman 1999)**. The intersection labeled interaction learning (LS) contains instructional and learning theories with an emphasis on

social constructivism. All three aspects overlap at the primary intersection (DLS) in the centre of the Venn diagram. Hypothetically, the primary intersection, a convergence of all three aspects, defines an ideal mobile learning situation. By assessing the degree to which all the areas of the FRAME model are utilized within a mobile learning situation, practitioners may use the model to design more effective mobile learning experiences.

MOBILE USAGE INDEX QUESTIONNAIRE

This questionnaire consists of items related to mobile usage behavior, general mobile usage, the importance of some features in a mobile, experience in social media such as facebook, orkut, etc., the educational purposes of a mobile and the willing of the participants. There are 38 items in the questionnaire. General mobile usage behaviuor consists of 8 items dealing with the general mobile usage, the class room usage, sending and receiving of SMS, content of SMS message, etc. The next 14 items dealt with the specific mobile usage related to other features, such as Bluetooth, mobile internet, watching TV, listening to radio, Twitter, music, pictures, mobile games, etc, which are of Likert scale items, ranging from never (0) to very frequently (3). Six items dealt with the expertise in the social media features of the mobile. The next nine items dealt with the educational purposes of the mobile. They are of Likert type items ranging from never (0) to very frequently (3). The sum total of all the scores obtained in individual items was taken as the mobile usage index. This score was further taken as analysis. Personal information about the participants such as age, gender, medium, locality, etc., were also included in the questionnaire and collected from the participants. A pilot study was conducted to determine the suitability of various test items, to find out whether all the students understand the test items, and to select the best items with proper discrimination and difficulty indices. The reliability was found out by finding the Cronbach's Alpha. The reliability coefficients of Mobile Usage Index questionnaire was found out to be **.8173.**

STUDY

A sample of 300 student teachers studying B.Ed. in various study centres of TNOU and IGNOU in and around Chennai was selected by using stratified random sampling method. They were administered Mobile Usage Index questionnaire and the data were collected from them. Mobile Usage Index Scores is the process variable or Independent Variable and Age, Gender, Locality, Medium, Subject, Socio-Economic Status, Mobile

Experience and Teaching Experience are the categorical variables of the present study. The data were then fed into SPSS package for further analysis. The results are given here.

Null Hypothesis 1

There exist no significant differences between Mean Mobile Usage Index scores of the Subgroups of the Student teachers with respect to the following categorical variables. (a) Age Group (b) Gender (c) Medium (d) Locality (e) Subject (f) Socio – Economic Status (g) Experience in Mobiles and (h) Teaching Experience.

Null Hypothesis 1 - A:

There exists no significant differences between Mean Mobile Usage Index scores of the Subgroups of the Student teachers with respect to the (a) Gender and (b) Medium of Instruction.

Table-1: 't' Test for Significant difference between the Mean Mobile Usage Index Scores of the Student teachers with respect to Gender and Medium of Instruction

Variables	Group	Mean	S.D.	't' value	P value
Gender	Female	57.77	14.32	2.781	0.007**
	Male	45.16	22.23		
Medium of Instruction	English	60.16	13.20	2.68	0.009**
	Tamil	49.28	21.29		

** denotes significant at 1% level.

Since P value is less than .01, the null hypothesis is rejected at 1% level with regard to Gender. Hence there is a significant difference between male and female student teachers with regard to Mean Mobile Usage Index scores. The female students have more Mobile Usage Index scores **(57.77)** than their male counterparts **(45.16).**

Since P value is less than 0.01, the null hypothesis is rejected at 1% level with regard to Medium of Instruction. Hence there is significant difference between Tamil medium and English medium student teachers with regard to Mean Mobile Usage Index scores. The English medium students have more Percentage Retention scores **(60.16)** than the Tamil Medium students **(49.28).**

Null Hypothesis 1 - B

There exist no significant differences between Mean Mobile Usage Index scores of the Subgroups of the Student teachers with respect to the (a) Age Group (b) Locality (c) Subject (d) Socio – Economic Status (e) Experience in Mobiles and (f) Teaching Experience.

Table 2: ANOVA for Significant differences between the Mean Mobile Usage Index Scores with respect to Age Group, Locality, Subject, Socio – Economic Status, Experience in Mobiles and Teaching Experience

Variables	Group	Mean	S.D.	'F' value	P value
Age Group (In Years)	20-29	68.56 [b,c,d]	7.13	9.641	0.000**
	30-39	52.07 [a]	16.54		
	40-49	49.60 [a]	15.43		
	50 and above	37.16 [a]	13.62		
Locality	Urban	51.70	15.31	1.719	0.162
	Semi-urban	62.72	21.02		
	Rural	54.02	15.06		
Subject	Science	66.20 [c]	6.41	8.043	0.000**
	Commerce	54.04	13.37		
	Arts	45.35 [a, d]	18.48		
	Comp. Science	62.78 [c]	9.62		
Socio-Economic Status	Low	50.73	19.02	1.206	0.286
	Moderate	56.56	14.74		
	High	59.05	14.56		
Experience in Mobiles	<1Yr	43.11	21.70	1.621	0.163
	1 - 3 Yrs	51.08	17.37		
	4- 6 Yrs	56.42	15.43		
	> 6 Yrs	59.43	14.52		
Teaching Experience	<5 Yrs	58.72 [c]	12.65	11.143	0.000**
	5 - 9 Yrs	67.88 [c, d]	6.26		
	10 - 15 Yrs	41.10 [a, b]	19.00		
	>15 Yrs	48.05 [b]	12.34		

** denotes significant at 1% level.

Different alphabet between variables denotes significant at 5% level using Tukey's Post – Hoc Test.

Age Group

Since P value is less than 0.01, the null hypothesis is rejected at 1% level on Age Group with regard to Mean Mobile Usage Index scores of student teachers. Hence, there are significant differences between student teachers belonging to different age groups with regard to Mobile Usage Index scores.

Based on Tukey's Post Hoc Analysis, the student teachers in the age group **{(20 – 29), (68.56)}** significantly differ from those in the age group **{(30 – 39), (52.07)}, {(40 – 49), (49.60)}** and **{(50 and above), (37.16)}**, at 5% level. But there are no significant differences between students in the age group (30 – 39), (40 – 49), and (50 and above) with regard to Mean Mobile Usage Index sores.

Locality

Since P value is greater than 0.01, the null hypothesis is accepted at 5% level on Locality with regard to Mobile Usage Index scores. Hence, there are no significant differences between student teachers belonging to different localities with regard to Mobile Usage Index scores.

Subject

Since P value is less than 0.01, the null hypothesis is rejected at 1% level on Subject with regard to Mobile Usage Index scores. Hence, there are significant differences between students belonging to different subjects with regard to Mobile Usage Index scores.

Based on Tukey's Post Hoc Analysis, the students in Arts **(45.35)** significantly differ from those with Science **(66.20),** Commerce **(54.04)** and Computer Science **(62.78)** as their subjects at 5% level. But there are no significant differences between students with Science, Commerce and Computer Science backgrounds with regard to Mobile Usage Index scores.

Socio-Economic Status

Since P value is greater than 0.05, the null hypothesis is accepted at 5% level on Socio-Economic Status with regard to Mobile Usage Index scores. Hence, there are no significant differences between student teachers belonging to different socio-economic statuses with regard to Mobile Usage Index scores.

Experience in Mobile Phones:

Since P value is greater than 0.05, the null hypothesis is accepted at 5% level on Experience in Mobile Phones with regard to Mobile Usage Index scores. Hence, there are no significant differences between students with different mobile experiences with regard to Mobile Usage Index scores.

Teaching Experience

Since P value is less than 0.05, the null hypothesis is rejected at 5% level on Teaching Experience with regard to Mobile Usage Index scores. Hence, there are significant differences between students with different teaching experiences with regard to Mobile Usage Index scores.

There are significant differences in Mobile Usage Index scores of the participants with the teaching experience **{(10 – 15 Years), (41.10)}** and **{(>15 Yrs), (48.05)}** with those with **{(<5 Years), (58.72)}** and **{(5 - 9 Years), (67.88)}.** There are no significant differences between the participants with the teaching experience (<5 Years) and (5 - 9 Years).

CONCLUSION

This study was conducted to find out the use of mobile devices among student teachers in ODL systems. The study reveals that many of the student teachers use mobile phones for various purposes and there are some significant differences among them with regard to some categorical variables. Due to space, time and financial constraints, a limited sample was taken. But such studies should be expanded in a large scale. By integrating mobile phone usage in day to day activities of teaching-learning process will drastically enhance the students' learning. This study is an eye-opener for the academics, parents, administrators, policy makers, technology experts and above all the society at large.

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Chapter 20

TABLET COMPUTING – AN INFORMAL LEARNING DEVICE FOR 21ST CENTURY FACULTY MEMBERS AND STUDENTS IN HIGHER EDUCATION

Mr. N. Ramesh*

INTRODUCTION

Technically still in its infancy in higher education, learning with mobile computing devices has been described and defined in a variety of ways. Mottiwalla (2007) stated that mobile learning "combines individualized learning with anytime and anywhere learning" Additional researchers have defined mobile learning as learning facilitated by mobile devices. Because our interest was focused on how mobile computing devices impacted learning with coursework, we felt a combination of definitions was most appropriate. Mobile computing devices have included technologies that are transportable, such as cell phones and smart phones, and these may include tablet computers, laptop computers, and net books, however, recognized that mobile learning should focus on the actual mobility of the device. That is, mobile learning should be "restricted to learning on devices which a lady can carry in her handbag or a gentleman can carry in his pocket". This is the essence of mobile learning accessing information and knowledge anywhere, anytime from devices that learners are used to "carrying everywhere with them" and that they "regard as friendly and personal".

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TABLET COMPUTING

In the past two years, advances in tablets have captured the imagination of educators around the world. This category is led by the incredible success of the iPad, which at the time of publication had sold more than 85 million units and is predicted to sell over 377 million units by 2016. In the process, the tablet (a device that does not require a mouse or keyboard) has come to be viewed as a new technology in its own right, one that blends features of laptops, smart phones, and earlier tablet computers with always connected Internet and thousands of apps with which to personalize the experience. As these new devices have become more used and understood, it has become even clearer that they are independent and distinct from other mobile devices such as smartphones, e-readers, or tablet PCs. With significantly larger screens and richer gesture based interfaces than their smart phone predecessors and a growing and ever more competitive market they are ideal tools for sharing content, videos, images, and presentations because they are easy for anyone to use, visually compelling, and highly portable.

APPLICATION OF TABLET IN EDUCATION

Tablets have gained traction in education because users can seamlessly load sets of apps and content of their choosing, making the tablet itself a portable personalized learning environment alone. Mobile applications continue to push the capabilities of these devices, and hundreds of thousands of specialized apps are available to extend the functionality of tablets, integrating features including location awareness, network connections, and other built-in sensors, such as accelerometers. The larger screen allows for more detailed interfaces or viewing area than smart phones. The tablet computing applications range from games to banking services that allow users to check their credit card balances to science and art applications that enable users to explore reading materials. It is this transformative nature of applications that has helped tablets become popular and powerful tools in higher education.

PORTABILITY AND HIGH RESOLUTION

Extremely portable, tablets have become significant distribution points for magazines and e-books, with major retailers revealing that their e-books outperform their print books. Cameras have added capabilities, sharper images, and higher resolution and social media enhancements have made sharing video and pictures very simple. Fast, easy email, web browsers, and rich, full-featured game platforms are all everyday tools on the new

devices. It is increasingly clear that tablets are not a new kind of lightweight laptop, but rather a completely new technology.

RELEVANCE FOR TEACHING, LEARNING, AND CREATIVE INQUIRY

The rising popularity of tablets in higher education is partly the product of campuses across the world embracing the BYOD (bring your own device) movement. It is so easy for students to carry tablets from class to class, using them to seam lessly access their textbooks and other course materials as needed, that schools and universities are rethinking the need for computer labs, or even personal laptops. A student's choice of apps for his or her tablet makes it easy to build a personalized learning environment, with all the resources, tools, and other materials they need on a single device, and with most tablets, the Internet is woven into almost every aspect of it. Productivity apps, including Cheddar, TagMyDoc, Dropbox and many more enable learners to take and share notes, create to-do lists, store all of their files, and organize their academic schedules.

TABLET AND ITS MOBILE APPLICATIONS

Mobile applications are also tightly integrated with social networks, making tablets effective tools for collaborating and sharing. Many note-taking and annotation applications enable users to immediately email content to peers or post insights to their social networks. Students who use Ever note, for example, can share digital notebooks and see each other's text, picture, or video updates in real-time. An increasing number of educators are also turning to Edmodo's application to communicate with students about assignments and schedule updates.

Students are using Tablet PCs to draw and annotate diagrams, solve math equations, design structures, and conduct field work. Full-featured, and with a versatile combination of keyboard and digital pen, Tablets support the full repertoire of learning and teaching, for example:

Language Arts

Emergent readers can trace letters while hearing them enunciated. All grade levels can take notes, highlight and annotate reading assignments and worksheets, and create story and concept maps.

Math and Science

Students can complete equations, create graphs and diagrams, predict trends, record observations in class or in the field, illustrate concepts, create

models, unpack sophisticated diagrams pushed to Tablets by the teacher, and follow hot-links to deeper content.

Learning

Tablet PCs support improved retention, organization, capture of video/audio while taking notes, sharing class work, collaboration, and peer review.

Teaching

Teachers can deliver curriculum through PPT presentations, Word docs, and spreadsheets; mark up digital class work and homework; pull in and annotate student work on-the-fly, demonstrating multiple solutions to the same problem.

Save Time and Money

Teachers can use digital forms, convert digital notes to text without having to retype, and reduce paper, supply, and copying costs. All of this also supports learning continuity. For instance, on a snow day students can access assignments, or after an absence, they can review a teacher's notes.

Access

Teachers can access a wide range of free, compatible software applications for education.

Performance

Tablet PCs help deliver an engaging learning experience with rich, multimedia digital content.

Bottom Line

The convertible Tablet form factor best accommodates the wide range of complex repertoires demanded by students and teachers. By providing ink capacity, coupled with a keyboard, it represents the ultimate learning and teaching platform.

BENEFITS OF IMPLEMENTING TABLETS

The aim of implementing tablets in classroom is to implement this as a supporting system not to replace the traditional teaching methodology. There are a number of benefits of using tablets for e-learning. The expected benefits to implement tablets in classroom for e-learning are as follows, E-Books Most schools including AIS previously used to sue physical

textbooks which are pricey. A number of students cannot afford to buy the original books. Also regular text books are very heavy and carrying a bunch of 8 to 10 books plus copy books in a single bag makes it extremely difficult for the students to carry them to and fro between classrooms, school and their home. If a student writes on physical book for referencing or taking notes, it cannot be removed or modified. To resolve these problems, use of tablets allows students and teachers to use e-books instead of regular books. It makes it really easy for students to carry 10 or maybe hundreds of books with them without worrying about the heavy weight of the books in their tablets or USB flash drives while in the classroom.

Environment Friendly Physical books as well as the classroom worksheets that teacher distribute for several activities make use of papers. A lot of paper is wasted which is harming our eco-environment. Also due to the concerns about greener environment, there has been a great deal of implementation of green computing among educators. Therefore implementing tablets helps in maintaining a greener environment with the use of e-books and e-documents containing exercises and worksheets and students would be able to solve the sheets and email or send the solved files back to their teachers saving a lot of time and paper which makes the use of tablets environment friendly.

Efficient and Time Saving Using tablets in classroom is more efficient. Teachers can pre-assign the work to students through email or school web portal before even getting into class or a day before. Students can view the assignments and class schedule in advance in order to prepare and complete the assigned work beforehand making it more efficient and time saving approach rather than the traditional approach in which teacher used to assign work to the students during the class time.

Interactive Classroom Activities Teacher can use tablets for one to one interactive activities with the students by having a quick survey, quiz or web-based science and mathematical simulations making this a good choice to deliver the knowledge in a way that is more enjoying and easy to understand for the students.

Presentations While delivering presentations, teachers can provide students the required information electronically. Students can then take notes in the form of interactive annotations and side notes to better understand the topic and review them later.

Online and Web-Based Quizzes With the implementation of tablets in classroom, students can give online and web-based quizzes. AIS have developed a web based system before for teachers to create online quizzes and student previously used to give the quizzes in computer labs.

TABLET PCS IN HIGHER EDUCATION

The Tablet PC allows faculty members to create digital materials for their classes with great ease. Through the use of the digital ink feature and a variety of software packages, faculty can address multiple learning styles. One of the strongest benefits to using the Tablet PC in face-face instruction is the ability to use the device as an "interactive whiteboard". Windows Journal is an excellent program for this task and requires a short learning curve, which is one reason that faculty members are quickly adopting this program. Coupled with the ability to use digital ink for writing, drawing, and annotating, this proves to be a simple but powerful presentation tool. In fact, a faculty member could allow students to take control of the tablet to create a collaborative learning experience.

CONCLUSION

Online learning environments can offer different affordances than physical campuses, including opportunities for increased collaboration while equipping students with stronger digital skills. Employers have specific expectations for new hires, including communication and critical thinking skills, talents that are often acquired or enhanced through informal learning. This challenge is exacerbated by the fact that digital literacy is less about tools and more about thinking, and thus skills and standards based on tools and platforms have proven to be somewhat ephemeral. Because of their portability, large display, and touch screen, tablets are also ideal devices for informal learning. Many institutions are relying on handheld computers in place of cumbersome laboratory equipment, video equipment, and various other expensive tools that are not nearly as portable or as inexpensive to replace. In these scenarios, the immediate access recording and analytical tools enables direct and active learning in the field. Therefore, for the 21st century faculties and students, the easily portable and mobile devices like tablets and tablet computing serve an informal learning that promotes the extra learning experience to the college students and professional development for faculty members in higher education.

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Chapter 21

ROLE OF E-LEARNING IN SCHOOL EDUCATION

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INTRODUCTION

Today ICT has been become a revolution in all walk of life in general and in education in a particular. The ICT revolution has changed the learning process of childhood up to the real world. By e-Learning today's children may be enabled to develop a self concept; develop basic decision for making skills. Students require higher level of education to succeed in the new, knowledge based society.

E-LEARNING

"e-Learning most often means an approach to facilitate and enhance learning by means of personal computers, CD-ROMs, audio visual aids and the Internet. This includes email, discussion forums, and collaborative software."

e-Learning is defined for our purpose here as the use of any of the new technologies or applications in the service of learning or learner support. It is important because e-Learning can make a significant difference: to how learners learn, how quickly they master a skill, how easy it is to study; and, equally important, how much they enjoy learning. Such a complex set of technologies will make different kinds of impact on the experience of learning:

- **cultural** – students are comfortable with e-Learning methods, as they are similar to the forms of information search and communications methods they use in other parts of their lives

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- **intellectual** – interactive technology offers a new mode of engagement with ideas via both material and social interactivity online
- **social** - the reduction in social difference afforded by online networking fits with the idea that students should take greater responsibility for their own learning
- **practical** – e-Learning offers the ability to manage quality at scale, and share resources across networks; its greater flexibility of provision in time and place makes it good for widening participation

BENEFITS OF E-LEARNING

The shift to the new paradigm is accompanied with many educational benefits including:

- **User-centric learning:** e-Learning provides a learner centered model of education where students take the responsibility for learning by themselves. Students may set their own objectives and explore their own learning needs and agendas.
- **Accessibility:** The Internet can bring more access to information and learning resources for all learners, including the disadvantaged, disabled, adults and those needing special curriculum.
- **Collaborative learning:** It allows students to come in contact and to work in collaboration with students from other countries and cultures. It enables learning from other individuals or groups of learners.
- **Tools for innovation:** e-learning is accompanied by a suite of tools to enable teachers and learners to be innovative, creating and sharing ideas or customizing digital learning resources for their own use.
- **Flexible study:** Learning anytime, anywhere – learning is no longer location dependent and learners are able to take courses independently of their physical location, be it their homes, their places of employment, or elsewhere. Just-in-time learning: Students can follow a non-linear path at a pace that meets their individual needs at that time.
- **Adaptability:** Differing learning styles can be catered for, allowing for greater detail and depth of learning. The content presentation can be customized according to individual student needs. Similarly, differing teaching styles can easily be adopted and adapted to suit different communities of learners.
- **Cost effectiveness:** The e-learning environments are less expensive to produce and distribute the content, resulting in a higher degree of cost effectiveness and cost reduction. Costs can be reduced through

standardization, resource sharing, increased productivity, lowering of travel costs etc.

- **Easy management and administration:** On a practical level, functions such as the development and distribution of learning materials, training, assessment, registration, marketing and sales, learner support, and general administration can now be easily done.

E-LEARNING EXPERIENCES FOR TEACHERS AND STUDENTS

e-Learning experiences should

- be thoughtfully designed and delivered with goals and outcomes clearly stated;
- be accurate, interesting, engaging, relevant, and standards-based;
- be facilitated or guided by fully accessible teachers or instructors skilled in both content and pedagogy in an e-Learning environment;
- incorporate instructional design practices that allow for individual decision making and accommodate differences among learners and their contexts;
- strengthen teaching and learning through digitally delivered content that has the potential to provide active or constructive learning experiences that enable the learner to gather, analyze, and display data and fully engage in simulated real-world problem contexts;
- connect learners—both students and educators—to experiences that mimic the process and advancement of science in the real world;
- provide access to meaningful collaborative learning experiences with experts and other learners;
- promote frequent interaction between teacher and learner to allow continuous monitoring and adjustment of the dynamic learning environment; and
- conduct ongoing evaluation and assessment of program effectiveness, learners performance, and academic achievement to ensure the highest possible quality of education. Both formative and summative evaluations should be used to guide continuous improvement of instruction.

SCOPE FOR IMPROVEMENT IN SCHOOL EDUCATION BY USING E-LEARNING

Convenience

One of the key advantages of choosing e-learning over classroom learning is convenience. Students can learn whilst they are at home, in

the library or on vacation. This prevents students from having to stick to a schedule and allows them to carefully manage the pace of their own learning experience.

Time Efficiency

e-Learning is very time efficient as it eliminates the time you would need to spend on travel, introductions and breaks. Also, students might not be on the same level in terms of knowledge, speed of learning etc. e-Learning is therefore more time efficient as students can manage their own learning experience.

Accessibility

Access to online resources, lectures and other study material 24 hours a day and 7 days a week can be seen as another major advantage. This is particularly useful to those students who need to read over the lecture slides again for revision purposes.

Dynamic Interaction

e-Learning technologies such as Moodle allow online discussions to be generated. A teacher may ask an open question to the students in order to make them think about a certain subject matter, in preparation for a test or seminar.

Creativity

There is no doubt that creativity is important in teaching and some argue that e-learning facilitates greater creativity as ideas, resources, knowledge, understanding and skills can be shared easily, regardless of the location.

CONCLUSIONS

Education is essential for everyone. The increased rate of literacy will push the nation towards development. e-Learning is a useful way to provide education. Considering India's rural areas, problems create difficulties to implement the e-Learning system but strategies can be developed and implemented. Before the actual implementation of e-Learning system, the understanding of different components and their functions is necessary. A policy should be developed to implement the functions and to maintain the quality of system. e-Learning technologies have great potential to spread learning however, the benefits of these technologies have to reach the rural masses of India, and otherwise they will be one of the causes of

the Digital Divide. Development in the 21st century will be determined, to a large extent, by the thought, action and imagination of young people. This in turn, is shaped by the education system.

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Chapter 22

DESIGN OF SCHEMABASED INSTRUCTIONAL STRATEGY (SBIS) FOR SOLVING STORY PROBLEMS

*Vijesh K.**

INTRODUCTION

Stepping in with problems helps to shape human life. Thus the learning how to solve problems have a key function in human lifespan. Unfortunately teachers and learners ignore the importance of problem solving process in education. The best means to learn a concept in science particularly in Physics is present the concept embed in problem situation. In the example of physics learning successful Problem solving is the symbol of conceptual understanding. Traditional approach to solving story problems in physics does not foster the construction of mental representation of problem attributes. This approach give emphasis to identifying the physical quantities given in the problem and merely applying these quantities into mathematical equations, to generate a required numerical value for the unknown physical quantity. Effective problem solving demands proper conceptual understanding. If the novice problem solver is provided suitable problem solving learning strategy he will be successfully transfer his problem solving ability to novel situation .So the Present Physics education system strongly demands a constructive approach to teaching and learning problem solving process. In the present paper the researcher designed Schema Based Instructional Strategy for solving story problems in higher secondary physics. The design based on the concept problem schema.

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This strategy will foster novice solver's ability to construct proper mental representation of given problem. Problem solving by constructing Problem schema will promote reflective thinking and creative thinking .

WHAT IS PROBLEM SOLVING?

Problem solving process is the careful analysis of details of a problem to reach a solution. According to Davidson, Deuser, and Sternberg (1994), the elements, relations, and conditions that given in the problem represents the initial state of the problem (problem state), desired solution represents goal state of the problem and characteristics of the problem solver or the problem situation that make it difficult to transform initial state into goal state represents obstacles. So problem solving is the process of moving from problem state to goal state (problem space) along with various operations. This problem space also known as problem schema.

STORY PROBLEMS

On the basis of structure of the problems there are mainly two types of problems. Well structured problems (problems encountered in formal education that is typical text book problems) and ill structured problems (problems that occur in our everyday and professional lives). Well structured problems are also known as transformation problems (Greeno,1980), that consist of a well-defined initial state (problem state), a known goal state, and a constrained set of logical operators (Jonassen, 2011).Analysing different type of well structured and ill structured problems Jonassen (2000c) identified eleven kinds of problems: logic problems, algorithms , story problems, rule-using/rule-induction problems, decision making, troubleshooting, diagnosis-solution problems, strategic performance, policy-analysis problems ,design problems and dilemmas. Among them story problems play important role in formal education especially in physics education.

Story problem is a type of textbook problems that are shown as a piece of shallow story context (Eg:A car moving with a speed of 10 m/s is brought to rest in 10 second by applying brakes.find the retardation produced?) . Generally story problems particularly in Physics would have a situational part and a structural part. Wood (1983) states that the context in which problems are embedded become a significant part of the problem and necessarily part of its solution.

PROBLEMS IN SOLVING STORY PROBLEMS

Students solve numerical problems (Eg: 5-2=?) very easily. But most of them face difficulty to solve the same problem in story context (Eg:Ram has 5 balls and Sitha has 2 balls.How many balls does Sitha have less than

Ram). Often students' performance on story problems was worse than the performance on numerical problems.

Sherrill (1983)describes Story problems are normally solved by identifying key values in the situation, selecting the appropriate algorithm, applying the algorithm to generate a quantitative answer. This Direct transilation strategy focuses only on quantitative representation of problem. Research reviews show that many students faces cognitve difficulty while solving story problems.The fundamental cognitive barriers of novice solver are inability to identify key features of problem situation; inability to visualise problem situation ; inability to clasify the problem; inability to identify and use key cocepts and procedures in analogous but new situations. Keller and Cancannon (1998), argue that the lack of transfer of structure between problems is a significant cognitive difficulty, not only for inexperienced problem-solvers but also for experts. Jonassen (2011) argues that direct transilation strategy is actualy problem avoiding strategy and Successful problem solving requires the construction of a conceptual model of the problem and the application of solution plans that are based on those models.

Story problem solving calls for not only calculation accuracy, but also the comprehension of textual information, the capacity to visualize the data, the capacity to recognize the semantic structure of the problem, the capacity to sequence their solution activities correctly, and the capacity and willingness to evaluate the procedure that they used to solve the problem .The research studies related to problem solving show that learner's ability to construct conceptual model of problem will promote transfer of problem solving skill in different problem situation .

HOW EXPERTS AND NOVICES SOLVE STORY PROBLEMS ?

Experts construct robost mental representation of the problems.while novices focus only on a quantitative data given in the problem. In the view of novices story problem solving is merely using arithmetic formula for converting two or more numerical value in to required single numerical value. Oftenlearners who shows less interest in mathematics,shows anxiety on solving story problems in physics.

Experts perceived meaningful patterns in a problem that novices missed because novices could not analyse the information appropriately. Experts redefiined and classified problems that they encountered acording to underlying principles,laws and theories where as novices classified problems on the basis of surface features of the task (Zimmerman and

Campillo , 2003).Elstein,Shulman &Sprafka(1978) and Simon(1979) observed that experts possessed greater domain specific knowledge about task than novices. They use their domain specific knowledge to take strategic short cuts.

Research evidence put forward by Chi,Glaser and Rees(1982) shows experts retrieve information about typical problems more effectively. This is because they organise their knowledge more hierarchically than novices. In the view of Moore (1990) experts spent more time planning and analysing problems than novices did. Novice solver's problem solving process confined with in the process of plucking data from problem, plunging them in to appropriate mathematical formula for getting numerical result. Novices often approach story problems with out redefining and reinterpreting the problem. Acording toBruning ,Schraw and Ronning (1995) experts used strategies to break a task in to parts and to solve each part sequentialy.

Clearly experts uses logical way to solve problems.They show greater use of mental representation of the problem attributes. They analyse problem situations, identify problem type, recognise inter relations between various physical quantities. While novices consider problem solving merely a process of finding out unknown numerical data using given numerical data.So they treat problem solving as a calculating process including two or more mathematical steps.Fig:1 depicts problem solving by novices and experts. Thus successful problem solving requires domain-specific knowledge about goal state of the problem.If the learner organise required informationabout different problem types in a meaningful and sequential pattern, it will be effectively and easly retrieved while solving problems. So the novices should provide such problem solving learning strategy .

PROBLEM SCHEMA

Inability to reach satisfactory level of proficiency in problem solving creates fear and anxiety in learner at the time of facing new problems . To develop effective problem solving skill, the learner must construct mental representation of the problem that would help the learner overcome cognitive difficulty in problem solving process. Thus problem solving learning must be designed as that can promote the ability to construct mental representation of a particular problem.This mental representation is called problem schema. Rumelhart and ortony(1977) introduced the concept of problem schema as a sort of knowledge structure used to identify type of problem being solved. According to Riely and Greeno(1988) problem schema is the mental representationof the pattern of information that is

represented in the problem.This Problem schema(conceptual model) is necessary for developing meaningful solution to the problem.

Jonassen (2011) studied about the role of problem schema on solving story problems.Jonassen(2011) describes problem schema includes semantic information and situational information about the problem. Problem schemas also possess knowledge about the process of solving problem. Jonassen (2011) also argues that the most successful problem solvers are those who can integrate the situational and structural characteristics of the story problems.

COMPONENTS OF PROBLEM SCHEMA

According to Jonassen(2011), understanding a problem includes two process-representing pattern of information in the meaning of terms in the text and constructing a conceptual model that represent the situation in the text.A robost problem schema have the following components

1. ***Problem Type***: Classification of problem based on relationships embedded in the principle
2. ***Structural Model***: It represents inter relationship between problem elements. Learning about the structure of each type of problem will help to construct robost problem schema.
3. ***Situation Model:*** The situational characteristics represent the contextual story elements in the problem. Situational content is also valuable because it affects access to internal, mental problem schemas.
4. ***Set Identifier***: Identifying key values in the problem are important process in solving story problems.
5. ***Arithmetic Model:***students assign values from the structural model onto an equation.

CONCLUSION

Qualitative problem representations are necessary prerequisites to learning quantitative representations (Ploetzner, Fehse, Kneser, and Spada, 1999). Design of SBIS is an attempt to integrate the structural and situational representations of the problem.This strategy condradicts with the traditionalapproach of problem solving. It helps to retrieve required information for solving problems. It promotes indepth learning by integrating different dimensions of problem.Thus it gives conceptual clarity and enhance learning.

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Chapter 23

A STUDY ON ICT ORIENTATION RESEARCH IN THE HIGHER EDUCATION OF INDIAN EDUCATION SYSTEM

*S. Agilandeswari S. Rama**

INTRODUCTION

Now a day's people are very familiar with their technological side. In every corner of this world many technological aspect rolling here and there. In that, most prominent ongoing development, advances and innovations in information and technology. ICTs are important tool for all organization, education and other such areas. It can able to move all around the world for all aspects. ICT is used to communicate, create, store, gather and manage information. This broad definition of ICT includes technologies as radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail. The Introduction to ICT is intended to do more than teach basic computer literacy skills on current packages. It provides a combination of theoretical knowledge and practical skills that together comprise a mental framework that will enable the student to adapt and learn new. The course has a strong practical focus with the intention of enabling students to use ICT's for productivity and problem solving in their lives.

ICT encourage students to actively participate in their education, through the participation they able to take responsibility for their own learning. It is necessary to acquire the ability to use technology to, organize, evaluate and communicate information and the possession

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of the fundamental understanding of the information. Transformation of ICT in higher education in India has helped increase the country's requirement of higher education through part-time and distance-learning system. Our aim is to integrating ICT in higher education. For this, the Information and Communication Technologies (ICTs) are utilized by higher education institutions worldwide. ICTs in higher education are being used for developing material; presenting material and sharing content; communication between learners, teacher and the outside; developing and delivery of presentations; administrative support, student enrolment. This paper highlights the concepts of ICTs, role of ICTs in education and Integrating of ICT in higher education.

ICT IN EDUCATION

As the access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time. Information and communication technologies (ICTs) which include radio and television, as well as newer digital technologies such as computers and the Internet have been touted as potentially powerful enabling tools for educational change and reform. ICT in education is any Information Technology that focuses on the acquisition, storage, manipulation, management, transmission or reception of data required for the educational purpose. ICT in education is support material for all human for their educational development. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life.

ICT AND ITS ROLE IN EDUCATION

ICT in education is any hardware and software technology that contribute in the educational information processing. In the present era, ICT mainly comprises of Computer technology with its hardware, like, Personal computer machine, infrastructure required for setting up Internet facility and also software like, CD ROM including various program packages, E-learning strategies etc. In ICT, Hardware approach like use of machines and materials, Software approach like use of methodologies and strategies of teaching learning and Systems approach that uses the management technology that deals with the systematic organization of the hardware and the software. Different software packages for the use in

different department of education; e.g. library software, statistical software, administration software, software related to managing the entire learning process.

ICT has become an essential component of basic life. In many countries, ICT has helped in improving the quality of education. It has the ability to improve the quality of education in all sectors through multimedia capabilities. ICT can give learners access to concepts by their own way. The acquisition of ICT skills in educational institutions helps knowledge sharing, thereby multiplying educational opportunities. Integrating ICT literacy will be crucial as it means harnessing technology to perform learning skills. It must use of ICT to manage complexity and solve problems by thinking critically, creatively, and systematically towards the goal of acquiring thinking and problem-solving skills.

For this, student can be used for making assignments, collecting data, documentation, and conducting research. It can be minimize the teaching method. This can able to know the update information to learn for both teacher and students. Here in order to introduce and understand the need of ICT in educational institutions. They must be given opportunities for acquisition of new knowledge. This can be made possible by promoting ICT-based training programs introduced in their curriculum.

ICTS IN HIGHER EDUCATION

ICTs help to access, retrieve, convert, store, organize, manipulate and present data and information. ICT to enhance or support learning in education. Most universities today offer some form of eLearning. So computers are already changing the organization and delivery of higher education. Now a day's educational technology has been providing both teachers and students with more options and flexibility in their practices. With the availability of Internet, educational technology becomes increasingly indispensable in the field of education. ICT in education deals with digital contents can contribute to substantial improvements in education. The communication facilities are enabling improved forms of communication and sharing. E-Learning has progressed through a number of stages and transformations over the past thirty years. In the 1970s and 1980s, it was called Computer Assisted Learning, Computer Based Training or Technology Based Training. By the 1990s this learning was being supplemented by other media, particularly the e-mail and discussion groups. Today virtual learning environments (VLEs) provide facilities for both the course management and interaction via a range of communication tools.

The introduction of ICT in the higher education has profound implications for the whole education process ranging from investment to the use of technologies in dealing with key issues of access, equity, management, efficiency, pedagogy and quality.

1. Student-centered Learning: Student-Centered Learning represents both a mindset and a culture within a given educational institution and is a learning approach which is broadly related to, and supported by, constructivist theories of learning. It is characterized by innovative methods of teaching which aim to promote learning in communication with teachers and other learners and which take students seriously as active participants in their own learning, fostering transferable skills such as problem-solving, critical thinking and reflective thinking.
2. Supporting Knowledge Construction: Learning approaches using contemporary ICTs provide many opportunities for constructivist learning and support for resource-based, student centered settings by enabling learning to be related to context and to practice.
3. Anyplace Learning: Using the help of ICT, educational institutions can arrange anything in a distance mode . Today many students can use this facility through technology-facilitated learning settings.
4. Anytime Learning: It controls the geographical barriers. Students are able to undertake education anytime and at any place. This flexibility has provided learning opportunities for many more learners who previously were constrained by other commitments.

INTEGRATING ICTS IN HIGHER EDUCATION

The integration of ICTs in higher education brings many opportunities and also face more challenges; that is why it is very important before implementing the use of ICTs to make sure that suitable levels of investment is in place, adequate training, careful planning, restructuring the teaching process, and a systematic approach also are require when integrating ICTs in education in order to achieve maximum educational benefits. It is also vital to think carefully about purpose of education or the context in which the ICTs can be used before implementation. It does not just impart knowledge and skills, but it is also responsible for building human capital. Designing and delivering information through ICT is not simply a matter of selecting a tutoring team with expertise in subject matter and technical skills, but is also finding educationalists with information and communication skills required to manage online learning. ICT not only brings changes in the

way that we deal with information, it also changes the way we think and how we view our world.

ICT is changing the face of education, nature of work and the workplace. It improves the higher level education in high level. From this our education system will grown up as high as possible through ICT. Some of the institutions in most developing countries due to many socio-economic and technological barriers not able to maintain the ICTs. So for the convenience of low cost to fix ICT in higher education institution for improving their education. Cultural and pedagogic change should occur for the technology to be implemented to its full effectiveness and achieve the goals it was designed to fulfill. In some cases, integrating technology into the teaching-learning transaction has been found to transform the teacher's role from being the traditional "sage on the stage" to also being a "guide on the side", and student roles also change from being passive receivers of content to being more active participants and partners in the learning process. Thus the higher education system will improve the through the ICT, to gain more knowledge and tackle by own in all aspects. Thus there is a need of government authority support and the higher education institutions commitment to making the integration of ICT in education a successful process.

CONCLUSION

Integrating of ICT is very difficult task, not an easy thing. Use of ICT, to strengthen the system in educational mode like open and distance system. This could help the higher education system for all. ICT integration in education is a broad process of applying technology to the curriculum to improve teaching and learning process. There are significant challenges in integrating ICTs use in education rising from environmental, cultural and educational faced by educators, educational administrators and students in higher education. Information and Communication Technology has no doubt brought about tremendous change in education. Similarly wider availability of course material in education which can be shared by means of ICT, can foster better teaching. While technology can influence the way how students are taught, it would also enable development of collaborative skills as well as knowledge creation skills.

The higher education system in India gain more adequate knowledge through the ICTs which maintain the developing country into developed country in education. However, the application of ICT in higher education has very high positive support of all aspects in all over the world. It should

address the needs and perform multiple roles in higher education to benefit all. This sense of urgency and the continuous implementation of ICT in higher education has led many universities to gain quality of education and to create own participation in every moment of the individual.

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Chapter 24

THE ROLE OF ICT IN HIGHER EDUCATION FOR THE 21ST CENTURY

Dr. R. Annadurai and N. Allimuthu**

INTRODUCTION

Ensuring universal service and access to information and communication technology is a top national objective in many countries, often enshrined in laws that govern the sector. One of the distinctive features of human beings is their ability to acquire knowledge, and what makes this knowledge an ever-thriving entity is man's ability to 'impact' this knowledge to others. Transfer of knowledge, which is one of the foundations of learning, is among the most fundamental social achievements of human beings. Building strong relationships with students is something that frequently explains why faculty takes pleasure in the challenge of working at a small university.

The concept of moving the traditional classroom of desks, notebooks, pencils, and blackboard to an online forum of computers, software, and the Internet intimidates many teachers who are accustomed to the face-to-face interaction of the traditional classroom. In the past 10 years, online instruction has become extremely popular as is evident in the rise of online universities, such as University of Phoenix Online and Athabasca University (Canada), and on-campus universities offering online courses and degrees, such as Harvard University and University of Toronto. For many students who find it difficult to come to campus due to employment, family responsibilities, health issues, and other time constraints, online

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education is the only option. Advancements, standards, specifications and subsequent adoptions have led to major growth in the extensibility, interoperability and scalability of e-learning technologies. E-learning is fast becoming a major form of learning.

The rapid development of Information and Communication Technology (ICT), particularly the Internet, is one of the most fascinating phenomena characterizing the Information Age. ICT powers our access to information, enables new forms of communication, and serves many on-line services in the spheres of commerce, culture, entertainment and education. Over the last decade in the United Kingdom there has been growth in support for the use of technology within teaching and learning in Higher Education (HE). In particular, since 1993 the Teaching and Learning Technology Programme (TLTP) has promoted the creation of technology-based materials for use across the HE sector.

WHAT IS ICT?

Information and Communication Technologies (ICTs) are referred to as the varied collection of technological gear and resources which are made use of to communicate. They are also made use of to generate, distribute, collect and administer information.

Introducing ICT as a tool to support the education sector has initiated substantial discussions since the late 1990s. A decade ago the emphasis was on Technical and Vocational Education and Training and training teachers. During the last few years an increasing number of international development agencies have embraced the potential of ICT to support the education sector. UNESCO has played a major role in spearheading the Education for All initiative to harness the potential of ICT.

ICT AND HIGHER EDUCATION

The major teaching and learning challenges facing higher education revolve around student diversity, which includes, amongst others, diversity in students' academic preparedness, language and schooling background. Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information and communication technologies (ICTs) as an educational tool in the promotion of women's advancement has immense potential.

Integrating ICT in teaching and learning is high on the educational reform agenda. Often ICT is seen as indispensable tool to fully participate in the knowledge society. ICTs need to be seen as "an essential aspect of

teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach, 2005). For developing countries like Vietnam, ICT can moreover be seen as a way to merge into a globalizing world. It is assumed that ICT brings revolutionary change in teaching methodologies. The innovation lies not per se in the introduction and use of ICT, but in its role as a contributor towards a student-centered form of teaching and learning.

The Information and Communication Technology (ICT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of ICT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. ICT is about the new ways in which people can communicate, inquire, make decisions and solve problems. It is the processes, tools and techniques for:

1. gathering and identifying information
2. classifying and organizing
3. summarizing and synthesizing
4. analyzing and evaluating
5. speculating and predicting

ICTs which can be in the form of videos, television and also computer multimedia software, that merges sound, transcripts and multicolored moving imagery, can be made use of so as to make available stimulating, thought provoking and reliable content that will keep the student interested in the learning process. The use of online pedagogy within universities and management institutes is increasing. The introduction of the Wi-Fi system too has led to the growth of hi-tech education system, where accessibility and accountability of subject matter is made readily available to the students. The students can now study and comprehend the related information at their own convenient time.

ICT IN RESEARCH

The application of ICTs in academic research has grown steadily in the past 10 to 15 years in both developing and developed countries, although there are wide variations in usage both within and between countries and regions. The most straightforward use of ICTs in research is in data processing. The unprecedented growth in bandwidth and computing power provide opportunities for analyzing/processing huge amounts of

data and performing complex computations on them in a manner that is extremely fast, accurate and reliable. Computer data processing not only frees researchers from the cumbersome task of manually analyzing data but more importantly facilitates quick and accurate analysis of huge amounts of data from national samples or even multi-national samples covering tens of thousands of respondents.

Another important dimension of ICTs in research is the use of online full text databases and online research libraries/virtual libraries which are the direct outcome of the growth in telecommunications networks and technology.

ICT IN TEACHING

Academics have taken to the use of computer in teaching much more readily than they adopted earlier audio-visual media. ICT according to a number of commentators, enhance teaching, learning, and research, both from the constructivist and instructivist theories of learning. Behind this increasing faith in the role of technology in higher education however, lies implied acceptance of technology by various commentators, either as neutral and autonomous, neutral and human controlled, autonomous and value laden, or human controlled and value laden. In many countries, demand for higher education far outstrips supply and Governments and institutions are turning more and more to the use of ICTs to bridge the access gap. It is too early to say whether the role of ICTs in the teaching function of higher education is truly transformative, or whether it is simply a repackaging of previous pedagogy.

ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people.

Effectiveness, cost, equity, and sustainability are four broad intertwined issues which must be addressed when considering the overall impact of the use of ICTs in education. The educational effectiveness of ICTs depends on how they are used and for what purpose. And like any other educational tool or mode of educational delivery, ICTs do not work for everyone, everywhere in the same way.

The constitution of the United Nations Educational, Scientific and Cultural Organization (UNESCO) was adopted by 20 countries at the London Conference in November 1945 and entered into effect on 4 November 1946. UNESCO's principles on ICT in education can be summarized as follows:

1. Old and new technologies need to be used in a balanced way. On-the-air and off-the-air radio/radio-cassette, television and offline video-assisted technologies are still considered valid and cost-effective modes of education delivery, as important as more interactive computer/Internet-based virtual education or online distance learning.
2. Meeting the international education goals by 2015 will require huge investments in teacher training institutions.
3. The demand for higher education cannot be met in both the developed and developing world without distance or virtual modes of learning.
4. Vocational training needs cannot be met without virtual classes, virtual laboratories, etc.
5. Educational goals cannot be met without gender sensitivity. Wherever possible, the proposed indicators will address the need to measure the gender gap.

BENEFITS AND CHALLENGES OF ICT

Tools are now available on the Internet to assist both teachers and students to manage writing assignments to detect and avoid the pitfalls of plagiarism and copyright violations. One of the great benefits of ICTs in teaching is that they can improve the quality and the quantity of educational provision. For this to happen, however, they must be used appropriately. While using ICTs in teaching has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. Introducing ICT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g., buildings) are relatively less costly. Using unlicensed software can be very problematic, not only legally but in the costs of maintenance, particularly if the pirated software varies in standard formats. Even though students can benefit immensely from well-produced learning resources, online teaching has its own unique challenges as not all faculties are ICT literate and can teach using ICT

tools. The four most common mistakes in introducing ICTs into teaching are: i) installing learning technology without reviewing student needs and content availability; (ii) imposing technological systems from the top down without involving faculty and students; (iii) using inappropriate content from other regions of the world without customizing it appropriately; and (iv) producing low quality content that has poor instructional design and is not adapted to the technology in use.

The other challenge faced is that in many developing nations the basic requirement of electricity and telephone networks is not available. Also many colleges do not have proper rooms or buildings so as to accommodate the technology.

CONCLUDING OBSERVATIONS

As we move into the 21st century, many factors are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of ICT.

It is believed that the use of ICT in education can increase access to learning opportunities. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The integration of ICTs in higher education is inevitable. The very high demand for higher education has stimulated significant growth in both private and public provision. ICTs in the form of Management Information Systems are increasingly universal. ICT has also led to the emergence of Open Educational Resources (OERs). The use of ICT creates an open environment which enables the storage and the reuse of information materials as also it enables the interface among the teachers as well as students.

Apart from having enabling telecommunications and ICT policies, governments and higher education institutions will need to develop strategies for effective ICT and media deployment and sustainability.

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Chapter 25

ROLE OF ICT IN IMPROVING THE QUALITY IN ALL ASPECTS OF HIGHER EDUCATION

Dr. G. Arumugam*

INTRODUCTION

It is no secret that education is slow to change, especially in incorporating new technologies. This is described by Jukes and McCain (1997) as Paradigm paralysis, the delay or limit in our ability to understand and use new technology due to previous experiences. It takes new experiences to replace the old ones, and this simply takes time. Unfortunately education can no longer take the time it wants. The trends in technology are creating a future that is arriving faster than education is preparing for it. We must therefore ask what are these trends and how will education adopt to them? To answer these questions, the techniques of H.G. Wells will be used. Wells, the father of future studies had a gift for seeing how all the activities of human kind, social cultural, technological, economic, and political-fit together to produce a single past and by extension a single future. First we will take a brief look at our past to formulate an understanding of the trends of today. This will be followed by a detailed analysis of these trends. Finally, we will peek into the crystal ball and predict the future of technology and education.

THE FUTURE OF EDUCATION

It is no secret that our educational system is slow to adopting innovations. The old adage, "the only constant in life is change" has rarely been applied to education, Gentry and Csete have stated, "Educators

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are slow to recognize the need to develop a curriculum that will prepare work force for the demands they will face". Some would argue that change in education will continue to be a dream unrealized well into the new millennium, but many opinions run contrary to this argument.

In 1996, the American Association of School Administrators (AASA) brought together 55 advisors from various fields, including education, business, government, psychology, sociology, anthropology, and demography to study the future of education. A short summary of these findings is (Ulchida, 1996):

- Students need to be skilled in accessing the vast array of information available through advanced technology and be able to process the information.
- Students must know how to use computers and be familiar with various types of technology.
- Schools must Incorporate "marketplace" technologies and ensure that new and emerging technologies are incorporated into the school program.

If an association of school administrators believes emerging technologies need to be incorporated into school programs then we can expect action on the subject. A consistent point brought up by most futurists is the need to provide education to both children and adults. The Special Libraries Association (SLA) believes that schools will become around- the-clock facilities. The academic day will stretch to seven hours for children; adults will work a 32-hour week and prepare for their next job in the remaining hours. The SLA believes that new technologies will greatly enhance these educational opportunities with job simulation stations, telecommunications course-work (distance education), 3-D graphics, and artificial intelligence making the largest contributions. The driving force behind educational reform will come from the new information economy's call for technologically fluent workers. Government will place more emphasis on the outcomes of public education (for example, America 2000). Improved pedagogy will revolutionize learning; learning environments will become less important as individuals will "learn more on their own." Computer-supported approaches to learning will allow for more content- specific material to be learned. (Cetrone & Davies, 1994).

Gentry and Csete (1990) have also written that pressures from business, industry, and government will "force the educational establishment to better prepare graduates for the workplace". Several of the points they mentioned were that:

- Increased access to electronically delivered instruction will provide new channels of instruction developed independently of traditional educational systems.
- Artificial intelligence will have an increased role in education; as technology becomes easier to use, more educators will become adopters.
- Technology-capable students will demand the adoption of technology; independent learning skills (lifelong learning) will need to be supported.
- People conforming to technology will shift to technology fitting the diversity of the people using it.

Jukes and McCain (1997) of the Thombur Center offer insight into the future of technology and education. Both see education's role as being similar to that of a quarterback on a football team: "A quarterback must be a futurist -- throwing the ball not to where the receiver is, but to where the receiver is going to be. It's much the same with technology. We need to be looking ahead 3, 4, even 5 generations down the road." Jukes, McCain, and David Thornburg advocate a new educational paradigm that shifts curriculum from content-based to process-based. Juke's and McCain's message is that educators need to change their mindset quickly, "or the market will find its educational experiences elsewhere" (1997). These experiences found elsewhere are already evidenced in increased home school numbers and support for school vouchers.

A 1997 study performed by the National Home Education Research Institute showed that there are approximately 1.23 million American children being taught at home. Home school students collectively outnumber the individual statewide public school enrollments in each of 41 states. On average, home schoolers outperform their public school counterparts by a minimum of 30 percentile points across all subjects. The study further shows that family income, parental education, gender and minority differences have no impact on the success of home school student performance. Also, the amount spent per student is staggeringly different: $546/student for home school versus $5,325/student for public schools. The study shows that nearly 84% of home school children use a computer in their education, compared to the national average of 26% (Ray, 1997).

School vouchers appear to be another factor that might create a larger private market for education. Initiatives in California and Florida have already shown that vouchers are gaining support among the American public.

Experts from all fields, including education, business, and government agree that we have moved into the information age. As much as 97% of the world's knowledge will be accumulated over one person's lifetime

(Molitor, 1998). Against statistics like this, teaching students a host of facts "just in case" they need them later on in life is a fruitless effort. The ability to find and use facts as they are needed becomes the skill that will enable students to become lifelong learners. The roll of education is no longer to provide educational opportunities through early adulthood, but to provide the scaffolding necessary to support individuals and families from all walks of life, throughout their entire lives. In order to prevent a further widening between the upper and lower classes, it will become increasingly important for educational institutions to provide this support by providing weeknight and weekend adult classes focused on emerging technologies.

Very soon we can look for interactive video technologies to allow parents to play a more active role in their children's education (e.g. watching a class presentation via online video). Schools that actively pursue such avenues will be in great demand. School days will grow to seven hours in length to provide more instruction and to meet the needs of dual income families. As more states pass school voucher initiatives, a greater dependency upon private education will result. Schools will compete to hire teachers, raising teacher salaries. Dissatisfaction with public education and national and statewide acceptance of school vouchers will cause the private and home schooling markets to grow well into the next century.

The effects of Moore's Law, Metcalfe's Law, and technology fusion will produce a variety of hand-held and wearable computers that will be connected to a worldwide digital network. Technology fusion and a changing world economy will place new demands upon education. The teacher's role will shift from that of the transmitter of facts, to a facilitator, coaching students in how to find and use facts specific to a particular context.

CONCLUSION

Knowing exactly what happens in our future is not important. It is important that educators have a sense of where the world is headed. Only then will they be able to adequately prepare current and future students to thrive in this ever-changing world. We must always keep in mind that a good driver doesn't watch the car's hood while they are motoring down the road. Instead, a good driver carefully watches the road ahead, looking for the obstacles and challenges that lie before them. It is time that education quit watching its hood and start / looking at the road ahead.

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Chapter 26

INTEGRATING ICT IN HIGHER EDUCATION

M. Balasundaram and Dr. D. Vinodh Kumar***

INTRODUCTION

Information and Communication Technologies (ICTs) exemplified by the internet and interactive multimedia would definitely be focused in the future education and it may become inevitable to integrate into formal teaching and learning process at all levels, right from schooling to higher learning.ICT is providing a plethora of opportunities for educational institutions and many other organizations to enhance the use of technologies to complement and support the teaching learning process. The rapid development in ICT especially the internet, methods of teaching and learning are undergoing a rapid change.

The modern educational system has increasingly believed that technology makes learning easier. So it is essential to refine traditional teaching by redesigning the contents and various skills of curricula in higher education. Effective technology integration across the curriculum deepens and enhances the learning process. Integrating ICT tools and a project-learning approach, students are more likely to stay engaged and on task, reducing behavioral problems in the classroom. Integrating ICT is very challenging to all the teachers to address the children born in the age of technology hence they should be familiar with the new technologies.

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ICTS INTEGRATION

ICT is universally acknowledged as an important catalyst for social transformation and national progress. ICT stands for information and communication technology and is defined, for the purpose of primer, as a 'diverse' set of technological tools and resources used to communicate and to create, disseminate, store and manage information. It is also potentially powerful tool for extending education opportunities, both formal and non-formal.

NATIONAL MISSION FOR HIGHER EDUCATION THROUGH ICT

The MHRD under which all the institution of higher learning would be networked through 'Broadband' connectivity has prepared a national mission for education through ICT. ICT has a great potential to contribute positively towards knowledge, dissemination, effective learning and the development of more efficient educational service.

APPROACHES TO INTEGRATING ICT IN TEACHING–LEARNING PROCESS

1. Wireless connectivity,
2. Merging of Technology,
3. Developments in portable devices.
4. Availability of high speed communications,
5. Intelligent application.
6. Visual immersion system.

The following skills are expected from the Teacher

(*a*) Basic operational skill

(*b*) IT skills

(*c*) Software evaluation skill

(*d*) effective use of the internet

(*e*) pedagogical skill for classroom management

The main focus on ICT modules are ICT for learning, 'online' learning and 'web authoring' and developing and designing digital portfolios.

BENEFITS OF THE INTEGRATION OF ICT PROGRAM

1. Student/ teachers/ used online support is help them, solve the problem they faced in completing their learning and assessment tasks.

2. Students/ teacher developed their reflective skills through their use of journals and portfolio activities.
3. Students/ teacher developed their computing skills particularly in the use of program such as 'word' 'excel' and 'power point'.
4. Students / teacher developed teaching resources that would help them during their practice teaching.

The effective integration of ICTs in to the education system is a complex, multifaceted process that involves just not technology, indeed, given enough initial capital, getting the technology is the easier part but also curriculum and pedagogy, institutional readiness, teacher competencies and long term financing among other.

The four broad issues in the use of ICT in education

(*a*) Effectiveness

(*b*) Cost

(*c*) Equity

(*d*) Sustainability

SKILLS NEEDED IN THE WORKPLACE OF THE FUTURE

1. Digital age literacy – related to ICT
2. Functional literacy – use of images, graphic, video, chart, grapier of visual literacy.
3. Scientific literacy – Understanding both the theoretical and applied science
4. Technological literacy – Competence in the use of ICT.
5. Cultural literacy – Appreciation of the diversity of culture.
6. Global awareness – to knowledge about the world.

INNOVATIVE THINKING

(*a*) Adoptability

(*b*) Curiosity

(*c*) Creativity

(*d*) Risk taking

EFFECTIVE COMMUNICATION

(*a*) Collaboration and interpersonal skills

(*b*) Personal and social responsibility

(*c*) Interactive communication and

(*d*) High Productivity

PEDAGOGY IN ICT (ACTIVITIES)

(*a*) **Active Learning:** Activities determined by learner, in small groups.

(*b*) **Collaborative Learning:** Working in teams, Heterogeneous groups, supporting each other.

(*c*) **Creative Learning:** Productive learning, finding new solution to problem.

(*d*) **Integrative learning:** Integration theory and practice, relation between subject, thematic, teams of teacher.

(*e*) **Evaluative:** Student directed, diagnostic.

CHALLENGES IN INTEGRATING ICTS IN EDUCATION

Significance challenges those policymakers and planners, educators, education administrator and other stakeholders.

(*a*) A rigorous analysis of the present state of the educational system ICT-based arrangements. Especially drivers and barriers to ICT, use need to be identified, including these related to curriculum and pedagogy. Infrastructure, capacity –building, language and content and financing.

(*b*) The policymaker understood the potentials of different ICTs when applied in different content for different purpose.

(*c*) The identification of stakeholder and harmonizing of efforts across different interest group.

POTENTIAL SOURCES OF MANY AND RESOURCES FOR ICTS PROGRAM IN HIGHER EDUCATION

1. Grant
2. Public subsidies
3. Private donation, fund rising events
4. In-kind support (e.g. Equipment, and volunteers)
5. Community supports (e.g. Rental building)
6. Membering fee
7. Revenue earned from core business connectivity (Phone, Fax, Internet, web page, Direct

Computer access to user, office service-photo coping, scanning, Audio-Visuals aids)

8. Revenue earned from ancillary activities – education service (distance education, training Course). Community service (meeting room, social events, local information, remittance from migrant workers, telephonic consulting, specialized activities, sales etc.

CONCLUSION

The most visible symbol of globalization has been the spectacular development of ICTs. ICTs are integrated into all aspects of life, Today and therefore, it is important for pre service teacher to be confident and be competent in their use. They will use them as a resource for preparation and as a tool to gather knowledge and communication. Teachers are the architect of our future generation. The role of teacher in society is both significant and valuable. Learning with computer and internet, in which technology facilities learning across the curriculum, integrating skills development with curriculum application is the need of the hour.

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Chapter 27

INTEGRATING ICT IN HIGHER EDUCATION

Dr. C. Barathi* and S. A. Gowri*

INTRODUCTION

Information and communication technology (ICT) is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than what the other fields have experienced. Open and distance learning universities taking advantage of the affordances provided by ICT and the Internet are making higher education more accessible to people, especially for working adults and those in remote rural areas.

The use of ICT in education lends itself to more student-centered learning settings and often this creates some tension for some teachers and students. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. In the past educational institutions have provided little choice for students in terms of the method and manner in which programs have been delivered. Students have typically been forced to accept what has been delivered and institutions have tended to be quite staid and traditional in terms of the delivery of their programs. ICT applications provide many

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options and choices and many institutions are now creating competitive edges for themselves through the choices they are offering students.

Information and Communication Technologies (ICTs) is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. This broad definition of ICT includes technologies as radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail (UNESCO, 2002). ICT is potentially a powerful tool for extending educational opportunities and can provide remote learning resources. ICT encourage students to take responsibility for their own learning and offers problem centered and inquiry based learning which provides easy access and information based resources.

ICT IN HIGHER EDUCATION

The ICT Policy in higher education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socio-economic development of the nation and global competitiveness. The introduction of ICT in the higher education has profound implications for the whole education process ranging from investment to the use of technologies in dealing with key issues of access, equity, management, efficiency, pedagogy and quality.

Generally speaking, learning is expensive, takes a long time and the results can vary. E-learning has been trying for years now to complement the way we learn to make it more effective and measurable.

THE IMPACT OF ICT ON STUDENT'S LEARNING

Just as technology is influencing and supporting what is being learned in schools and universities, so too is it supporting changes to the way students are learning. Moves from content-centered curricula to competency-based curricula are associated with moves away from teacher-centered forms of delivery to student-centered forms. Through technology-facilitated approaches, contemporary learning settings now encourage students to take responsibility for their own learning. In the past students have become very comfortable to learning through transmissive modes. Students have been trained to let others present to them the information that forms the curriculum. The growing use of ICT as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in the learning process. The following sections describe

particular forms of learning that are gaining prominence in universities and schools worldwide.

1. Student-Centered Learning

Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centered models.

The use of ICTs in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (eg. Reeves & Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase.

2. Supporting Knowledge Construction

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning. The theories of learning that hold the greatest influence today are those based on constructivist principles (eg. Duffy & Cunningham, 1996). These principles put forward that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (eg. Berge, 1998; Barron, 1998). As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become.

3. Any Place Learning

The concept of flexibility in the delivery place of educational programs is not new (e.g. Moore & Kearsley, 1996). Educational institutions have been offering programs at a distance for many years and there has been a vast amount of research and development associated with establishing effective practices and procedures in off-campus teaching and learning. Use of the ICT technology, however, has extended the scope of this activity and whereas previously off-campus delivery was

an option for students who were unable to attend campuses, today, and many more students are able to make this choice through technology-facilitated learning settings.

4. Anytime Learning

In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (eg. Moore & Kearsley, 1996). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (eg. Young, 2002). Through online technologies learning has become an activity that is no longer set within programmed schedules and slots. Learners are free to participate in learning activities when time permits and these freedoms have greatly increased the opportunities for many students to participate in formal programs.

5. Information Literacy

Another way in which emerging ICTs are impacting on the content of education curricula stems from the ways in which ICTs are dominating so much of contemporary life and work. Already there has emerged a need for educational institutions to ensure that graduates are able to display appropriate levels of information literacy, "the capacity to identify and issue and then to identify, locate and evaluate relevant information in order to engage with it or to solve a problem arising from it" (McCausland, Wache & Berk, 1999, p.2). The drive to promote such developments stems from general moves among institutions to ensure their graduates demonstrate not only skills and knowledge in their subject domains but also general attributes and generic skills. Traditionally generic skills have involved such capabilities as ability to reason formally, to solve problems, to communicate effectively, to be able to negotiate outcomes, to manage time, project management, and collaboration and teamwork skills.

ADVANTAGES OF ICT ENHANCED LEARNING

ICT enhanced learning is a relatively new form of educating students through the use of ICT enabled devices as an instructional medium. It is used to educate people of all different ages and ICT enhanced learning

possesses variety of advantages. Some of the important advantages are given below.

1. Sharing of Ideas
2. Instructors' accessibility
3. Enabling student-centered teaching approaches
4. Providing 24/7 accessibility to course materials
5. Helpful for instructors
6. Flexibility
7. Each student can individually set his / her own speed of study
8. Interactivity
9. Faster evaluation of tests, faster feedback
10. Easy to update content.
11. Personal tutor every time.
12. More students at the same time.
13. Less cost for participation.
16. Improved open access to education, including access to full degree programs
17. Better integration for non-full-time students, particularly in continuing education
18. Improved interactions between students and instructors,
19. Provision of tools to enable students to independently solve problems,
20. Acquisition of technological skills through practice with tools and computers.
21. No age-based restrictions on difficulty level, i.e. students can go at their own pace.

THE VALUES OF INTEGRATING ICT IN HIGER EDUCATION

The values or the uses of integrating ICT in Higher Education consist of 5 Es. They are as follows

1. **E**xcellence of outcomes
2. **E**xpertise in e-learning
3. **E**nthusiasm for jobs
4. **E**xtension through continuous improvement
5. **E**mpowerment of ownership

E-LEARNING

E-learning (or eLearning) refers to the use of electronic media and Information and Communication Technologies (ICT) in education. E-learning is broadly inclusive of all forms of educational technology in learning and teaching. E-learning is inclusive of, and is broadly synonymous with multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-based training(CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT),web-based training (WBT), online education, virtual education, virtual learning environments (VLE) (which are also called learning platforms), m-learning, and digital educational collaboration.

TRENDS IN E-LEARNING

Several e-learning trends give us a view to how e-learning and learning tools will be shaped in the future.

The following three key trends are shaping the new e-learning reality;

Trend #1: Mobile learning

Mobile devices in business are becoming ubiquitous (even in unexpected places such as retail and hospitality), and it makes sense to deliver learning to employees on a platform that is integral to their personal and professional lifestyles. Mobile is suited to short bursts of information, which allows you to integrate on-demand learning into your performance support system.

Trend #2: Social media for learning

People often learn as much from one another as they do from the course materials. And better than 50 percent of the workforce (and growing) is plugged into social networks as a way of life. Organizations already are incorporating social media into their core training strategy, including:

- Using Facebook to provide advanced materials, conduct intersession activities, and build learning communities
- Using Twitter for introductions, pre-training preparation and instruction, conversations, debates, reflecting, brainstorming, and polls
- Using YouTube for training videos
- Creating blogs for additional learning information
- Creating wikis for learning resources

- Creating discussion groups around specific topics, such as on boarding for new employees
- Creating more immersive learning environments such as virtual experiences, which are particularly useful when hands-on or experiential training is required.

Trend #3: Personalization

Learning is an individual experience, but with the advancement of learning technologies, learning strategy can be developed based on each individual's unique competencies and learning preferences.

Personalization considers;

- The learner's preferred and habitual mode of learning
- Their current state of knowledge—what specific knowledge, skills, and attitudes are required, and where are the gaps? What learning can be skipped, and what needs to be repeated?
- Other considerations that may impact learning: are there any generational, cultural or language considerations that need to be addressed to improve learning?

CONCLUSION

Integration of ICT in higher education is inevitable. In the forthcoming years the thrust will be on the use of ICT to strengthen the system in the mode of open and distance learning. Institutional and sector-wide higher education ICT policy and planning should identify the specific role of ICT in enhancing research capabilities and provide for adequate infrastructure backed by capacity building. In addition, the integration of ICT in higher education is also moving beyond getting personal computers into the hands of learners and towards mobile technology, virtual world, and cloud computing, among others. Thus, higher education systems has to be innovative and leverage on the developments in ICT to lead by example in using these cutting edge technologies to provide more accessible, affordable, effective and efficient higher education. The nations and the people are counting on graduates of their higher education systems to be competitive in creating wealth for their respective countries. More and more higher education institutions are using ICT to develop course materials, deliver and share course content, lectures and presentations, facilitate communication among lecturers and students, encourage pedagogical innovation, increase cooperation and collaboration, conduct research, enhance professional development, and provide administrative and management services.

Learning should become more relevant to stakeholders' needs, learning outcomes should become more deliberate and targeted, and learning opportunities should diversity in what is learned and who is learning. At the same time, quality of programs as measured by fitness for purpose should continue to grow as stakeholder groups find the offerings matched to their needs and expectations.

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Chapter 28

ICT A TOOL FOR QUALITY IN HIGHER EDUCATION

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INTRODUCTION

Integrating ICT in teaching and learning is high on the educational reform agenda. Often ICT is seen as indispensable tool to fully participate in the knowledge society. ICTs need to be seen as "an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach 2005). Moreover ICT is seen as a way to merge into a globalizing world. ICT is conceptualized as a tool that can effectively support the innovation of teaching, learning and education management, and that contributes to improve efficiency and quality of education. Educators are encouraged to reasonably implement ICT applications in new and innovative methods of teaching and learning at each grade.

The last two decades have witnessed the inclusion of developments in ICTs in higher education systems around the world. Even then the challenge to develop a higher education system that is flexible and dynamic so as to holistically integrate the technology in the management and delivery of learning programmes in daunting.

ICT AND HIGHER EDUCATION

The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network

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hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. When such technologies are used for educational purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology. ICTs in higher education can be used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc.

Today ICTs – including laptops wirelessly connected to the Internet, personal digital assistants, low cost video cameras, and cell phones have become affordable, accessible and integrated in large sections of the society throughout the world. It can restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the development in social integration. It is only through education and the integration of ICT in education that one teaches students to be participants in the growth process in this era of rapid change. ICT also allows for the creation of digital resources like digital libraries where students, teachers and professionals can access research material and course material from any place at any time. Such facilities allow the networking of academics and researchers and hence sharing of scholarly material.

India, like any other knowledge economy, depends on the development of its educational sector. Higher education drives the competitiveness and employment generation in India. However, research findings have shown that the overall state of higher education is dismal in the country. There is a severe constraint on the availability of skilled labor (Agarwal, 2006). There exist socio-economic, cultural, time and geographical barriers for people who wish to pursue higher education (Bhattacharya and Sharma, 2007). Innovative use of Information and Communication Technology can potentially solve this problem.

ICT can affect the delivery of education and enable wider access to the same. In addition, it will increase flexibility so that learners can access the education. It can influence the way students are taught and how they learn. It would enable development of collaborative skills as well as knowledge creation skills. This in turn would better prepare the learners for lifelong learning. It can improve the quality of learning and thus contribute to the economy.

Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching learning. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. Also proper controls and licensing should be ensured so that accountability, quality assurance, accreditation and consumer protection are taken care of. ICT enabled education will ultimately lead to the democratization of education.

ADVANTAGES OF ICT IN HIGHER EDUCATION

- Eliminating time barriers in education for learners as well as teachers (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007);
- Eliminating geographical barriers as learners can log on from any place (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007);
- Asynchronous interaction is made possible leading to thoughtful and creative interaction.
- Enhanced group collaboration made possible via ICT.
- New educational approaches can be used. (Sanyal, 2001);
- It can provide speedy dissemination of education to target disadvantaged groups.
- It offers the combination of education while balancing family and work life.
- It enhances the international dimension of educational services (UNESCO, 2002);
- It allows for just in time and just enough education for employees in organizations.
- E-learning allows higher participation and greater interaction.
- It challenges the concept that face-to-face traditional education is superior to it.
- It also facilitates inter disciplinary research.
- The use of ICT is motivating for the students as well as for the teachers themselves.
- Use of ICT can improve performance, teaching, administration, and develop relevant skills in the disadvantaged communities.

- It also improves the quality of education by facilitating learning by doing, real time conversation, delayed time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn.
- ICTs also provide a platform for sharing information and knowledge.
- It also helps researchers by provision of information, networking, online journals, libraries and data.
- Research findings show that technology can support pedagogical, curricula, and assessment reforms, which intend to support the process of knowledge creation.
- Students and teachers plan their learning activities and build on each other's ideas to create new knowledge.
- It also facilitates monitoring of their progress in understanding and preparation for lifelong learning and participation in the information society.
- Cost effectiveness, research has proved that ICT is most effective to tackle problems like expanding number of students in each class.
- ICT enabled distance education provides environmental benefits, as there is a major reduction in the amount of student travel.
- Provide access to the best the best practices or knowledge available.
- ICT can play a valuable role to monitor and log the progress of the students across time, place and varied activities.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. The opportunities can be categorized as the aspects relating to role of ICT for access and equity in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

PROVIDES, ACCESS AND EQUITY IN HIGHER EDUCATION:

ICTs are very powerful tool for diffusing knowledge and information, a fundamental aspect of the education process. ICTs can play enormous role for improving access and equity in education sector in general and higher education sector in particular.

PROVIDES QUALITY TEACHING LEARNING

ICT integration is improving quality of teaching-learning. Integration of ICTs would not only help in promoting personal growth but also in developing "knowledge societies". Therefore to strengthen and / or advance this knowledge-driven growth, new technologies, skills and capabilities are needed like ICT. Promote competency and performance. Technology facilitated learning would result in preparation of staff regarding innovative pedagogic methods, new ways of learning and interacting, easy sharing of new practices among teaching community and result in widening the opportunities for their participation.

PROVIDES APPROACHES FOR TEACHING

ICTs have the potential to drive innovative and effective ways of teaching-learning and research. The inclusion of learning tools, easier use of multimedia or simulation tools, easy and almost instant access to data and information in a digital form which allows for computations and data processing generates possibilities which were otherwise not feasible.

EDUCATIONAL IMPLICATION

- Teaching and Learning should encompass ICT skills along with a full understanding and complete mastery of ICTs as pedagogical tools.
- Higher education institutions should be ensured with financial and human resources with training for successful incorporation of ICTs.
- It is also necessary to extend a stronger understanding of future learning needs and future environments for ICT skills.
- A constructive atmosphere must be there to provide an occasion for all stakeholders to form a part of the information society. Instead of focusing on cost, efforts should be taken to promote broadband, computers, and Internet access.
- Progress and planning is still needed in providing attractive learning content and learning technologies.

CONCLUSION

Since time immemorial, education has been an important instrument for social and economic transformation. Presently higher education in India is experiencing a major transformation in terms of access, equity and quality. This transition is highly influenced by the swift developments in information and communication technologies (ICTs) all over the world.

Changes in the curriculum do support fundamental economic and social transformation in the society. Such transformations require new kinds of skills, capabilities and attitudes, which can be developed by integrating ICT in education. The overall suggests that successful ICT integration depends on many factors. National policies as well as school policies and actions taken have a deep impact on the same. Similarly, there needs to be an ICT plan, support and training to all the stakeholders involved in the integration. There needs to be shared vision among the various stakeholders and a collaborative approach should be adopted. Care should be taken to influence the attitudes and beliefs of all the stakeholders.

ICT can affect the delivery of education and enable wider access to the same. In addition, it will increase flexibility so that learners can access the education. It can influence the way students are taught and how they learn. It would enable development of collaborative skills as well as knowledge creation skills. This in turn would better prepare the learners for lifelong learning. It can improve the quality of learning and thus contribute to the economy.

Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching learning. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 29

USAGE OF ICT IN TEACHING LEARNING PROCESS AMONG B.ED. STUDENTS: A SURVEY

N. Baskaran* and Dr. S. Chelvi**

ABSTRACT

The present situation education is more advanced. The world is changing every second. The last few decades have seen a drastic change in the field of education, and it was known by terms such as ICT, in teaching learning process called instructional aids. Many researchers have revealed that technology integrated into mainstream classrooms support higher-level learning and thinking skills among students. It is proved to have positive effect in language learning and it becomes an integral part of education and contributed as teaching tools in the language classroom (Tsou, Wang &Tzeng, 2006). There is a great deal of interest to learn more about the potential use of ICT in schools. Student teachers should be prepared to integrate information and communication technology (ICT) into their future teaching and learning practices. Despite the increased availability and support for ICT integration, relatively few teachers intend to integrate ICT into their teaching activities. Therefore the investigator had chosen for his research which is more appropriate in the field of teacher education. Though investigator wanted to have a study an usage of ICT among the B,Ed students. Who are budding teacher and who are going to make future world. With respect to three major variable- major subject locality and computer already taken. The usage of ICT of B,Ed students studied. The result will pave how much the B,Ed students aware of ICT how far they are using and any significant differences among the B,Ed the B,Ed students in the usage of ICT with regard to their subject of study, locality of living and the computer training they have taken.

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INTRODUCTION

The present situation education is more advanced. The world is changing every second. The last few decades have seen a drastic change in the field of education, and it was known by terms such as ICT, in teaching learning process called instructional aids. Teaching and instructional aids include the use of slide projector, television, radio, audio and video cassettes, etc, in the teaching within the class room and beyond it. Previous researches revealed that the integration of technology in the process of teaching and learning increase student and teacher productivity as well as to make vast amounts of information available. Education is not only limited to teaching the students according to prescribed syllabus as a specific school level. It has much broader objectives, goals and other concepts. Thus, education is becomes an increasingly important tool to combat poverty and to establish a modern nation. Feature of modern society is the penetration of information technologies in all spheres of life, including schooling. In general, the new technologies have been recognized to play a valuable role in developing and improving the teaching and learning situations.

Since the introduction of educational technologies into classroom settings, teacher education has faced the challenge of improving in-service teacher education and preparing pre-service teachers for successful integration of educational technologies into their teaching and learning practices. In recent years, teacher education institutes have made efforts in preparing pre-service teachers to integrate technology into their future teaching practices (e.g., Krueger, Hansen, & Smaldino, 2000). In recent years, teacher education institutes have made efforts in preparing pre-service teachers to integrate technology into their future teaching practices. According to Myers and Halpin (2002), a major reason for studying teachers' attitudes is that it is a major predictor of future classroom computer use. Hung and Liaw (2005) also state that among the factors that affect the successful use of computers in the classroom, teachers' attitudes towards computers play a key role. Khine (2001) studied 184 pre-service teachers and found a significant relationship between computer attitudes and its use in the institution. Taking the importance of attitudes toward computer into consideration, it is also important to understand what influences pre-service teachers' attitudes towards computers (Fisher, 2000). Therefore the ICT usage in the teaching learning process by teachers is very important to achieve more productivity from the student side.

NEED AND SIGNIFICANCE

Worldwide research has shown that ICT can lead to improved student learning and better teaching methods. A report made by the National Institute of Multimedia Education in Japan, proved that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of knowledge Comprehension, Practical skill and Presentation skill in subject areas such as mathematics, science, and social study.

Integrating ICT into education seems to be a necessary issue for educators / education administrators in the world. However, if teachers cannot make good use of the ICT the money and time spent on the ICT is going to be a waste. Also, if the educational budget is limited, looking for a cost-effective and high-performance ICT tool can be the first priority. At the same time Educational ICT tools are not for making educators master of ICT skills themselves, but for making educators create a more effective learning environment via ICT. Student teachers should be prepared to integrate information and communication technology (ICT) into their future teaching and learning practices. Despite the increased availability and support for ICT integration, relatively few teachers intend to integrate ICT into their teaching activities. Therefore the investigator had chosen for his research which is more appropriate in the field of teacher education.

OBJECTIVE

- To study the significant difference usage among B,Ed students in the usage of ICT in teaching learning process with respect to their subject, locality of living place and computer training.

HYPOTHESIS

- There is no significant difference usage among B,Ed students in the usage of ICT in teaching learning process with respect to their subject, locality of living place and computer training.

METHODOLOGY

Descriptive survey method was taken to assess the nature and scope of student teachers' usage of ICT among B.Ed., teacher trainees. Teacher trainees who are join one year professional B.Ed course to teach after the completion of UG or PG course have been taken for this study. The B.Ed., college students were selected through stratified random sampling

technique. Totally 120 B.Ed students were selected who represent various residential background and belonging to various departments.

Usage of ICT in teaching learning process. This tool is three joint scale to assess the usage of ICT was constructed by the investigator. This is three point scale. Initially 35 items were constructed in the draft form. The draft form was given to experts for validation, among 35 items only 25 items were retained as per the guidance of experts. The reliability of the tool is 0.84. It was established by test - retest methods. These 25 items consist of 3 point scale (A, UD, and DA). It has 10 negative items 15 positive items. The scoring for positive items are 2, 1, 0 and negative item 0, 1, 2 so total maximum score value is 50 and minimum is 0. The maximum score indicates maximum usage of ICT with positive attitude.

ANALYSIS OF DATA AND INTERPRETATION

Table-1: Subject, Locality of living and Computer training wise N, M, SD, df and t-value of ICT usage in Teaching

Variables	Dimensions	N	M	SD	Df	t-value	Level of Significance
Subject	Art	66	33.15	6.49	118	1.70	Not Significant
	Science	54	35.05	5.5			
Locality	Rural	51	32.70	6.35		2.20	Significant at 0.05 level
	Urban	69	34.97	5.80			
Computer Training	Untrained	65	33.12	6.73		1.73	Not Significant
	Trained	55	35.05	5.17			

From the above table 1, it is evident that the t-value 1.70 is not significant at 0.05 levels. It reflects that the mean ICT usage scores of art and science B.Ed students do not differ significantly. In this context the null hypothesis, "There is no significant difference among B,Ed students on ICT usage in teaching learning process with respect to their subject." is accepted. Therefore, it may be concluded that the ICT usage of art and science B.Ed students do not differ significantly.

From the above table .1, it is evident that the t-value 2.20 is significant at 0.05 levels. It reflects that the mean ICT usage scores of rural and urban B.Ed students differ significantly. In this context the null hypothesis, "There is no significant difference among B,Ed students on ICT usage in teaching

learning process with respect to their locality." is rejected. Therefore, it may be concluded that the ICT usage of urban B.Ed students possess significantly higher ICT usage in teaching than rural B.Ed students.

From the above table 1, it is evident that the t-value 1.70 is not significant at 0.05 levels. It reflects that the mean ICT usage scores of untrained and trained B.Ed students do not differing significantly. In this context the null hypothesis, "There is no significant difference on ICT usage among B,Ed students in teaching learning process with respect to their computer training." is accepted. Therefore, it may be concluded that the ICT usage of untrained and trained B.Ed students do not differ significantly.

DISCUSSION

From the above the analyses B.Ed subject does not have any relation with. Though there is slight difference in the usage of ICT among science and arts student the difference is no so much. So it can be taken that the subject does not much relation with usage of ICT. Therefore all subject B.Ed students are using ICT in their teaching learning process. Locality of living place has significant relation with the ICT usage in teaching learning of B.Ed students. Urban students have more chance to know the emergence of ICT but rural students possess lack of facility in some remote villages. So, they may have very low awareness and skills to use ICT in teaching. Computer training has no relationship with influence the usage of ICT, this may be due to the skills required for that using. The skill required is not so high but minimum knowledge and skill of using computer is enough.

FINDINGS

1. Arts and science B.Ed students does not differ significant in the ICT usage
2. Urban B.Ed students has significantly higher ICT usage in teaching than rural B.Ed students.
3. Untrained and trained B.Ed students do not differ significant in the ICT usage.

CONCLUSION

Both ancient and medieval both periods fully focused on some group of pupil. There was no plan for mass education but emerging modern era provides universal and compulsory educate to all. In present scenario there

is a need of compulsory and mass education fulfilled by ICT. But present scenario, there is a need education for all. For that ICT is gift. It paves way for all getting education. In order to change the society, the teacher has to educate all by equipping themselves with of ICT.

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Chapter 30

ENHANCING ECOLOGICAL INTELLIGENCE IN CONTROLLING AIR POLLUTION AMONG STUDENTS THROUGH INFORMATION AND COMMUNICATION TECHNOLOGY

A. Chinnathai* and A. Kamalaveni,

INTRODUCTION

Ecological Intelligence is an unavoidable ability that is an essential need for the students at Higher Secondary Level. In the stage of adolescence, they must make use of the Ecological Intellectual ability to learn, to understand, and to make judgement in environment activities. Student's intellectual ability is essential to perceive the important problem of Ecological Environment and the same can be solved through his Ecological Intellectual activities. To understand the modern complex issues related to environment through information and communication technology. Traditional methods of teaching will not give much effect like current internet sources. Environmental health is that aspect public health that is concerned with those forms of life substances, forces and conditions in the surroundings of man that may exert an influence on man's health and well-being, Health is a state of complete physical, mental and social well-being as well as the absence of disease or infirmity. Man is subjected to a variety of environmental hazards. Sometimes, man- made hazards are direct in their impact. Discuss about air pollution, green house effect, acid

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rain, cause and effect of air pollution. These topics are teaching through information and communication technology.

INFORMATION AND COMMUNICATION TECHNOLOGY HELPS IN TEACHING OF ENVIRONMENTAL EDUCATION IN THE FOLLOWING WAY

1. Computer technologies provide different learning experiences like multimedia and hypertext to teach the difficult concepts of theoretical environmental education through graphics, animation, dynamic images and simulations.
2. Information and communication technologies enables to access online libraries, journal and research to enable individual learning.
3. Information and communication technologies exemplified by the internet and you tube video's are obviously of great significance for teaching abstract concept of environmental education such as environmental pollution.
4. Latest technologies such as multimedia, personal computer, laptop, digital video still camera, Local Area Network,(LAN), compact disc read only memory (CD-ROM) and Digital video disc(DVD) power point, simulation and speech really given interest in concrete learning.
5. The latest technologies also have a capacity to integrate with older analogy technologies and retrieve information stored in old technologies and to develop link between the old and the new technology in various concepts of environmental education.

So information technology and communication can be used to develop active mastery learning. In this learning situation, there is an active participation on the part of learners listening to lectures and demonstrations. It crosses traditional boundaries of college, work place and enabled learners to choose their learning materials in their own time and on their own pace. In a few years multimedia computers will be an anachronism because all computers will readily deal with images, sounds and motions, videos, seamlessly and smoothly integrated in to what a computers says (Tag vanglan 2000). The invention of moving images, originally in silent movies and later with sound, had a greater impact than a variety of other environment sources. As the aft- repeated opinion goes "a picture embedded in documents is worth even more".

Technology has been turned to be a preferred medicine in revolutionizing education. The national destiny is achieved through scientific and meticulous manipulation of these resources to the maximum. Due to the technological advancement, the teaching learning methods have to be adopted so that the system of education can produce a qualitative standard in front of the global village.

ENVIRONMENTAL POLLUTION AND HEALTH PROBLEMS

The relationship between human health and the environment is a two-way process. We improve our living conditions and increase our comforts but the alterations to the environment may be harmful to our health. The factory has increased our well being beyond calculation by the goods, which it makes so readily available, while the fumes from partly consumed oil and coal, which the factory emits from its chimneys, poison the atmosphere with sulphur dioxide and other noxious chemicals, causing chronic bronchitis and adding to the risk of lung cancer. This dynamic process can be seen at work in agriculture, when pesticides, essential to healthy plant life, build up excessively and harmfully in food, water and air, which the human ingests. Irrigation and dam building, upon which improved food supplies depend, can create favourable conditions for vectors or disease, e.g., for the mosquito carrying malaria and the snail; the intermediate host of bilharzias. It is well known that the earth's surface and the environment surrounding it are important to human health. The nature of the soil, air, water, temperature, barometric pressure, wind, sunshine, cloud, rainfall, humidity and latitude, must all determine man's health and welfare. Health signifies a wholeness or soundness of body and mind, but we are confronted with the difficulty of determining its relationship to 'disease'. Health and disease must be intimately related, for if disease did not exist it would be irrelevant to talk of health. The two states are contrasted in our minds; as if it were the two sides or a coin - so that when one is present the other is absent.

ENVIRONMENTAL POLLUTION

Environmental pollution is the act of introduction by man, or extraneous substances or energy into the environment that induces un favourable changes. These changes may affect man directly or indirectly by endemfering his health, harming his living resources and ecosystem, or by interfering with legitimate uses of the environment. Environmental pollution causes health problems by affecting human health and lives.

Environmental deterioration by man is attributed to three major causative factors.

1. overpopulation
2. Urbanization
3. Industrialization

OVERPOPULATION

Human population was about 5 million (1 million=10 lakhs) in the year 6,000 B.C. By 1,650 A.D, it was 500 million. By 1,850 A.D. it had reached one billion in 1975 and is now on the further rise. Current estimates indicate an average annual rise of world population by 2 per cent. Indian population, according to the latest estimates, is over one billion. Such an increase in population demands more food, water and land.

URBANIZATION

Growing population leads to a greater concentration of people in living areas. People move to urban areas (cities) abandoning rural settings in search of employment, comfort and facilities. As a result cities are being over- loaded with population that they can barely hold or support. Almost 40% of the population in India is concentrated in the states of Bihar, Punjab, Haryana, Uttar Pradesh, and west Bengal. Population of four major cities in India - Bombay, Calcutta, Madras and New Delhi, and Aurangabad, Bangalore, Hyderabad and Kanpur account for 52% of its population.

INDUSTRIALIZATION

Human needs are never-ending. Discovery of new products and the production of luxuries to suit the changing life style are accomplished by the process of industrialization. It also is the key to the economic development of a nation. Industries, during the processing intermediate chemicals and end-products, generate waste materials and useless by-products. Each industry is associated with an emission of one type or another of dangerous, or potentially dangerous pollutants directly or indirectly. Not only can the industries be responsible for the pollution of air but also for the contamination of water. The quantity of water spent in producing every little thing in the world is un assumable large. For example, the production of 1 kg of sugar consumes about 1,800 litres of water. Similarly, it takes about 8,000 litres of water to produce on Kilogram of beef.

EFFECTS OF AIR POLLUTION ON HUMAN HEALTH

Air pollution is one of the greatest environmental evils. The air we breathe has not only life-supporting properties but also life-damaging properties. Air constitutes about 80% of man's daily intake by weight. Human beings breathe nearly 22,000 times each day, inhaling about 16kg of oxygen. Thus pollution of air may have profound health effects and other consequences.

HEALTH EFFECTS OF POLLUTANTS

Sulphur Dioxide

Sulphur dioxide is an irritant gas which affects mucous membranes when inhaled. Sulphur trioxide is a very strong irritant, much stronger than sulphur dioxide, causing severe bronchi spasms at relatively low levels of concentration.

Carbon Monoxide

Carbon monoxide has a strong affinity for combining with the haemoglobin of the blood to form car boxy haemoglobin (COHB). This reduces the ability or the haemoglobin to carry oxygen to the body tissues. Carbon monoxide also affects the central nervous system. It is also responsible for heart attacks and a high mortality rate.

Ozone

Ozone is a gas that has an irritant action in the respiratory tract, reaching much deeper in to the lungs than the oxides or sulphur.

Fluorides

Fluorine is a cumulative poison even in sub-acute concentrations under conditions of prolonged exposure.

Lead

Lead is a highly toxic and cumulative poison. Lead poisoning can cause severe mental retardation or death. The effects include gastro-intestinal damage, liver and kidney damage, abnormalities in fertility and pregnancy, and mental development of children.

Insecticides

Insecticides are not only harmful for insects but also poisonous for man. e.g., DDT [Dichloro Diphenyl Trichloroethane]. They can affect

the central nervous system and may attack other vital organs. In fact, DDT has been found in mother's milk in western countries and even in our own country.

GREEN HOUSE EFFECT

The primary source of greenhouse gas emissions in the developing world comes from hazardous and expensive fuel-based sources such as kerosene. Kerosene lamps are responsible for the annual emission of over 100 million tonnes of CO2; each lamp emits one tonne of CO2 over the course of its five year life.

There is a different way – each Solar Sister lamp sold can replace one or more kerosene lamps, thereby reducing global carbon emissions on the scale of tens of thousands of tons. Our aim is for each Solar Sister to sell 100 lamps per year. we not only help each Entrepreneur to build an independent income and bring light to hundreds of homes across Africa, but each Entrepreneur will directly remove 30 tonnes of CO2 emissions.

ACID RAIN

Acid rain is an environmental problem; increasing acidity in natural waters and soils is becoming a problem all over the world.

The term acid rain was first used by Robert angus in 1872. Acid rain means the presence of excessive acids in rain waters. Acid rain in infected cocktail of mainly sulphuric acid and nitric acid where the ratio of these two may vary depending upon the relative quantities of oxides of sulphur and nitrogen emitted. Sulphuric acid is the major contributor (60-70) to acid precipitation, nitric acid ranks second (30-40%) and hydrochloric acid third.

Acidification of environment is a man made phenomenon. There is now no doubt that most acids come from human activities from cars, homes, factories and power stations etc. The acidity is mainly associated with the transport and subsequent deposition of oxides of sulphur, nitrogen and their oxidative products. These oxides are produced by combustion of fossil fuels, power plants, automobile exhausts and domestic fires etc.

Actually acid rain is the one phase of acid deposition which can either be wet or dry. Acid rain , snow, dew, fog, frost and mist represent the wet form of deposition, while dust particles containing sulphates and nitrates, settled on earth, is called dry deposition.

Wet acid rain every source of energy that we use is it coal, fuel wood or petroleum products has sulphur and nitrogen. These two elements, when

burnt in atmospheric oxygen, are converted into their respective oxides (sulphur oxide and nitrous oxide) which are highly soluble in water. Natural sources, oxides of sulphur and nitrogen enter the atmosphere. **Conclusion**

The quality of life is directly related to the quality of the environment. The concepts of "clean" air, and "clean" neighbourhood reflect the newer concepts of health as meaning more than the absence or disease. The environment must satisfy not only mans physiological needs but also his psychological and sociological needs. Teaching through information and communication technology such as Computer, Internet and YouTube enhance the ecological intellectual ability among higher students. Therefore teachers must make use of techniques to enhance the environment Intellectual abilities of the students to survive in the universe by enhancing the perceptual knowledge of the students in relation to the environment issues and problems.

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Chapter 31

ICT IN HIGHER EDUCATION: OPPORTUNITIES AND CHALLENGES

*V. Deepthi**

INTRODUCTION

Higher education systems have grown exponentially in the last five decades to meet the demands of quality education for all. This aspect has further gained momentum due to swift advancements in Information and Communication Technology (ICT). Demand for skilled and competent labour is ever increasing in the contemporary globalised society. In this backdrop, access to quality in higher education for all has emerged as determining factor of economic growth and development. In order to increase the access to higher education and improving its reach to the remotest parts of the country contribution of open and distance learning facilities is on the increase. In addition, it is catering to life-long learning aspirations and that too at affordable cost. The last two decades have witnessed the inclusion of developments in ICTs in higher education systems around the world. Even then the challenge to develop a higher education system that is flexible and dynamic so as to holistically integrate the technology in the management and delivery of learning programmes is daunting. The first section presents briefly the present profile of higher education in India. Role of ICTs in higher education and the areas in which they can be integrated to play prominent role are discussed in the second section. The final section explores the challenges in expanding the role of ICTs for future development in higher education.

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TRENDS IN GROWTH OF HIGHER EDUCATION IN INDIA

Though higher education is very old in India, modern higher education in India began with the establishment of Hindu College in Calcutta in 1817. By 1855, there were 281 High Schools and 28 Colleges. To regulate them, three universities; Bombay, Calcutta and Madras were established in 1857 by then British Indian Government. The growth continued unimpeded and by 1947, there were 19 universities, 496 colleges with 2,40,000 students. University Education Commission, 1948-49 (popularly known as Radhakrishnan Commission) emphasized the need for setting up an apex body to coordinate the growth and development of education at the tertiary level and maintenance of standards in education. Thus, the University Grants Commission (UGC) came into existence by an Act of Parliament in 1956. In the last five half decades, the growth of higher education presents a very impressive picture. There has been commendable quantitative expansion in terms of students' enrolment, number of teachers, colleges, universities and research degrees.

THE IMPACT OF ICT ON *WHAT* IS LEARNED

Conventional teaching has emphasised content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasise capabilities and to be concerned more with *how* the information will be used than with *what* the information is.

A. Competency and Performance-Based Curricula

The moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies (eg. Stephenson, 2001). Such curricula tend to require:

1. access to a variety of information sources;
2. access to a variety of information forms and types;
3. student-centered learning settings based on information access and inquiry;
4. learning environments centered on problem-centered and inquiry-based activities;
5. authentic settings and examples; and
6. teachers as coaches and mentors rather than content experts.

Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (eg. Oliver, 2000). For many years, teachers wishing to adopt such curricula have been limited by their resources and tools but with the proliferation and widespread availability of contemporary ICTs, many restrictions and impediments of the past have been removed. And new technologies will continue to drive these forms of learning further. As students and teachers gain access to higher bandwidths, more direct forms of communication and access to sharable resources, the capability

to support these quality learning settings will continue to grow.

B. Information Literacy

Another way in which emerging ICTs are impacting on the content of education curricula stems from the ways in which ICTs are dominating so much of contemporary life and work. Already there has emerged a need for educational institutions to ensure that graduates are able to display appropriate levels of information literacy, "the capacity to identify and issue and then to identify, locate and evaluate relevant information in order to engage with it or to solve a problem arising from it" (McCausland, Wache & Berk, 1999, p.2). The drive to promote such developments stems from general moves among institutions to ensure their graduates demonstrate not only skills and knowledge in their subject domains but also general attributes and generic skills. Traditionally generic skills have involved such capabilities as an ability to reason formally, to solve problems, to communicate effectively, to be able to negotiate outcomes, to manage time, project management, and collaboration and teamwork skills. The growing use of ICTs as tools of

every day life have seen the pool of generic skills expanded in recent years to include information literacy and it is highly probable that future developments and technology applications will see this set of skills growing even more.

THE IMPACT OF ICT ON *HOW* STUDENTS LEARN

Just as technology is influencing and supporting what is being learned in schools and universities, so too is it supporting changes to the way students are learning. Moves from content-centered curricula to competency-based curricula are associated with moves away from teacher-centered forms

of delivery to student-centered forms. Through technology-facilitated approaches, contemporary learning settings now encourage students to take responsibility for their own learning .In the past students have become very comfortable to learning through transmissive modes. Students have been trained to let others present to them the information that forms the curriculum. The growing use of ICT as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in the learning process. The following sections describe particular forms of learning that are gaining prominence in universities and schools worldwide.

A. Student-Centered Learning

Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centered models. Evidence of this today is manifested in:

1. The proliferation of capability, competency and outcomes focused curricula
2. Moves towards problem-based learning
3. Increased use of the Web as an information source, Internet users are able to choose the experts from whom they will learn.

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (e.g. Reeves & Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase.

B. Supporting Knowledge Construction

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning. The theories of learning that hold the greatest sway today are those based on constructivist principles. These principles posit that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. In constructivist theories, social interactions are seen to play a critical role in the processes of learning and cognition. In the past, the conventional process of teaching has revolved around teachers

planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission. The strengths of constructivism lie in its emphasis on learning as a process of personal understanding and the development of meaning in ways which are active and interpretative. In this domain learning is viewed as the construction of meaning rather than as the memorisation of facts. Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice. As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become.

EMERGING ISSUES

A number of other issues have emerged from the uptake of technology whose impacts have yet to be fully explored. These include changes to the makeup of the teacher pool, changes to the profile of who are the learners in our courses and paramount in all of this, changes in the costing and economics of course delivery.

A. Expanding the Pool of Teachers

In the past, the role of teacher in an educational institution was a role given to only highly qualified people. With technology-facilitated learning, there are now opportunities to extend the teaching pool beyond this specialist set to include many more people. The changing role of the teacher has seen increased opportunities for others to participate in the process including workplace trainers, mentors, specialists from the workplace and others. Through the affordances and capabilities of technology, today we have a much expanded pool of teachers with varying roles able to provide support for learners in a variety of flexible settings. This trend seems set to continue and to grow with new ICT developments and applications. And within this changed pool of teachers will come changed responsibilities

and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles

B. Expanding The Pool Of Students

In the past, education has been a privilege and an opportunity that often was unavailable to many students whose situation did not fit the mainstream. Through the flexibilities provided by technology, many students who previously were unable to participate in educational activities are now finding opportunities to do so. The pool of students is changing and will continue to change as more and more people who have a need for education and training are able to take advantage of the increased opportunities. Interesting opportunities are now being observed among, for example, school students studying university courses to overcome limitations in their school programs and workers undertaking courses from their desktops.

C. The Cost of Education

Traditional thinking has always been that technology-facilitated learning would provide economies and efficiencies that would see significant reductions in the costs associated with the delivery of educational programs. The costs would come from the ability to create courses with fixed establishment costs, for example technology-based courses, and for which there would be savings in delivery through large scale uptake. We have already seen a number of virtual universities built around technology delivery alone. The reality is that few institutions have been able to realize these aims for economy. There appear to have been many underestimated costs in such areas as course development and course delivery. The costs associated with the development of high quality technology-facilitated learning materials are quite high. It has found to be more than a matter of repackaging existing materials and large scale reengineering has been found to be necessary with large scale costs. Likewise costs associated with delivery have not been found to diminish as expected. The main reason for this has been the need to maintain a relatively stable student to staff ratio and the expectation of students that they will have access to teachers in their courses and programs. Compared to traditional forms of off-campus learning, technology-facilitated learning has proven to be quite expensive in all areas of consideration, infrastructure, course development and course delivery. We may have to brace ourselves for the advantages and affordances which will improve the quality of education in the near future to also increase components of the cost.

SUMMARY AND CONCLUSIONS

This paper has sought to explore the role of ICT in education as we progress into the 21st century. In particular the paper has argued that ICTs have impacted on educational practice in education to date in quite small ways but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices. Learning should become more relevant to stakeholders' needs, learning outcomes should become more deliberate and targeted, and learning opportunities should diversity in what is learned and who is learning. At the same time, quality of programs as measured by fitness for purpose should continue to grow as stakeholder groups find the offerings matched to their needs and expectations. To ensure that the opportunities and advantages are realized, it will be important as it is in every other walk of life to ensure that the educational research and development dollar is sustained so that education at large can learn from within and that experiences and activities in different institutions and sectors can inform and guide others without the continual need for re-invention of the wheel. Once again ICTs serve to provide the means for much of this activity to realize the potential it holds. The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. ICT has enhanced distance learning. The teaching community is able to reach remote areas and learners are able to access qualitative learning environment from anywhere and at anytime. It is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 32

INTEGRATING ICT IN HIGHER EDUCATION

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INTRODUCTION

Information and Communication Technology (ICT) represent one of the current applications of technology towards teacher education. According to UNESCO, "ICT is a scientific technological and engineering discipline and management technique used in handling information, its application and association with social, economical and cultural matter", Similarly, According to Toomy' "ICT generally relates to those technologies that are used for accessing, gathering, manipulating and presenting or communication information". To quote UNESCO "Technological developments lead to changes in work and changes in the organization of work, and required competencies are therefore changing. Gaining in importance are the following competencies (UNESCO, 2002):

ICT has influenced all aspects of human life teacher education cannot be exception. It provides the capacity to store, retrieve and process e-content both fast as well as accurate.

ROLE OF ICT IN EDUCATION

The Information and communication Technology insurgency brings particular challenges to education systems around the world. This mainly occurs in three broad areas. One occurs with participation in the information society. The second is ICTs impact on access to do with the way ICT changes the education process. Here the formal learning of ICT is in schools and

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higher education institutions which make available organized education. Thirdly non-formal education occurs with 'continuing education', 'adult education' through distance education and other organized programmes.

The acquisition of ICT skills in educational institution helps knowledge sharing, thereby multiplying educational opportunities. In education ICT can act as an auxiliary device. Integrating ICT literacy will be crucial as it means harnessing technology to perform learning skills. It must encompass the use of ICT to manage complexity, solve problems and think critically, creatively and systematically towards the goal of acquiring thinking and problem-solving skills (Yves, et.all. (2006). For the students, this can be used of making assignments, collecting data, documentation and conducting research. It can be a medium for teaching and learning. This can act as the medium through which teacher and learners can learn. Here in order to introduce and understand the need of ICT in educational institution, teachers or students undergoing teacher education must first comprehend and be at ease with ICT. They must be given opportunities for acquisition of new knowledge. This can be made possible by promoting ICT based training programs introduced in their curriculum. Our next segment will discuss in detail about learning of ICT in higher education institutions, especially teacher education institutions.

ICTS IN TEACHER EDUCATION

The need for teacher training is widely acknowledged, Professional development to incorporate ICTs into teaching and learning is an ongoing process. Teacher education curriculum needs to update this knowledge and skills as the school curriculum change. The teachers need to learn to teach with digital technologies while many of them have not been taught to dos so. The aim of teacher training in this regard can be either teacher education in ICTs or teacher education through ICTs. Teacher's process in education. They are unsure of how to make most effective use of ICT as a powerful and diverse resource and one which can potentially alter traditional teacher-student relationships. If they are to invest the time and energy in embracing the technology, teachers need to understand and experience the potential benefits of using ICT and to have access to the evidence that supports the improvements in teaching and learning, including case studies and examples of effective practice. In addition they need strong leadership and support and a school development plan for the integration of technology if the necessary changes in education are to be realized. They also need technical support so that they feel comfortable in using technology and are more willing to experiment.

The Futurelab study shows many affirmative results from review of a number of UK case studies on teacher training. Although they are not representative, most of these studies highlight positive impacts of teacher training with ICT, such as increasing teacher self-assurance and aptitude in the use of IT resource by providing them fully equipped multimedia portable computers (MPTP) or by supporting online teacher communities. The "talking Heads online Community" pilot study showed that informal online communities can help to reduce head teacher isolation, enable head teachers to generate and exchange insights regarding practices for school improvement; and provide an effective way for gaining quick access to a spectrum of perspectives on key topical issues. Another UK (2002) pilot study reviewed by Futurelab on learning to usel ICT for science teaching showed that for the 40 schools that participated, the impact of equipped computers reached far beyond individual teachers. It prompted department-wide exploration of new teaching strategies and reviewed enthusiasm for sharing and collaboration (Fisher et.al., 2006) & (Yves, et.al., 2006).

ICT INITIATIVES BY LEADING INSTITUTIONS

In order to motivate the teacher use of appropriate and powerful multimedia for enhancing learning, NCTE has visualized networking of 3000 and odd teacher education institutions and make 25000 teacher educators computer literate and also see how these 25000 teacher educators would reach out to 3 million school teachers. Two schemes have been proposed to be adopted viz., (i) Networking of teacher education institution using Internet and (2) use of EduSat for education These schemes are going to break the isolation of teacher education institutions. NCTE has already created one of the biggest portals on the teacher education system. The immediate task before NCTE is to make all the existing 25,000 teachers ICT literates. Once that happen it will create multiplier impact in the sense that the 200 thousand teachers produced every year from the Teacher Training Institutions (TTIs) will be able to and use ICT to prepare teaching learning materials and also access information from internet.

NCTE, SCERT, IASEs, and DIETs are being equipped with necessary hardware. NCTE is in the process of developing ICT base instructional packages for teacher educators. The in-service education of all the teacher educators will be arranged with the help for master trainers drawn from universities, private sectors organization involved with ICT education. The whole programme is being implemented under the guidance of a committee of experts. This proposed committee would also examine the

vast amount of Software generated. This plan of NCTE is to start with 5 ICT professional who will develop training material and train 250 master trainers who will in turn train, at the rate of 100 each, 25000 teacher educators. In the next phase NCTE plan to train 3 million school teachers. This is a mega plan NCTE has initiated to improve the quality of teacher education. It would use ICT-enabled learning bring in several innovations in teacher education in the context of quality assurance.

The communication technology is advancing very swiftly from single channel transmission in 1962 to 120 channels in 2005. In Education also beginning with the use of Satellite Instructional Television Experiments (SITE) in 1974-75 it has advanced to several stages sush as Countrywide Classroom (CWCR) for Higher Education in 1984 Gyan Darshan in 2000, and it has reached to now 24 -hour Vyas Higher Education Channel and Eklavya Technology Channel in 2004. Technology has also advanced to enable 24 hours Worldwide Internet Communication.

CONCLUSION

In planning the integration of ICT in teacher Education, it is important for the teacher education institution to understand the knowledge and skills necessary for teachers to effectively use ICT in their instruction. They must also understand the Institution's level of readiness to integrate technology into the teacher education curriculum. Integrating ICT in into subject specific teaching like mathematics, science, social science, languages, etc., Using on line tools for information gathering and online collaborative work like e-mail, website, and discussion groups, computerized networking in lab work, etc.

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Chapter 33

ICT IN HIGHER EDUCATION AND ITS EFFECT ON THE COMPETITIVENESS OF ACADEMIC INSTITUTIONS

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INTRODUCTION

It may have become part of history that an academic institution could manage without utilizing the most up to date information and communication technology (ICT). The rapidly changing and advancing modern tools of teaching and learning in higher education have made the use of technology a must for competitiveness and survivability. Today, higher education institutions are adopting many types of technologies, and this adoption has increased the movement towards electronic learning and also towards online and blended methods of learning. In addition, the increasing competition and the demand for quality higher education have encouraged the adoption of ICT tools in higher education institutions (Dawson, Heathcote, & Poole, 2010). Dawson et al. (2010) suggested that "the adoption of ICTs … is no longer a luxury, but a necessity for all institutions (p. 120). In other words, utilizing ICT tools has been seen as an important strategy for academic leaders to enhance student learning experience and also to respond to the increase in competition among institutions.

THE IMPACT OF ICT ON TEACHING AND LEARNING

Information and communication technology (ICT) has played an important role in changing the methods of teaching and learning in higher education. It is easy for students and professors to exchange their ideas

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and research materials in a different way other than face-to-face. They also added that communication and the exchange of ideas between academic stakeholders can improve and create socially constructed knowledge. It is noted that "the promotion of individual learning through collaboration leads to individual construction of knowledge

ICT tools have provided opportunities to communicate and contribute ideas and knowledge for many people anytime and anywhere around the world. To explore the effect of ICT on teaching and learning in more details, instructional designs and strategies, collaboration and effective communication, and ICT mediated assessment are reviewed and explained separately.

INSTRUCTIONAL DESIGNS AND STRATEGIES

The ICT revolution has powered the movement towards online and blended designs of learning. The technology-driven education has been supporting online and blended learning which has become an important part of providing higher education. Online learning and collaborative activities, according to Arinto (2013), are structured based on web technologies and resources. She added that this type of e-learning allows for "a shift from teacher-focused knowledge transmission pedagogies to learner-focused social constructivist knowledge generation pedagogies" (p. 175).

This new way of electronic learning can be challenged by social presence theory, as Aragon described. Social presence is "the ability of the learners to socially and affectively project themselves in communities of inquiry" (Aragon, 2003, p. 60). He also explained that "the challenge in online learning environments is facilitating this degree of interpersonal contact with the instructor and other participants" (p. 59). Aragon suggested that social presence in learning can help in building the students' identity and leadership personality, proving students' ability, and developing the relationship with others.

Electronic learning can enhance student's autonomy, competence, and relatedness. "Autonomy concerns the individual feeling in control of their own actions, competence is effectiveness of the individual in the environment, and relatedness is the need to feel connected to others, such as teammates or teachers".

The students' self-regulation is an important pillar in e-learning due to the lack of self-regulation may lead to a low students' performance and may also increase procrastination. However, this type of web-based learning and activities might enhance students' participations and reduce the

classical lecture behavior (with no or little communication with students), but it can also isolate some students as they are constrained to follow group schedules instead of their own pace.

Computer and internet technologies are important tools to support electronic learning by enhancing the joint and collaborative activities. It is noted that the adoption of online technologies "has not only impacted upon the delivery of education resources to off-campus students, but also on the design and accessibility of learning activities available for on-campus cohorts". There is no need to replace face-to-face instruction, but "there is a need to design Computer Supported Collaborative Learning (CSCL) tools to support the effective integration of online and face to-face communication.

The ICT tools and electronic learning and suggested that the implementation of ICT tools can help in increasing the accessibility to higher education, and can allow for more contact between peers and academic faculty members. Indeed, using collaborative learning and computer-support can open new resources for learning by enhancing communication and discussion which may enhance students' teaching and learning.

COLLABORATION AND EFFECTIVE COMMUNICATION

ICT tools allow for increasing the collaboration between students, instructors, and researchers around the world which allows them to share their ideas and course materials more readily with each other. Indeed, students can collaborate to discuss their ideas and to explore each other's ideas in order to create shared cognition. The collaboration through technology can encourage students to develop their joint understanding and encourage them to learn.

In higher education institutions, using ICT tools like blogs can serve the main activities of constructive collaboration and communication between those who have different backgrounds. To enhance collaboration and communication in higher education, academic institutions can implement some active blogs with different technological designs. Collaboration through blogging can increase the quality of academic research and knowledge, and can also reduce the private individual work behaviour in academic. The sharing knowledge can be facilitated by the similarity of languages, knowledge, beliefs, attitudes, and experiences. In addition, the blogging allows for working directly with those who are interested in the same research ideas, academic researchers may not be interested in blogging since it does not help them build their social capital or individual

network (e.g., developing a strong and good network connection) when compared with "traditional forms of publishing and institutional affiliation"

Podcasting is another ICT teaching tool. Podcasting allows for discussion and communication between students themselves and between students and their teacher. Students can also watch podcasts several times to regain knowledge. Podcasting technology can be watched anywhere and anytime by students based on their learning styles. Hill and Nelson examined the effectiveness of using podcast technology in enhancing teaching and learning and concluded that podcasts "add variety to learning resources to support a range of learner styles.

ICT MEDIATED ASSESSMENT

Electronic feedback is another ICT tool which is implemented to enhance teaching and learning in higher education. However, self-assessment should be a formative feedback tool which is "carried out throughout the teaching-learning process" Electronic self-assessment feedback is important in improving students' learning, since students' learning processes are influenced by how they can assess their own knowledge. The students' knowledge and students' motivation can be enhanced by adopting collaborative annotations on formative assessments.

Online peer-assessment is another ICT tool that can be adopted to enhance learning quality and to reduce the heavy burden of teachers in generating questions and grading the exam papers. This online technological tool can improve learning quality by "assigning the assessment task to students" In addition, while this tool may increase students workload, it still has some advantages and can enhance students' sense of independence and enhance students' skills

Reliability and validity of peer assessment is also important. The reliability of marks awarded by peers, the possibility of enhancing students' learning, and the possibility of reducing the teachers' workload and increasing students' workload are still issues that need to be addressed. According to Bouzidi and Jaillet (2009), while many studies found that peer assessment learning tools are valid and efficient, other studies argued that it only reduces the teachers' workload. Bouzidi and Jaillet compared the marks awarded by teachers and marks awarded by students and found that they were the same. They also concluded that to enhance the validity of the assessment process, both self-assessment and peer-assessment should be adopted together.

While several ICT tools can be adopted in order to enhance teaching and learning, each academic institution has its own priorities and should

implement the tools that fit their needs. (Roberts, 2008). Strategic planning and its four steps, according to Roberts (2008), can be utilized by academic leaders to identify academic institution' needs of ICT tools. Increasing the number of students enrolled in online courses may require faculty members to be prepared for teaching online.

CONCLUSION

The change in student demands and the competition among academic institutions have enhanced the adoption of ICT tools in higher education. Implementing ICT tools in higher education can increase the productivity and the efficiency of the educational operation, increase the quality of teaching and learning, increase the flexibility to provide several educational services to potential learners, and can also increase access of traditional and non-traditional learners to educational opportunities. To successfully implement the proper ICT tools, open communication channels between academic leaders, administrators, faculty members, technological professionals, and staff is important. Academic leaders, as change agents, might need to encourage instructors to use technology and students to use these tools. Finally, it is important to say that the availability of supporting leaders and the availability of technology do not mean that all instructors will use technology in their teaching. This might raise a question about the motivation of using ICT tools and how academic leaders can motivate educators to use these tools.

It can be argued that using ICT has become a 'must' for academic institutions. The need to reach potential students, regardless of their geographic locations, and the need to cut operational costs have made the use of technology a strategic option and a key success factor in the viability and survivability of academic institutions. It is imperative to satisfy the needs of students by facilitating the learning process. Thus ICT is the modern competitive advantage in today's higher education industry. Efficiency and effectiveness are no longer the terminology of private providers of goods and services. Public institutions are also chasing these terms for many emerging problems related to the level of public funding, and the use of advanced technology might be the missing piece in the complicated higher education puzzle.

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Chapter 34

INTEGRATING ICT IN HIGHER EDUCATION

S. Hilda Hepzibah and Dr. A. S. Arul Lawrence***

INTRODUCTION

Education is the most important invention of mankind. It is more important than his invention of tools, machines, spacecraft, medicine, weapons and even of language, because language too was the product of his education. Man without education, would still be living just like an animal. We live in the age of computers. There are growing demands on almost everyone, including the learning and teaching community to become technologically literate.

Information Communication Technology is the most powerful engine to accelerate the growth of developing countries. It is evident to equip the young generation with the skills of ICT so that they will be fit to meet the challenges ahead of them. Today school children are well exposed to T.V. shows, computer programs, videogames, e-mail based information exchange, internet browsing, social networks such as facebook, twitter, linkedin and many other forms of educative entertainment. Using the experiences of the children as the base, providing further learning experience is a challenging task. Teachers who use these techniques are able to forge far ahead of others who only use traditional classroom techniques.

STATEMENT OF THE PROBLEM

A study on the usage of I.C.T. and achievement in science among student teachers in Colleges of Education in Madurai District.

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OBJECTIVES

1. To find out the difference in the usage of ICT knowledge and skills, attitude towards technology and Status of Technology available with regard to gender, type of institution, location of institution, optional subjects, computer literacy and internet usage.
2. To find the relationship between the usage of ICT knowledge and skills, Attitude towards technology and Status of Technology and their score in science with regard to gender, type of institution, location of institution, optional subjects, computer literacy and internet usage.

NULL HYPOTHESIS

1. There is no difference in the use of ICT knowledge and skills, attitude towards technology and Status of Technology with regard to gender, type of institution, location of institution, optional subjects, computer literacy and internet usage.
2. There is no relationship between the use of ICT knowledge and skills, attitude towards technology and Status of Technology by the teacher trainees and their score in science with regard to gender, type of institution, location of institution, optional subjects, computer literacy and internet usage.

METHOD ADOPTED FOR THE STUDY

The researcher has selected 100 samples from B.Ed. colleges in Trichy District. Survey method has been adopted. 't' test and Karl Pearson product moment correlation are the statistical techniques used.

TOOLS APPLIED IN THE PRESENT STUDY

The following tools have been applied for collection of data.

1. Questionnaire to collect information regarding the knowledge and skills in using ICT by the teacher trainees in the college.
2. Questionnaire to check the attitude towards using ICT by teacher trainees.
3. Table to show the availability of ICT in the college.
4. Questionnaire for conducting achievement test in science for B.Ed. trainees.

HYPOTHESIS TESTING

1. There is no difference in the skills of ICT used with regard to gender.

Table-1: Difference in the skills of ICT used with regard to gender.

Variable	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Male	25	69.28	2.179	0.432	1.96	NS
Female	75	9.56	9.27			

From the above table, it is inferred that the calculated 't' value 0.432 is smaller than the table value 1.96 at 0.05 level of significance. So, the Null Hypothesis is accepted.

There is no difference in the skills of ICT used with regard to gender.

2. There is no difference in the skills of ICT used with regard to location of college.

Table-2: Difference in ICT used among teacher trainees with regard to location of institution

Variable	N	Mean	SD	Calculated 't' Value	Table Value	Remark
Rural	84	67.69	8.98	2.23	1.96	S
Urban	16	73.25	9.83			

From the above table, it is inferred that the calculated 't' value 2.23 is greater than the table value 1.96 at 0.05 level of significance. So, the Null Hypothesis is rejected. There is difference in the skills of ICT used with regard to location of the college.

Table-3: Relationship between ICT used by the teacher trainees and their score in science with regard to type of Institution.

S. No.	Background Variables		Correlation Co-efficient	Remark
1.	Type of institution	Government	0.24368	Substantial
		Self financing	0.054281	Negligible

There is a significant positive relationship between ICT used by the teacher trainees and their score in science with regard to the usage of Computers.

Table-4: Relationship between ICT used by the teacher trainees and their score in science with regard to computer literacy of teacher trainees.

S. No.	Background Variables		Correlation Co-efficient	Remark
1	Computer literacy	Literate	0.206842	substantial
		Illiterate	0.15917	Low

There is a significant positive relationship between ICT used by the teacher trainees and their score in science with regard to the usage of Internet.

Table-5: Relationship between ICT used by the teacher trainees and their score in science with regard to Internet usage of teacher trainees.

S. No.	Background Variables		Correlation Co-efficient	Remark
1.	Internet usage	Using internet	0.4721	High
		Not using Internet	0.1054	Low

There is a significant positive relationship between ICT used by the teacher trainees and their score in science with regard to Internet usage of teacher trainees.

FINDINGS

A. Differential Studies

1. There is a significant difference between rural and urban teacher trainees with regard to the ICT used. Urban teacher trainees have more skill in using ICT than the rural teacher trainees.

2. There is no significant difference in the ICT used by the teacher trainees with regard to the gender, type of institution, optional subjects, computer literacy and internet usage.

B. Relationship Studies

There is low, positive relationship between ICT used by the teacher trainees and their score in science with regard to the gender and optional subjects.

There is a significant, positive relationship between ICT used by the teacher trainees and their score in science with regard to type of Institution.

EDUCATIONAL IMPLICATIONS

It is evident that the impact of ICT on teacher education is so tremendous that those who possess the skills to use ICT are fit to become teachers than those who don't. It paves way for the conclusion that the skills of ICT helps in enhancing the achievement in the academic subject, especially science subject of B.Ed. student teachers.

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Chapter 35

ATTITUDE TOWARDS ICT AMONG HIGH SCHOOL TEACHERS

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ABSTRACT

Ensuring universal service and access to information and communication technology is a top national objective in many countries, often enshrined in laws that govern the sector. One of the distinctive features of human beings is their ability is to acquire knowledge. ICT powers our access to information, enables new forms of communication, and serves many on-line services in the spheres of commerce, culture, entertainment and education. **T***eacher is an effective and dominating factor among the ones contributing to educational improvements. The teacher effectiveness depends mainly on the teachers' attitude, characteristics and the classroom phenomena such as environment and climate, organisation and management. The findings in the present study reveals that the male and female teacher differ in their attitude towards ICT. Many teachers think the computer is used only to make the content look attractive! They need to know that in 21st century, information is not difficult access, instead organizing, sharing, and collaborating become essential skills. Hence, ICT is not merely to portray information but to interact, share, and thus learn. ICT provides meaningful, absorbing media that makes teaching-learning more productive. The teacher has to enhance teaching. The role of the teacher: helping the student learn. The Internet is full of information, textbooks are bursting with information. But this information can become true knowledge only when the teacher makes it meaningful.*

Keywords: *Attitude, ICT and High school teachers*

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INTRODUCTION

Ensuring universal service and access to information and communication technology is a top national objective in many countries, often enshrined in laws that govern the sector. One of the distinctive features of human beings is their ability is to acquire knowledge. ICT powers our access to information, enables new forms of communication, and serves many on-line services in the spheres of commerce, culture, entertainment and education. **T**eacher is an effective and dominating factor among the ones contributing to educational improvements. The teacher effectiveness depends mainly on the teachers' attitude, characteristics and the classroom phenomena such as environment and climate, organisation and management.

Various commissions and committees have recommended methods of bringing about qualitative improvements in education. As a result, the teachers are motivated, inspired and endured to develop better curriculum, text books and teaching aids. But, all the efforts are meaningless unless teachers are not having the positive attitude towards educational technology. The teaching learning process has been greatly influenced by rapid advances in Information and Communication Technology (ICT). Integration of this ICT in classroom helps to create an environment for students' activities that lead to meaningful and sustainable learning experiences. It supports students in their own constructive thinking, allows them to transcend their cognitive limitations. It is possible to bring the process of learning beyond the boundaries of classroom by exploring new possibilities of ICT.

The Information and Communication Technology (ICT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of ICT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. ICT is about the new ways in which people can communicate, inquire, make decisions and solve problems.

NEED FOR THE STUDY

Training a teacher in using ICT is more crucial than acquiring a large number of computers. Teachers have to be trained to facilitate the learning process, make the process real, achievable, challenging, yet exciting and not intimidating. Reducing teacher talk and encouraging student discussion is extremely important. Everything need not be written on the blackboard to be considered as taught. Here the teacher can use multimedia to make topics more comprehensible.

The teacher needs to be fully aware of the fact that students can find information, they need proper instructions, they need scope for creativity, and expectations of the teacher bring forth performance. The present generation is a multimedia generation. They are numbed by too much of information and easy access to that information. The information that is given in the classroom is redundant and presented in boring manner. They show so much of the present and the past far and wide that one seems to learn unknowingly.

Although ICT offers the opportunity to construct powerful learning experiences, it is pedagogically neutral. That is, ICT can be used in support of traditional teaching methodologies like the large group lecture, student note taking, and examinations. Teachers can use a computer and projector to show slides to illustrate a lecture, students can use laptops to take notes during the lecture, and multiple choice quizzes about the content of the lecture can be put on a website. ICT has the potential to be used as a supportive educational tool enabling students' learning by doing. ICT can make it possible for teachers to engage students in self-paced, self-directed problem-based or constructivist learning experiences; and also test student learning in new, interactive, and engaging ways that may better assess their understanding of the content. So the investigator has chosen this topic for the study.

STATEMENT OF THE PROBLEM

"ATTITUDE TOWARDS ICT AMONG HIGH SCHOOL TEACHER".

OBJECTIVES OF THE STUDY

To study the attitude towards ICT among high school teachers based on the select sub sample viz., Gender, Medium of instruction, Locality of school, Computer knowledge, family status and type of management

HYPOTHESES OF THE STUDY

High sschool teachers do not differ significantly in their attitude towards information and communication technology based on the select sub samples Viz., Gender, Medium of instruction, locality of school, Computer knowledge, Family status and type of management

METHODOLOGY

Normative survey method is used in the present study. In this study 100 higher secondary school teachers were selected. Stratified random sampling technique was used to select the sample.

In this study, the investigator used standardized tool developed by Vandana Mehra (2013). The tool consists of 25 statements with a five point scale. All the statements were positive. In the present study the reliability was found to be 0.812 and face validity was used in the study. The range of scores is from 25 to 125. Statistical techniques applied for the study were 't' test and F test

DATA ANALYSIS

High sschool teachers do not differ significantly in their attitude towards information and communication technology based on the select sub samples Viz., Gender, Medium of instruction, Locality of school, Computer knowledge and Family status

From tables 1 and 2, it is referred that the 't' values in the case of gender is higher than the table value at 0.01 level of significance but in all the other cases the calculated 't' value is less than the table value. Hence the hypothesis is not accepted in the case of gender but accepted when referred to other cases.

Table-1. Mean differences of the high school teachers attitude towards ICT

Variable		N	Mean	SD	't' value
Gender	Male	42	77.52	14.086	2.221**
	Female	58	85.31	19.294	
Medium	Tamil	43	81.56	15.807	0.236 (NS)
	English	57	82.40	19.048	
Locality	Rural	70	83.07	18.334	0.892 (NS)
	Urban	30	79.63	15.962	
Family status	Joint	43	83.09	19.115	0.516 (NS)
	Nuclear	57	81.25	16.583	
Computer knowledge	Having knowledge	61	81.79	19.181	0.179 (NS)
	Not having computer knowledge	39	82.44	15.171	

**- significant at 0.01 level

Table-2: Mean differences of different management high school teachers' attitude towards ICT

	Sum of Squares	df	Mean Square	F
Between Groups	192.997	2	96.498	.306 (NS)
Within Groups	30636.843	97	315.844	
Total	30829.840	99		

NS – Not Significant

DISCUSSION

Regarding gender, the female school teachers are better than the male school teachers, and rural school teachers have better mean value than the urban school teachers. This result suggests that the female teachers and the rural school teachers learn to teach more innovatively and creatively to their students in order to enhance their teaching – learning process a great success. And also they to improve their carrier and update their knowledge to update the information.

EDUCATIONAL IMPLICATIONS

Moving into the 21st century, many factors are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of ICT. It is believed that the use of ICT in education can increase access to learning opportunities. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The continued and increased use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced.

CONCLUSION

Many teachers think the computer is used only to make the content look attractive! They need to know that in 21st century, information is not difficult access, instead organizing, sharing, and collaborating become

essential skills. Hence, ICT is not merely to portray information but to interact, share, and thus learn. ICT provides meaningful, absorbing media that makes teaching-learning more productive. The teacher has to enhance teaching. The role of the teacher: helping the student learn. The Internet is full of information, textbooks are bursting with information. But this information can become true knowledge only when the teacher makes it meaningful.

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Chapter 36

POSSIBILITIES OF QUALITY ENHANCEMENT IN HIGHER EDUCATION BY INTENSIVE USE OF INFORMATION TECHNOLOGY

Jayasheela Samuel*

INTRODUCTION

It is now a commonplace knowledge that computers can be used to store, retrieve, and process and transmit data and information in large volumes at a great speed and very cheap rate. Along with it, computer hardware is progressively becoming inexpensive and affordable not only to the institutions but also to the individuals. Computer software for different applications also is now available. Side by side, over the years a growing number of persons have acquired the skill of using computers and training others how to use computers in different walks of life. In the traditional mode of formal education the transmission of knowledge characterizes, among others, a person to person contact established so often by verbal means and sometimes by demonstration. One of the major secondary mediums of storage and transmission of knowledge is a book – a paper medium on which information is printed. Along with it, periodicals of different types, including journals and magazines, make another kind of medium. Reports, dissertations, etc are there to add to this body of the material medium. A traditional library is a collection of such large number of paper mediums. These libraries have been the nodes of knowledge accumulation and knowledge distribution for centuries now. The objective

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of this paper is to highlight the possibilities of quality enhancement in college and university education by means of an intensive application of modern advancements in information technology. For this purpose, the paper is divided into four sections as follows.

QUALITY IN HIGHER EDUCATION

In this paper we mean by higher education the tertiary or after-school formal education imparted to the students in colleges and universities (including various institutes). However, we require a discussion as to the quality in education.

Parameters of Quality in Higher Education:

A general agreement on all the parameters may not be there, but the following aspects of quality may be acceptable to all.

(*i*) **Richness in Knowledge and Skill:** Perhaps the most important parameter of quality in higher education relates to absorption of knowledge and generation of skill among the students. A recipient of higher education in the formal system conventionally chooses a set of disciplines, which, at a given time, have a body of extant information and knowledge as well as a level of skill at using those information and knowledge to practical applications. A college student, having completed his/her studies, is supposed to have acquired a subset of those extant information and knowledge and use them in practical applications. A university graduate, similarly, is expected to be well versed in a larger subset of the said body of information, knowledge and skill, and a doctorate degree holder is supposed to command a still larger subset. In this respect quality refers to the level of achievement of the graduate vis-à-vis the norm set (or adopted) by the institution imparting higher education. This entails the 'fitness for the purpose' criterion. Availability of reading materials of high quality tends to prepare an environment suitable to such changes and, consequently, facilitate a movement upward towards a better quality of education.

(*ii*) **Relevance:** The second most important parameter of quality is the appropriateness and relevance of the information, knowledge and skill imparted by education to the current and the foreseeable techno-economic and social needs and priorities of the nation that supports the educational system. UNESCO (1998) rightly views that quality

"reflects national, regional and global socio-economic, cultural and political visions".

(*iii*) **Creativity:** The two parameters of quality mentioned above often join with the characteristics of students and under favorable conditions lead them to gain courage of facing challenges and conquering the adversities. Inculcation of problem solving ability, creativity, innovativeness and such faculties make the third parameter of quality in education. A poor quality of education discourages and subverts these faculties.

(*iv*) **Sublime Values:** Nevertheless, there is some sort of conflict between the first two parameters deliberated above. The personal priorities of a college or university graduate of very high quality judged on the first criterion may not be conformal to the priorities of the nation or the regions that imparted excellent education to him/her (Dey, 2000) or even the priorities of a discipline judged on international norms might be quite unsuitable to the national/regional techno-economic and social needs. Education must inculcate among the graduates certain values such as to appreciate the importance of commitment, cooperation and compassion in making competence creditable. These values are absolutely necessary for the establishment, functionality and development of a knowledge-based society towards which we are progressing steadily.

(*v*) **Cost-effectiveness:** The fifth parameter of quality of education is its cost effectiveness. If two kinds of educational process assure the same quality but they differ in the cost incurred in attaining it, then the less expensive educational process is obviously better than its expensive alternative. After all, resources have multiple uses and every use has its opportunity cost.

MODERN INFORMATION TECHNOLOGY AND QUALITY IN HIGHER EDUCATION

We have already reviewed what the modern information technology has made feasible. Now we have to elaborate on the possibilities that it has created to enhancement of quality in higher education.

1. **Possibilities in Enrichment of Information, Knowledge and Skill:** The modern information technology has greatly extended the possibilities of enrichment of information, knowledge and skill. Development of e-books, e-journals, e-libraries, e-encyclopedias,

e-photography, electronic audio-visual aid, etc has opened up a world of possibilities before us. Internet can be used to download a variety of reading materials, often illustrated by means of audio-visual aid.

Illustration may be static with different color schemes or dynamic with the use of animation. Thousands of books, if in e-form, can be scanned to search and retrieve the required information in no time. Scores of thousands of books can be carried in a small external hard disk or a laptop computer and they can be copied on to other storage devices. Student can store in a pen drive all their textbooks covering the entire syllabus for a semester or even for two years' program.

The role of information technology for promoting quality in higher education has been widely acknowledged. They also predict that e-journals are the journals of the future while printed journals will be the things of the past. Higher education system must go along to keep itself abreast with this development.

2. **Removing Obstacles to Learning:** A variety of software and software based teaching aids are available now. Software can read out the text loudly and thus visually impaired persons can also 'read' the text without the help of Brail or a human reader assisting them. There are a number of software programs that teach mathematical concepts, numerical methods, problem solving and such arts step by step. Certain exercises that earlier were highly labor and time consuming and error prone too, can now be done and redone within no time to get at them.
3. **Support to Creativity:** Teachers can search out on the relevant web sites the reading materials best suited to their students and hyperlink those websites in their own web pages. They can compile, edit, write, illustrate, vocalize and animate the illustrations so as to make the reading materials rich, lively and student friendly, and post them on web pages that may help not only their own students but the students anywhere in the world. They can contact the experts via e-mail, arrange an e-conference and discuss their findings with them. They can also ventilate their ideas to others and benefit by the comments and observations made by others living far away in the distant lands.
4. **Removing Obstacles to Creativity:** One may note that the traditional method of ventilation of one's ideas through printed journals is not only outdated, costly, time-taking and restrictive; it is also so often

biased. The referee system does not always work in favor of a healthy development of science. The journals and the referees have their own biases. This bias of the traditional method against putting on record one's own scientific ideas and findings can be overcome by the use of the internet which allows web publishing. Archives that publish working papers on their web pages are also useful.

5. **Adding to Relevance of Education:** Initially land and other natural endowments were the most important sources of social and economic development of the nations/people. After the Industrial Revolution, manufacturing and therefore physical capital overtook the prominence of agriculture and remained in throne for centuries. However, for a century now, the role of education in shaping development has come into the forefront. Education has been the major contributor to making of the human capital, and thus it has been the most important factor in promoting growth and welfare of the modern society. However, it may be noted that natural endowments and human resources as well as the historical forces together with social institutions of a region/nation determine as to the kind of knowledge which would be more suitable to attain a higher level of development with social wellbeing. This is to say that different regions/nations have different kinds of knowledge and skill appropriate and suitable to them.
6. **Cost-Effectiveness of and IT-based Educational Materials:** Electronic documents (e-books, journal articles, etc.) are very easy and inexpensive to search, download, duplicate and distribute. Communication by e-mail is extremely fast and inexpensive. It is easy to arrange e-conferences. Storage of e-materials is extremely space-saving, resource-saving and safe. It is also aligned to the benefits of the paperless economy with far-reaching favorable effects in terms of saving energy and environment.
7. **Favorable Effects on Cooperation, Empathy and Compassion:** Partly due to its inexpensive nature and a new "give-and-take" culture emerging due to the spread of the IT based culture, there is an increased sense of reciprocation, coordination, empathy and compassion among the scholars working in and across different disciplines. Information technology has given rise to the 'blog" culture which has proved to be very effective in solving problems of those who participate in it. A participant posts a problem on the 'blog page' and numerous others respond to solve the problem.

CONCLUSION

At present most of the institutions of higher learning in India use information technology only nominally. This is reflected in the websites of those institutions. As a matter of fact, many institutions do not have a presence on the World-Wide Web. Those having the said presence, seldom post up-to-date information on the web pages. Information posted on the web pages is skeletal and minimal. None would visit those sites for the second time since there is nothing that may induce one to revisit them. Courses of studies continue to be outdated and oblivious to the changing needs of the society. Teachers in general do not have any will or commitment either to the discipline they teach or to the problems of the society that need their attention. In many institutions where computers and internet facilities are available, people do not know what to do with them except sending e-mails occasionally and playing games or typing letters frequently. There is a need, therefore, that the institutions of higher learning should organize programs to train the teachers, the office staff and the students to harness the modern advances in information technology to enrich the teaching/learning process so as to improve the quality in education. The training program should highlight the possible applications of computers, internet, World-Wide Web, educational portals, websites of reputed institutions, available e-libraries and e-based encyclopedias, websites that permit a free download of educational materials, useful computer programs and software, etc. Educational Institutions should be web-conscious and make their websites so as to be used for educational purposes rather than posting stale and skeletal information on them as many of them have been presently doing.

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Chapter 37

ICT IN HIGHER EDUCATION

Dr. P. Karthikeyan*

INTRODUCTION

Information and communication technology (ICT) is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence and far less change than other fields have experienced. A number of people have attempted to explore this lack of activity and influence. As we move into the 21st century, these factors and many others are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of ICT. This paper seeks to explore the likely changes we will see in education as ICT acts as a powerful agent to change many of the educational practices to which we have become accustomed.

COMPETENCY AND PERFORMANCE-BASED CURRICULA

The moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies (e.g. Stephenson, 2001). Such curricula tend to require:

- Access to a variety of information sources;
- Access to a variety of information forms and types;

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- Student-centered learning settings based on information access and inquiry;
- learning environments centered on problem-centered and inquiry-based activities;
- Authentic settings and examples; and
- Teachers as coaches and mentors rather than content experts.

Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies. For many years, teachers wishing to adopt such curricula have been limited by their resources and tools but with the proliferation and widespread availability of contemporary ICTs, many restrictions and impediments of the past have been removed. And new technologies will continue to drive these forms of learning further.

INFORMATION LITERACY

Another way in which emerging ICTs are impacting on the content of education curricula stems from the ways in which ICTs are dominating so much of contemporary life and work. Already there has emerged a need for educational institutions to ensure that graduates are able to display appropriate levels of information literacy, "the capacity to identify and issue and then to identify, locate and evaluate relevant information in order to engage with it or to solve a problem arising from it". The drive to promote such development stems from general moves among institutions to ensure their graduates demonstrate not only skills and knowledge in their subject domains but also general attributes and generic skills.

THE IMPACT OF ICT ON *HOW* STUDENTS LEARN

Just as technology is influencing and supporting what is being learned in schools and universities, so too is it supporting changes to the way students are learning. Moves from content-centered curricula to competency-based curricula are associated with moves away from teacher-centered forms of delivery to student-centered forms. Through technology-facilitated approaches, contemporary learning settings now encourage students to take responsibility for their own learning. The growing use of ICT as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in the learning process. The following sections describe particular forms of learning that are gaining prominence in universities and schools worldwide.

STUDENT-CENTRED LEARNING

Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centered models. Evidence of this today is manifested in:

- The proliferation of capability, competency and outcomes focused curricula
- Moves towards problem-based learning
- Increased use of the Web as an information source, Internet users are able to choose the experts from whom they will learn

SUPPORTING KNOWLEDGE CONSTRUCTION

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning. The theories of learning that hold the greatest sway today are those based on constructivist principles. These principles posit that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. In constructivist theories, social interactions are seen to play a critical role in the processes of learning and cognition.

THE IMPACT OF ICT ON *WHEN* AND *WHERE* STUDENTS LEARN

In the past educational institutions have provided little choice for students in terms of the method and manner in which programs have been delivered. Students have typically been forced to accept what has been delivered and institutions have tended to be quite staid and traditional in terms of the delivery of their programs. ICT applications provide many options and choices and many institutions are now creating competitive edges for themselves through the choices they are offering students. These choices extend from when students can choose to learn to where they learn.

ANY PLACE LEARNING

The concept of flexibility in the delivery place of educational programs is not new. Educational institutions have been offering programs at a distance for many years and there has been a vast amount of research and development associated with establishing effective practices and procedures in off-campus teaching and learning. Use of the technology, however, has extended the scope of this activity and whereas previously off-campus delivery was an option for students who were unable to attend

campuses, today, and many more students are able to make this choice through technology-facilitated learning settings.

ANYTIME LEARNING

Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments.

- Through online technologies learning has become an activity that is no longer set within programmed schedules and slots. Learners are free to participate in learning activities when time permits and these freedoms have greatly increased the opportunities for many students to participate in formal programs.
- The wide variety of technologies that support learning are able to provide asynchronous supports for learning so that the need for real-time participation can be avoided while the advantages of communication and collaboration with other learners is retained.

EXPANDING THE POOL OF TEACHERS

In the past, the role of teacher in an educational institution was a role given to only highly qualified people. With technology-facilitated learning, there are now opportunities to extend the teaching pool beyond this specialist set to include many more people. The changing role of the teacher has seen increased opportunities for others to participate in the process including workplace trainers, mentors, specialists from the workplace and others. Through the affordances and capabilities of technology, today we have a much expanded pool of teachers with varying roles able to provide support for learners in a variety of flexible settings. This trend seems set to continue and to grow with new ICT developments and applications. And within this changed pool of teachers will come changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles.

EXPANDING THE POOL OF STUDENTS

In the past, education has been a privilege and an opportunity that often was unavailable to many students whose situation did not fit the mainstream. Through the flexibilities provided by technology, many students who previously were unable to participate in educational activities are now finding opportunities to do so. The pool of students is changing and will

continue to change as more and more people who have a need for education and training are able to take advantage of the increased opportunities. Interesting opportunities are now being observed among, for example, school students studying university courses to overcome limitations in their school programs and workers undertaking courses from their desktops.

THE COST OF EDUCATION

Traditional thinking has always been that technology-facilitated learning would provide economies and efficiencies that would see significant reductions in the costs associated with the delivery of educational programs. The costs would come from the ability to create courses with fixed establishment costs, for example technology-based courses, and for which there would be savings in delivery through large scale uptake. We have already seen a number of virtual universities built around technology delivery alone. The reality is that few institutions have been able to realize these aims for economy. There appear to have been many underestimated costs in such areas as course development and course delivery.

The costs associated with the development of high quality technology-facilitated learning materials are quite high. It has found to be more than a matter of repackaging existing materials and large scale reengineering has been found to be necessary with large scale costs. Likewise costs associated with delivery have not been found to diminish as expected. The main reason for this has been the need to maintain a relatively stable student to staff ratio and the expectation of students that they will have access to teachers in their courses and programs. Compared to traditional forms of off-campus learning, technology-facilitated learning has proven to be quite expensive in all areas of consideration, infrastructure, course development and course delivery. We may have to brace ourselves for the advantages and affordances which will improve the quality of education in the near future to also increase components of the cost.

CONCLUSION

This paper has sought to explore the role of ICT in education as we progress into the 21st century. In particular the paper has argued that ICTs have impact on educational practice in education to date in quite small ways but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on:

- What is learned?
- How it is learned?
- When and where learning takes place?
- Who is learning and who is teaching?

The upshot of all this activity is that we should see marked improvements in many areas of educational endeavor. Learning should become more relevant to stakeholders' needs, learning outcomes should become more deliberate and targeted, and learning opportunities should diversify in what is learned and who is learning.

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Chapter 38

INTEGRATING ICT IN HIGHER EDUCATION

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INTRODUCTION

At the time of the current era of globalization, with the free market and rapid technological development which makes the competition even more stringent. Thus, the human resources in all sectors should be able to follow this growing age, within the meaning of human resources should be able to master technology intensive. When we talk about technological developments, it is closely related to education, whether it is an institution based on the basic or higher education, or teachers and students who become subjects in education. When teachers and students implement an integrated education in the conventional classroom teacher is expected to provide input is good enough, interesting and also efficient in order to achieve the vision of studying a science itself. Science without technology as just ships without navigation, we have to guess in which direction to go, contritely if we already use the technology it is not possible we can go somewhere with proper navigation, accurate and fast. It has shown the apparent differences between sciences without technology with science inside based applying technology in the above education practitioners or institutions with a sensible its implementing learning technologies at every level of education. With a vision to optimize the potential that exists in every learner then present a model of learning is not only a conventional model with face to face (direct teaching), students were introduced to one model of learning called

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as E-Learning, with the expectation when students use this learning model, students and teachers can implement the teaching-learning process accurately, quickly and efficiently without having to waste time.

DEFINITION

> "E- Learning can be defined as the use of digital technologies and media to deliver support and enhance teaching, learning, assessments and evaluation"
>
> *(Armitade and O'Leary,2003)*

E-learning stands for Electronic Learning, a new way in teaching and learning that use electronic media in particular the Internet as a learning system. E-learning is a basic and logical consequence of the development of information and communication technology. E-learning can also be done informally with a simpler interaction, for example by means of mailing lists, e-newsletter or personal websites, organizations and companies that want to socialize the services, programs, knowledge or skills in the wider community (usually without charge). Functionally E-Learning can be as complementary or supplementary, and in certain conditions can even become an alternative to conventional learning. Learners who follow learning activities through e-Learning courses have the same recognition to learners who followed a conventional. In other words, E-Learning is learning carried out or supported using the means or digital learning materials. In practice, there are on-line interaction between students and their teachers and with their own friends. E-Learning in general carried out through the Internet, although some are using other technologies such as CD-ROM. *(Hartoyo, 2010:126)*

COMPONENTS OF E-LEARNING

Creating e-learning material involves several components: once content is developed, it must be managed, delivered, and standardized. Content comprises all instructional material, which can range in complexity from discrete items to larger instructional modules. A digital learning object is defined as any grouping of digital materials structured in a meaningful way and tied to an educational objective.

Learning objects represent discrete, self-contained units of instructional material assembled and reassembled around specific learning objectives, which are used to build larger educational materials such as lessons, modules, or complete courses to meet the requirements of a specified

curriculum. Examples include: tutorials, case-based learning, hypermedia, simulations, and game based learning modules. Content creators use instructional design and pedagogical principles to produce learning objects and instructional materials. Content management includes all the administrative functions (e.g., storing, indexing, cataloging) needed to make e-learning content available to learners. Examples include portals, repositories, digital libraries, learning-management systems, search engines, and e-Portfolios. *(Allen, 2003)*

THE OBJECTIVE OF E-LEARNING

The purpose of e-learning as a medium of technology applications in education. Meanwhile, other goals of e-learning include:

1. To increase of access to learning opportunity and flexibility
2. To enhance the general quality
3. To develop skills and competencies
4. To meet the learning styles / needs
5. Cost effectiveness. *(Hartoyo, 2010: 130)*

E-Learning aims to improve the efficiency and effectiveness of learning on the learner by utilizing information technology and communications and other communication media. In the other hand, the model of E-Learning also to facilitate the students to access distance education from the teacher that has problems due to separation of students and teachers by great distances.

E-LEARNING TECHNOLOGIES

Functionally, e-learning includes a wide variety of learning strategies and ICT applications for exchanging information and gaining knowledge. Such ICT applications include television and radio; Compact Discs (CDs) and Digital Versatile Discs (DVDs); video conferencing; mobile technologies; web-based technologies; and electronic learning platforms. This section discusses what these ICTs entail and their pedagogical, technical and cost implications.

E-LEARNING PROCESSES AND OUTCOMES

Adopting e-learning and its technology requires large investments in faculty, time, money, and space that need to be justified to administrators and leadership. As with other educational materials, there are two major approaches to the evaluation of e-learning: process and outcomes. Process evaluation examines an e-learning program's strengths and weaknesses

and how its results are produced, often providing information that will allow others to replicate it.

FAMILY AND HOME EFFECTS OF E-LEARNING

Parental involvement and other home effects are often secondary, if not peripheral, to the goals of e-Learning deployment. Nevertheless, e-Learning does seem to produce some positive effects in the home.

Evidence suggests a relationship between frequency of home PC use and academic achievement. Reviewing data from the 1996 National Assessment of Educational Progress in mathematics, one study reported that students using home computers more often had higher levels of achievement in mathematics. (*Wenglinsky, USA)*

SOCIAL AND COMMUNITY EFFECTS

By issuing a laptop to each student, schools aim to meet the educational needs of students who ordinarily could not afford a PC and thereby improve the performance of all students. Research shows that this strategy is working. • In studies of students with disabilities, researchers have observed improved student self-esteem, increased motivation and ability to work independently, and other academic achievements such as improved quality and quantity of student writing.

BENEFITS OF E-LEARNING

- E-learning is important for education because it can improve the quality of the learning experience, and extend the reach of every lecturer and tutor.
- E-learning can help remove barriers to achievement, by providing new and creative ways of motivating and engaging pupils and learners of all abilities, enabling and inspiring everyone to attain their educational potential.
- E-learning can support learning by offering differentiated learning, particularly for those who need support in literacy, numeracy and ICT.
- E-learning creates on-line communities of practice. The Internet can bring learners, teachers, specialist communities, experts, practitioners and interest groups together to share ideas and good practice.
- E-learning can provide an individualized learning experience for all learners, including those who are disadvantaged, disabled, exceptionally gifted, have special curriculum or learning needs or who are remote or away from their usual place of learning.
- E-learning can facilitate wider participation and fairer access to further and higher education by creating the opportunity to start learning and to choose courses and support according to the learners' needs.
- E-learning provides virtual learning worlds where learners can take part in active and creative learning with others through simulations, role-play, remote control of real-world tools and devices, online master classes, or collaboration with other education providers.

ADVANTAGES OF E- LEARNING

- Class work can be scheduled around work and family
- Reduces travel time and travel costs for off-campus students
- Students may have the option to select learning materials that meets their level of knowledge and interest
- Students can study anywhere they have access to a computer and Internet connection
- Self-paced learning modules allow students to work at their own pace
- Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms

DISADVANTAGES OF E- LEARNING

- Learners with low motivation or bad study habits may fall behind
- Without the routine structures of a traditional class, students may get lost or confused about course activities and deadlines
- Students may feel isolated from the instructor and classmates
- Instructor may not always be available when students are studying or need help
- Hands-on or lab work is difficult to simulate in a virtual classroom

CONCLUSION

From the above discussion we conclude that e-learning is an innovative technique or a form of ICT (Information and Communication Technology) used in providing learning experiences to the students on-line through the use of Internet services and Web technology of computers on the same lines as

witnessed by us in the form of e-mail, e-banking, e-booking and e-commerce in our day-to-day life. E-learning is also having some disadvantages which are discussed earlier. Inspire of certain defect, E-learning is very useful and it is becoming more and more popular.

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Chapter 39

USES OF ICT IN HIGHER EDUCATION

Dr. Kiran Kumar K. S.* and Yadu Kumar M.**

INTRODUCTION

Information and Communication Technology (ICT) is another brick in the wall of human civilization. It is opening up a new era of education along with the changing role of teachers from just as knowledge transmitter to facilitator - a constructivist teaching learning environment. Importance of education in almost all walks of life has increased with the support of information and communication technologies (ICT). During the past 20 years, the use of ICT has fundamentally changed the working of education. In the current environment-conscious world, the importance of education and acceptability of ICT as a social necessity has been increasing. Social acceptability of information and communication tools is necessary to improve the mobility in the society and increase the pitch for equity and social justice. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education tends itself to more students – centre learning settings and often this creates tensions for some teachers and students. But the role of computing and ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century.

ICT AS AN INNOVATION

Schools provide insight in to the issues surrounding ICT as an innovation. The teacher is central in the adaption and use of ICT. The impact of ICT on educational quality, on learning, and the differential

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benefits from these all flow from the way in which the technological is used. Educational institutions used it to support movement towards a variety of educational goals. T

NEED OF ICT IN HIGHER EDUCATION

Uses of ICT in Higher Education has proved to be an essential aspects of teachings, cultural tool kit in the early generation also it affords new & transformative models to develop & extent the nature & reach of teacher learning wherever the place may be.

- ICT in higher education is any hardware and software technology that contribute in the educational information procession.
- ICT in higher education is any Information Technology that focuses on the acquisition, storage, manipulation, management, transmission or reception of data required for the educational purpose.
- ICT in higher education is any technology that deals with the exchange of information or in other words communication in the teaching learning process.
- ICT in higher education is any educational technology that is applied in the educational process .It encompasses Hardware approach like use of machines and materials, Software approach like use of methodologies and strategies of teaching learning and Systems approach that uses the management technology that deals with the systematic organization of the hardware and the software.
- ICT in higher education is the support material in the hands of the human resource involved in the educational process in order to enhance the quality of education.
- ICT in higher education comprises of the application of science of On-line, offline learning with the help of the computer technology.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. On the one hand there is acceptance of its potential benefits to knowledge creation i.e. field of research and its dissemination and on the other extreme it is feared that there use will further the digital divide/ inequity. It is inevitable that their increasing

use in education system will also raise issues regarding what kind of technologies, in what quantity, at what level and for what purpose they need to be introduced. The concerns such as who will manage this process develop policy guidelines and strategies also require consideration. Wright (2000) pointed out that it will not be wise to ignore the issues related to equity, cultural integrity, and the negative aspects of technology in economic and social development. Nevertheless, the opportunities and challenges raised at different platforms can be categorized as the aspects relating to role of ICT for access and equity in education, role in management and efficiency in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

ADVANTAGES OF ICT IN HIGHER EDUCATION

1. Quick access to information: Information can be accessed in seconds by connecting to the internet and surfing through Web pages. Information Literacy: The growing use of ICT as tools of everyday life have seen the pool of generic skills expanded in recent years to include information literacy. It is highly probable that due to the future developments and growth in technology, it will help further for information literacy.
2. Easy availability of updated data: Sitting at home or at any comfortable place the desired information can be accessed easily. This helps the students to learn the updated content. Teachers too can keep themselves abreast of the latest teaching learning strategies and related technologies.
3. Any place, any time Learning: With the advancement of ICT, education does not remain restricted within four walls of the educational institutions. With the help of ICT, educational institutions can offer programs at a distance mode. Students from different parts of the world can learn together by using online, offline resources. This would result in the enriching learning experience. Today many students can use this facility through technology-facilitated learning settings. Technology-facilitated educational programs remove the geographical barriers. Students are able to undertake education anywhere, anytime and at any place. This flexibility has provided learning opportunities for many more learners who previously were constrained by other commitments.

4. Wider range of communication media: With the advent of ICT, different means of communication are being introduced in the teaching learning process. Offline learning, on line learning, blended learning is some of the resources that can be used in educational institutions. Collaborative learning, individualized learning strategies can enhance the quality of group as well as individual learning with the real society. This can ensure the applicability of knowledge.
5. Supporting Knowledge Construction: Learning approaches using contemporary ICTs provide many opportunities for constructivist learning and support for resource-based, student centered settings by enabling learning to be related to context and to practice.
6. Wider learning opportunities: Application of latest ICT in education has provided many options to the learners to opt for the course of their choices. Many Online courses are available for them to select any as per their aptitude and interest. Students can evaluate their own progress through different quizzes, ready to use online tests. This can ensure fulfillment of the emplurses oyment required in the job market thus minimizing the problem of unemployment. Also various virtual online courses are available in the market. It can also provide more efficient and effective citizens to the society as per the changing needs.

CONCLUSION

On the basis of study we can conclude that there is high scope & potential of ICT's in higher education.ICT implements education more effectively & responsively. Contribution of ICT's in higher education is inevitable. Higher education has considerable growth in both private & public provision. Since ICTs provide greater opportunity for students and teachers to adjust learning and teaching, also improving the quality of community life. Even though ICTs play significant roles in representing equalization strategy for developing countries, the reality of the digital divide- the gap between those who have access to, and control technology and those who do not, make a huge difference in the use of ICTs. ICT can be useful for learners of all kinds, because of the resources available on the Internet, applications that make it possible to explore subjects and the possibilities of networking among learners and teachers. ICT allows higher education providers to accommodate the needs of students in the form of mode, pace; place & time of study & to cater to different & new target groups & markets both locally & globally.

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Chapter 40

FACTORS AFFECTING AND FACILITATING ICT LEARNING IN COLLEGES

Dr. Kowshik. M.C.*

INTRODUCTION

The new technologies of the digital age have presented higher education system and educators with a perplexing mix of promise and confidence. ICT has been promoted as the great hope of higher education, the great liberator, the common currency of the knowledge age. The use of information technologies (ITs) in higher education has been identified strongly with a variety of applications over the years. Computers, internet, educational software, laptops are concepts largely used in higher education as technological icons to show what extent colleges are in-line with modern life. However, these technologies are often considered fads but also they show the tip of the iceberg in educational issues. There are many issues that are considered to interplay to determine the extent to which ICT is used. In this unit, the different sides of this iceberg will be analyzed to understand more comprehensively what the factors that affect and facilitate ICT learning are.

FACTORS AFFECTING ICT LEARNING

Teacher-Level Barriers

1. lack of time - for both formal training and self-directed exploration, and for preparing ICT resources for lessons, lack of self-confidence in using ICT.
2. negative experiences with ICT in the past

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3. fear of embarrassment in front of pupils and colleagues, loss of status and an effective degrading of professional skills
4. lack of the knowledge necessary to enable teachers to resolve technical problems when they occur
5. lack of personal change management skills (Cox *et al.* 1999).
6. perception that technology does not enhance learning
7. lack of motivation to change long-standing pedagogical practices
8. perception of computers as complicated and difficult to use (Cox *et al.* 1999).

College-level Barriers

1. lack of ICT equipment, and the cost of acquiring, using and maintaining ICT resources (Cox *et al.* 1999)
2. lack of access to ICT equipment due to organisational factors such as the deployment of computers in ICT suites rather than classrooms
3. obsolescence of software and hardware (Preston *et al.* 2000)
4. unreliability of equipment
5. lack of technical support (Preston et al. 2000; Cox *et al.* 1999)
6. lack of administrative support
7. lack of institutional support through leadership, planning and the involvement of teachers as well as managers in implementing change (Cox *et al.* 1999)
8. lack of training differentiated according to teachers‘ existing ICT skill levels
9. lack of training focusing on integrating technology in the classroom rather than simply teaching basic skills.

External and Internal Barriers

Many authors categorize barriers as external (first order) or internal (second order). First-order barriers include lack of equipment, unreliability, lack of technical support and other resource-related issues; second-order barriers include both college-level factors such as organizational culture and teacher-level factors such as beliefs about teaching and technology, and openness to change. A lack of equipment is the highest rated barrier internationally, often cited even in well-resourced countries. Indeed, one study (Guha 2000) found that teachers who used technology most were more

likely to complain about a lack of equipment. It would appear therefore this is less a barrier to the introduction of technology than to its use in creative and innovative ways. While these first-order barriers are clearly significant, research suggests the importance teachers attach to them can reflect their own second-order barriers. In particular, teacher's beliefs about the relevance of ICT to their subject can magnify or reduce the effect of practical difficulties they may encounter.

Attitudes

Attitudes towards ICT, therefore, can be barriers in themselves and can influence or be influenced by other barriers. One study divided attitudes into three groups: self-confidence with ICT, perceived relevance of ICT, and innovativeness. Although attitudes partly depend on personality (Guha 2000), the importance of previous computer experience is widely recognized. Negative experiences affect perceptions of the ease of use and relevance of ICT, reducing confidence and increasing anxiety.

Training

ICT training can help overcome barriers, yet many authors argue that it often fails to do so. While a lack of time and training are major obstacles (Guha 2000; Cox *et al.*1999), research suggests there are weaknesses in the design and delivery of many courses. By focusing on basic ICT skill, training fails to prepare teachers to integrate ICT in their pedagogy. One study (Snoeyink & Ertmer 2001), on the other hand, found that computer novices preferred to be taught basic skills before addressing pedagogical integration of technology. This illustrates the need for differentiated training; taking into account teacher's varying levels of computer experience and learning styles.

FACTORS FACILITATING ICT LEARNING

Pedagogical Objectives and Goals

The research on educational innovation suggests that it is important for colleges to share a reformed vision of teaching and learning in order to create sustainable change at the classroom levels. The Indian education system is moving away from a traditional system based on memorization and testing to support a more student-centered approach to teaching and learning with ICT. This change is expressed in the state curricula in terms of curricular frameworks that are often difficult to translate into practice (Rampal, 2002).

Leadership

The research literature also indicates that leadership at various levels of the system is important if an innovative project is to take root and grow at the classroom level. Most of these colleges function with two levels of leadership-first there is the national or provincial ministry of education that sets overall policy, curricula, and national assessment, and second, there is the building leadership that makes the day-to-day decisions.

Professional Development and Ongoing Support

For much the same reasons that supportive leadership is important in helping teachers innovate, ongoing professional development also appears to be a critical factor. In the context of education reform, the tools and teaching strategies are new to many of the teachers; therefore, both the quality of the professional development courses and the presence of ongoing support for teachers in their classrooms are important. Research suggests that teachers must be offered multiple points of entry into practices supporting ICT use and student centered teaching. This allows teachers to begin changing their practice from whatever point their context and current practice requires.

Experimentation, Adaptation, and Critical Reflection

Research literature's perspective offers an interesting insight on the importance of experimentation for ICT integration and education reform. Educators usually exhibit a willingness to experiment and take on the challenges of trying to do new things. If professional development provides teachers access to information about new tools and practices, there will be a willingness to experiment with novel ideas, and openness to reflect on the successes and failures, in order to create positive changes.

Time

Much like a physical resource, time is a scarce resource that colleges must manage carefully. Time in relation to ICT implementation has to be viewed in two dimensions: (1) teacher's professional development and planning time, and (2) student's time in the classroom or learning activity. Each college should develop their own strategies for training teachers and implementing the use of ICT depending on the particularities of the larger system.

ICT infrastructure

In most developing countries, ICT Infrastructure also is commonly a limited resource in colleges. With limited resources, it is often difficult

for colleges to provide sufficient access so students can use ICT during their classes. Research studies suggest that no single strategy will work for all colleges with resource limits.

Financing and Sustainability

All of the successful colleges utilize multiple strategies to obtain funds or ICT resources. There are three basic sources of funding the colleges. First, all three countries have government programs that provide an infrastructure to support these colleges. The government programs provide the colleges with a basic level of resources, but each of these colleges has gone farther. A second critical source is the community: Successful colleges have developed good relations with the surrounding community, and the communities value the ICT initiatives of the college. Finally, some colleges had their own small sources of revenue: Some of the public colleges have concessions, such as a college café or a photocopy shop. These colleges also attempted to control other costs associated with ICT, such as ink, paper, and peripherals.

CONCLUSION

For the success of ICT in learning, colleges should be encouraged to look at all the tree options of financing and sustainability. The responsibility for change cannot rest solely on the shoulders of the teachers—bringing about these changes is a long-term, incremental process. There is a broad range of factors, from leadership to funding to effective professional development, that help create and sustain the conditions for change. Effective reform requires sustained investment and support along multiple dimensions of the educational system, including physical and technical infrastructure, human resources, curricular frameworks, standards, and assessments. In the end, the success of teachers is dependent on the conditions in which they work.

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Chapter 41

ROLE OF ICT IN HIGHER EDUCATION IN THE PRESENT SENARIO

I. Manavalan*

INTRODUCTION

Information and communication technology is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel, business, law, banking, engineering, education and architecture, the impact of ICT across the past two or three decades has been enormous. They way these fields operate today are vastly different from the ways they operated in the past. But when one looks at education, there seems to have been an uncanny lack of influence. A number of people have attempted to explore this lack of activity and influence.

There have been a number of factors impeding the wholesale uptake of ICT in education across all sectors. These have included such factors as a lack of funding to support the purchase of the technology, a lack of training among established teaching practitioners, a lack of motivation and need among teachers to adopt ICT as teaching tool (Starr, 2001). But in recent times, factors have emerged which have strengthened and encouraged moves to adopt ICTs into classrooms and learning settings. As we move into 21st century, these factors and many others are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will soon see large scale changes in the way. Education is planned and delivered as a consequence of the opportunities and affordances of ICT. This paper seeks to explore the likely changes we will see in education as ICT acts as a powerful agent to change many of the educational practices to which we have become accustomed.

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ICT AND HIGHER EDUCATION

The major teaching and learning challenges facing higher education revolve around student diversity, which includes, amongst others, diversity in students' academic preparedness, language and schooling background. Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information and communication technologies (ICTs) as an educational tool in the promotion of women's advancement has immense potential. ICTs need to be seen as " an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place". It is assumed that ICT brings revolutionary change in teaching methodologies. Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education.

ROLE OF INTERNET

The role of the Internet on teaching and learning are highlighted in a later section of this site. In summary, a Web based learning class is a more effective learning experience, since the learner participates in the learning process and receives individual attention, even when the instructor and the learner are at different locations. This participation in learning is by itself a positive learning experience. The Web-based learning atmosphere allows more effective interaction between the students and instructor. Therefore, it can be as effective as the traditional classroom learning environment where the space, seating, etc., could be inadequate. Online learning teaches you how to think before writing in a discipline of both instructor and student. There is less 'physical touch' but much more intellectual touch.

Online community is one of the tools for a collaboration learning environment. Web-based collaboration has the potential to enhance the learning process. Educators who value collaboration and implement collaborative activities are more likely to engage in student centered practice. Constructivist learning, a revised and updated from of discovery learning, is also a student-centered learning approach that is based on cognitive psychology, in this active learning environment, students encounter thinking for themselves that enable them to construct personal knowledge through problem-solving and experimentation. Constructivist principles work particularly well on Web-based teaching / learning setting.

Learning is the act or process of developing skill or knowledge. Modern, Web-based learning provides the means for changing

fundamentally the way in which instruction is delivered to students. Multimedia learning resources combined with work books attempt to explore the essential concepts of a course by using the full pedagogical power of multimedia. Many websites are designed to provide students with a "self-help" learning resource to complement a traditional textbook. The major role of the Internet is that the traditional teacher and student role change significantly. Students assume increasing responsibility for their learning while teachers become resources, facilitators and evaluators, guiding students in their problem-solving efforts. For you as a learner, the ability to concentrate and to use your time well is the key to succeed.

WEB BASED LEARNING BENEFITS

Here are some of the benefits which ICT brings to education.

1. General benefits:
   - Greater efficiency throughout the school.
   - Communication channels are increased through email, discussion groups and chat rooms.
   - Regular use of ICT across different curriculum subjects can have a beneficial motivational influence on students' learning.
2. Benefits for teachers:
   - ICT facilitates sharing of resources, expertise and advise
   - Greater flexibility in when and where tasks are carried out.
   - Gains in ICT literacy skill, confidence and enthusiasm.
   - Easier planning and preparation of lessons and designing materials.
   - Access to up-to-date pupil and school date, anytime and anywhere.
3. Benefits for students:
   - Higher quality lessons through greater collaboration between teachers in planning and preparing resources.
   - More focused teaching, tailored to students' strengths and weakness, through better analysis of attainment data.
   - Improved pastoral care and behavior management through better tracking of students.
   - Development of writings skills (including spelling, grammar, punctuation, editing and re-drafting), also fluency, originality and elaboration.
   - Encouragement of independent and active learning, and self-responsibility for learning.

- Students, who used educational technology in school felt more successful in school, were more motivated to learn and have increased self-confidence and self- esteem.

DISADVANTAGES OF WEB BASED LEARNING

- Web based learning overcoming a traditional teaching method.
- Sometimes students may avoid the classroom environment.
- Other disadvantages like lack of training and familiarity with computers and the internet could lead to irritation, instead of inspiration.
- Teachers can monitor the students. But websites never do that.
- Students may diverted to social networks and waste their time instead of gaining knowledge.
- Students are isolated from the relationship of teachers as well as their peer group.
- It also leads the students towards cyber crime.
- Technical problems are unavoidable while using internet.

FUTURE OPPORTUNITIES FOR HIGHER EDUCATION

- Higher education through ICT can widen access to include students at a distance and to accommodate groups unable to attend at specific times.
- Higher education promotes engaging learning and enquiry using ICT.
- ICT through online communities can be used to promote community.
- ICT provides as opportunity for re-thinking the curriculum and developing the pedagogy for adults.
- ICT might be used solely to reduce unit costs and to capture a growing international market.

CONCLUSION

Web based learning is a great boon for the present generation because, it brings the whole world to our room and makes us get communication as well as information at the hand. Students today no longer spend their time in a lonely little attic, a noisy lecture room or the deadly silence in the huge reading room of a university library. These components of learning environment still exist but their functionality has changed. Web-based course delivery is the beginning of a new wave of technology development in higher education. Freeing student work from paper and making it organized and transportable opens enormous possibilities for re-thinking whole curricula: the evaluation of faculty, assessment of programs, and how accreditation works. The supporting evidence of its effectiveness might be the biggest challenge in technology innovation on campus. If used efficiently, e-learning has a greater potential to alter higher education at its very core than any other technology application we have known thus far.

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Chapter 42

ENHANCING THE QUALITY OF HIGHER EDUCATION THROUGH THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY

Manisha Kumari and Dr. Kumud Ranjan***

INTRODUCTION

Education is a process which is especially designed to facilitate an all round development of each and every child. Education helps a person to lead balanced pleasure not only at physical level, but also at the mental, social, emotional level. It is a continuous process which begins at birth and ends with death. The concept of education is like a diamond which appears to be of a different colour when seen from a different angle. It is a process of self-realization through this we realize our latent powers. As we know that education is divided into two parts i.e. ***formal education and another is informal education.*** Formal education is imparted in planned institutions like school. In educational institution classroom is a common place where the teachers and the students interact purposefully to acquire knowledge. It is perfectly said that the nation is shaped inside the classroom. Students, teachers and curriculum are the three important components of teaching learning process and classroom is the collection and interaction of all these three and these three were depend on ways of learning.

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NEED OF ICT IN TEACHING LEARNING SITUATION

In traditional method learning process is mainly based upon the teacher or teacher centered approach. In this method teachers were the active member and less activity done by the learners. The teaching process is based upon the lecture method and repetition and less interaction between the teacher and students. Teacher's role is directive and rooted in authority and no voice for students. Knowledge is seen as inert and students work primarily alone. That's why learning process becomes burden to the learners, learners feels bore because nothing new to be done by them, they have no space to express their own interest and feelings towards the study, and they only follow the rote learning. To overcome the limitations and drawbacks of traditional method we go for the constructivist approach because only this approach gives the space for the learners. It was based on learner centered approach. Role of teacher is interactive, rooted in negotiation or in simple word they are facilitator. Learning is based on learning by doing, interactive and building on what students already knows. It was mainly based on their past experience or knowledge of the learners. ICT helps them to explore their views and ideas in a right direction. With the help of ICT students were correlate with the subject matter easily. They understand it with the help of learning by doing.

OBJECTIVE OF THE STUDY

- To study the quality of higher education is enhanced through the use of ICT on pre-service teachers.

HYPOTHESIS OF THE STUDY

- ICT will significantly enhance the teaching- learning situation of the experimental group of pre-service teachers.

METHODOLOGY

Based on empirical observations and detailed micro level survey. Purposive random sampling - SPM Intelligence test of J. C. Raven. & Researcher made pre & post achievement test - Primary sources. The collected data was analyzed quantitatively with the help of Mean, S.D & T-Test.

Table-1. Experimental Design of the Study

Random assignment of groups	Pre-test	Treatment	Post-test
Experimental	Achievement test on health education and teaching techniques (T1)	Learning with the help of ICT in teaching	Achievement test on health education and teaching techniques (T2)
Control	Achievement test on health education and teaching techniques (T1)	Learning through traditional method of teaching	Achievement test on health education and teaching techniques (T2)

Table-2. Selection of the Sample

Name of the School	Class	Group	No. of Students	Grand total population
B. B. M. B. Ed College	Sec- A	Experimental	40	80
	Sec- B	Control	40	

DATA ANALYSIS & RESULT

The purpose of this study was to study the effectiveness of ICT in teaching-learning situation on pre-service teachers. Therefore, the data were collected from the one college and hypothesis was tested statistically by using mean, standard deviation, t-test to arrive at the conclusion.

First of all researcher conducted a test on both the sections of B.Ed students to make it equivalent with the help of SPM Intelligence test and the collected data were analyzed with the help of **t-test.**

Table-3. Result of SPM Intelligence test

Groups	No. of students	Mean	S.D	T-test	Degree of freedom
Sec- A	30	35.63	8.26	0.439	58
Sec- B	30	35.3	8.33		

Not significant

The table shows obtained t value = 0.439 is not significant at 0.01 levels (2.66). Therefore the results shows that there is no significant difference between the both the section. So, it proves that both the groups are equivalent with each other.

Table-4. T-test of two groups in relation to their achievement before intervention.

GROUPS	No. of students	Mean	Standard Deviation	t-test	Degree of freedom
Experimental Group	30	13.5	4.89	0.48	58
Control Group	30	13.53	4.43		

** Not Significant at 0.01 levels.

Through table no.-4 infer that there is no difference between the groups in their achievement. T-test was applied on the post-test score of both the groups to find out the effect of treatments.

Table-5. T-test of two groups in relation to their achievement after intervention.

Groups	No. of students	Mean	Standard Deviation	t-test	Degree of freedom
Experimental group	30	37.1	4.40	3.72**	58
Control group	30	29.16	4.85		

** Significant at 0.01 level

Table no.-5 shows that mean of post achievement scores of experimental group is 37.1 and mean of post achievement scores of control group is 29.16. and the calculated 't' value = 3.72 between the mean scores of experimental group and control group after giving them treatment by using two method for these two groups. The obtained **t** value **3.72** with df **58** is greater than the table value **2.66** at **0.01** levels. So, there is significant difference between these two groups. These differences are due to the effect of ICT on achievement of experimental group students. This means use of ICT in teaching learning situation has significant effect on the achievement

of the pupil teacher's. This proves the hypothesis of the study i.e. ICT will significantly enhance the teaching-learning situation of the experimental group of the pre service teachers of B.B.M. B.Ed college, Chas.

CONCLUSION

In traditional classroom the experimenter had provided all the information which are only written in the book through which learner are able to memories these entire thing. But in using ICT learning strategy each and every student bound to actively participate in classroom situation to construct their own new knowledge. They were totally free from wrote learning in the environment. They had opportunities to verbalize their conceptual understanding or to demonstrate new skills or behaviors and also actively explore the concept. Through ICT learning situation, students could gain new experience, develop deeper and broader understanding of major concept, obtain more information about area of interest and refine their skills. Researcher observed that in ICT teaching- learning situation has significantly effect on achievement of pre-service teachers in health education and teaching techniques.

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Chapter 43

INTEGRATING ICT IN HIGHER EDUCATION

S. Marthal* and Dr.P.Pandiya Vadivu**

ABSTRACT

Information and communication technologies (ICT) have become commonplace entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. The use of ICT in education lends itself to more student-centred learning settings and often this creates some tensions for some teachers and students. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. The paper argues the role of ICT in transforming teaching and learning and seeks to explore how this will impact on the way programs will be offered and delivered in the B.Ed., college student's future. The design of the present research study belongs to the survey method. The investigator has selected 200 student-teachers studying in the different B.Ed. College as Sample for this study through Random Sampling Technique in Madurai District. The inventory consists of as 30 items. In each item, five activities given against 5 Column and the respondents are required to give the response as to what they liked the most, out of five.

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INTRODUCTION

Internet is a wonderful new tool that is available to present generation of students. It is very useful tool in assisting university students in their educational endeavors with a wealth of information present in different sites. From research papers, to research projects, the internet has revolutionized the way that people of all ages learn, whether they are in school or college or just looking for information on a particular topic. The internet is the best source of reference ever, a pool of information accessible twenty four hours any time anywhere. There are no limits and no geographical barriers anymore. If any student needs instant updated information on a particular subject, he/she does not need to travel further than his/her computer. The internet is the best source of reference ever, a pool of information accessible twenty four hours any time anywhere. There are no limits and no geographical barriers anymore. If any student needs instant updated information on a particular subject, he/she does not need to travel further than his/her computer. The internet is a most helpful tool in education.

The way we educate ourselves has not changed but have been chanced with the help of the internet, student, researchers, teachers everybody uses the internet. Compared to other media sources like books, Journals, television and newspapers which feed us with information but without any possibility to respond back, internet on the contrary is interactive.

NEED FOR STUDY

- The application of ICT for teaching and learning in real classroom depends very much on the ICT skills that the teacher possesses.
- There is no single agency or single well conceived curriculum for ICT skills training to trainees or a definite set of ICT skills or competencies that the trainees are expected to possess.

OBJECTIVES OF THE STUDY

- To find out the difference if any between the following B.Ed., College Students in Madurai District with respect to Qualification, Major, Area of Residence, Usage of Internet, Usage of Mobile Phone, Usage of Face book among higher education students.

METHODOLOGY

The design of the present research study belongs to the survey method. The investigator has selected 200 student-teachers studying in the different B.Ed. College as Sample for this study through Random Sampling Technique in Madurai District. The inventory consists of as 30 items. In each item, five activities given against 5 Column and the respondents are required to give the response as to what they liked the most, out of five.

CALCULATIONS

Variables	Sub-variables	N	Mean	SD	t-test
Qualification	UG	132	78.36	10.42	0.49
	PG	68	79.27	13.37	
Major	Arts	100	68.54	11.854	5.54*
	Science	100	78.23	12.823	
Area of Residence	Rural	72	63.71	12.50	2.17*
	Urban	128	69.02	10.10	
Usage of Internet	Yes	146	71.1	10.88	0.55
	No	54	63.2	13.60	
Usage of Mobile Phone	Yes	165	72.57	9.65	6.07*
	No	35	56.9	14.62	
Usage of Face Book	Yes	120	71.82	10.56	5.47*
	No	80	63.27	11.07	

* Significant Difference for above 0.05 level

There is significant difference between Major, Area of Residence, Usage of Mobile Phone, and Usage of Face Book for Integrating ICT in Higher Education for B.Ed., College students in Madurai District. Research Hypothesis is accepted.

There is no Significant Difference between Qualification and Usage of Internet for Integrating ICT in Higher Education for B.Ed., College Students in Madurai District. Research Hypothesis is rejected.

CONCLUSION

The development of ICT wireless technologies has generated a considerable amount of excitement among practitioners and academics because it results in shifting the academic environment from traditional setting to mobile learning setting. Internet has become an indispensable tool as cell phone in today's computer age. In the past students spent

time going to libraries to find the information needed for their university course and research work. But today if the university students are trained in this internet research skills they can take up qualitative research work and they contribute their research work through the web-pages and they can better grades in their higher education courses and research degrees.

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Chapter 44

INTEGRATING ICT IN HIGHER EDUCATION

C. Muthuselvi* and T. Sheba Rani**

INTRODUCTION

In this change of paradigm, it is now impossible to ignore the potential of Information and Communication Technologies (ICT), and especially that of the Internet (Trindade, 2002). With the change from a world of atoms to a world of "bits" (Negroponte, 1995) we are witnesses to the appearance of the Information Society and its expansion through the development of computer networks, which allow citizens to access enormous sources of information, communicating at a speed never seen before, connecting to any point on the globe and asserting themselves not only as consumers of information and knowledge but also as the creators and sources of that very information and knowledge itself. As mentioned in the *Report to UNESCO of the International Commission on Education for the Twenty-first Century,* this technological revolution obviously constitutes an essential element in the understanding of our modernity, in as much as it creates new forms of socialization and, even, new definitions of individual and collective identity (UNESCO,1996). Several international bodies, with a special emphasis on UNESCO, have drawn attention to the impact which the ICT may have in the renovation of the structures within the educational system as well as on the methodologies of teaching-learning. It is within this framework that the present communication should be considered. The pedagogics of higher education cannot be disconnected from academic

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success and, thus, from teaching and innovation. The first, undertaken in the subject of *Information and Communication Technologies in Education* in the Higher Degree in Education, deals with the conception and practice of a support model for the development of collaborative work resorting to the Internet. The second, being developed in the subject of *Educational Technology* taught in various Teacher Training Degrees, deals with the construction of an open and flexible platform (website) providing support for learning activities. We conclude with a brief reflection on the importance of promoting the integration of ICT in education and training in a sustained and reflected manner.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. The opportunities can be categorized as the aspects relating to role of ICT for access and equity in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

ACCESS AND EQUITY IN HIGHER EDUCATION

Presence of ICT in education sector is increasing steadily. In spite of the fact that education is a social enterprise and teachers are the traditionally mainstay of teaching learning process, ICTs are very powerful tool for diffusing knowledge and information, a fundamental aspect of the education process. ICTs can play enormous role for improving access and equity in education sector in general and higher education sector in particular.

11th Plan proposed to achieve the target of 15 percent GER by 2012 through the increase in institutional capacity and increase in 'intake capacity' of existing educational institutions. These efforts are also experiencing the push created in this direction through the consistent rise in enrolment at elementary level and secondary level. The demand for higher education is expected to rise steeply in the forthcoming years under these influences. ICTs lend themselves as an ideal mechanism to bridge this gap by complementing both formal education system as well as distance learning systems (Neeru, 2009).

E-learning is emerging as an important strategy to provide widespread and easy access to quality higher education. E-learning is a generic term referring to different uses and intensities of uses of ICTs, from wholly online education to campus-based education and through other forms of distance education supplemented with ICTs in some way. Although, presently the initiatives for development of e-learning in India are continuing in a sporadic manner, UGC is advocating and making efforts to enhance the quality of higher education by framing policy guidelines for their integration in classroom and other activities.

ROLE OF ICTS IN PEDAGOGY FOR QUALITY TEACHING LEARNING

Another most important dimension of higher education sector influenced by ICT integration is improving quality of teaching-learning. Also, the changes taking place due to globalization and internationalization attach premium to knowledge and information. Therefore, the integration of ICTs would not only help in promoting personal growth but also in developing "knowledge societies". The call of the hour is the need to provide education for everyone, anywhere, and anytime. Life-long learning has become the driving force to sustain in the contemporary competitive environment. Therefore to strengthen and / or advance this knowledge-driven growth, new technologies, skills and capabilities are needed.

Conventional teaching-learning processes are undergoing a paradigm shift. Focus of instruction is now on education programs/practices that promote competency and performance. Such curricula tends to require access to variety of information sources, information forms and types; student centred learning settings based on information access and inquiry; learning environments centred or problem-centred and inquiry-based activities, authentic settings and examples; and teachers as coaches and mentors rather than content experts (Neeru, 2009). The shift towards development of educational programs is well supported by and encouraged by the emerging instructional technologies.

Apart from enhancing student's learning experience, role of ICTs in capacity building/training of educational personnel has very large potential. National level institutes can provide leadership role in enhancing technical and managerial manpower in different disciplines through ICT networks and collaborations. Technology facilitated learning would result in preparation of staff regarding innovative pedagogic methods, new ways of learning and interacting, easy sharing of new practices among teaching community and result in widening the opportunities for their participation. The capabilities of competent and trained teachers/academic experts can be made available to larger audiences/students through flexible and virtual settings.

INNOVATIVE APPROACHES FOR TEACHING

ICTs have the potential to drive innovative and effective ways of teaching-learning and research. The inclusion of learning tools, easier use of multimedia or simulation tools, easy and almost instant access to data and information in a digital form which allows for computations and data processing generates possibilities which were otherwise not feasible. The possibility to diffuse these innovations and complement the learning content to improve quality in higher education through innovative pedagogic methods is high. The focus on ICTs to back quality research through utilization of rigorous research methodology and in-depth analysis is the call of the hour.

POTENTIAL DRAWBACKS-CUM-CHALLENGES TO USING ICT IN EDUCATION

While using ICTs in education has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. Introducing ICT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g. buildings) are relatively less costly (UNESCO, 2009).

The four most common mistakes in introducing ICTs into teaching are i) installing learning technology without reviewing student needs and content availability; ii) imposing technological systems from the top down without involving faculty and students; iii) using inappropriate content from other regions of the world without customizing it appropriately; and iv) producing low quality content that has poor instructional design and is not adapted to the technology in use (UNESCO, 2009). Although ICT offers a whole lot of benefits there are some risks of using ICT in education which have to be mitigated proper mechanisms. They are:

- It may create a digital divide within class as students who are more familiar with ICT will reap more benefits and learn faster than those who are not as technology savvy.
- It may shift the attention from the primary goal of the learning process to developing ICT skills, which is the secondary goal.

- It can affect the bonding process between the teacher and the student as ICT becomes a communication tool rather than face to face conversation and thus the transactional distance is increased.
- Also since not all teachers are experts with ICT they may be lax in updating the course content online which can slow down the learning among students.
- The potential of plagiarism is high as student can copy information rather than learning and developing their own skills.
- There is a need for training all stakeholders in ICT.
- The cost of hardware and software can be very high.

CONCLUSION

The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. ICT has enhanced distance learning. The teaching community is able to reach remote areas and learners are able to access qualitative learning environment from anywhere and at anytime. It is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 45

INFORMATION COMMUNICATION TECHNOLOGY IN TEACHER EDUCATION

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INTRODUCTION

Information and communication Technology is the buzzword today everywhere as the world has entered into an information and communication era. It has helped in all walks of life in one-way or other and indispensable. The twentieth century witnessed the rapidly accelerating advent of Information and Communication Technology. Computers have proliferated, becoming increasingly fast, powerful, small and cheap the picture has changed radically. The emerging technologies supporting computers and telecommunication systems provide new dimensions in business, industries and teacher education in a productive way. It is impossible to deny the importance of ICT in teacher educational, cultural, agricultural, scientific, technical disciplines and in all walks of life. Designing and implementing successful ICT- enabled teacher education programmes is the key to fundamental, wide-ranging educational reforms, and it has potential in the field of education

ROLE OF ICT IN TEACHER EDUCATION

ICT role in teacher education is solicited for improving quality, widening access and enhancing operational efficiency across all functions in teacher education sector and to create new dynamics in Teacher Education.

Introduction of ICT in Teacher education has profound implications for the whole education process. ICT applications provide teacher training

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Institutions with a competitive edge by offering enhanced services to students and creating enriched learning experience.

NEW REQUIREMENTS

Today's teachers are required to be

- Facilitators helping learners to make judgment about the quality and validity of new source and knowledge.
- Open- minded and critical independent professionals
- Active cooperation and collaborators.
- Mediators between learners and what they need to know.
- Providers to scaffold understanding.

NEW COMPETENCIES

For teachers to be able to integrate the use of ICTs into teaching various kinds of skills need to be developed. A vast array of competencies is demanded, such as

- Creativity
- Flexibility
- Logistic skills for assigning work and study places and grouping students.
- Skill for project.
- Administrative and organizational skills.
- Collaborating Skills.

ADVANTAGES OF ICT FOR TEACHER EDUCATION

1 Through ICT images can easily be used in teaching and improving the retentive memory of students.

2 Through ICT teachers can easily explain complex instructions and ensure students comprehension.

3 Through ICT teachers can able to create interactive classes and make the lessons more enjoyable which improves students' concentration.

ICT AS TOOLS IN TEACHING AND LEARNING

Mobile Learning

New advances in hardware and software are making mobile "smart phones" indispensable tools. It is likely that mobile devices with internet

access and computing capabilities will soon overtake personal computers as the information appliances of choice in the classroom.

Cloud Computing

Applications are increasingly moving off of the standalone desk top computer and increasingly onto sever farms accessible through the internet. The implications of this trend for education systems are huge: they will make cheaper information appliances available which do not require the processing power or size of the PC. The challenge will be providing the ubiquitous connectivity to access information sitting in the "Cloud"

One–to-one Computing

The trend in classrooms around the world is to provide an information appliance to every learner and create learning environments that assume universal access to the technology. Whether the hardware involved is one laptop per child (OLPC), or – increasingly- a net computer smart phone, or the re-emergence of the tablet, classrooms should prepare for the universal availability of personal learning devices.

Ubiquitous learning

With the emergence of increasingly robust connectivity infrastructure and cheaper computers, schools systems around the world are developing the ability to provide learning opportunities to students "anytime, anywhere". This trend required a rethinking of the traditional 40 minute lesson.

Gaming

The phenomenal success of games with a focus on active participation, built in incentives and interaction suggests that current educational methods are not falling short and that educational games could more effectively attract the interest and attention of learners.

Personalized Learning

This focus transforms a classroom from one that teaches to the middle to one that adjusts content and pedagogy based on individual student needs- both strong and weak.

Redefinition of learning spaces

Concepts such as greater use of light, colors and circular tables, smaller open learning spaces for project- based learning are increasingly emphasized.

Smart Portfolio Assessment

The collection, management, sorting and retrieving of data related to learning will help teachers to better understand learning gaps and customize content and pedagogical approaches. Tools are increasingly available to students to gather their work together in a kind of online portfolio; whenever they add a tweet, blog post, or photo t any online service, it will appear in their personal portfolio which can be both peer and teacher assessed.

TelNet

This is very popular internet service which enables a user for a log into another computer to run software there, telnet is a program which allows a computer to establish a session with a remote host on the internet.

e-education

The development of e-Education has enabled distance education to overcome the lack of interactivity inherent in earlier forms of distance based on correspondence and mass media; but it looks as if it is also pushing up the costs of distance education, e-learning materials available in electronic form.

e-books

E-books have revolutionized the teaching-learning process. It can be effectively utilized in the classroom to enhance the learning process. The e-books can be described that the electronic content that is transmitted and / or displayed on a device or system to be read by the viewer similar in experience to reading a physical book. It ensures rapid retrieval of discrete items.

E-LIBRARY:

There are number of digital libraries containing e-copies of textbooks, year books, encyclopedias, journals etc., available on the net. These information are provided free as well as a nominal charge on registration.

E-ZINE

Newspapers and magazines on the web represent an enormous source of novel and up-to-date information. Some of the electronic magazines have their own search engines and archives.

e-Journals

The publications of Journals in electronics from are called as e-journals, which have brought significant changes in the global information process.

e-Learning

E-learning refers to learning and other supportive resources that are available through a computer. In on-line session, the computer displays material in response to a learner's request.

CONCLUSION

ICT is a powerful tool in supporting teacher education and inclusiveness of the students. "Education should more soulful" which must inculcates the analytical and synthetical skills among students. If any teacher educator develops on ICT and used ICT skills in teaching and learning in classroom, He / she can attained the result as maximum as possible. Online teaching method is for gaining knowledge.

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Chapter 46

CONTEMPORARY ISSUES IN ICT TEACHING AND LEARNING

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INTRODUCTION

ICT is an ever changing subject. There will always be developments within the subject that you will need to be aware of and keep up-to-date with. Along with this are other changes to the environment within which we work it can also impact on the educational arena. The constantly evolving landscape of ICT can be a source of anxiety as well as inspiration for ICT teachers. Many of the technologies we use in schools and colleges will have been superseded by the time our pupils enter the work force. So, what do we teach them? The fundamental concepts of ICT do not change (although they may be refined), which provides ICT teachers with an element of stability while technologies change around us. Through the technological changes we still teach pupils the principles for choosing appropriate ICT for a given task, how to use a systems model and human-computer interface principles. This should reassure teachers of ICT when the pace of technological change seems overwhelming.

DISCRETE TEACHING OF ICT

Discrete teaching of ICT develops pupils' capability. It provides the theoretical underpinning knowledge of ICT needed to be equipped to adapt to evolving technologies. The use of ICT as a tool in other subjects is important to help consolidate ICT skills through other contexts, which is vitally important given ICT's limited curriculum time.

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Cross-curricular use of ICT is encouraged by the government and monitored by the office for standards in Education (Ofsted), but busy teachers in other subject areas may see this as a tick-box exercise unless it is coordinated across departments and forms part of a strategic version. The co-ordination role may be allocated to the ICT department, particularly as well-developed cross-curricular use of ICT could benefit pupils' achievement in ICT. Ofsted is looking for ICT to be fully embedded in the school curriculum to the extent that it is an everyday aspect of pupils learning (Ofsted, 2005a:1). While some schools do this well, many others still have much work to do before this becomes a reality.

Technology is recognized as transformative tool. It is increasingly used for developing and managing schools at a strategic level, but teachers are also expected to use ICT to develop and enhance their own practice. ICT is a mandatory National Curriculum subject and it is very difficult to meet the requirements set out in the National curriculum and the secondary frameworks through purely cross-curricular teaching.

CURRICULUM CHANGES

The academic year starting in 2008 has seen a number of changes come to fruition across the secondary or higher education curriculum. ICT has seen a range of new vocational in recent years. Some of these qualifications are flexible in meeting the requirements of different activities. Some schools or colleges can select the units which are most appropriate to their pupils and the strengths of their department. These tend to offer a broad range of units covering traditional ICT skills (such as databases and presenting information units) as well as units which focus on more contemporary technologies, such as those connected with web development and gaming technologies. Other qualifications have more focused progression routes, but provide interesting and engaging learning for particular groups of pupils.

The changes to the 14-19 curriculum necessitated a review of the Key Stage 3 curriculum too. It is sensible to examine the foundation point of the knowledge, skills and understanding which enables pupils to progress to suitable qualifications in Key Stage 4 and beyond. We should be providing an integrated curriculum which builds on, consolidates and enhances pupils' knowledge and understanding thorough their formal education.

PROFESSIONAL ISSUES

Teachers have an immediate and lasting impact on children and young people, which may continue to affect them throughout their lives. What you say and do guides pupils when forming opinions of the world around

them and, more importantly, of themselves. Professionalism is connected with how you behave, which is influenced by your values and beliefs. It is of paramount importance that you act in a professional manner thorough your career. Your dedication to promoting effective teaching and learning. Helping pupils to achieve to the best of their ability, will be underwritten by your professionalism.

TRADITIONAL TEACHERS

Traditional teachers are following certain conventional procedure or customary way of teaching refers to long-established customs found in schools that society has traditionally deemed appropriate. Traditional teachers are focused on rote learning and memorization they can abandoned student-centered and task-based approaches to learning. They cannot utilize innovative methods and technologies in class room teaching.

RESEARCH

Nowadays ICT plays a key role in the research work. As a researcher, you will be making sense of a whole range of information and evidence, textbooks, lectures, government publications, Ofsted reports, journals and Internet sources. Coupled with this, you bring a whole set of experience, values and beliefs of your own to professional practice. Research and evidence should be the lens through which you make sense of this wide range of opinions, fact and experience.

As an ICT practitioner, you may have already engaged with project work where you have used a systems approach to collect and analyze evidence – for example, conducting end-user interviews, collecting current documentation and observing workplace practices. This experience will provide a good foundation for developing some of the analytical techniques which are required for research. However, you may now be asked to engage in research which applies to education rather than ICT development and this can look very different. It is important that you have experience of a variety of research methodologies to enable you to engage effectively in research now and in the future.

INNOVATING

In is not possible to have all of the latest technologies in our class rooms: schools and colleges have limited budgets. It is possible, though, to use creatively the technologies we do have.

RURAL PUPILS

Now the rural pupils are not equipped well in computer knowledge because, they cannot understand ICT skills in class room teaching. Their families do not have even sufficient infrastructure or basic daily needs to live in this world normally so, they cannot think of learning ICT.

CONCLUSIONS

Within three years (at most), children will be using an application that has not even been imagined at the time of writing. In this section we explored the new technologies in schools and colleges. We also discussed the key issues to consider in choosing classroom technology. You will find signposts to websites to help you keep up to date with educational technology.

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Chapter 47

IMPACT OF ICT FOR E-LEARNING IN RURAL AREAS

R.Periyasamy and Dr. K.S.Ramakrishnan***

INTRODUCTION

The tremendous development in Information and Communication Technologies (ICTs) has paved the way for e-learning. Use of computers in education sector can be traced back to the early 1980s when simple word processors were in use. The Internet has revolutionized the computer and communications world like nothing before. This brings us great learning opportunities by having access to large amount of information with benefits in terms of time and cost savings. The modern educational technology facilitates design, delivery and management of educational activities for learners. This could be face-to-face in a lecture hall, online, or combination of both. Imparting education in this way is termed as e-learning (electronic learning), i.e. learning through information and communication technologies. E-learning facilitates distance learning and provides means to learners to access learning material any time and at any place.

A. Problems Faced in Rural Education in India

- Teachers of rural schools in villages and small towns receive low income; so there is a possibility that teachers give less attention to children.
- Most of the schools do not have proper infrastructure. So they do not get most of the facilities such as computer education, sports education and extra-curricular activities.

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- There are no proper transport facilities; so children don't like to travel miles to come to school.
- There is no excess to supplemental education.

B. Need based ICT Education in Rural Areas

Due to various developmental activities in education department, rural schools are improving its infrastructure facilities. But the development is not uniform in all rural areas; still many areas are neglected from even basic infrastructure facilities. Though governments are providing ICT facilities to rural schools, many of them are not working properly. Lack of accessibility of the facilities by the beneficiaries, beyond the level knowledge of users and not fulfilling their needs or beyond their level of needs are some reasons. Thus, whenever we implement the ICT related programmes in the rural areas, local conditions and priority needs of rural students should be assessed.

C. Create Awareness on ICT Education

Before providing knowledge through computer related technologies, the authorities should have to create knowledge on ICT education and its usage to the rural school students. Due to their lack of awareness in the field of ICTs, rural students do not pay interest in the computer based education; some of them initially pay their interest, later they do not follow this because majority of rural ICT related programmes fail even in initial periods.

D. Infrastructure Facilities

Infrastructure facilities are one of the important factors for the implementation of ICT programme in rural areas. Existing infrastructure in schools needs to be improved for the successful and unhindered implementation of ICT. Without proper infrastructure facilities like power, place of the centre, connectivity, computer related materials and human support, the programme will not success. So, before starting the ICT education programme, one should make sure all these facilities.

E. Community Participation

Involvement/ interest of rural students are one of the significant aspects of ICT education programme. The attitude and behaviour of rural students and their accessibility of ICTs are different from urban students. The urban area students might have some basic knowledge in

the usage of computer and its usages through their method of education and living condition, whereas the rural students may not have much awareness about the benefits of ICT to their educational improvement. So, education and motivation of rural students about usages and benefits of ICT programme is an important aspect. Here, the role of teacher is vital. So, first of all, clear knowledge should be provided to teachers working in rural schools about ICTs. Majority of the rural students think computer based education is like computer training in various levels like MS word application, C, C++ programming and also one of instruments for playing games, need more English knowledge, and difficult to access and getting information. So these kinds of the unnecessary taboo should be removed from their mind with the help of computer graduates, who are living in rural areas and understand rural student's education and life condition. Without knowledge about rural condition, working for development of rural education will not give sustainable success to rural ICT education programme.

F. The Vision of the ICT for Education

ICT for education should be more concerned about the upliftment of rural community. In this connection the Vision is: **"Integrated Development for Education and Economic Empowerment for Rural Students".** The integration should concentrate on rural life conditions and provide information about urban areas' educational developments. The ICT education programme should provide computer education, information on higher education, and employment opportunities in various fields to rural students. In school education of Tamil Nadu, for example there is separate syllabus for moral class or life education. It has included some vocational training class like farming, tailoring, weaving etc. But most of the schools do not follow effectively these classes. So ICT for education programme can provide the same training and awareness through computer based education technologies effectively. Also the computer based education should disseminate information on new technological developments from local to global level. The rural students can understand about the social and technological development of the world and they can easily understand to connect with their rural life condition. This kind of ICT related educational programme provides employment opportunity to computer and other educated youths in rural areas. Also it may help rural school students to understand computer related training and wide knowledge about recent developments in the world.

NEED FOR ICT EDUCTION IN RURAL SCHOOLS

The Indian Education system is one of the largest in the world. Planning and management of ICT based education is primarily the matter of the state. The large size and complex structure across Indian states makes the matter of policy, planning and monitoring highly complex. In order to improve the quality and effective ICT education, planning and management is needed in-time and in a format conforming to the requirements of the user operated agencies at various administrative hierarchies. The complexities of the multi-level decision making process and control mechanism increases due to wide geographical institutional network representing variety of school locations and endowment. Further, due to the large variations in school structure, endowment and availability of teaching learning resources, the matter becomes more complicated.

CONCLUSION

Since ICT is new to rural areas, it will be appropriate to establish institutional networks at Panchayat level to facilitate in-service training of teachers and Panchayat officials such as Block Education Officers to ensure optimal utilization of ICT resources. State Institute of Education and Training could provide leadership at the state level which can have network with districts and district level lead institutes can develop network at Panchayat level. These institutions, if provided with adequate funding and professionally trained staff, can effectively take responsibility of capacity building at different levels to ensure absorption of ICT inputs. Through this conclusion of the position paper would like to emphasise that in the national policy of ICT for education, the policy makers paid more attention in rural areas and its student education standard while implement ICT for education programme. It is a great opportunity to rural students to improve their educational, employment and knowledge on world technological developments.

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Chapter 48

A STUDY ON APPLICATION OF ICT AMONG HIGHER SECONDARY STUDENTS

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INTRODUCTION

Information and Communication Technology (ICT) is a vehicle to enhance the quality of the education. As the world is moving rapidly into digital media and information, the role of ICT in education is becoming more important in the 21st century. ICT helps to share availability of educational objectives in the conception of the teaching and learning process. ICT allows the academic Institutions to reach disadvantaged groups and new international educational markets. One of the major problems of using Information Communication Technologies (ICTs) in education is to base choices on technological possibilities rather than educational needs. The educational effectiveness of ICTs depends on how they are used and for what purpose, like any other educational tool or mode of education delivery, ICTs do not work for everyone, everywhere in the same way. In the different part of the world the use of ICTs is different depending on the affordability, availability and access to technology. We need to understand how technology and the education system interact with each other. The integration of ICTs in higher education brings many opportunities and also causes more challenges. The use of ICT in education provides problem based learning and enables students to be independent, have a critical thinking. So

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the nativity and the type of school also taken in to consideration in the integration of ICT among the students.

NEED OF THE STUDY

The awareness of the computer helps the students to perform better and better. It is obvious that by integrating the use of ICT's in education, educators/teachers will develop strategies that will promote deep learning and change the learning environment into the learner-centered environment. It is highly probable that due to the future developments and growth in technology, it will help further for information literacy. So there is a need to integrate ICT in the teaching learning process for better learning.

OBJECTIVES OF THE STUDY

- To study the application of ICT among higher secondary students.
- To find out whether there is any significant difference in application of ICT among higher secondary students with respect to gender, medium of instruction, nativity and type of school.

HYPOTHESES OF THE STUDY

1. The level of Application of ICT of Higher Secondary students is not so high.
2. There is no significant difference in the mean scores of Application of ICT among Higher secondary students with respect to gender, gender, medium of instruction, nativity and type of school

METHODOLOGY

Normative survey method is used in this research. The target population is the students at the higher secondary level. A sample of 150 students was selected at random. To assess the application of ICT the tool prepared and standardized by M.Elangovan (2009). In order to establish reliability the chronbach Alpha coefficient was estimated for application of ICT scale. They were calculated to be 0.85. The intrinsic validity coefficient was established by taking the square root of reliability coefficient, which is 0.921. Thus these coefficient shows that the tool is highly reliable and valid. Descriptive analysis (Mean and Standard Deviation) and Differential analysis (t-value) were used as statistical techniques.

ANALYSES OF DATA

The Mean and Standard Deviation were calculated for Application of ICT with respect to Entire sample

Variable	Mean	SD
Application of ICT among Higher Secondary students	26.89	3.72

Hypothesis 1: The level of Application of ICT of Higher Secondary students is not so high.

Table-1. Level of Application of ICT with respect to Entire sample

Variables	Description	Number of students	Percentage
Application of ICT	Low	44	29
	Average	63	42
	High	43	29

Table shows the percentage scores of the Application of ICT

The level of Application of ICT of Higher Secondary students is average. 42% of Higher Secondary Student's Application of ICT is average. 29% of Higher Secondary Student's Application of ICT is high. 29% of Higher Secondary Student's Application of ICT is low.

Hypothesis 2: There is no significant difference in the mean scores of Application of ICT among Higher secondary students with respect to gender.

Table-2. Application of ICT among higher secondary students with respect to Gender

Variable	Boys		Girls		t-value	Level of Significance
	Mean	SD	Mean	SD		
Application of ICT	27.53	3.50	26.25	3.84	2.46	0.05

From the Table 2, it is found that Overall mean score is not equal for the boys (27.53) and girls (26.25). The t-value is calculated for the

Overall mean scores with respect to Gender reveal that the boys and girls differ significantly. Hence the t-value (2.46) is greater than the table value (1.96) at 0.05 level. So, the null hypothesis is rejected.

Hypothesis 3: There is no significant difference in the mean scores of Application of ICT among Higher secondary students with respect to Medium of Instruction.

Table-3. Application of ICT among higher secondary students with respect to Medium of Instruction

Variable	English		Tamil		t-value	Level of Significance
	Mean	SD	Mean	SD		
Application of ICT	26.68	3.38	27.04	3.95	0.68	Not Significant

From the Table 3, it is found that students in Tamil and English medium do not differ significantly in the Overall mean scores. Hence the t-value (0.68) is less than the table value (1.96) at 0.05 level. So, the null hypothesis is accepted.

Hypothesis 4: There is no significant difference in the mean scores of Application of ICT among Higher secondary students with respect to Nativity.

Table-4. Application of ICT among higher secondary students with respect to Nativity

Variable	Rural		Urban		t-value	Level of Significance
	Mean	SD	Mean	SD		
Application of ICT	26.79	3.63	26.97	3.80	0.99	0.05

From the Table 4, it is found that Nativity of the students belongs to rural and urban do not differ significantly in the Overall mean scores. Hence the t-value (0.99) is less than the table value (1.96) at 0.05 level. So, the null hypothesis is accepted.

HYPOTHESIS 5: There is no significant difference in the mean scores of Application of ICT among Higher secondary students with respect to Type of School.

Table-5. Application of ICT among higher secondary students with respect to Type of School

Variable	Government		Private		t-value	Level of Significance
	Mean	SD	Mean	SD		
Application of ICT	26.41	3.87	27.05	3.49	2.42	0.05

From the Table 5, it is found that Overall mean score is not equal for the students in Government school (26.41) and in private school (27.05). The t-value is calculated for the Overall mean scores with respect to Type of School reveals that the students studying in government and private school differ significantly. Hence the t-value (2.42) is greater than the table value (1.96) at 0.05 level. So, the null hypothesis is rejected.

FINDINGS

From the analysis it is found that boys and girls, students studying in government and private schools differ significantly in the Application of ICT. But the medium of instruction and nativity do not influences the application of ICT of higher secondary students. There was no significant difference among the students studying in the Higher Secondary with respect to Medium of Instruction and Nativity.

CONCLUSION

The paper brings out the level of application of ICT of higher secondary students. It is clear that type of school and gender have major role in the application of ICT. The technology available for accessing makes the student work well and know better than reading theoretically. The Type of school also plays a major role and the sex of the students also plays a significant role in application of ICT. Progress and planning is still needed in providing attractive learning content and learning technologies. However, fundamentals of computer knowledge were to be included in the curriculum.

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Chapter 49

ITPBL FOR ENHANCING THE TEACHING AND LEARNING PROCESS

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INTRODUCTION

Projects play an important role in practical work in education and in science. The use of projects in higher education comprises several tasks that are usually perceived as separate units: to teach project management and dedicated subjects, to educate students for research and practical work and to achieve relevant results within student's projects. The integration of these aims with limited resources causes a lot of synergetic effects but is only possible with a systematic approach. ***W. H. Kilpatrick*** was published a paper on ***'The Project Method'*** in 1918. He was a chief proponent of this method. He mainly focuses on the purposeful activity and problem solving capacity of the students based on their needs, interest, attitudes and abilities. He was influenced by the John Dewey's Pragmatism principle. Creative teaching disciplines such as Project Based Learning (PBL) are replacing the decades-old passive learning practices to which students no longer respond. PBL enhances a global perspective as well as a flexible forum that will be pervasive in their work community. PBL is not just a way of learning, but a way of working together. Authentic assessment and evaluation allows systematic documentation of a child's progress and development. PBL gives the multiple assessment opportunities to the teacher. It allows a child to demonstrate his/her capabilities while working independently. PBL also develops the child's ability to work with his/her peers as well

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as building teamwork and group skills. PBL shifts away from teacher directed learning to more pupil centered learning activities that focus on real world issues and practices.

Project Based Learning (PBL)

The term project is no longer reserved for the planned undertaking calling for the constructive thought and action. Project means almost any undertaking.. PBL organizes learning around projects or complex tasks precipitated by an in-depth question or problem. Students, particularly in the higher education setting are encouraged to be self-directed and the learning path becomes the curriculum as the concepts are absorbed and idea development connects itself to the outcome. PBL is a model for classroom activity that shifts away from the usual classroom practices of short, isolated, teacher-centered lessons. PBL activities are long-term, interdisciplinary, and student-centered and integrated with real-world issues and practices. PBL is a method that fosters abstract, intellectual tasks to explore complex issues In PBL, students explore, make judgments, interpret and synthesize information in meaningful ways. It is more representative of how students are asked to learn and demonstrate knowledge.

INFORMATION TECHNOLOGY IN PROJECT BASED LEARNING-(ITPBL)

Technology, combined with progressive instructional strategies, is blurring traditional teaching approaches and the nature of learning is becoming more inclusive for diverse learners. ITPBL used in many schools and by many different teachers. PBL is being enhanced by routine use of Information Technology (IT). Thus, it is now a vehicle for learning "traditional" subject matter content and for learning how to use IT effectively. IT ads three new dimensions to PBL, These dimensions are:

- IT as an aid to carrying out the work in a project. This includes using IT in a project's product, presentation or performance.
- IT as part of the content of a project.
- IT as a vehicle that helps create a teaching and learning environment in which students and teachers are both learners and facilitators of learning –that is, they function as a community of scholars.

ITPBL helps students develop skills for living in a knowledge-based and highly technological society. The old-school model of passively learning facts and reciting them out of context is no longer sufficient to prepare

students to survive in today's world. Solving highly complex problems requires students to have both fundamental skills and Digital Age skills. With this combination of skills, students become directors and managers of their learning, guided and mentored by a skilled teacher. If students learn to take responsibility for their own learning, they will develop in the way to work with others in their student life.

Types of ITPBL

Following are the types of ITPBL.

1. ***Constructive project:*** Practical or physical tasks such as construction of articles, making a model, digging the well and playing drama are done in this type of projects.
2. ***Aesthetic project:*** Appreciation powers of the students are developed in this type of project through the musical programmes, beautification of something, appreciation of poems and so on.
3. ***Problematic project:*** In this type of project develops the problem solving capacity of the students through their experiences. It is based on the cognitive domain.
4. ***Drill project:*** It is for the mastery of the skill and knowledge of the students. It increases the work efficacy and capacity of the students.

Implementation of ITPBL in School

Teaching young children to become engaged in learning strategies that are both challenging and motivating is one of the positive outcomes of ITPBL. To keep children's minds engaged in an in-depth project, which can last for several days, requires planned activities and sustained effort rather than "spontaneous play". One important aspect of ITPBL, which is also a component in problem-based learning, involves the approach students utilize in their endeavors to identify a solution to a problem or to complete the goals of a project. ITPBL, as with all lessons, requires much preparation and planning. When designing the project, it is essential that the content standards are addressed. With these standards in mind, devise a plan to integrate as many subjects as possible into the project. Teachers must have ideas on what materials and resources to be made accessible to assist students. Next, students will also need to be given assistance in managing their time. Finally, multiple means are used to assess students' projects upon completion. It is important for students to become aware of their potential and capabilities in completing tasks.

ITPBL Planning for Students and Teachers

ITPBL emphasizes developing products to create a learning situation. In particular, students analyze previous literature, create a plan, perform related research, as well as summarize and share new knowledge. While a final product provides evidence of completed learning activities, ITPBL focuses mainly on the learning process and practical experiences. Project planning includes description of each task and subtask, the resource needed or available, a timeline milestones, resources and timeline.

Description of tasks in outline form: Project should be initiated with the framing an outline of the task to be accomplished. The model of outline for the project is as follows.

Task 1: Get started

1.1. Project content: Develop a working title or mission statement for the project.

1.2. Choose team members on the pre-requisite knowledge and skills.

1.3. Specify project goals : General and IT based goals

1.4. Prepare and turn in a one-paragraph report summarizing the above steps.

Task 2: Do research

2.1 Find the relevant information related to the project from e-resources like encyclopedia, web, journals, library etc.

2.2 Make necessary corrections in project outline on the basis of review related to project.

2.2 Find the solution or answer to the project using the steps of PBL.

Task 3: Write a first draft of a comparison/contrast report using a word processor.

Task 4: Polish and publish the reports

4.1 Edit and revise the report

4.2 Desktop publish the report

4.3 Turn in the report on the date due.

Task 5: Make an oral presentation

5.1 Prepare an oral report and accompanying desktop published presentation materials

5.2 Rehearse the oral report and revise as needed

5.3 Present the oral report

INSTANT AVAILABLE ONLINE TOOLS FOR ITPBL

One very holistic approach that has emerged to put constructivism into action is PBL which also infuses technology into learning activities in a very natural way. Following is a set of some wonderful and effective tools for ITPBL.

1. **Glogster EDU** : This is an excellent creative tool that enables students to create multimedia projects and digital posters easily. We can use Glogster as a great way of highlighting research, as a pre-tool for major projects, or as a supporting presentation tool in a project. There are great templates to choose from and importing sources is as easy as it gets. This app is free to use on the Internet and there is free Glog reader available at the Apple Store.
2. **MindMeister :** Mapping out ideas becomes a much easier and more creative process with the use of MindMeister. This tool is a great way to start a creative project by setting the main ideas and determining its essence. This free web based tool also has a free versions available for both Android and iOS users.
3. **Pixton :** Students love comics and this fun web-based tool will bring that dynamic environment into the lessons. The app has various cool features, including images, background templates, and different expressions that make the lectures much more interesting. There is a free trial for teachers, after which the app can be licensed for some marginal amount around $1 per student per month (less when licenses for longer periods).
4. **Myhistro :** This is a browser-based tool with versatile features that combine photographs, videos, and blogging on interactive Google Maps and Google Earth. The tool features a chronological timeline that can be used for elaborate representation of school activities, presentations, and projects. A “light app” is available for free at the Apple Store.
5. **Animoto :** This is a great tool for presenting learning concepts and field trips through slideshows. Students can use Animoto to illustrate their projects with text, photos, and videos. All they need to do is choose the style of video and start adding their visual material. There isn’t a better way to give that polished finish to all school projects. Animoto is also available for free as an app for Android and iOS users.
6. **Reeldirector :** This $1.99 Apple app has some similarities to iMovie, but comes with some advanced video making features. Students can use it to combine clips together, smooth out the video flow and put

transitions between the clips. The app also allows its users to record voice-overs and add text and photos to the videos they create.

7. **FotoBabble :** This tool enables students to create slideshows by recording voiceovers for images. Collaborative projects can be greatly enhanced with FotoBabble, which enables students to start their projects by analyzing the concepts and expressing their creativity. Teachers can use the tool to create quizzes and test the knowledge of their students in a less scary way. This free Internet app is also available for free in the Apple Store.
8. **VoiceThread :** This versatile tool allows its users to comment on different types of media, from photos to videos. VoiceThread is an Internet application that can be very useful in learning foreign languages, as well as for group projects where students can use the tool to add voice comments to stories or images. Apple Store offers a VoiceThread app for free.
9. **Capzles :** Digital storytelling becomes a brand new concept with the usage of this browser-based timeline-style tool. Students can select their favorite template from the wide choice and use it to share visual narratives and stories with soundtracks. It doesn't matter whether the students need to work on in dept multimedia projects or simple stories – Capzles can be a great tool in both cases. It is available as a free app on the Internet, and for iOS users.
10. **Popplet** : Popplet is a great planning tool that students can use as a mind map enriched with videos, photos and drawings. This is an interactive app that's easy to use for adding comments, creating galleries and generating concepts. The app is available at the Apple Store for $4.99.

ADVANTAGES OF ITPBL

1. ***Meaningful.*** This emphasizes the active construction of meaning, so that students find purpose in their studies.
2. ***Socially Responsible.*** This develops in students a sense of social responsibility, so that they become aware of their obligations and duties as citizens in a democracy, and are especially sensitive to the needs of the poor and the aged. It promotes social interaction and cooperation among the students.
3. ***Multicultural.*** This reflects and is responsive to the cultural diversity of this nation and our community, so that students develop a sense of pride in their own heritage and a respect for that of others.

4. ***Reflective.*** This fosters in students the skills and attitudes of reflection, so that they are able to think critically, creatively, and affirmatively. The project is challenging and focuses on helping students to improve higher order thinking skills.
5. ***Global.*** This develops in students an awareness of global interdependence in all aspects of life including the environment and the economy.
6. ***Open-ended.*** This is open-ended in two ways: it is open to revision and continued refinement; and it provides open access to all students, allowing them to go beyond explicitly stated learning outcomes in curriculum documents.
7. ***Goal-based.*** This focuses on significant goals, so that all students, including those with special needs, develop the critical skills and acquire the knowledge they need for effective lifelong learning and full functioning as citizens in a changing society.
8. ***Laws of Learning*****.** This method is based upon law of readiness, exercise and effect of leaning.
9. ***Dignity of Labour***. This method upholds the dignity of labour.
10. ***Collaborative and Co-Operative Approaches***. This method will helps to use the collaborative and co-operative approaches to generate knowledge and this is the key to facilitate meaningful and real-life learning.
11. ***IT Competency***. To gain more IT Knowledge and skills. This uses technology as one delivery system, examines the influence of technology on students' lives, and gives students the skills they need to use technology.
12. ***Research Skills***. Helps in developing research skills.
13. ***Portfolio***. The project requires students to produce a product, presentation, or performance that is of portfolio quality.
14. ***Resource Management Skills***. The PBL helps in developing the resource management skills.

DISADVANTAGES OF ITPBL

1. ***Teacher***. This method gives demands on the teacher. The teacher required for this method should be exceptionally gifted, knowledgeable, alert and hard worker.
2. ***Time***. This method is time consuming. The syllabus cannot be completed on time by this method.

3. ***Text Books***. Instructional materials and text books written on these lines are not easily available.
4. ***Superficial Knowledge***. This method gives a superficial knowledge of the subject.
5. ***Expensive***. This method is expensive. The cost of education goes up as more expenditure will have to be incurred on well equipped library, laboratory.
6. ***Work Load***. In this method, the work load on teacher is increased a lot.

CONCLUSION

ITPBL, an instructional strategy, train learners on how to fully utilize acquired knowledge, skills and attitudes to solve problems and adapt to unforeseen circumstances in real life. PBL also integrates subject-matter goals with an authentic learning environment. Using authentic activity as a model for appropriate pedagogical activities is thus intended to increase learning effectiveness by applying knowledge within a specific context. In sum, ITPBL can enhance problem solving and higher-order thinking skills of students. ITPBL is an excellent approach for teachers taking increased responsibility for their own professional growth and development. ITPBL aims to develop many of the skills desired by 21st Century employers, including the ability to work well with others, be thoughtful and reflective in decision-making, take initiative and solve complex problems.

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Chapter 50

INTEGRATING ICT IN HIGHER EDUCATION

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INTRODUCTION

The development of science and technology paved way for the ICT development which is a specific term that stresses the role of unified communications and the integrated telecommunications, computers as well as necessary enterprise software, middleware, storage and audio visual systems, which enables users to access, store, transmit and manipulate information. ICT is an acronym that stands for information communication technology.

ICT IN EDUCATION

It is generally agreed that ICT is a crucial resource in education. Students are taught practical ICT skills that are transferable into the work place. Usage of ICT in education is a cheap, fast way to access a huge amount of resources that are regularly updated. Students download information uploaded by the teachers and do the work in their own time even if they miss their classes.

STUDENT- CENTERED LEARNING

Nowadays teacher directed enterprise is changed to which supports more student- centered models which proliferates competency and outcome focused based learning. The students could choose the experts from whom

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they will learn. The ICT education settings catalyses for change in this domain. It also support knowledge construction the introduction of ICT's in the higher education has profound implications for the whole education process, especially in dealing with key issues of access, equity, management, efficiency, pedagogy and quality.

In the current information society, people have to access knowledge via ICT to keep pace with the latest developments. In such a scenario, education which always plays a critical role in any economic and social growth of a country, becomes even more important. Education not only increases the productive skills of the individual but also his earning power. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audio cassettes and CD Rom's have been used in Higher Education for different purposes.

THE FOUR RATIONALES FOR INTRODUCING ICT IN HIGHER EDUCATION

1. ***Social:*** perceives role that technology now plays in society and the need for familiarizing students with technology.
2. ***Vocational:*** prepares students for jobs that require skills in technology.
3. ***Catalytic:*** utility of technology to improve performance and effectiveness in teaching, management and many other social activities.
4. ***Pedagogical:*** to utilize technology in enhancing learning, flexibility source.

BENEFITS OF ICT IN HIGHER EDUCATION:

It increases the access of the students. It makes the combination of work and education through flexibility of content and delivery. Leads to the learner- centered approaches providing high-quality of education and new-ways of interaction. The swift growth of ICT have emerged as powerful tool for diffusion of knowledge and information. Their role in pedagogy for quality learning and teaching at higher education. ICT can play enormous role for improving access and equity in education sector in general and higher education sector in particular. It is more important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners.

CLASSIFICATION OF ICT EDUCATION:

1. E-learning (on-line learning)
2. Mobile learning (learning anytime, anywhere, and any context- cell phone & laptop)
3. Blended learning (Hybrid learning)
   - Face to face learning
   - Self-paced learning
   - On – line collaborative learning
4. Distance learning (overcome time & distance barriers)

ICT SET-UPS

A modest amount of change is predicated to occur related to more radical change (more distance learning students and students taking courses from other institutions), but only parallel to the on- campus mode, not replacing it. This confirms the "Stretching the mold" scenario and the combination of traditional and new settings, rather than the scenarios involving ICT, replacing existing practices or radically changing the traditional models and roles in the institutions. As for their teaching functions, institutions generally focus on teaching the traditional student group and less on new target groups such as international students and lifelong learners, who usually require more flexibility in learning settings and thus a more intensive use of ICT.

ROLE IN TEACHING LEARNING PROCESS

1. ***Easy Comprehension:*** The traditional way of teaching learning process is effective and interesting by using information and communication technologies. For example, when a teacher uses audio, video, or power point presentation in his/her lectures; the whole class becomes more attentive about the lecture. Such activities also help students to understand the things easily.
2. ***Increased time for discussion:*** The concept & process of education is changing. The face of classroom is changing. In conventional Teaching, most of the time is consumed for input- output and less time is left for processing in the classroom. But in teaching with ICT the input and output time is reduced and processing time is increased. In this left over time, some other students' activities can be performed like discussion and interaction. This will increase the quality of learning.

3. ***Constructive approach to Learning:*** ICT enabled teaching follow constructivist approach to learning by using hyper text and hyper-media which provides branched design of instruction rather than a linear format of instruction. This divergent exposure through multimedia is crucial for constructive learning.
4. ***Self Pacing of Learning:*** ICT enables the individual instruction with individual pace. Self pacing of learning is only possible through CD's/ DVD's and online learning and not in class room teaching due to short duration of time.
5. ***Guidance to the learners:*** Remedial teaching to each and every student is not possible by the teacher in the traditional classroom. Video conferencing can provide diagnostic & remedial teaching by experts in remote places.

STUDENTS TRANSITION

This traditional focus in terms of scenarios for changing is further confirmed by the extent to which changes in the students demand are currently affecting the institutions ICT policies. Some more influence is expected for the future and institutions seem to be generally aware that lifelong learners and international students will need more flexibility. In addition to flexibility relating to location of participants, flexibility has also to do with the second dimension of the scenario model that concerns the extent of choice that students have in curriculum.

PROGRESS OF ICT IN HIGHER EDUCATION

Besides the changing demand from students, competition from other higher education providers (both traditional and new types) could be an external force driving the ICT Policy of an institution. Respondents' competitors as well as about their partner for cooperation in the area of ICT moulds the quality of Higher Education.

The second dominant theme is that ICT use, in terms of e-mail, word processing, PowerPoint, and the web, has become standard, is part of the teaching and learning process. But this has not radically affected the nature of this process; rather, ICT has become part of the blend on- campus delivery.

Decision – makers indicate that in almost half of the cases rectors have the formal responsibility for the ICT policy; in all other cases this responsibility has been decentralized. They also indicate that in the actual

implementation of policies the central level is much less important. This is confirmed by data concerning the leadership taken in the implementation process.

TECHNOLOGY USE, TEACHING AND LEARNING PRACTICE:

ICT as part of a blend, gradually stretching the traditional ways of teaching and learning, is clearly established. The general level of technology infrastructure in the institutions is valued as between average and high. The available technology is used more often for organizational purposes (including course preparation) and outside classroom activities then for communication and in- classroom activities.

Use of e-mail and the use of Web resources is becoming a common phenomenon in the education practice, whereas other ICT forms, such as wireless solution and conferencing tools, are used little are in a much more limited extent. Face to face interaction and direct communication between instructors and students and among students is still very important in the way in which instructors teach. ICT is used in a way that is complimentary to this, but does not replace what traditionally as occurred in the teaching and learning process.

PERCEIVED EFFECTIVENESS

The lecture remains the "core medium", the instructional form that is most highly valued. However, ICT as clearly become part of the blend, serving as compliment to already existing instructional tools. This notion of core and complimentary media relaters to the idea of blended learning, with ICT now clearly part of the blend.

CONCLUSION

Overall it seems that higher education institutions do not expect any revolutionary change as a result from or related to the use of ICT. There is not really a concern about being forced to change by external forces or developments. These changes, however, are gradual and usually slow and may comply with the slight changes in needs and demands as perceived by the institutions. But the question is whether the perception of the institutions is adequate in all respects. ICT exemplified by interactive multimedia and internet is going to be of great significance in raising the quality of higher education. It needs to be effectively integrated into the formal class-rooms, laboratories, libraries, educational administration and management of admission and examination. It can also be used for teachers training.

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Chapter 51

INTEGRATING ICT IN HIGHER EDUCATION: INITIATIVES AND CHALLENGES

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INTRODUCTION

India, like any other knowledge economy, depends on the development of its educational sector. Higher education drives the competitiveness and employment generation in India. However, research findings have shown that the overall state of higher education is dismal in the country. There is a severe constraint on the availability of skilled labor (Agarwal, 2006). There exist socio-economic, cultural, time and geographical barriers for people who wish to pursue higher education (Bhattacharya and Sharma, 2007). Innovative use of Information and Communication Technology can potentially solve this problem. Education is the driving force of economic and social development in any country. Considering this, it is necessary to find ways to make education of good quality, accessible and affordable to all, using the latest technology available.

ICT ENABLED EDUCATION: AN OVERVIEW

The Government of India assessed the importance of the ICT intervention in education as early as 1984-85 with the introduction of Computer Literacy and Studies in Schools (CLASS) as a joint venture of the Ministry of Human Resource Development in collaboration with the Department of Electronics, wherein 12000 secondary and senior schools were beneficiaries.

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The Sarva Shiksha Abhiyan (SSA) – Education for All Movement is a programme by launched by the Government of India that aims to universalize of elementary education. SSA seeks to provide quality elementary education including life and value-education skills. Most importantly, SSA specially focuses on education and empowerment of the girl-child and children with special needs. SSA also seeks to provide computer education to bridge the digital divide.

The launching of INSAT, INSAT-1A and INSAT-1B were important milestones in the promotion and development of ICT in educational sector. The Information Technology Policy 2005 recognized the strategic importance of ICTs as key components of socio-economic development, governance and enhanced service-delivery. Additionally, the policy also called for improvement and spread of education to achieve computer literacy among students. The VISION 2020 programme, initiated by President A.P.J.Abdul Kalam, encompassed a holistic development module that included integrated information technology tools with a sustainable environment-conscious approach to education.

INITIATIVES OF USE OF ICT IN EDUCATION

India is making use of powerful combination of ICTs such as open source software, satellite technology, local language interfaces, easy to use human-computer interfaces, digital libraries etc. with a long-term plan to reach the remotest of the villages. Community service centers have been started to promote e-learning throughout the country (Bhattacharya and Sharma, 2007). Notable initiatives of use of ICT in education in India include:

- Indira Gandhi National Open University (IGNOU) uses radio, television and internet technologies.
- National Programme on Technology Enhanced Learning: a concept similar to the open courseware initiative of MIT. It uses internet and television technologies.
- Eklavya initiative: Uses internet and television to promote distance learning.
- IIT-Kanpur has developed 'Brihaspati', an open source e-learning platform (Virtual Class Room).
- Premier institutions like Calcutta have entered into a strategic alliance with NIIT for providing programmes through virtual classrooms. Jadavpur University is using a mobile-learning centre. IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real time interactive satellite technology.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. The opportunities can be categorized as the aspects relating to role of ICT for access and equity in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

POTENTIAL DRAWBACKS-CUM-CHALLENGES TO USING ICT IN EDUCATION

While using ICTs in education has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. The four most common mistakes in introducing ICTs into teaching are i) installing learning technology without reviewing student needs and content availability; ii) imposing technological systems from the top down without involving faculty and students; iii) using inappropriate content from other regions of the world without customizing it appropriately; and iv) producing low quality content that has poor instructional design and is not adapted to the technology in use (UNESCO, 2009). Although ICT offers a whole lot of benefits there are some risks of using ICT in education which have to be mitigated proper mechanisms. They are:

- It may create a digital divide within class as students who are more familiar with ICT will reap more benefits and learn faster than those who are not as technology savvy.
- It may shift the attention from the primary goal of the learning process to developing ICT skills, which is the secondary goal.
- It can affect the bonding process between the teacher and the student as ICT becomes a communication tool rather than face to face conversation and thus the transactional distance is increased.
- Also since not all teachers are experts with ICT they may be lax in updating the course content online which can slow down the learning among students.
- The potential of plagiarism is high as student can copy information rather than learning and developing their own skills.

- There is a need for training all stakeholders in ICT.
- The cost of hardware and software can be very high.

CHALLENGES IN INTEGRATING ICTS IN EDUCATION

Although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICTs integration in the education system. The concerns such as who will manage this process of ICTs integration in education develop policy guidelines and strategies. There are significant challenges in integrating ICTs use in education rising from environmental, cultural and educational faced by policy makers, educators, educational administrators and students in higher education. The following section we discuss these challenges in details.

1. Environmental Challenges: People are expected to be able to work, learn, and study whenever and wherever they want to; this in developing world this still not possible. A country's educational technology infrastructure sits on top of national telecommunications and information technology infrastructures. There is a limited regional infrastructure for the full ICTs integration in education. It is very important for policymakers and planners before any ICT implementation in education to carefully consider the following:

   • Appropriate rooms or buildings available to house the technology. In countries where they are many old buildings, ensure proper electrically wiring, heating/cooling and ventilation and also security and safety will be needed.

   • Availability of electricity and telephony in most developing countries where there still large areas without a reliable supply of electricity and the nearest telephones are miles away.

   • Policymakers should also look at the ubiquity of different types of ICT in the country in general and in the educational system in particular.

2. Cultural Challenges: Diversities of culture in different part of the world are also challenges in introducing ICT in education. English is the dominant language of the internet. Research has shown that an estimation of 80% of online content is in English. A large proportion of educational software produced in the world market is in English also. In most countries where English is not the first language this represents a serious barrier in integrating ICTs use in education system. Using the example of India and Pakistan, the majority all the websites in the world are in English. This situation limits the information access for some people who has lack or no ability in English language.

3. Educational Challenges: One of the greatest challenges in ICT integration in education is balancing educational goals with economic realities. ICTs in education require large capital investments. Due to financial difficulties, government in some part of the world specially developing countries priority is the rehabilitation of school buildings and teacher welfare. In some part of the world due to educational background generally there is lack preparedness for students entering higher education in the knowledge and skills required for the basic use of technologies. Still in educational, learning challenges arise in the delivery methods of using ICTs (online-based, blended etc.), content not adapted to the technology and context, limited interaction between students and educators. In general, integrating ICTs use in education requires establishment of infrastructural facilities, acquisition of technologies and their periodic updating, management and professional support services.
4. The other challenges that are encountered in achieving optimized ICT environment in educational institutions are:
   - Infrastructure-related
   - Teacher-related
   - Capacity-building related
   - Technical-support related
   - Language and Content-related
   - Sustainability related
   - Equality-related

CONCLUSION

It must be remembered that integration of ICT into higher education cannot be accomplished overnight. It takes years of planning and preparation, refining and retuning the systems. The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning

process, but also provides the facility of e-learning. ICT has enhanced distance learning. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 52

INTEGRATING ICT IN HIGHER EDUCATION

R. S. Raju*

INTRODUCTION

Education plays pivotal role in any nation. Its role in the development of a nation is remarkable. The process of globalization has posed new challenges in every sphere of social, economic, and cultural life of both the developed and developing societies. As new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Recent developments in technologies have provided new possibilities to teaching profession, but at the same time it placed more demand on teachers how to use these technologies in their profession.

Now a day educational system are under great pressure to adopt innovative methodologies and to integrate ICT in teaching and learning process to prepare students with the knowledge and skills they need in the 21st century. ICT provided society with a vast array of new communication capabilities. Modern ICT have created a "global village" in which people can communicate with others across the world as if they were living next door. Moreover ICT can promote international collaboration and networking in education and professional development. Undoubtedly ICT has brought about many challenges and opportunities for education. The educational system needs to come to terms with these new challenges and take full advantages of the opportunities. ICT integration in institution is being

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perceived as a necessity and is growing exponentially. The pervasive use of technology in all spheres of life, the knowledge economy and the paradigm shift together, generate demands on the institutions to adopt ways that help inculcate 21st century skills amongst students.

ICT IN INDIAN EDUCATION SYSTEM

In India the use of ICT in education and training has become a priority during the last decade. However, very few have achieved progress. Indeed, a small percentage of schools in achieved high levels of effective use of ICT to support and change the teaching and learning process in many subject areas. Others are still in the early phase of ICT adoption. The ICT provides that many teachers use ICT to support innovative pedagogy. It states: "New technologies that provide a good fit with existing practices, such as interactive whiteboards are first to be embedded, but others like video conferencing, digital video and virtual learning environments are now being incorporated, providing evidence of ongoing learning by the workforce. Training needs to continue to support innovative pedagogy." ICT can improve teaching by enhancing an already practiced knowledge and introducing new ways of teaching and learning. Transforming teaching is more difficult to achieve. "Changes that take full advantage of ICT will only happen slowly over time, and only if teachers continue to experiment with new approaches." Many teachers use ICT to support traditional learning methods, for example, information retrieval in which students are "passive learners of knowledge instead of active producers" able to take part in the learning process.

OPPORTUNITIES AND CHALLENGES

1. It is generally believed that ICTs can empower teachers and learners, making significant contributions to gain knowledge and a productive one. But studies have shown that in most of the schools and colleges ICTs are not generally considered central to the teaching and learning process. It is clear that more studies to be needed to understand the complexity between ICTs, learning, and productivity.
2. The costs associated with the development of high quality technology facilitated learning materials are quite high. Compared to traditional forms of off-campus learning, technology based learning has proven to be quite expensive in all areas of considerations.
3. Many of the issues and challenges ICT are associated with policymakers, staff and educators. This leads to the lack of common set of indicators for ICTs in education. If ICTs are to become effective and integral part of education, monitoring and evaluation system should be the priority area of focus.
4. Radio and TV providing educational programs in some countries for many years. Many related new technologies, including satellite broadcasting and multichannel learning, have the potential to greatly increase access to education. Today the internet is not widely available in most developing countries, but new internet technologies and mobile internet centers hold promise for connecting teachers, learners, and communities.
5. The use of ICTs in the classroom does not automatically change the teaching practice. Teachers must have adequate access to functioning computers and sufficient technical support. Shifting pedagogy, redesigning curricula and assessment tools all contribute to the optimum use of ICTs in education.
6. As a relatively new field, there is no standard repository for existing ICTs in education-related national policies. Successful policy formulation requires consultation with a group of stakeholders, many of which may be outside of the traditional educational system.

CONCLUSION

Integration of ICT in higher education system is inevitable. In the coming years the thrust will be on the use of ICT in higher education to strengthen the system in the mode of opens and distance learning. Institutional and sector wide higher education ICT policy and planning should identify the specific role of ICT in enhancing research capabilities and provide for adequate infrastructure facilities. Teacher has to adopt continuous professional developments in the educational uses of technology. In this sense teachers have to be ready to make use of the possibilities that ICT offer. ICT enhances the international dimension of educational services. ICTs have an important role to play in changing and modernizing educational systems and ways of learning. On the whole this paper highlights the integration of ICT in higher education.

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Chapter 53

INTEGRATING ICT IN LIBRARY FOR HIGHER EDUCATION

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INTRODUCTION

Information and communication technology (ICT) is the biggest achievement in the evolution of mankind.ICTis any system designed to gather, process or distribute information or it is the science and skill of all aspects of computing, data storage, and communication. ICT may be any combination of tools and procedures that facilitate the Generation ,acquisition, storage, organization, searching, retrieval and transmission of information using electronic means.ICT fundamentally changes the access storage and dissemination of information, and facilitates global interconnectivity, and accelerated information exchange.ICTliteracy is the ability to use digital technology, communication tools, and/or networks appropriately to solve information problems including the ability to use technology as a tool to research,organize,evaluate,and communicate information and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information. An ideal college library with the advancement of ICT is becoming a hybrid library, a digital library or a virtual library. The future librarian may be designated as cyberian or cyber librarian, as he has to provide information service from a large number of documents published in digital form and available through internet where a significant number of documents are available free of cost. It may not be far away when a large number of students will demand computerized service from a college library. So libraries may think to reorient their activities with the help of ICTs.

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ICT BASED RESOURCES IN LIBRARY FOR HIGHER EDUCATION:

1. ***E-Journals:*** Libraries in higher educational institutions have been exploring easy to cope with the problems of ever increasing prices of the journals, space requirements and decreasing level of usage as the journals get= older. Nevertheless, libraries are required to maintain back issues of the journals, usually in bound form. Electronic Journal helps the librarians in addressing these problems to a great extent without significantly affecting the service levels. Electronic Journals can be accessed via internet from any web enabled PC. Depending on the type of subscription, one or more users can access the service simultaneously, either directly from an independent web enabled PC or in a local area network through a proxy server (IP addresses based access). Electronic journals also offer benefit of full text searching and downloading of articles. Many publishers of electronic journals offer their journals through consortia of libraries at much lower rates. *INDEST (Indian Digital Library of Engineering, Science and Technology),* and *INFLIBNET* are two such consortia operating in India. Access to articles in electronic journals can also be made through aggregator services which offer searchable databases of contents of e-journals from several publishers, and links to journal site for full text. Emerald, OCLC and J-Gate are some of the example of e-journal aggregator services. The main disadvantage of electronic journal is that libraries cannot physically possess the journals.
2. E-Books: E-Book has been described as a text analogous to a book that is in digital form to be displayed on a computer screen. E-books can be read just like a paper book, using dedicated E-Book reader such as *GemStar eBook* or on a computer screen after downloading it. There are also some newer technologies developing such as electronic paper, which is much like paper, except that the text can be changed, and talking books in MP3 format. E-book offer advantages like portability, 24 hours access, text search, annotation, linking, and multimedia and self-publishing possibilities. Development of e-book is still in the infancy stage and issues like compatibility, e-book readers, availability and intellectual property rights are to be addressed before it can be implemented on large scale.
3. ***Electronic Theses and Dissertations (ETD):*** Dissertations and theses produced at higher educational institutions are important sources of information and knowledge for further research. A large number of

universities have converted their theses and dissertation collection into digital libraries and have made it available on Internet for global access. A number of higher educational institutional libraries have also implemented Electronic Theses and Dissertation programmes, where researchers submit theses in electronic format. Some initiatives such as *Networked Digital Library of Dissertation and Theses (NDLTD) (*www.ndltd.org) in development of web based union catalogues of ETDs submitted over 100 libraries throughout the world are worth mentioning.

4. ***Patents:*** Many patent issuing authorities now have made their complete full text patent records online. For example United States patent documents can be searched and downloaded free of cost from (www.uspto.gov/patft/index.html). Some of the commercial organizations such as *Derwent* also provide downloading of full text patent from either an online database vendor (e.g. *Dialog, STN*) or directly from their site to the subscribers.

5. ***Course Material:*** A large number of web based course ware and teaching aids are being developed to facilitate flexible open learning by many universities and commercial organizations. Many academic institutions have adopted such course material for their curricula. Libraries can provide access to course material to the learners and teacher and thus contribute to open learning. This can be done by providing links to the courseware sites through subject gateways or provide local access after downloading the material. Some of the important sites where web based course material and tools can be found are *Ask ERIC* (http://ericir.syr.edu/), *CAREO-Campus Alberta Repository of Educational Objects Alexandria* (http://www.careo.org) , *LESTER-Learning Science & Technology Repository* (http://lester.rice.edu/), *MERLOT-Multimedia Educational Resources for Learning and Online Teaching(* http://www.merlot.org/), and *GEM- The Gateway to Educational Materials* (http://www.thegateway.org/).

INFORMATION SERVICES

Some of the important changes that developments in ICT have brought about in information services are:

1. ***Reference Service****:* Asynchronous tools such as email, subject gateways, FAQs, and electronic libraries and interactive tools like chat rooms, virtual reference desk, and ask-me are replacing the conventional means of post, phone or in-person reference enquiries. *Ask-a-Librarian* allows the user to click on *ask-a-librarian* link to send a formatted enquiry to the reference librarian. The reference librarian either provides an answer, links to resources or link to a subject expert. Interactive tools now allow a reference interview online.

2. ***Bibliographic Service:*** Compilation of bibliographies, reading lists and state-of-art reports are very parts of LIS work, particularly in research and academic libraries. Browsing through the manual indexes and abstracts is a tedious and time consuming work, and does not always produce up to date result. Availability of databases in electronic form on CDROM or online, offers convenient, efficient and cost effective information retrieval. Electronic databases also provide unique search features such as searching on multiple criteria (key-word, subject, author, source, classification code, year of publication, language etc.), and variety of display formats & styles. Advance features like natural language query ranking the search results in also available in many databases. Web based services facilitate full text searches and link to full text of the documents. *Dialog, STN* and *Silver Platter* are some of the popular database companies that offer bibliographic and reference databases on CDROM and Online platforms.

3. ***Current Awareness Service:*** Current Awareness Services has been important means for keeping the users up to date in their areas of interest. A current awareness service may be as simple as copy of table of contents or a bulletin containing bibliographic records, of articles selected from the current issues of journals and other material, and usually organized by subjects. Libraries now compile current awareness bulletins using predefined search strategy and running on the database either on CDROM or online periodically and getting the desired output. Subject to copyrights, the output can also be stored on a local system, and disseminated online (internet, intranet) and offline (print, CDROM, email). Table of contents of most journals are available free from the publishers' sites. Some publishers even offer free email update of table of contents. A large number of electronic publishing sites or portals now offer current information via email to registered users. For example one can register on New York Times newspapers to receive summary of news on daily basis.

ROLE OF ICT IN EFFECTIVE LIBRARY SERVICES

Neankwo (2006), opines that ICTs application to library works and services could be seen as the best way that could be used to assist researchers to adequately solve their literature need for effective research

activities. This, according to the writer, is because the application of ICT to library operations greatly helps in the provision of efficient reference and information services, the utilization of network operations such as cataloguing, authority control, inter library loans and cooperation and in the participation of international bibliographic project. Also Dike (2000) claimed that instant access to information from a multiplicity of source is one of the major roles of ICT application to library services. Not only can it help in locating the materials where the required information can be found easily but ICT helps in sorting out what information is relevant from a mass of irrelevant information.

The use of ICT has impacted on library services according to Igbeka (2008), Adebisi (2009) and Uwaifo (2010) in the following ways:

1. ***Online Public Access Catalogue (OPAC):*** It is the computer form of library catalogue to Access materials in the library.
2. ***No Physical Boundary:*** The user of a digital library need not go to the library physically once it is connected to the internet.
3. ***Storage Capacity:*** Digital libraries have the potential to store much more information, since it requires very little space to contain it.
4. ***Indexing and Abstracting Services:*** With the aid of ICT, database of print and audio-visual materials can be created and indexed. Also, ICT has made it possible for information seekers to conveniently access a wide range of library produced abstracts (indicative or informative).
5. ***Preservation and Conservation:*** An exact copy of the original can be made any number of times without any degradation in quality.
6. ***Inter-Library Loan:*** Needed materials from other libraries can be received within the shortest time through the email, courier services.
7. ***Access to Electronic Resources:*** Electronic resources are internet based resources such as electronic journals, reference sources, books etc.
8. ***Document Delivery Service:*** Document can be sent to needed users through e-mail, fax, etc.
9. ***Library Retrieval Systems:*** This involves using Compact Disc Read Only Memory (CDROM) technological mechanism of acquisition of specialized CD-ROM databases in various courses such as sciences, law, technology, agriculture, social sciences, medicine, humanities etc. the prominent ones are MEDLINE in medicine, AGRICOLA and AGRINDEX in agriculture, LEXIS and NEXIS in law, INIS and AGRIS in pure sciences and Public Affairs in social sciences. They are available commercially.

CONCLUSION

It is obvious from the study that ICT has brought higher educational institutional libraries into a larger pool of resources. The use of the internet and its resources being an integral part of ICT has added values to the services provided by libraries. Acquisition of current and usable information services through the use of ICT is expected to facilitate community development. That community development can only be enhanced through the elimination of all inhibitions to and provision of ICT facilities in all the existing libraries in higher educational institutions.

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Chapter 54

INTEGRATING ICT IN HIGHER EDUCATION

*V. Saravana Bhavan**

INTRODUCTION

Higher education systems have grown exponentially in the last five decades to meet the demands of quality education for all. This aspect has further gained momentum due to swift advancements in Information and Communication Technology (ICT). Demand for skilled and competent labour is ever increasing in the contemporary globalized society. In this backdrop, access to quality in higher education for all has emerged as determining factor of economic growth and development. In order to increase the access to higher education and improving its reach to the remotest parts of the country contribution of open and distance learning facilities is on the increase. In addition, it is catering to life-long learning aspirations and that too at affordable cost. The last two decades have witnessed the inclusion of developments in ICTs in higher education systems around the world. Even then the challenge to develop a higher education system that is flexible and dynamic so as to holistically integrate the technology in the management and delivery of learning programmes is daunting. The first section presents briefly the present profile of higher education in India. Role of ICTs in higher education and the areas in which they can be integrated to play prominent role are discussed in the second section. The final section explores the challenges in expanding the role of ICTs for future development in higher education.

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ICT ENABLED EDUCATION: AN OVERVIEW

The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning.

When such technologies are used for educational purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology. ICTs in higher education are being used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc.

In the current information society, people have to access knowledge via ICT to keep pace with the latest developments. In such a scenario, education, which always plays a critical role in any economic and social growth of a country, becomes even more important. Education not only increases the productive skills of the individual but also his/her earning power. It gives them a sense of well-being as well as capacity to absorb new ideas, increases their social interaction, gives access to improved health and provides several more intangible benefits. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes

IN VIEW OF ICT, EDUCATION CAN BE CLASSIFIED INTO THREE MAIN CATEGORIES

- E-learning
- Blended Learning, and
- Distance Learning

E-Learning or Electronic learning is a general term used to refer to computer-enhanced learning. It is commonly associated with the field of advanced learning technology (ALT), which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies. It is also known as online learning. Distance education provided the base for e-learning's development. E-learning can

be 'on demand'. It overcomes timing, attendance and travel difficulties. E-learning allows delivery, dialogue and feedback over the internet. It allows mass customization in terms of content and exams. E-education can provide access to the best gurus and the best practices or knowledge available (UNESCO, 2002). It is possible to leverage the online environment to facilitate teaching techniques like role-play across time and distance. It can also facilitate the development of scenarios, which can be rarely witnessed in practice. ICT can play a valuable role to monitor and log the progress of the students across time, place and varied activities.

E-LEARNING HAS THE FOLLOWING ADVANTAGES

- Eliminating time and geographical barriers in education for learners as well as teachers.
- Enhanced group collaboration made possible via ICT.
- New educational approaches can be used.
- It can provide speedy dissemination of education to target disadvantaged groups.
- It offers the combination of education while balancing family and work life.
- It enhances the international dimension of educational services.

Blended Learning is the combination of multiple approaches to learning. It is usually used to define a situation where different delivery methods are combined together to deliver a particular course. These methods may include a mixture of face-to-face learning, self-paced learning and online classrooms.

Face to face Learning refers to learning that occurs in a traditional classroom setting where a faculty member delivers instruction to a group of learners. This could include lectures, workshops, presentation, tutoring, conference and much more. Self-paced Learning provides the flexibility to learn according to the availability of learners' own time and pace, it occurs in a variety of ways such as: reading specific chapters from text book, studying course material presented through web-based or CD based course, attending pre-recorded classes or sessions, reading articles referred by faculty member, working on assignments & projects, and searching & browsing the internet.

Online Collaborative Learning involves interaction between learners and faculty members through the web; this interaction can occur in one of the following modes:

- Synchronous interaction.
- Asynchronous interaction.

Synchronous, means 'at the same time', it involves interacting with a faculty member and other learners via the web in real time using technologies such as virtual classrooms and / or chat rooms. On the other hand, Asynchronous means 'not at the same time'; it enables learners to interact with their colleagues and faculty member at their own convenience, such as interacting through email.

DISTANCE LEARNING

It is a type of education, where students work on their own at home or at the office and communicate with faculty and other students via e-mail, electronic forums, videoconferencing, chat rooms, instant messaging and other forms of computer-based communication. It is also known as open learning. Most distance learning programs include a computer based training (CBT) system and communications tools to produce a vital classroom. Because the Internet and World Wide Web are accessible from virtually all computer platforms, they serve as the foundation for many distance learning systems.

ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time. Such facilities allow the networking of academics and researchers and hence sharing of scholarly material and leads to quality enhancement in teaching and learning.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. The opportunities can be categorized as the aspects relating to role of ICT for access and equity in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

ACCESS AND EQUITY IN HIGHER EDUCATION

Presence of ICT in education sector is increasing steadily. In spite of the fact that education is a social enterprise and teachers are the traditionally mainstay of teaching learning process, ICTs are very powerful tool for diffusing knowledge and information, a fundamental aspect of the education

process. ICTs can play enormous role for improving access and equity in education sector in general and higher education sector in particular. E-learning is emerging as an important strategy to provide widespread and easy access to quality higher education. E-learning is a generic term referring to different uses and intensities of uses of ICTs, from wholly online education to campus-based education and through other forms of distance education supplemented with ICTs in some way. Although, presently the initiatives for development of e-learning in India are continuing in a sporadic manner, UGC is advocating and making efforts to enhance the quality of higher education by framing policy guidelines for their integration in classroom and other activities.

ROLE OF ICTS IN PEDAGOGY FOR QUALITY TEACHING LEARNING

Another most important dimension of higher education sector influenced by ICT integration is improving quality of teaching-learning. Also, the changes taking place due to globalization and internationalization attach premium to knowledge and information. Therefore, the integration of ICTs would not only help in promoting personal growth but also in developing "knowledge societies". The call of the hour is the need to provide education for everyone, anywhere, and anytime. Life-long learning has become the driving force to sustain in the contemporary competitive environment. Therefore to strengthen and/or advance this knowledge-driven growth, new technologies, skills and capabilities are needed. Apart from enhancing student's learning experience, role of ICTs in capacity building/training of educational personnel has very large potential. National level institutes can provide leadership role in enhancing technical and managerial manpower in different disciplines through ICT networks and collaborations. Technology facilitated learning would result in preparation of staff regarding innovative pedagogic methods, new ways of learning and interacting, easy sharing of new practices among teaching community and result in widening the opportunities for their participation. The capabilities of competent and trained teachers/academic experts can be made available to larger audiences/ students through flexible and virtual settings.

INNOVATIVE APPROACHES FOR TEACHING

ICTs have the potential to drive innovative and effective ways of teaching-learning and research. The inclusion of learning tools, easier use of multimedia or simulation tools, easy and almost instant access to

data and information in a digital form which allows for computations and data processing generates possibilities which were otherwise not feasible. The possibility to diffuse these innovations and complement the learning content to improve quality in higher education through innovative pedagogic methods is high. The focus on ICTs to back quality research through utilization of rigorous research methodology and in-depth analysis is the call of the hour.

CONCLUSION

The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems leading to quality enhancements. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. ICT has enhanced distance learning. The teaching community is able to reach remote areas and learners are able to access qualitative learning environment from anywhere and at any time. It is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 55

AWARENESS AND USAGE OF TECHNOLOGY AMONG B.ED STUDENTS IN LERANING

*A. Sasikala**

ABSTRACT

Technology is increasingly a part of learner's lives. The purpose of the present paper was to discuss research avenues employing computers as a learning tool and to analyse the results obtained by this method at the B.Ed students' learning level. Specifically this research was to determine if computer assisted instruction (CAI) was a useful tool to enhance cognitive, emotional, linguistic, and literacy skills in B.Ed Students. CAI programmes may never replace the book and the blackboard but one should be aware that they were more accessible by youth in Higher Education, who learn better with pictures and sounds, and the proper use of appropriate programmes could make a considerable difference. Findings suggest participants' learning capacity of the B.Ed Subjects could be improved successfully when CAI used as a supplement to regular lecture in teaching.

INTRODUCTION

Computer-assisted instruction (CAI), a program of instructional material presented by means of a computer or computer systems. The use of computers in education started in the 1960s. With the advent of convenient microcomputers in the 1970s, computer use in schools has become widespread from primary education through the university level and even in some preschool programs. Instructional computers are basically used in one of two ways: either they provide a straightforward presentation of data or they fill a tutorial role in which the student is tested on comprehension.

If the computer has a tutorial program, the student is asked a question by the computer; the student types in an answer and then gets an immediate response to the answer. If the answer is correct, the student is routed to more challenging problems; if the answer is incorrect, various computer messages will indicate the flaw in procedure, and the program will bypass more complicated questions until the student shows mastery in that area.

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NEED FOR THE STUDY

In this technology era the usage of computers in educational instruction is inevitable. They provide one-to-one interaction with a student, as well as an instantaneous response to the answers elicited, and allow students to proceed at their own pace. Computers and Computer Assistant Programs (CAI) are particularly useful in subjects that require drill, freeing teacher time from some classroom tasks so that a teacher can devote more time to individual students. A computer program can be used diagnostically, and, once a student's problem has been identified, it can then focus on the problem area. Finally, because of the privacy and individual attention afforded by a computer, some students are relieved of the embarrassment of giving an incorrect answer publicly or of going more slowly through lessons than other classmates. Hence the need for the study.

OBJECTIVES OF THE STUDY

- The specific objective of the present study is to measure the awarness and usage of cai among B.Ed students in learning.
- To realize the awareness and usage of technology (CAI) among B.Ed students.
- To find out whether any difference exists among the B.Ed students in their awareness and usage of CAI in terms of – age, residence, medium of instruction, educational qualification, availability of laptop/computer and availability of internet.

HYPOTHESIS OF THE STUDY

The hypothesis formulated for verification in this study is as follows:

1. There is average awareness and usage of CAI among B.Ed Students.
2. There is a significant difference among the B.Ed students in their awareness and the usage of CAI in terms of - age, residence, medium of instruction, educational qualification, availability of laptop / computer and availability of internet

METHODOLOGY-IN-BRIEF

Method	:	Normative
Technique	:	Survey
Tool	:	Self constructed tool by the researcher which contains 19 items with 5 point scale.
Sample	:	A stratified representative sample of 120 B.Ed Students in 2 Colleges at Madurai district.
Statistical	:	Two-tailed't' test between means of large independent samples at Treatment 0.05 level.

ANALYSIS AND DISCUSSION

The mean score of Awareness and Usage of CAI in higher education students in Madurai is computed as 70 while the theoretical average is 57. It indicates that the students, in general, are above the average level of Awareness and Usage of CAI. Alternatively, it can be claimed that the higher education students, in general, are found that they learn with CAI very effectively. This finding shows that the college students have the willingness to learn with Computer Assisted Instruction (CAI).The details of results of 't' test are presented in Table 1 and 2.

Table-1: The level of awareness and usage of CAI among B.Ed students

Sample	Number of students	Theoretical Mean	Calculated Mean
B.ED College students	120	57	70

Table-2: Difference in the level of Awareness and Usage of CAI based on Age, Residence, Medium of Instruction, Qualification, Availability of Laptop/Computer and Internet

Sl. No.	Variable	Sub-Category	N	M	't' value	Significance at 0.05 level
1.	Age	Upto 22	45	82.36	2.134	S
		Above 22	75	79.00		
2.	Residence	Urban	80	81.38	1.782	NS
		Rural	40	78.03		
3.	Medium of Instruction	Tamil	60	80.65	0.436	NS
		English	60	79.87		
4.	Qualification	UG	69	79.10	1.528	NS
		PG	51	81.82		
5.	Laptop/ Computer	Availability	98	79.42	3.430	S
		Non - Availability	22	84.00		
6.	Internet	Availability	83	78.90	2.775	S
		Non - Availability	37	83.30		

S - Significant, NS - Non Significant

It is of paramount significance to observe that there is no significant difference in awareness and usage of CAI among the higher education students in terms of the three variables, viz. Residence, Medium of Instruction and Qualification in terms of Degree. But it is to be noted that there is a significant difference in awareness and usage of CAI among the higher education students in terms of the three variables, viz. Age, Availability of Laptop and Internet. Hence the hypothesis partially accepted in terms of Age, Availability of Laptop and Internet. It shows that Age of the student, Availability of Laptop/Computer and Internet plays a vital role in learning by using Computer assisted Instruction (CAI).

CONCLUSION

The result of the study is not very encouraging in that there are a majority of the rural students still need to be focused upon. Parents and Educational institutions can bring effective learning through CAI. The facilities and knowledge must be given to the B.Ed students. These

will enhance the learning and give broad knowledge to the students. Because of the instruction and evaluation methods CAI is preferred by the students. Hence the technology changes the mode of learning in positive way. So, it is to be encouraged by the Teachers and can be followed by the teacher.

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Chapter 56

INTEGRATING ICT IN HIGHER EDUCATION

A. Selvi Jeya* and Dr. K. S. Ramakrishnan**

INTRODUCTION

The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. Data mining, *the extraction of hidden predictive information from large databases,* is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. Data mining tools can answer business questions that traditionally were too time consuming to resolve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations.

THE FOUNDATIONS OF DATA MINING

Educational Data mining is the application of data mining techniques to educational data, and so its objective is to analyze these types of data in order to resolve educational research issues. Data mining can be defined as the process involved in extracting interesting, interpretable, useful and

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novel information from data. It has been used for many years by businesses, scientists and governments to sift through volumes of data like airline passenger records, census data and the supermarket. Data mining techniques are the result of a long process of research and product development. This evolution began when business data was first stored on computers, continued with improvements in data access, and more recently, generated technologies that allow users to navigate through their data in real time.

SCOPE OF DATA MINING:

Data mining derives its name from the similarities between searching for valuable business information in a large database — for example, finding linked products in gigabytes of store scanner data — and mining a mountain for a vein of valuable ore. Both processes require either sifting through an immense amount of material, or intelligently probing it to find exactly where the value resides. Given databases of sufficient size and quality, data mining technology can generate new business opportunities by providing these capabilities:

- **Automated prediction of trends and behaviors**. Data mining automates the process of finding predictive information in large databases. Questions that traditionally required extensive hands-on analysis can now be answered directly from the data — quickly. A typical example of a predictive problem is targeted marketing.
- **Automated discovery of previously unknown patterns**. Data mining tools sweep through databases and identify previously hidden patterns in one step. An example of pattern discovery is the analysis of retail sales data to identify seemingly unrelated products that are often purchased together. Other pattern discovery problems include detecting fraudulent credit card transactions and identifying anomalous data that could represent data entry keying errors.

The most commonly used techniques in data mining are:

- **Artificial neural networks**: Non-linear predictive models that learn through training and resemble biological neural networks in structure.
- **Decision trees**: Tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decision tree methods include Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID).

- **Genetic algorithms**: Optimization techniques that use processes such as genetic combination, mutation, and natural selection in a design based on the concepts of evolution.
- **Nearest neighbor method**: A technique that classifies each record in a dataset based on a combination of the classes of the k record(s) most similar to it in a historical dataset (where k ³ 1). Sometimes called the k-nearest neighbor technique.
- **Rule induction**: The extraction of useful if-then rules from data based on statistical significance.

MODELING

The technique that is used to perform these feats in data mining is called modeling. Modeling is simply the act of building a model in one situation where you know the answer and then applying it to other situations that you don't. This act of model building is thus something that people have been doing for a long time, certainly before the advent of computers or data mining technology. What happens on computers, however, is not much different than the way people build models. Computers are loaded up with lots of information about a variety of situations where an answer is known and then the data mining software on the computer must run through that data and distill the characteristics of the data that should go into the model. Once the model is built, it can then be used in similar situations where you don't know the answer. For example, say that you are the director of marketing for a telecommunications company and you'd like to acquire some new long distance phone customers. You could just randomly go out and mail coupons to the general population - just as you could randomly sail the seas looking for sunken treasure. In neither case would you achieve the results you desired and of course you have the opportunity to do much better than random - you could use your business experience stored in your database to build a model.

ARCHITECTURE FOR DATA MINING

Many data mining tools currently operate outside of the warehouse, requiring extra steps for extracting, importing, and analyzing the data. Furthermore, when new insights require operational implementation, integration with the warehouse simplifies the application of results from data mining. The resulting analytic data warehouse can be applied to improve business processes throughout the organization, in areas such as promotional campaign management, fraud detection, new product rollout, and so on.

The ideal starting point is a data warehouse containing a combination of internal data tracking all customer contact coupled with external market data about competitor activity. Background information on potential customers also provides an excellent basis for prospecting. This warehouse can be implemented in a variety of relational database systems: Sybase, Oracle, Redbrick, and so on, and should be optimized for flexible and fast data access.

PROFITABLE APPLICATIONS

A wide range of companies have deployed successful applications of data mining. While early adopters of this technology have tended to be in information-intensive industries such as financial services and direct mail marketing, the technology is applicable to any company looking to leverage a large data warehouse to better manage their customer relationships. Two critical factors for success with data mining are: a large, well-integrated data warehouse and a well-defined understanding of the business process within which data mining are to be applied (such as customer prospecting, retention, campaign management, and so on). Some successful application areas include:

- A pharmaceutical company can analyze its recent sales force activity and their results to improve targeting of high-value physicians and determine which marketing activities will have the greatest impact in the next few months. The data needs to include competitor market activity as well as information about the local health care systems. The results can be distributed to the sales force via a wide-area network that enables the representatives to review the recommendations from the perspective of the key attributes in the decision process. The ongoing, dynamic analysis of the data warehouse allows best practices throughout the organization to be applied in specific sales situations.
- A credit card company can leverage its vast warehouse of customer transaction data to identify customers most likely to be interested in a new credit product. Using a small test mailing, the attributes of customers with an affinity for the product can be identified. Recent projects have indicated more than a 20-fold decrease in costs for targeted mailing campaigns over conventional approaches.
- A diversified transportation company with a large direct sales force can apply data mining to identify the best prospects for its services. Using data mining to analyze its own customer experience, this company can build a unique segmentation identifying the attributes of high-value prospects. Applying this segmentation to a general business database such as those provided by Dun & Bradstreet can yield a prioritized list of prospects by region.
- A large consumer package goods company can apply data mining to improve its sales process to retailers. Data from consumer panels, shipments, and competitor activities can be applied to understand the reasons for brand and store switching. Through this analysis, the manufacturer can select promotional strategies that best reach their target customer segments.

CONCLUSION

Comprehensive data warehouses that integrate operational data with customer, supplier, and market information have resulted in an explosion of information. Competition requires timely and sophisticated analysis on an integrated view of the data. However, there is a growing gap between more powerful storage and retrieval systems and the users' ability to effectively analyze and act on the information they contain. Both relational and OLAP technologies have tremendous capabilities for navigating massive data warehouses, but brute force navigation of data is not enough. A new technological leap is needed to structure and prioritize information for specific end-user problems. The data mining tools can make this leap. Quantifiable business benefits have been proven through the integration of data mining with current information systems, and new products are on the horizon that will bring this integration to an even wider audience of users. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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Chapter 57

EFFECTIVENESS OF ICT IN EDUCATION

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INTRODUCTION

Today's classroom teachers must be prepared to provide technology-supported learning opportunities for their students. Being prepared to use technology and knowing how that technology can support student learning must become integral skills in every teacher's professional repertoire. Traditional educational practices no longer provide prospective teachers with all the necessary skills for teaching students, who must be able to survive economically in today's workplace. Teachers must teach students to apply strategies for solving problems and to use appropriate tools for learning, collaborating, and communicating. The problem is not necessarily lack of funds, but lack of adequate training and lack of understanding of how computers can be used to enrich the learning experience.

FOCUS TOWARDS ICT

In this paper, we focus on "new" digital ICTs with special emphasis on educational uses of the Internet and the World Wide Web. In our discussion, we will consider several important issues in respect to the use of ICTs in educational settings including how newer ICTs differ from older technologies, why these differences are thought to be educationally important, what research shows about the effectiveness of ICTs in education, what measures are being taken to create ICT-enabled learning environments, and some of the significant issues facing educators and policy-makers

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when considering implementing ICT. Although our focus will be on formal education, we will also refer to the use of ICT in non-formal and informal education. Along the way, we will provide a few of the innumerable possible examples of current educational ICT applications. We hope to illuminate trends that will help readers to understand current directions and promising practices in the application of these systems in educational settings. The new digital ICTs are not single technologies but combinations of hardware, software, media, and delivery systems. Today, ICT in education encompasses a great range of rapidly evolving technologies such as desktop, notebook, and handheld computers; digital cameras; local area networking; the Internet and the World Wide Web; CD-ROMs and DVDs; and applications such as word processors, spreadsheets, tutorials, simulations, electronic mail (email), digital libraries, computer-mediated conferencing, videoconferencing, and virtual reality. It should also be noted that use of newer ICTs is being integrated with use of older technologies. An exhaustive review of all of these technologies, combinations of technologies, and applications is not possible here. We also acknowledge the difficulties in implementing such innovations, and we are sensitive to the fact that whatever is said now about ICTs in education will quickly become outdated as the technologies and educational applications continue to rapidly evolve.

ICT ACCESS IN FORMAL EDUCATION

Although no comprehensive data on ICT in schools worldwide apparently exists, it is clear from many national examples that schools are also increasingly being equipped with ICT.1 It is also apparent that ICT equipment and Internet connectivity is still much more abundant in North American schools than elsewhere (Genius Newsletter.1997 a) In the United States, the ratio of students per computer dropped from 63:1 to 6:1 from 1985 to 1997 (Market Data Retrieval, 1998) while the number of schools with internet access has grown from 35% in 1994 (U.S. National Center for Education Statistics, 1996) to 72% in 1997 (QED's Educational Technology Trends, 1997) In Africa, the *Creating Learning Networks for African Teachers* project, part of the UN's *Harnessing Information Technology for Development* initiative mentioned above, will equip a maximum of four teacher training colleges (TTCs) in each of 20 African countries with a computer and full access to the Internet. The project will also fund teacher training curriculum development and the creation of 20 national educational WWW sites (UNESCO, 1980) These few examples serve to illustrate that efforts to provide ICT and Internet access to teachers

and students in developed and developing countries around the world can be expected to continue and accelerate until most, if not all, schools are equipped and connected in the next century.

ICT ACCESS IN INFORMAL AND NON-FORMAL EDUCATION

Informal and non-formal education refers to educational activities and programs that are offered outside of formal educational institutions, including those offered by libraries, museums, community schools and centers, zoos, planetariums, commercial companies, and many other organizations. Informal and non-formal education institutions, too, are increasingly being equipped with ICT and connected to the Internet. At present, about 20% of libraries in the United Kingdom are connected to the Internet. The British government's *National Grid for Learning* initiative will connect all British libraries and museums to the Internet (United Kingdom Department for Education and Employment, 1997). In the United States, a 1998 survey sponsored by the American Library Association found 73% of the nation's public libraries offered basic Internet access to the public (American Library Association, 1998). In conclusion, ICTs are rapidly becoming available for use in every setting. This trend is true for formal, informal, and non-formal teaching and learning programs. However, such access is much more common among the rich, and in the developed countries, than for the poor, or in developing countries.

POWERFUL DIFFERENCES

In part, efforts to connect educational organizations to the Internet are being driven by societal pressure. But such efforts are also being driven from within education by powerful differences between older and new ICTs, differences that greatly enhance the usefulness of such technologies to teaching and learning. New ICTs differ in several important dimensions from older technologies, including the integration of multiple media, interactivity, flexibility of use, and connectivity. Understanding these differences will provide a clearer picture of why the use of ICT in education can be expected to continue to grow.

FLEXIBILITY OF USE

Previously, ICT-use required students to be grouped together in a controlled environment at a specific time and location. With some technologies, for example radio and television, use was rigidly tied to schedules developed by people far removed from the day-to-day functioning of the classroom.

New ICT applications have given rise to the term "anytime anyplace," a reflection of the flexibility possible in using ICT to support teaching and learning. One outgrowth of this flexibility has been the development of "virtual" educational experiences. A virtual experience refers to educational situations in which distance and time separate the teacher and students, who use ICT to interactively to share resources, communicate, and learn. Virtual education allows students to study at their own time, place and pace. In essence, a virtual education means having educational transactions accessible from the home, workplace, or anywhere that the student chooses to be. Virtual classrooms, schools, colleges, and universities offering classes by email, computer-mediated conferencing (CMC), videoconferencing, or websites, or combinations of these technologies, are proliferating. We will say more about virtual education later.

EFFECTIVENESS

Perhaps the most important question about ICT is how effective is its use in education? To answer this question one must consider three aspects. How effective is ICT-mediated instruction when compared to traditional face-to-face instruction? What does ICT enable that would not otherwise be possible? And third, are ICT worth their costs?

ICT ENABLED CHILDREN

A second way to assess the merit of ITC-use in education is to consider what, if anything, such use enables students and teachers to do that they would not otherwise be able to do. To explore this question, we consider five aspects of the educational use of ICT – supporting new pedagogical methods, accessing remote resources, enabling collaboration, extending educational programs, and developing skills for the workplace.

ONLINE EXPERTS

Many organizations offer "ask an expert" services. For example, students may send inquiries about scientific topics to working scientists at the Canadian Centre for Marine Geology of Dalhousie University (is.dal.ca/~stanet/ask.html) and the U.S. Argonne National Laboratory (newton.dep.anl.gov/#AAS).

ONLINE MENTORS

ICT can also enable mentoring programs to provide one-on-one guidance to individuals by well-established members of a particular community. Such virtual collaborations between individuals are an effective

ways for senior members of a community to teach, inspire, and support newcomers. Mentor High School in the United States offers an electronic *Quest Forum* in which freshmen students may discuss course options with students in the senior class (http://www2.mhs.k12.oh.us/quest/forum).

COST-EFFECTIVENESS

We consider when assessing the effectiveness of ICT in education is the question of cost-effectiveness – information is of critical importance, especially to developing countries with fewer resources to invest. However, assessing the cost-effectiveness of ICT in education is difficult, if not impossible, for at least four reasons – lack of meaningful data, variability in the implementation of ICTs, difficulty of generalizing from specific programs, and difficulty of assessing the value of qualitative educational differences. In addition, cost-analyses do not consider the societal and economic consequences of *not* investing in ICT for education.

SCHOOL–UNIVERSITY PARTNERSHIPS

Although not primarily intended as infrastructure projects, partnerships between schools and universities often result in new infrastructure development. These projects typically target university/school connectivity for research, teacher education, and Internet access. As early as 1990, Wilbur and Lambert reported over 1,200 such partnerships in the United States alone.

CONCLUSION

As our trust has been demonstrated in this paper, the use of newer, digital ICTs – the ability to integrate multiple media, interactivity, flexibility of use, and connectivity are inspiring remarkable transformations in education around the world. These transformations hold promise for the improvement of the lives of the rich and of the poor, whether living in developed or developing countries. We have chosen to focus on existing, widespread uses of ICTs in education, but advances in wireless telecommunications, virtual reality, pervasive computing, artificial intelligence, speech recognition, and "next generation" networking technologies promise to remodel today's educational applications as comprehensively as the computer revolutionized yesterday's. If we can claim to have detected any "theme" in our overview of ICT in education worldwide, it is this – ICT is neutral, human choices that will determine how ICT will be used and whether the revolution in information and communications technologies will benefit all humanity.

This is true at the micro-level, in the choices of teachers make when deciding whether and how to use ICT in the classroom, at the macro-level, by the choices international, regional, and national governmental and non-governmental organizations (NGOs) make to support, or not, ICT access in formal and informal educational settings.

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Chapter 58

INTEGRATING ICT IN HIGHER EDUCATION

K. Sharmila*

INTRODUCTION

Information and Communication Technology (ICT) has become one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing, and numeracy. There is a widespread belief that ICTs have an important role to play in changing and modernizing educational systems and ways of learning. Inventive use of ICT is defined as the use of ICT applications that hold up the learning objectives based on the requirements of the modern information society. Hence, there is a need to bring out the facts on the impact of ICT on educational trainers.

ICTS IN TEACHER EDUCATION

The need for teacher training is widely acknowledged. Professional development to incorporate ICTs into teaching and learning is an ongoing process. Teacher education curriculum needs to update this knowledge and skills as the school curriculum change. The teachers need to learn to teach with digital technologies, even though many of them have not been taught to do so.

Importance of education in almost all walks of life has increased with the support of information and communication technologies (ICT). During the past 20 years, the use of ICT has fundamentally changed the

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working of education. In the current environment-conscious world, the importance of education and acceptability of ICT as a social necessity has been increasing. Social acceptability of information and communication tools is necessary to improve the mobility in the society and increase the pitch for equity and social justice

The three main categories of ICT education:

- E-learning
- Blended Learning, and
- Distance Learning

E-Learning or Electronic learning is a general term used to refer to computer-enhanced learning. It is commonly associated with the field of advanced learning technology (ALT), which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies. It is also known as online learning.

Blended Learning is the combination of multiple approaches to learning. It is usually used to define a situation where different delivery methods are combined together to deliver a particular course. These methods may include a mixture of face-to-face learning, self-paced learning and online classrooms.

Distance Learning

It is a type of education, where students work on their own at home or at the office and communicate with faculty and other students via e-mail, electronic forums, videoconferencing, chat rooms, instant messaging and other forms of computer-based communication. It is also known as open learning. Most distance learning programs include a computer based training (CBT) system and communications tools to produce a vital classroom. Because the Internet and World Wide Web are accessible from virtually all computer platforms, they serve as the foundation for many distance learning systems.

ICT IN TEACHING AND LEARNING

ICT in higher education change the view of learning from teacher centered to student centered learning system and the teachers are the facilitators, coachers and mentors were ICT support the learning environment to students.

Some of the supporting environments are:

- **Tele-Education System:** It is the application of space technology in education. An integrated network system comprising of EDUSAT, Broadband and V-SAT networks helps in bringing virtual class rooms in a multi class environment with seamless two-way interaction between the teachers and students in a collaborative environment.
- **Virtual Learning Campus (VLC)**: Virtual Learning Campus or VLC is an approach that divides the responsibility of building, commissioning and running the different systems and Information Infrastructure for education like Broadband, EDUSAT and ERNET services.

VIRTUAL LIBRARIES AND DIGITAL LEARNING

Teachers and students must be able to get information quickly and conveniently. Distance education requires virtual libraries. It provides text, video, audio, and other formats for teaching and learning and support digital learning. They collect and organize information and help the users to use the right information at the right time. (Schmitz, 2004) Digital education creates changing patterns for students, teachers, librarians, and others.

Distance Learning

It is a type of education, where students work on their own at home or at the office and communicate with faculty and other students via e-mail, electronic forums, video conferencing, chat rooms, instant messaging and other forms of computer-based communication. It is also known as open learning. Most distance learning programs include a computer based training (CBT) system and communications tools to produce a virtual classroom

Wireless Connectivity (wi-fi)

Wireless campus benefit both students and teachers. Wireless environment will help faculties to mould the future workforce, improve campus efficiency, streamline operations and enable real time connectivity through any device. Furthermore the students adopting tablets and other devices, many educational institutions are embracing the concept of bring your own device to enhance learning and teaching. Going wireless helps as it address the need to be connected constantly and provide seamless networking, ensuring improved student engagement with technology.

CONCLUSION

Education is the driving force of economic and social development in any country. Considering this, it is necessary to find ways to make education of good quality, accessible and affordable to all, using the latest technology available. Use of ICT in education develops higher order skills

such as collaborating across time and place and solving complex real world problems. ICT integration in higher education brings a change in student and teacher learning behavior and the Collaboration of all stakeholders in the universities and colleges by sharing the information for mutual benefit. Thus the successful integration of ICT in higher education depends on the collaboration of national policies and institutional policies. The actions taken for the implementation of ICT needs to be a proper action plan and training to all stakeholders involved in the integration and bring change on them. In addition to this there should be proper controls and licensing, quality assurance and accreditation of technology must be compulsory to reduce the complexities of implementation.

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Chapter 59

THE EFFECTIVENESS OF ICT IN ADVANCED EDUCATION

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INTRODUCTION

Guaranteeing worldwide provision and right of entry to information and communication technology is a peak national aim in a lot of nations, frequently preserved in decrees that administrate the region. One of the distinguishing characters of mankind is their aptitude to obtain knowledge, and what helps the acquired knowledge a flourishing aspect is the person's capability to 'impact' the acquired knowledge to other persons. Transmitting the knowledge, which serves to be one of the basics of becoming skilled at, is in the midst of the most essential communal accomplishment of mankind. Constructing well-built associations with the learners is something that recurrently elucidates the reason why the resource persons delight in the challenge of toiling at a petite academy.

E-learning is a chief structure of learning which is growing very fast. Computer multimedia provides perfect prospects for generating and demonstrating prominently enhanced gaining knowledge atmospheres. Computer-based structures have immense capability for transporting teaching and learning matter. The fast advancement of Information and Communication Technology (ICT), chiefly the Internet, is one of the most enthralling rare occurrences typifying the Information Era. ICT authorizes our admittance to information, facilitates novel structures of communication, and provides scores of on-line services in the orb of commerce, culture, entertainment and education. During the last decade in the United Kingdom

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there has been escalation in backing up for the employment of technology in teaching - learning in Higher Education (HE).Especially, ever since 1993 the Teaching - Learning Technology Programme (TLTP) has encouraged the formation of technology-based resources for utilization across the Higher Education areas.

MEANING OF ICT

Information and Communication Technologies (ICTs) are mentioned to as the diverse compilation of technological mechanisms and resources which are brought into play to communicate. They are also made employed to create, allocate, collect and manage information. ICT is a mighty one that has transformed several facets of the way of our life.

Information and Communication Technologies include the hardware, software, networks, and means for collection, storage space, processing, transmission and presentation of information (voice, data, text, images), in addition to the allied aids. ICTs can possibly be divided into two divisions, Information and Communication Infrastructure (ICI) which points out to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that use those (Internet, voice, mail, radio, and television), and Information Technology (IT) that refers to the hardware and software of information compilation, storage, dealing out, and presentation. The notion of a "Digital Divide" has been more or less nearly only if ICT is in public reachable. Notwithstanding the fact that traditionally it has arrived to signify the allocation in the society which has been found on socio-economic motives, does not 'paint the entire picture'.

Initiation of ICT as a system to support the education division has made the first move considerable talks since the late 1990s. Some ten years back the attention was on Technical and Vocational Education and Training, and training teachers. Throughout the last few years a growing number of worldwide development organizations have enclosed the aptitude of ICT to buttress the education zone. The chief objectives of the paper are to appraise the significance of ICT in higher education and to examine the government plans for the advancement of ICT in higher education.

ICT AND HIGHER EDUCATION

The relevance of ICTs as a device for efficient improvement of teaching-learning, and educational management envelope the whole gamut of education from early childhood growth, primary, secondary, tertiary, basic education and higher education and training.

Incorporation of ICT in teaching - learning stands the foremost on the educational reorganization schedule. Repeatedly ICT is perceived as an essential device to participate fully in the knowledge society. ICTs need to be seen as "an essential aspect of teaching's cultural tool kit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach, 2005). The Information and Communication Technology (ICT) programme endows with a wide observation on the character of technology, its usage and application of a range of technologies, and the influence of ICT on the individual and the world. ICT is considered with the innovative means in which people can converse, interrogate, investigate, call the shots and analytical. It is the procedures, devices and modus operandi for:

1. Collecting and recognizing details
2. Categorizing and systematizing
3. Briefing and merging
4. Scrutinizing and appraising
5. Hypothesizing and forecasting

ICTs can develop the standard of education in many ways: By supplementing student interest and dedication, by making the attainment of basic skills probable and by getting the teacher training better. When used properly, ICTs are also devices which facilitate and result in alteration which can egg on the change surroundings which is learner-centered.

ICTs which are in the structure of videos, television and also computer multimedia software, that combines sound, records and vibrant movement metaphors, can be employed so as to make obtainable motivating, challenging and trustworthy substance that will sustain the attention of the student in the learning procedure. The radio alternatively through its give and take programs makes use of songs, acoustic effects, altered copies, humorous comedies and auxiliary compilation of presentations so as to provoke the students to pay attention and get involved into the exercise that is being given.

The employment of online- tutoring inside the universities and management organizations is growing. The initiation of the Wi-Fi system also has directed towards the development of hi-tech education structure, where openness and responsibility of subject matter is made willingly obtainable to the students. The students can now learn and understand the associated information at their personal well-situated time.

ICT IN EXPERIMENTATION

Implications of ICTs are specially potential and undisputable in higher education's analytical purpose. The chiefly simple exercise of ICTs in analysis is in data processing. The unparalleled growth in frequency range and calculating skill give chances for scrutinizing/processing massive quantity of data and performing intricate calculations on them in a way that is tremendously speedy, precise and dependable. Computer data processing not only allows researchers free from the burdensome job of physically scrutinizing data but more significantly smoothes the progress of rapid and exact examination of bulk quantity of data from national models or even cosmopolitan models including multitudes of respondents.

An additional significant magnitude of ICTs in study is the employment of online complete text databases and online research libraries/virtual libraries which are the direct product of the development in telecommunications networks and technology. These databases and libraries make the investigators available with online admission to the contents of multiples of books from the most important publishers, research reports, and peer- reviewed articles in electric journals.

ICT has also played a major role in university and industry partnership in Europe. The University of Minnesota's MBB Net (a web portal of the state's virtual biomedical and bioscience community) in collaboration with Zurich Med Net (a web based information source covering 400 universities, companies and institute) offers links to more than 1,300 organizations in the area of technology transfer.

ICT IN TEACHING

ICTs make nonparallel learning, or learning branded by a time gap between the deliverance of content and its response by learners possible. For instance, online course materials, cay be available 24 hours a day, 7 days a week. Teachers and learners no more need to depend exclusively on printed books and other resources in physical media arranged in libraries (and available in limited quantities) for their learning purposes. With the Internet and the World Wide Web, prosperity of study materials in almost all the disciplines and in a range of media can be at present accessed without any difficulty from everywhere without any time constraints and by an indefinite number of folks.

Efficiency, expenditure, impartiality, and viability are four wide entwined concerns which must be concentrated while bearing in mind the universal impact of the employment of ICTs in education. The educational

value of ICTs is based on how they are utilized and the significance of the purpose. As well like any other instructional device or method of instruction, ICTs do not toil for one and all, in all places in the identical manner.

ADVANTAGES AND DISPUTES OF ICT

Devices are at present obtainable on the Internet to lend a hand to both instructors and learners to control writing course works to identify and shun the drawbacks of plagiarism and copyright abuse. One of the striking profits of ICTs in instruction is that they are able to develop the standard and the size of educational supply.

Even as utilizing ICTs in instructing has a few noticeable profits, ICTs also invite disputes. The first is overpricing of obtaining, fitting in, functioning, preserving and substituting ICTs. At the same time as conceivably of bigger significance, the incorporation of ICTs into instruction is yet in its formative years. Launching ICT schemes for instruction in budding nations has especially soaring cost since establishing them is typically more high-priced in complete terms than in developed nations while, on the contrary surrogate investments (e.g., buildings) are comparatively a smaller amount.

Using illegal software can end in risk, not only lawfully but also in the expenditure of preservation, especially if the illegally copied software differs in standard set-up. Still the students can get enormous advantage from the well-produced learning materials. Online tutoring has its individual distinctive disputes as not all instructors are ICT knowledgeable and can employ ICT tools in teaching.

The four most common mistakes in introducing ICTs into teaching are:

(*i*) fitting the learning equipment without identifying student requirements and material accessibility;

(*ii*) commanding technological systems from the top to bottom without linking faculty and students;

(*iii*) facilitating badly chosen material from other places of the globe without modifying it suitably; and

(*iv*) Generating poor quality content that has pitiable instructional aim and is not tailored to suit the technology in exercise.

The next dispute met by several budding nations is that unavailability of the fundamental necessity of electricity and telephone networks. Besides several collages do not have proper infrastructure in order to house the technology. Another dispute is that the educator needs to increase their

individual ability in order to make use of the diverse ICTs in various situations competently.

Skills development is an added essential field in which ICT could be successfully made use of. Efforts are being undertaken to make the ICT framework stronger for Technical and Vocational Education (TVET). The up-coming discussion on the function of skill development in taking poverty and developmental concerns in dispense points out the prospective role of ICT. The information communication technology can participate mainly incorporating skill development as a constituent of a poverty mitigation approach.

FINAL COMMENTS

The employment of ICT in instruction can augment admission to learning prospects. It can facilitate to improve the excellence of education with highly developed teaching techniques, get better learning outcomes and allow modification or enhanced administration of education structures. Hypothesising existing activities and exercises the sustained use and expansion of ICTs within education will provide a powerful impact on: the content well-read, the way it is learned, the time and the place where the learning took place, and the individual who is getting education and the individual who is teaching. The sustained and amplified exercise of ICTs in education in future will expand the worldly and geological occasions that are at present practised.

The incorporation of ICTs in higher education is unavoidable. The great requirement for higher education has inspired noteworthy development in both private and public condition.

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Chapter 60

INITIATIVES OF USE OF ICT IN EDUCATION

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INTRODUCTION

India is making use of powerful combination of ICTs such as open source software, satellite technology, local language interfaces, easy to use human-computer interfaces, digital libraries etc. with a long-term plan to reach the remotest of the villages. Community service centers have been started to promote e-learning throughout the country. Notable initiatives of use of ICT in education in India include:

- Indira Gandhi National Open University (IGNOU) uses radio, television and internet technologies.
- National Programme on Technology Enhanced Learning : a concept similar to the open courseware initiative of MIT. It uses internet and television technologies.
- Eklavya initiative : Uses internet and television to promote distance learning.
- IIT-Kanpur has developed 'Brihaspati', an open source e-learning platform (Virtual Class Room).

Premier institutions like Calcutta have entered into a strategic alliance with NIIT for providing programmes through virtual classrooms. Jadavpur University is using a mobile-learning centre. IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real time interactive satellite technology.

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The UGC initiated scheme called "ICT for teaching and learning process" for achieving quality and excellence in higher education. Network facilities with the help of ERNET, Ministry of Information and Technology, Government of India were installed at UGC office to promote a healthy work culture. Along with this UGC launched a mega programme namely, 'UGC INFONET', a network of Indian Universities and Colleges, by integrating Information and Communication Technology (ICT) in the process of teaching, learning and education management. The network is managed by ERNET India and almost all the universities are its members. Information for Library Network (INFLIBNET), an autonomous Inter University Centre of UGC is the nodal agency for coordination and facilitation of the linkage between ERNET and Universities. Training programmes for the manpower were conducted to manage the ERNET facilities and other aspects of systems including electronic subscriptions. In addition, UGC is encouraging creation of e-content / learning material for teaching learning process and management of education in colleges and universities.

ROLE OF ICT IN HIGHER EDUCATION

Swift growth of ICTs is taking place all over the world. They have emerged as powerful tools for diffusion of knowledge and information. Their introduction and unprecedented use in the higher education has generated varied response. The opportunities can be categorized as the aspects relating to role of ICT for access and equity in education, their role in pedagogy for quality learning and teaching at higher education level and in inducing innovations in approaches and programmes.

E-learning is emerging as an important strategy to provide widespread and easy access to quality higher education. E-learning is a generic term referring to different uses and intensities of uses of ICTs, from wholly online education to campus-based education and through other forms of distance education supplemented with ICTs in some way. Although, presently the initiatives for development of e-learning in India are continuing in a sporadic manner, UGC is advocating and making efforts to enhance the quality of higher education by framing policy guidelines for their integration in classroom and other activities.

ROLE OF ICTS IN PEDAGOGY FOR QUALITY TEACHING LEARNING

Another most important dimension of higher education sector influenced by ICT integration is improving quality of teaching-learning. Also, the changes taking place due to globalization and internationalization attach

premium to knowledge and information. Therefore, the integration of ICTs would not only help in promoting personal growth but also in developing "knowledge societies". The call of the hour is the need to provide education for everyone, anywhere, and anytime. Life-long learning has become the driving force to sustain in the contemporary competitive environment. Therefore to strengthen and / or advance this knowledge-driven growth, new technologies, skills and capabilities are needed.

Conventional teaching-learning processes are undergoing a paradigm shift. Focus of instruction is now on education programs/practices that promote competency and performance. Such curricula tends to require access to variety of information sources, information forms and types; student centred learning settings based on information access and inquiry; learning environments centred or problem-centred and inquiry-based activities, authentic settings and examples; and teachers as coaches and mentors rather than content experts. The shift towards development of educational programs is well supported by and encouraged by the emerging instructional technologies.

Apart from enhancing student's learning experience, role of ICTs in capacity building/training of educational personnel has very large potential. National level institutes can provide leadership role in enhancing technical and managerial manpower in different disciplines through ICT networks and collaborations. Technology facilitated learning would result in preparation of staff regarding innovative pedagogic methods, new ways of learning and interacting, easy sharing of new practices among teaching community and result in widening the opportunities for their participation. The capabilities of competent and trained teachers/academic experts can be made available to larger audiences/students through flexible and virtual settings.

INNOVATIVE APPROACHES FOR TEACHING

ICTs have the potential to drive innovative and effective ways of teaching-learning and research. The inclusion of learning tools, easier use of multimedia or simulation tools, easy and almost instant access to data and information in a digital form which allows for computations and data processing generates possibilities which were otherwise not feasible. The possibility to diffuse these innovations and complement the learning content to improve quality in higher education through innovative pedagogic methods is high. The focus on ICTs to back quality research through utilization of rigorous research methodology and in-depth analysis is the call of the hour.

POTENTIAL DRAWBACKS-CUM-CHALLENGES TO USING ICT IN EDUCATION

While using ICTs in education has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. Introducing ICT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g. buildings) are relatively less costly

The four most common mistakes in introducing ICTs into teaching are i) installing learning technology without reviewing student needs and content availability; ii) imposing technological systems from the top down without involving faculty and students; iii) using inappropriate content from other regions of the world without customizing it appropriately; and iv) producing low quality content that has poor instructional design and is not adapted to the technology in use. Although ICT offers a whole lot of benefits there are some risks of using ICT in education which have to be mitigated proper mechanisms. They are:

- It may create a digital divide within class as students who are more familiar with ICT will reap more benefits and learn faster than those who are not as technology savvy.
- It may shift the attention from the primary goal of the learning process to developing ICT skills, which is the secondary goal.
- It can affect the bonding process between the teacher and the student as ICT becomes a communication tool rather than face to face conversation and thus the transactional distance is increased.
- Also since not all teachers are experts with ICT they may be lax in updating the course content online which can slow down the learning among students.
- The potential of plagiarism is high as student can copy information rather than learning and developing their own skills.
- There is a need for training all stakeholders in ICT.
- The cost of hardware and software can be very high.

CONCLUSION

The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. ICT has enhanced distance learning. The teaching community is able to reach remote areas and learners are able to access qualitative learning environment from anywhere and at anytime. It is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Successful implementation of ICT to lead change is more about influencing and empowering teachers and supporting them in their engagement with students in learning rather than acquiring computer skills and obtaining software and equipment. ICT enabled education will ultimately lead to the democratization of education.

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