ICT Mediated Teaching Learning In Higher Educational Enterprise

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Abstract- *Information Communication Technologies (ICT) has become an essential complementary part of our everyday life. Last twenty years the use of ICT has basically changed the practices and processes of governance, academics and education as well. In the arena of higher education ICT is becoming more and more important and this importance will continue to flourish and develop in the next few decades. The ICT mediated teaching and learning in the field of education leads to more learner centered practices i.e. processed based rather than product based education. In this article we are to highlight the various aspects of ICT in the higher educational enterprises and explore various potential future developments.*

Keywords- E-learning, Information Communication Technologies (ICT), student Centered Learning, MOOC, Virtual Education.

I. INTRODUCTION

The Higher education systems have grown rapidly in the last few decades to meet the demands and challenges of quality education for all. This aspect has further gained momentum due to introduction of Information and Communication Technology (ICT) in the higher education and its quick advancements. Now ICT mediated teaching and learning is the basic needs of quality education in the higher education arena. Thus demand for skilled and competent teacher is ever increasing in the contemporary globalised society of higher education. In this context, access to quality 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, it is necessary to enhance the contribution of open and distance learning facilities. In developing country like India the cost of accessing life-long education for all is a prime factor and it should be affordable to all. In this backdrop ICT mediated teaching and learning play an important role in blended learning, open distance learning and Massive Open Online Course (MOOC). The inclusion and proper integration of ICT mediated teaching learning technology in the higher education in India is a great challenge as it is a holistically flexible and dynamic educational system. The role of ICT mediated teaching and learning in higher education and its presume for potential future developments are explored in the forthcoming section.

II. ICT MEDIATED TEACHING AND LEARNING IN HIGHER EDUCATION: AN OVERVIEW

In today's technological world, teaching and learning has taken a new direction when communicating information. ICT is considered a powerful tool for educational reform and is quickly becoming more accessible. ICT's encompass a wide combination of technologies such as radio, television, smart board, desktop, notebook, handheld computers, digital cameras 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. 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. Studies have shown that an appropriate use of ICT can raise educational quality and connect learning to real-life situations (Lowther, et al. 2008; Weert and Tatnall 2005). Additionally, ICT tools enable students' learning by doing, developing independence, developing higher order skills and improving students' performance. Learning theories such as the constructivist theory emphasizes that a student-center approach through construction of knowledge in a social setting is allowed through ICT tools (Sipila 2011). Hence, introducing ICT-mediated Teaching and Learning 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; etc.

In today's 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. The various kinds of ICT mediated products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD

ROMs have been used in education for different purposes (Bhattacharya and Sharma, 2007). The ICT mediated teaching learning in higher education can be broadly classified into four categories (Figure 1).
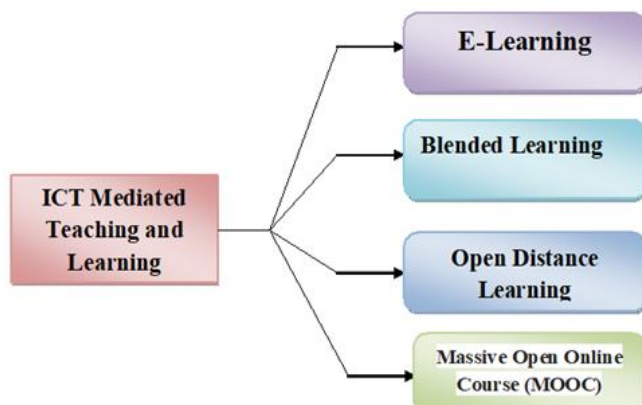

Figure 1. Categories of The ICT mediated teaching learning

1. E-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, which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies. E-learning varies across a large spectrum; in general E-learning course is likely to fall into one of the following three types: Text driven, Interactive and Simulation.

The content of Text driven E-learning is simple and includes text, graphics, audio and simple test questions. Compliance courses are a good example of text driven E-learning that usually has one purpose or goal: present the learning and quickly test on the content. The text driven course rarely has any interactive components, any gamification, and images used sparingly. PowerPoint files converted to E-learning often fall into this category.

An interactive E-learning course is very similar to a text driven one, with the exception that there has been more consideration placed on interactive components to enhance the learning. There is also a greater use of visuals in general (graphics, charts, diagrams), all of which are likely to have an interactive aspect. Unlike the text driven course, interactive courses also take advantage of additional media types, include videos.

Simulation E-learning is highly interactive and relies heavily upon graphics, video, audio and some level of gamification. Importantly, there are often custom simulations to aid in learning acquisition, which could very well include 3D components. New software training is an example of a course that often includes a high degree of interactivity and simulations. It isn't uncommon for these simulations to also be accompanied with some sort of controlled "test" environment.

2. Blended Learning: Blended learning is an education program (formal or informal) that combines online digital media with traditional classroom methods. It requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace. The main five Models (Figure 2) of Blended Learning are as follows:

a) **Face-to-Face Driver Model:** Of all the blended learning models, face-to-face driver is the closest to a typical traditional classroom structure. With this approach, the introduction of online instruction is decided on a case-by-case basis, meaning only certain students in a given class will participate in any form of blended learning. The face-to-face driver approach allows students who are struggling or working above their grade level to progress at their own pace using technology in the classroom.

b) **Rotation Model:** In this form of blended learning, students rotate between different stations on a fixed schedule – either working online or spending face-to-face time with the teacher. When in a course or subject where students rotate on a fixed schedule or at teacher's discretion between modalities and at least one of which is online are called station rotation. Other modalities might include activities such as small group or full class instruction, group projects, individual tutoring, and pencil-paper assignments. All the activities contained in a class room. When students were rotated between a computer laboratory and class room for other activities such as full class instruction, group discussion, projects etc. then the model is termed as Lab Rotation. In Flipped Classroom students were delivered content and instruction through online learning off site in place of traditional homework and then attend the brick and mortar class room situation for face to face instruction, teacher guided projects or practices. When students individualize the playlist i.e. fix or choose the schedule of rotation among the different stations and modalities i.e. face to face instruction, group discussion, projects, online learning etc, then the Model is termed as Individual rotation (Sana and Adhikary,2017)

c) **Flex Model:** Institutions who are supporting a large number of non-traditional or at-risk students often choose the flex model of blended learning. With this approach, material is primarily delivered online. Although teachers are in the room to provide on-site support as needed,

learning is primarily self-guided, as students independently learn and practice new concepts in a digital environment.

d) **Self-Blend Model:** The self-blend model of blended learning gives students the opportunity to take classes beyond what is already offered. While these individuals will attend a traditional classroom environment, they also opt to supplement their learning through online courses offered remotely. In order for this method of blended learning to be successful, students must be highly self-motivated. Self-blend is ideal for the student who wants to take additional Advanced Placement courses, or who has interest in a subject area that is not covered in the traditional course catalog. The model is also known as A La Carte Model.

e) **Online Driver Model:** At the opposite end of the spectrum from face-to-face driver we have online driver, which is a form of blended learning in which students work remotely and material is primarily delivered via an online platform. Although face-to-face check-ins are optional, students can usually chat with teachers online if they have questions. The model is also known as Enriched Virtual Model. This model of blended learning is ideal for students who need more flexibility and independence in their daily schedules. This approach is becoming increasingly popular – each year, the number of students participating in online driver programs increases by about 15 percent.

The mode of blended learning may of two types: Synchronous interaction and 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.
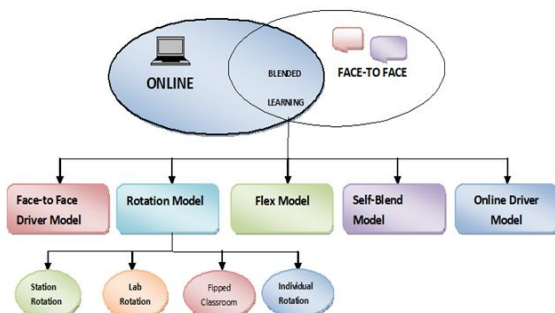

Figure 2. Schematic diagram of blended learning strategy

3. Open Distance Learning: This type of education is open for all and here 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. 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 open 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.

4. Massive Open Online Course (MOOC): A massive open online course (MOOC) is a free Web-based distance learning program that is designed for the participation of large numbers of geographically dispersed students. A MOOC may be patterned on a college or university course or may be less structured. edX is a massive open online course (MOOC) provider. It hosts online university-level courses in a wide range of disciplines to a worldwide student body, including some courses at no charge. It also conducts research into learning based on how people use its platform. The first MOOCs emerged from the open educational resources (OER) movement. The term MOOC was coined in 2008 by Dave Cormier of the University of Prince Edward Island in response to a course called Connectivism and Connective Knowledge (also known as CCK08).

III. INITIATIVES OF ICT MEDIATED TEACHING AND LEARNING IN HIGHER EDUCATION IN INDIA

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 (Figure 3):
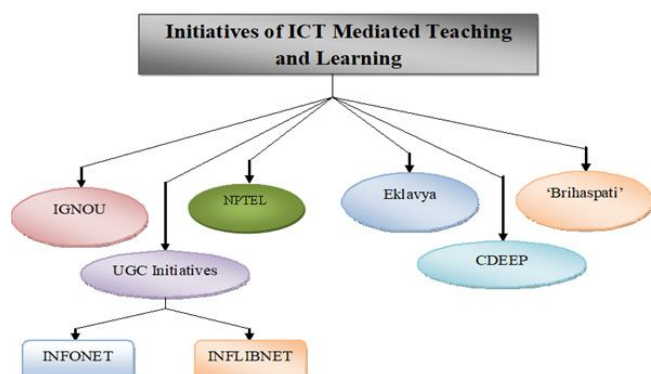
Figure 3. Schematic Diagram Representing Initiatives of ICT Mediated Teaching and Learning in Higher Education in India

a) Indira Gandhi National Open University (IGNOU) uses radio, television and internet technologies.

b) National Programme on Technology Enhanced Learning (NPTEL): a concept similar to the open courseware initiative of MIT. It uses internet and television technologies.

c) Eklavya initiative: Uses internet and television to promote distance learning.

d) IIT-Kanpur has developed 'Brihaspati', an open source e-learning platform (Virtual Class Room).

e) 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.

f) 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.

IV. ROLE OF ICT MEDIATED TEACHING AND LEARNING IN HIGHER EDUCATION

The use of ICT mediated teaching and learning in higher education offers a unique opportunity to solve many-fold challenges quickly as well as at low rate (Sukanta Sarkar May 2012). Some such advantages are:

i.   **Improve Quality of Education:** It Supports collaboration among students, teachers and institutions and offers a reliable grading system to measure and assign rank to Students, Teachers, Schools and Universities. It also promotes new innovative educational ideas and allows continuous improvement by feedback.

ii. **Improve Accessibility:** Flexible accessibility improves the access at anytime from anywhere to everyone. It even promotes education in remote rural areas. It brings text and other resource within the reach of students by providing online courses to them.

iii. **Reduce the cost of education:** It provides services at lower cost through online solutions and promotes learn yourself and community learning via online system.

iv. **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 easily.

v.   ICT opens the doors for girls to get education from home.

vi. ICT promote vocational courses as well as self paced learning for the adults.

vii. ICT Bring culturally diverse India on a common learning platform which is offered in all languages.

V. CHALLENGES AND SOLUTION IN ICT MEDIATED TEACHING AND LEARNING

The ICT Mediated Teaching and Learning in higher education has some obvious benefits but it also brings some challenges.

a) **The Digital Divide:** Digital divide is a term that refers to the gap between demographics and regions that have access to modern information and communications technology, and those that don't or have restricted access. This technology can include the telephone, television, personal computers and the Internet. Due to digital divide

people of remote area could not take the advantages of the ICT Mediated Teaching and Learning even after inclusion in higher education.

b) **ICT Infrastructure and Financial issues:** 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, 2008, 2010).

c) **Lack of trained staff:** Another challenge of developing nations to adopt ICT in education systems is a lack of trained teachers (Gulati 2008; Kozma 1999). When it comes to practically applying ICT, which is new to traditional teachers, many may not know how to deal with it and sometimes they are reluctant to accept new technologies in their classrooms. Thus, tutors who can train these teachers about new technology and IT professionals who can technically install and maintain the system are needed.

To address this issue, distance learning might be a useful alternative which is relatively affordable and does not require hiring of human resources in remote countries. However, due to the limited access to the internet, distance learning can only be based on text books and possibly satellite TV programs. This is not the case for the distance learning programs of many developed countries.

d) **Lack of policy:** Inappropriate policy and funding decisions may hinder equal educational development. The governments in developing nations need to liberalize markets and cut taxes on the ICT industries. For the reasonable and affordable pricing, market liberalization should be accomplished. Cutting taxes also help in increasing affordability resulting in spreading ICT accessibility.

VI. CONCLUSION

The role of ICT in developing countries is significant and critical for their rapid economic success which might lead to closing the gap between the developed and developing world. 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. When implementing the ICT mediated teaching and learning in

higher education sector, there are considerable challenges such as digital divide, cost, internet access, training and policy issue. But, each issue has its own ways of addressing which is effective practice around world.

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