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Overgrowing emergence to utilise educational technology for teaching-learning process in higher education

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Abstract
Educational technology is an overgrowing area in higher education. As indicated by publications, innovations of educational technology in higher education are dynamic. While advancements like online language classroom, online courses, digital time capsule, homework help site, flipped class room, e-learning, teleconferences, collaborative learning, team teaching and others are not new to education, the speed, reach and implication of current innovations are. The abilities are to interact, collaborate, challenge, engage and connect have reached new heights and continue to branch to even more unusual possibles. Many studies have found positive effect in higher education associated with educational technology. Most experts in the field of education agreed that, when properly used, educational technology in higher education programmes hold great promise to improve teaching and learning in addition to shaping workforce opportunities. The modern higher education system is exposed to advanced educational technologies. This diffusion of educational technology requires proper use of Educational Technology in teaching-learning process in higher education institutions like in colleges and universities. Due to globalisation, internationalization of higher education, expanding role of global competition and workforce, and collaboration extending to corporate-university partnerships, the emergence to utilise educational technology for teaching-learning process is becoming crucial day to day in the system of higher education.

Keywords: online courses, e-learning, collaborative learning, team teaching, globalisation, internationalization

Introduction
Education is the most vital input for the growth and prosperity of a nation. It provides strength and resilience to enable people to respond to the changing needs of the hour. Education is the backbone of all national endeavors. It has the power to transform human beings into human resource. We cannot build a sustainable and prosperous nation without human resource development which mainly depends on the health and vitality of higher education. Apart from primary and secondary education, higher education is the main instrument for development and transformation. Higher education has the omnipotent role of preparing leaders for different walks of life: social, political, economic, cultural, scientific and technological. Higher education has special value in the contemporary knowledge society which contributes both directly and indirectly to the wealth of a nation (Report to the People on Education, 2010-11).

Traditionally, higher education catered to the requirement of few select communities like priests, lawyers and doctors. The objective of higher education was to provide specific skills. During the medieval age, emphasis of higher education was laid on liberal arts and study of religion. In the late 17 th and 18 th century, with the industrial revolution there was a need for education in science and technology. However, during the 20th century, education started acquiring an open character. With a 'knowledge force' becoming an essential requirement for national development, there was an increased demand for professional education. With the advent of information and communication technology, higher education saw a paradigm change in both philosophy and pedagogy (Powar, K B, 2012).

In the 21st century, with the impact of globalization, due to increased trade investments and mobility of people across borders, there has been a need to adopt higher education to the changed global reality.

Educational Technology
Educational technology is one important field and technique in the modern system of education.

Educational technology, in terms of terminology and structural composition, may carry out two basic components, namely education and technology.

In the early period of human history, when writing was unknown, the method of verbal presentation on the part of the teachers and citation and memorisation on the part of the students was a common practice in almost all the civilisation of the world. With the advent of writing as means and materials of communication, like writing on the leaves and tree-trunks, engraving on metals and rocks, and then the use of some type of paper and ink material provided the next breakthrough in the use of writing technology for teaching and learning. The use of writing and printing technology then took its next leap in helping the cause of teaching and learning by being utilised in the production and use of the instructional material like chalk or blackboards, pictures, charts, models, maps, diagrams and other graphic material. Later on, with the industrial development and technical advancement, sophisticated scientific instruments, mass media and educational materials were used. It brought the use of

sophisticated hardware and software such as radio, television, tape recorder, films, transparency, etc. in the field of education. The concept of programmed instruction and theories of learning, later on, added another dimension to the meaning and concept of educational technology. This was again broadened when the new approaches in form of system-approach, microteaching, interaction analysis and computer assisted instruction came into existence.

In modern age, G. O. M. Leith defined, "Educational technology is the systematic application of scientific knowledge about teaching-learning and conditions of learning to improve the efficiency of teaching and learning." (1967) W. Kenneth Richmond said, "Educational technology is concerned with providing appropriately designed learning situations which, holding in view the objectives of teaching or training, bring to bear the best means of instruction." (1979) I. K. Davies said, "Educational technology is concerned with the problems of education and training context and it is characterised by the disciplined and systematic approach to the organisation of resources for learning."(1971) According to Scottish council for Educational Technology, "Educational technology is systematic approach to designing and evaluating learning and teaching methods and methodologies and to the application and exploitation of media and the current knowledge of communication techniques in education, both formal and informal" (1979).

Educational technology have forms including teaching technology, instructional technology, behavioural technology and instructional design technology. Lumbsdaine (1964) has listed three distinct approaches of educational technology-hardware approach, software approach and systems approach. Magic lantern, epidiascope, projector, radio, tape recorder, television, computer machines etc. concerning 'hard' are designated as hardware instructional aids. All such teaching learning materials like slides, films, graphic materials and programmed self instructional material used are designated as software in the field of education. Use of principles of teaching, use of maxims of teaching, formulation of teaching or instructional objectives, proper use of teaching strategies and teaching devices, effective communication in teaching learning, effective management in teaching learning, modification of teacher behaviour and interaction analysis, micro teaching, using models of teaching, information and communication technology, computer based learning, programmed learning are the important factors of modern educational technology.

Higher Education

Higher education includes graduation, master degrees and research works including M. Phil., Ph.D., Post Doc. etc. Generally graduation and masters are taught in colleges and universities, Masters and research works are done in universities.

Bachelor/ Undergraduate level

Bachelor's degree is offered after 12 years of school education. Generally it is offered in two streams: liberal and professional field of studies. The liberal studies are generally three years programme offered in arts, commerce and sciences. Some institutions offer bachelor courses with honours in liberal studies which are not necessarily longer in duration but indicate greater depth of study. Master's / Post-graduate level: Master's degree is normally of two-year duration in both the liberal and professional fields of study. It could be coursework based with or without thesis or research. Pre-Doctoral / Doctoral level: A pre-doctoral programme - Master of Philosophy (M. Phil.) is taken after completion of the Master's Degree. This can either be completely research based or can include course work as well which is generally of one and half year duration. Doctor of Philosophy (Ph.D.) is pursued after masters or pre-doctoral programme and generally takes two to five years to be awarded. Students are expected to write a substantial thesis based on original research with or without course work.

Diploma

Diploma Courses are also available at the undergraduate and postgraduate level. At the undergraduate level, it varies between one to three years in length while postgraduate diplomas are normally awarded after one year's study.

Distance learning programmes

At all the levels, programmes in both liberal and professional field are offered through distance learning mode which normally takes longer duration than their equivalent regular programme.

Higher education system globally

During its thousand years existence, starting with the establishment of the first of the modern Universities at Bologna, in 1088, the modern higher education system has definitely evolved. Traditionally, higher education has been elitist in character and has catered to the needs of select minority including priests, civil servants, lawyers. The objective was to provide specific skills. During the Medieval Age1 emphasis was placed on teaching of religion and liberal arts. With the advent of Industrial Revolution, science and technology became important in the late 17th and 18th centuries. The early part of 20th century saw the entry of working class' into the higher education system which slowly began to acquire a more open character. By the end of World War II, higher education acquired an egalitarian character. There was an increased demand for professional education as the knowledge force became an essential requirement for national development. With advent of information and communication technology, there was a paradigm shift in both education, philosophy and pedagogy (Pawar K B, 2012). The World Bank (1994) in its document, 'Higher Education: The Lessons of Experience' states that higher education is of paramount importance for economic and social development. Institutions of higher education have the responsibility for equipping individuals with advanced knowledge and skills required for positions of responsibility in government, business and the professions.

Teaching-learning process in higher education

Teaching, in simple terms, is referred to as either an occupation or profession of a group known as teachers or an activity or activities of a group undertaken to help an individual to learn or acquire some knowledge, skills, attitudes

or interests. Edmund Amidon (1967) said, "Teaching is defined as an interactive process, primarily involving classroom talk which takes place between teachers and pupils and occurs during certain definable activities." According to Clarke (1970), "Teaching refers to activities that are designed and performed to produce change in student behaviour." Learning is a psychological term, according to Crow and Crow, "Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things and operates on individual's attempts to overcome obstacles or adjust to new situation. It represents progressive changes in behaviour. It enables him to satisfy interests to attain a goal." Higher education includes graduation, master degrees and research works including M. Phil., Ph.D., Post Doc. etc. Generally graduation and masters are taught in colleges and universities, Masters and research works are done in universities. In higher education skills are not so important but the subject depth and richness of teaching are necessary. Students need information rich materials and quick learning capacity. In modern age educational technology is becoming crucial in higher education and used to promote both teaching and learning.

Overgrowing trend to utilise educational technology in higher education

As indicated by publications, innovations of educational technology in higher education are dynamic. While advancements like online language classroom, online courses, digital time capsule, homework help site, flipped classroom, e-learning, teleconferences, collaborative learning, team teaching and others are not new to education, the speed, reach and implication of current innovations are. The abilities are to interact, collaborate, challenge, engage and connect have reached new heights and continue to branch to even more unusual possible.

According to the data published by Pew Research Center (2011), use of educational technology has reached staggering levels. The following are relevant data points:

- 89% of four-year public universities offer online courses; the rate is 60% for four-year private universities.
- 50% of college presidents predict that in 10 years, most students will have taken courses online;
- 62% of college presidents predict that in 10 years, more than half of the text books used will be digital;
- 57% of college graduates have used a smartphone, laptop or tablet to some degree during class; most institutions do not have clear policies regarding use of such gadgets; for most institutions, it is up to the individual instructors to manage such uses. (Taylor, Parker, Lenhart, and Patten, 2011, pp. 1-2)

Through a project, European Virtual Campus for Biomedical Engineering (EVICAB) reported (January, 2006) that modern virtual mobility and e-learning support the harmonisation of higher education programmes, improve the quality of and comparability between the programmes, and advance post graduate studies, qualifications and certification. (Tempere University of Technology. Publication 901. Asta Kybarataite, p.2)

Such other many studies have found positive effect in higher education associated with educational technology. Most experts in the field of education agreed that, when properly used, educational technology in higher education programmes hold great promise to improve teaching and learning in addition to shaping workforce opportunities.

The modern higher education system is exposed to advanced educational technologies. This diffusion of educational technology requires proper use of ET in teaching-learning process in colleges and universities. For expanding role of global competition and workforce, collaboration extends to corporate-university partnerships, globalisation of higher education, understanding the challenges in rewiring education, innovations, quality teaching-learning and other issues, the use of educational technology is becoming essential in colleges and universities.

Globalization of higher education

Globalization has caused an impact on higher education, thereby necessitating highly skilled human resource to work on a global platform. The Asian countries are investing in enhancing their higher education system with the objective of building world class universities. Amongst these, China is particularly focused on upgrading its present universities to become internationally competitive research institutions in the coming decade. Even smaller countries like Singapore, by partnering with some of the world class universities, are projecting themselves as education hubs of Asia (Altbach, P.G.; Knight, J. 2007). Globalization and higher education are linked to each other. On one hand we see countries that, because of demographics, have a great demand for higher education than the supply. In such situations students tend to go abroad for higher education. In contrast, Europe for instance, because of its aging population, has a shortage of students, therefore a strong trend exists Europe to absorb students from developing countries. Secondly, the numbers and types of providers of higher education has also grown. Countries like USA have a combination of public and private universities which are not for profit. However, in Asia and Latin America, there has been an increase in number of private for profit universities. The third development is the emergence of innovative delivery methods of higher educations. The traditional model was face to face learning which has been now largely replaced by E-learning. So also, transnational education and cross border education has gained prominence primarily because of the movement of people and programmes and institutions across borders (Hans De Wit *et al*, 2008).

Internationalization of higher education

Over the last two decades, globalization has impacted operations of various institutions including academic institutions all over the world. Higher education institutions have been both the agent and objects of globalization (Scott P E, 1998). International mobility, global comparison, bench marking etc. has gained lot of importance in policy making. Enders, J.; Fulton, O (2004), notes with surprise the amount of debate on global phenomenon in higher education focusing on marketization, competition and management in higher education. Some of the countries adopted institutional devolution, quasi-market competition in the system and performance managed staffing to address the global

competition. The other countries have responded differently to the changes in global environment. In the English-speaking world, international operations have become the primary mode of development. In Europe, the negotiation of the common higher education area and European Research Area has been the major development leading to the emergence of global higher education environment. Global research circuits have been wired into the rapidly developing higher education systems of China, Singapore and Korea. India has not yet opened up the direct entry of foreign institutions in education sector. Internationalization in higher education is a phenomenon that has been defined in a wide variety of ways whether pertaining to individual student outcomes, such as language proficiency and intercultural competence, or to organizational strategies incorporating processes, procedures, and strategies that enhance the international identity and activities of an institution.

Global competition and the workforce

In today's technology enabled knowledge economy, many universities find themselves facing a new challenge: how not only to equip students with an adequate education in their field of study, but also to arm them with the skills and knowledge required to leverage technology effectively in the workplace. Although employers expect graduates to have assumed most of the requisite technology skills before joining their organisations, on the job training will be necessary for them through technologies.

We find the world facing both quantitative and qualitative changes – quantitative in terms of economic growth and technological innovations, and qualitative in terms of a new paradigm of an evolving society governed by altogether different values and ethos. With the end of Cold War and the fall of communism, we are left with a world that is more fluid, fragmented, and multi-polar than ever before. The process of trade liberalization and privatization has also led to economic integration of markets at the global level. Moreover, technological innovations in transport, information, and communication have already led to the compression of the 'economic' and 'learning space' (Gupta P V, 2004). In the era of knowledge-driven economy and learning societies, both formal and informal education is playing an increasingly vital role in promoting economic solidarity, social cohesion, individual growth, sustainable development, and a culture of peace and world citizenship. Whereas our views about the way we live, learn, work, and 'think about work' have changed, the acquisition of knowledge and skills provided by a traditional formal educational setup do not correspond. Therefore, a new paradigm must evolve that is developmental, human-centered, environmentally sound, and all-inclusive, so as to prepare learners to be contributors to knowledge and not just mere recipients of knowledge. It has opened up new challenges and opportunities for higher education institutions – whether public, private, or hybrid. Just a few years ago, we could not have imagined a university without classrooms, or a library without books. Nor could we imagine a university existing 10,000 miles away from its students. Or imagine technocrats rather than faculty and academic staff managing sensitive information and knowledge 'online'. Yet all of this is true today. Additionally, some university-owned firms, partly funded by the private sector, are producing certain products for the educational market. A number of universities are entering into contracts with private publishers. Similarly, a large number of private 54 enterprises are entering into agreements with various universities to meet their technological and other requirements or to help them with the distribution of their knowledge-based products. There are abundant examples of private booksellers, food services, and providers of other services, academic and non-academic alike (Altbach P G, 2004, pp68-84). Given the increasingly corporate culture in higher education, it is not surprising that 'education' has been included as a 'service' or a 'commodity' under the General Agreement on Trade and Tariffs (GATT) and World Trade Organization (WTO). Though UNESCO has been striving hard towards protecting and strengthening higher education as a common good at the global level by promoting pluralism and diversity, on the one hand, and equitable access, capacity building, and sharing of knowledge, on the other. (Amin, M.M, 2008)

The expanding role of online learning in higher education

More than two thirds of participants from academic settings of higher education say their institutions offer online courses today. The specialisation, customisation and convenience that distance education affords has found an eager audience among students, working professionals and employers. Many academic institutions, and especially those with a public service mandate, consider online learning key to advancing their mission, placing post graduation education within reach of people who might otherwise not be able to access it. While distance education programmes continue to grow in number and to improve in quality, most survey participants see online courses as a supplement to face-to-face classes. Corporate participants hold this view most staunchly. Few participants say that online and in-class students are likely to take the same classes together and compete for top grades. (report of EIU, 2008).

Collaboration extending to corporate-academic participants

More and more universities look to the private sector to support and extend technological advances. 93% of private sector respondents say that quality of university's technology will be a significant factor in their decision making process. Universities used private-sector resources to sustain technological leadership, but on the other hand they must demonstrate technological powers in order to attract that investment in the first place. (Report of EIU, 2008) Besides the issue in the age of globalisation corporate programmes among government and private universities and colleges are essential for prosperity of outcomes which could be succeed only with great height of educational technologies.

Conclusion

From the above discussion it is clear to face the above challenges including globalisation of higher education, internationalization of higher education, expanding role of global competition and workforce, and collaboration extending to corporate-university partnerships of rewiring education, the utilization of educational technology is becoming crucial day to day in the teaching-learning system in

higher education. But also there are few problems and challenges to utilise it. Students are so quick to turn to the Internet to answer questions that some believe critical thinking has gone down the tube. The problem with technology glitches is also seen with online textbooks. Some students have issues accessing textbooks at home if they don't have a large enough bandwidth. Other access problems to online materials can delay students and put them behind in class. Some teachers do not utilize the technology they've been given. They have been teaching for years and don't want to incorporate something new into their time-tested lesson plans. Sometimes the materials for use are costly. Preparing the right infrastructure for the technique is so expensive and not possible without good fund. Also proper training is necessary to utilise proper educational technology. Good cooperation with government and private sectors is necessary for the purpose. Continuous evaluation, update and research are also essential for sound utilisation of educational technology in teaching-learning process in higher education.

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