

Information and Communication Technologies (ICTs) and Higher Education

Dr. N. Ravichandran

MA, M.Phil, PhD, Academician
Indian Maritime University, Visakhapatnam Campus, Gandhigram, Visakhapatnam-5, India

Abstract: *The application of ICT in higher education has grown steadily in the past decade in both developing and developed countries although there are wide variations in the usage between countries and the regions. ICT is believed to specifically strengthen higher education systems. The increasing information and communication technologies has brought changes of teaching and learning at various levels of higher education systems leading to quality enhancements in the century. The adoption and use of ICTs in higher education have a positive impact on learning, research and teaching. In addition to learning and teaching process, ICT also provides the facility of e-learning. ICT increases the flexibility of delivery of education, so that learners can access knowledge at any time and from anywhere. It was observed from the research findings that, the students are very enthusiastic and receptive about the new mode of teaching based on ICT. Information and communication technology has become an integral part of today's teaching and learning process. This paper attempts to study the advantages and conveniences of applying in align with e-learning in higher education and teaching in universities. In this paper facts and figures obtained from various sources were used. Countries across the world are using ICT in facilitating information dissemination and communication in all areas of education and training. Effective use of technology can motivate students, make our classes more dynamic and interesting, and renew teacher enthusiasm as they learn new skills and techniques. Technology is also helping the students to understand any abstract concepts clearly. The use of ICT will not only enhance learning environment but also prepare next generation for future lives and careers. Effective use of technology can motivate the students, make our classes more dynamic and interesting and renew teacher enthusiasm as they learn new skills and techniques. Needless to say that library professional have shown a positive attitude towards the use of ICT applications and library automation, majority expressed the need for appropriate training to make use of ICT tools. Most of the students in higher education have own their laptop and search different sources of online for information and learning about a topic in which they have interest.*

Keywords: Information communication Technology, higher education, teaching, learning environment, research

1. Introduction

“While education unlocks the door to development, increasingly it is information technologies that can unlock the door to education”– Wims & Lawler (2007, P.7)

The people in university education shape the behavior, minds and the social and human values of the student community. The application of ICT in higher education has grown steadily in the past decade in both developing and developed countries although there are wide variations in the usage between countries and the regions. Effective use of technology can motivate students, make our classes more dynamic and interesting and renew teacher enthusiasm as they learn new skills and techniques. ICT is playing predominant role in education and particularly in higher education of all over the world. The use of ICT is a symbol of new era of education. The purpose of ICT is the remote student learners could connect to the learning programme and to worlds outside the classroom. This would connect students and teachers more closely to the different sections & communities, and significantly reduce the effects of remoteness. 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 raise. The increasing use of ICT has brought changes to teaching and learning at all levels of higher education systems leading to quality enhancements in the present century. In a current information society, people have to access knowledge through information and communication technology to keep pace with latest developments. By using ICT, the possibility of learning

without constraints of time and place would be achieved which suit the needs of the students. It is often ICT is seen as indispensable tool to fully participate in the knowledge society.

2. Statement of the problem

Higher education facility and services to distance locations becomes pricey. Due to limited human resources it is difficulty to deploy competent personal in all distance locations. The lack of higher education services at places like hills and islands is a major challenge faced by any government. Lack of higher education services in remote places, lack of scholarly research and lack of theories and frame works needs to be tackled through ICT services. In the higher education context, students who lack information and communication technology literacy cannot benefit fully from learning opportunities either in the classroom or beyond it.

3. Objectives of the Study

- To assess the condition of ICT in University higher education
- Influence of ICT on teaching in higher education
- To explore the factors that influence ICT use in the higher education, teaching and learning
- How ICT can be used to address the issues within the higher education teaching and learning.

4. Methodology

Information collected from various sources including statistical figures used for the study purpose. The study describe the influence of ICT in higher education including teaching and learning.

5. Review of Literature

Education is a driving force of economic and social development in any country.(Cholin 2005, Mehta and Kalra 2006) Several factors which have strengthened and encouraged moves to adopt Information and Communication Technology (ICT) into classrooms and learning settings included a growing need to explore efficiencies in terms of program delivery, the opportunities for flexible delivery provided by ICTs (Oliver & Short 1997). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. The 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 (Young 2002). Innovative uses of information and communication technology can potentially solve this problem. ICT is a diverse set of technological tools and resources used to communicate and to create, store, distribute and manage information. The 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).

In the paper integration of ICT in Higher education institutions: Challenges and best practice recommendations based on the experience of Makerere University and other organizations African higher education is poorly developed and unevenly distributed. The major challenges faced are lack of awareness and mindset, lack of top level commitment for the progress in ICT integration, a systematic method of ICT implementation, cost of bandwidth and efficient utilization of ICT. To settle these challenges it is necessary to define well planned ICT policy for successful mobilization of funds. Despite these difficulties, a number of higher education institutions in Africa have made significant progress in building an ICT infrastructure and developing computer science and other ICT disciplines. The demand for education in developing countries like India has skyrocketed as education is still regarded as an important bridge of social, economic and political mobility (Amutabi and Oketch 2003). 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 (Reeves & Jonassen 1996) the influence of the technology on supporting how students learn will continue to increase.

If we look into the history, the growth of all enrollments in primary, secondary, and senior secondary levels have occurred 6, 14 & 20 times during the years 1950-51 to 2001-02. An increase of 24, and twelve times in the number in the higher education institutions providing general and professional education respectively were recorded and ten

times the number in universities has been observed during this period. The government spends approximately 4 percent of the GNP on education whereas as per the recommendation of National Policy on education, the aim is to achieve 6 percent which seems very far. Several efforts in the past have been recorded (Bhatt 1998, 2006) but still more efforts are required. Affording to the report of the World Bank, about 60.7 million children of age group 6 – 10 years have joined the schools whereas 30.2 million could not obtain the opportunity, Further, for higher education, only 6 percent (Deshmukh 1999) falling in the age group of 17 – 24 years was able to enroll. If we study the development in the literacy improvement, we find that India had 18.33 percent literacy rate at the time of independence, which has now increased to 65.8 percent. As the months move ahead and the days seem to run shorter, 24 hours seem too little for all the targets that one would like to achieve, and multitasking becomes a way of life. Many of us would like to continue our education, but due to limitation on time it becomes difficult to pursue academics, for this many people and students have opted for studying through distance education courses, which allows a person to continue higher education comfortably. One can now easily browse through the websites of various Indian Universities and colleges offering online distance education courses and get latest information.

6. Information and Communication Technology (ICT) and Higher education

ICT is believed to specifically strengthen higher education systems. The increasing information and communication technologies has brought changes of teaching and learning at various levels of higher education systems leading to quality enhancements in the century. Introduction of ICTs in the higher education has profound implications for the whole education process ranging from investment to use of technologies in dealing with key issues of efficiency, access, management, equity, research, innovation and quality. ICT applications provide institutions with a competitive edge by offering enhanced services to students and faculty driving greater efficiencies and creating enriched learning experiences. The adoption and use of ICTs in higher education have a positive impact on learning, research and teaching. In addition to learning and teaching process, ICT also provides the facility of e-learning. With passage of time, a lot of changes have taken place in the field of education technology, particularly with the advent of information technology there has been a sea change in almost every sphere of our lives. Information Technology turning more users friendly and robust, academic activities in higher education are adopting the use of ICT in their day to day functioning. One of the important application of ICT for teachers to use computer technology for making lecture notes. It can improve the learning process through the provision of more interactive teaching materials that increase learner's interest and acquisition of knowledge.

In university higher education ICTs contribute in simulations to equip the students with latest practices. Various e-lectures are easily modifiable and shared. In relating to different concepts, visual aids enjoy a great role in making concepts clear to students or otherwise it is difficult to connect to the concept and can make substantial

improvement in teaching and learning process. The transformation of technology is taking the teaching and learning process at universities and colleges to the next level. Technology based tools are gaining prominence to impart education to students and helping them to learn, collaborate, communicated and study on and off campus. Digitization plays an important role in higher education and learning from the West, Universities in India are now making the own digital repository of books so that students can be provided a digital learning environment. It enables students to learn through e-books, videos, pictures, visualization and simulations.

In one study, According to Sampath Kumar and Biradar (2010) observe the use of ICT in 31 college libraries in Karnataka, India by analyzing the ICT infrastructure, status of library automation, barriers to implementation of library automation and librarians attitude towards the use of ICT. The survey carried out using questionnaire, observation and informal interview with selected college 22 librarians show that lack of budget, lack of manpower, lack of skilled staff and lack of training are the main constraints for not automating library activities, even though library professionals have shown a positive attitude towards the use of ICT applications and library automation, majority expressed the need for appropriate training to make use of ICT tools.

The use of ICTs can make substantial changes both for teaching and training mainly in multiple ways. Firstly, the rich representation of information changes learners' perception and understanding of the context, secondly, the vast distribution and easy process access to information can change relationships between teachers and taught. ICTs in general and e-learning in particular have reduced the barriers to entry to the higher education business. Countries and those aspiring to create new Higher education learnings can learn from the failures of a number of virtual universities. They reveal that ICTs should be introduced in a systematic manner that brings clarity to the business model through cost-benefit analyses. A study on the effective use of social software in further and higher education in the UK to support student learning an engagement has shown that there is growing interest in social dimensions of learning (Minocha, 2009), this has led institutions to adopt virtual learning environment, which incorporate collaboration and communication tools such as wikis, blogs, forums and chat. More recently, publicly available web-based social networking tools such as Facebook, Googledocs, Delicious, and Flickr have also been adopted in teaching and learning.

ICT usage in Higher education:

ICT consist of network, media, hardware and software for collecting, storing, processing, transmitting and presenting information (date, voice, text and image) as well as related services. ICTs can be divided into two parts Information Technology (IT) & Information, Communication and Infrastructure (ICI). The former relating to hardware and software of information collection, storage, processing and presentation and the latter refers to physical telecommunications system and network such as Cellular, mail, voice, radio and television. ICT is considered as important tool in higher education. This has been used in

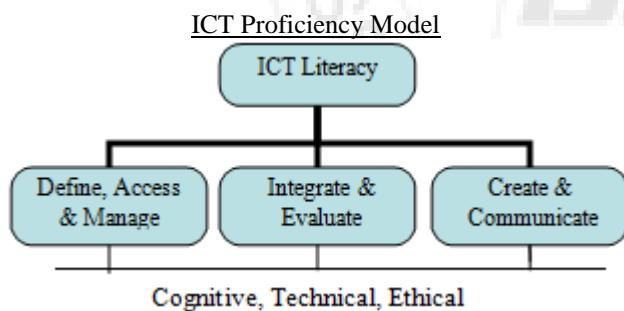
various areas such as: communication among learners, developing course materials, academic research, delivering content and sharing content, teachers and the outside world, creation and delivery of presentation and lecture, academic research, administrative support and student enrolment. Teaching and learning can further be improved by replacing of conventional teaching instead of the usual age old method of chalk and talk for teaching by innovative methods like power point presentations and animations, modeling and simulations, video clips and using AV aids, LCD projectors etc. This enhances the learning ability of the student and also helps the teacher to elaborate the difficult concepts effectively within a short time span. Integration of ICT in higher education enhances the quality of research work and more number of individuals enrolled in the research work in different fields. The collection and analysis of large data becomes easier through the availability of different software. It saves time, money and effort to the researchers in their research studies. In the paper challenges of e-learning in Nigerian University Education based on the experience of developed countries, author highlighted the importance of government's role to increase funds for education in order to face challenges of e-learning in Nigerian university education and explore the strategy to increase training, motivation and awareness programs for successful implementation of e-learning in higher education.

Benefits of ICT

One of the big benefits of ICT is teaching is that they can improve the quality and the quantity of education provision and must be used appropriately. Digital libraries simply offer electronic copies of resources and students will be able to use them everywhere. Allowing greater access to more students and more efficiency with better information: The learner with internet access is able to access online libraries, journals, conferences online and virtual classrooms and through this will achieve a high volume of the latest information (Faraj Allahi & Zarif Sanayei, 2009; Markovic 2010, Sarkar 2012). Learning and course management systems are useful in generating and managing a variety of student support services and products, such as course outlines, digitally recorded classroom material discussion groups, laboratory manuals and lab assignments, lecture notes, live lectures for later viewing and re-viewing, links to course specific websites, online tutorials, supplementary readings, and virtual office hours for teacher-student consultations, Virtual libraries, where they exist are a particular boon to students as they cut down on costs of acquiring expensive textbooks, journals and reference material. Significantly the advantages of ICT in Higher Education such as 1.Fast communication, 2. Co-operative learning, 3. Motivating factor 4. Acquiring varied writing skills and 5. Locating research materials

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. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. The internet is the main supporting infrastructure for ICTs. The platform it provides is wonderful e.g. e-libraries, online education, cyber

infrastructure; virtual portfolios and so on are some of the worthwhile instances of ways to spread education through e-learning. Such components create a platform where all stakeholders including instructors and students can connect. Virtual libraries are a particular boon to students in higher education as they cut down on costs of acquiring expensive journals, textbook and reference material. Tools are 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. Newer technologies such as Wi-Fi and VSAT are classic examples of low cost communication for the people of rural areas. Besides surfing, the students can listen to lectures through voiceover – IP applications which need less bandwidth than videoconferencing. Another approach is to open satellite campuses with high speed internet connectivity which enables the students living in smaller towns to get access to education which otherwise would not have been probable. The adoption and use of ICTs in higher education have a positive impact on learning, research and teaching. In addition to learning and teaching process, ICT also provides the facility of e-learning. ICT increases the flexibility of delivery of education, so that learners can access knowledge at any time and from anywhere. It was observed from the research findings that, the students are very enthusiastic and receptive about the new mode of teaching based on ICT. Seven processes, listed in the chart were identified by charter institutions as critical components of ICT literacy in higher education: The ability to define access, manage, integrate, evaluate, and create and communicative information. These processes reflect the wide range of uses for ICT. The proficiency model encompasses key components of ICT proficiency within the context of cognitive and technical skills and social & ethical consideration. These interactions are shown below:



Process	Definition
Define	Using ICT tools to identify and appropriately represent and information need.
Access	Knowing about and knowing how to collect and or retrieve information
Manage	Organizing information into existing classification schemes
Integrate	Interpreting, summarizing, comparing and contrasting information using similar or different forms of representation
Evaluate	Reflecting to make judgments about the quality, relevance, usefulness or efficiency of information
Create	Generating new information and knowledge by adapting, applying, designing, inventing or representing information.
Communicate	Conveying information and knowledge to various individuals and groups

Challenges of ICT

As the potential benefits of ICT administrations are significant, there are associated challenges that decision makers should be aware of before introducing technology changes. Introducing ICT systems for teaching 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 other challenge faced is that in many developing nations the basic requirement of electricity and telephone networks is not available and many collages do not have proper buildings or rooms so as to adapt the technology. The most important consideration is how can the services provided by universities through ICTs be accessed by all the students they serve? In Africa, where the insight of the internet stands at 5.6 percent compared to the world's 26.6 percent, any technology deployment for learning and academic services will need to address the issue of connectivity by students and instructors. The IT landscape of countries is improving continuously which also requires that institutions need to monitor the situation regularly to keep us with the pace of technology changes. ICTs would replace teachers English being the dominant language most of the online content is in English. This causes problems as in many nations the people are not comfortable or conversant with English. Introducing ICT systems for teaching in developing countries has to consider about high opportunity cost of installation, investments in hardware and software's and in human skills and training.

Common errors of ICT in Higher Education:

- 1) Unlicensed and pirated software
- 2) Enforcing technological systems from the top down without involving faculty and students.
- 3) Installing learning technology without reviewing student need and content availability.
- 4) Using inappropriate content from other regions of the world without customizing it appropriately; and
- 5) Making low quality content that has poor instructional design and is not adapted to the technology in use.

7. Summary & Conclusion

It is a fact that the use of ICT has now become an integral part of daily life for a large percentage of people in both developed and developing countries and believed that, it is becoming the heart of preparing students and teachers for participation in the teaching and learning society. Punie, Zinnabauer and Cabrera (2006) argued that "it is difficult and maybe even impossible to imagine future learning environments that are not supported, in one way or another by ICT" (SIDS P34). Countries across the world are using ICT in facilitating information dissemination and communication in all areas of education and training. Effective use of technology can motivate students, make our classes more dynamic and interesting, and renew teacher enthusiasm as they learn new skills and techniques. Technology is also helping the students to understand any abstract concepts clearly. The use of ICT will not only enhance learning environment but also prepare next generation for future lives and careers. Needless to say that library professional have shown a positive attitude towards

the use of ICT applications and library automation, majority expressed the need for appropriate training to make use of ICT tools. While higher education institutes in developed countries have policies on the generative role, there are controversies about balancing long-term academic research with short-term technology transfer projects. Finally it is never argued that ICT can replace teachers but it is a great aid for academic deliverance and gaining of higher education.

8. Suggestions & Recommendations:

- 1) Digital libraries, access to online databases, networking, etc., can be enhanced through inter institutional collaboration to ensure optimal usage of ICT expertise and resources in higher education.
- 2) ICT can add value to the role of Higher Education Institution (HEI) s in economic growth and social development, if appropriate perspectives and roadmaps are integrated in the policies.
- 3) Prospective employers may use the assessment for hiring or training purposes.
- 4) Teacher motivation becomes an important issue in technology integration into the higher education system.
- 5) 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.
- 6) Ensure ICT facilitates and enhances the academic administration by providing real time services for student admission, attendance, timetabling, examination and evaluation, announcement and submission of class assignments

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Author Profile



Dr. N. Ravichandran, MA, M.Phil, PhD, Academician, Indian Maritime University, Visakhapatnam Campus, Gandhigram, Visakhapatnam-5, India