



Understanding the Importance, Impacts and Barriers of Information and Communication Technology (ICT) in Higher Education

KEYWORDS

Dr. Saima Siddiqi

Department of Education, A.M.U., Aligarh

Introduction

Higher Education plays a pivotal role in the development of a country. The Indian Higher Education system has established itself as the largest system in the world in terms of number of institutions and third largest in terms of student enrolment (after China and USA).

Information and Communication Technology (ICT) is bringing changes in societies throughout the world. ICT comprises several multimedia tools, such as computers, broadcasting technologies (radio and television), the internet, telephone and the like.

Information Technology (IT) is defined as the study or use of electronic equipments, especially computers for storing, analyzing and sending out information.

Communication Technology is the process of sending, receiving and exchanging information.

ICT can be defined as "anything which allows us to get information, to communicate with each other or to have an effect on the environment using electronic or digital equipment (Siraj-Blatchford & Siraj Blatchford 2003, p.4).

The use of ICT is inherently advantageous to support, facilitate and make easier teaching-learning process. The use of ICT, particularly a computer stimulates a new atmosphere where teachers and students could interact and collaborate to learn new skills of understanding about any subject matter and solving complex problems.

ICT offers opportunities for pupils to;

- Prepare them for participation in a rapidly changing world where activities are increasing transformed by access to ICT.
- Making learning more interesting especially for those issues which are hard to understand.
- Develop initiative and independent learning skills.
- Bridging distances through the use of e mails, phones, video conferencing etc.
- Enhance interaction with peers over long distances.
- For research and useful information sharing by using internet.
- Gain rapid access to ideas and experiences from a wide range of people, communities and cultures.
- Breaking literacy barriers in communication.
- Provide more realistic information on life elsewhere.
- Create entertainment opportunities.
- Provide health information including on sensitive issues.

Impacts of ICT

ICT can and does impact on higher education throughout the world. It provides opportunities to stimulate learning and increase motivation that enables teachers and students to interact productively with neighboring communities and global economy in a wider and higher scope.

Technologies can play a role in student skills, motivation and knowledge (Grabe & Grab, 2007), Pickers gill (2003) said that ICT in the classroom increases the student's awareness of the world around them, as they have access to a large amount of information.

The introduction of various information technology ICT trends has lead to reorganization, change in work pattern, and demand for new skills, job retraining and reclassification positions. Technological advancement of the past twenty five years, such as the electronic data base, online services, CD-ROMs and introduction of internet has radically transformed access to information. ICT presents an opportunity to provide value added information services and access to a wide variety of digital based information resources to their clientele. In addition, the rapid increase in student enrolment, knowledge explosion, advances in information and communication technologies, globalization, economic restructuring and financial constraints have all contributed to reforms in higher education (Hattangadi & Ghosh 2008, Shin & Harman 2009, Welch, 2011). The integration of ICT in higher education is inevitable (James & Hopkins 2009). ICT has changed the way business and industries are conducted and influence the way people work interact function in society (Bhattacharya & Sharma 2007, UNESCO 2002). ICT has become common place at home, in work and educational institutions (Kirkup & Kirkwood 2005). ICT provides the opportunity of interaction as a means of training and knowledge (interaction between teachers and students, between students, between them and computers and between teachers and students on the one hand, as well as external partners). The main role of information search, critical analyses and the production of new information made available on the web. The use of ICT, including the internet at home, and work places, has increased exponentially (McGorry, 2002). ICT and the skills it develops are what future employers need and want.

Furthermore, the evolution both of society and of the work market demands that there be a change in the competence profile of graduates. Santos (2001) referring to a set of studies dealing with this issue, sums this up by stating that what is expected of a higher education graduate, is 1. Personal attributes (which includes intelligence, knowledge of a given scientific area, the will to learn throughout life, flexibility, self regulating skills, self motivation and self confidence). 2. Interactive attributes (which include the ability to communicate, relate to and work within a team).

In this change of paradigm, it is now impossible to ignore the potential of information and communication technologies ICTs and especially of the internet (Trindade, 2002). New demands regarding graduate student's skills have generated profound implication in the change of the pedagogical paradigm. With respect to teaching methodologies, the paradigm must evolve towards student centered methodologies, which make the student an active element in learning, duly guided and accommodated by effective and committed tutorial support. As mentioned to the report to UNESCO of the International Commission on Education for the Twenty First

Century, this technological revolution obviously constitute an essential element in the understanding of our modernity, in as much as it creates new forms of socialization and even new definitions of individuals and collective identity (UNESCO, 1996).

Harasim, Hiltz, Teles & Turoff (1996) took the following methodological aspects into account

1. The teacher would be able to provide tutorial support via internet through e-mails and forums especially created for this purpose.
 2. Students would use an electronic forum which should be seen as a public space for the sharing and debating of ideas between the various workgroups, through the presentation of suggestions, comments etc., relating to the various themes ;
 3. Students could/should use the e-mail to communicate with members of their own group and with the rest of their classmates.
 4. Students could/should use both the electronic mail and the forum to communicate with the teacher.
 5. Students could/should use the e-mail to communicate with the individuals and entities exterior to the class outside the course and outside the university, who might be able to contribute to the undertaking of assignments.
 6. Students should consider the possibility of proceedings with information research via the internet.
- The general view is that ICT can be pivotal in tackling the impacts of massification, diversification, internationalization, and marketization of higher education (International Association of Universities 1998, Thune & Welle Strand 2005).
 - Access to information and services that has accompanied the growth of the internet (Ozdemir & Abrevaya 2007). Some of the positive aspects of this increased access are better and often cheaper, communications such as VOIP phone and instant messaging.
 - Creating competition among institutions leading to improved quality (Cross & Adams, 2007).
 - Improved access to education e.g. distance learning and on line tutorials where students can access teaching materials from all over the world (Bhattacharya & Sharma 2007).
 - New ways of learning e.g. interactive multimedia and virtual reality, new job opportunities etc.
 - Developing higher order skills and collaborative skills (Bhattacharya & Sharma 2007).
 - New tools like digital cameras, photo editing software, high quality printers etc.
 - ICT can be used to help people overcome disabilities e.g. screen reading software enables partially sighted or blind people to work with ordinary text rather than Braille.
 - Possibility for students to have individual learning programs within a topic, rather than everybody having to do the same thing at the same time at the same pace (Casal 2007, Mooij 2007, Ozdemir & Abrevaya 2007, Thune & Welle Strand 2005).
 - ICT brings security issues e.g. Encryption methods can keep data safe from unauthorized people, both while it is being stored or while it is being sent electronically.
 - ICT contribute positively to the personal development and future economic well being of pupils and students, and meeting the needs of employees and encouraging lifelong learners (Kozma, Hong and Songan 2005, Lim & Hang 2003, Ozdemir & Abrevaya 2007).

Barriers of ICT

1. Lack of Time
2. Lack of Effective Training
3. Lack of accessibility
4. Lack of appropriate software/materials
5. Lack of basic knowledge/skills for ICT integration

6. Lack of technical support
7. Lack of teachers' confidence
8. Crowded classrooms
9. Lack of competence among teachers
10. Inadequate number of ICT courses
11. Resistance to change and negative attitude of teacher, principals and administrators
12. Lack of computers and other presentation equipment in classroom
13. Insufficient financing
14. Lack of technology plans.
15. Lack of guidance from specialist mentors and online resources.

Sinko (2002), discussing the barriers to successful integration of ICT into the teaching/learning process, distinguishes the following factors

- Lack of support for the educational personnel and learners;
- Lack of teacher competencies to use certain software;
- Insufficient financing (of teacher professional developments in ICT field, of appropriate computer hardware and software etc);
- Lack of cooperation among academic personnel in the same and in another school.

Whereas Lai (2001), distinguishing barriers to the ICT integration into teaching/learning process, describes them in a more detailed and structured way:

1. Lack of competencies
 2. Limited accessibility
 3. Lack of support
 4. Shortage of time
 5. Change process
1. Entry: learners are trained how to use information and communication technologies
 2. Adoption: teachers use technologies as supplementary aids in the context of traditional teaching/learning methods.
 3. Adaptation: technologies are used for expansions/enrichment of the curriculum.
 4. Appropriation: technologies are integrated and used due to their exceptional and unique qualities.
 5. Invention: new areas are invented where the use of technologies is appropriate.

Recommendations/conclusion:

ICT has the potential to enhance and transform higher education in many ways. Bringing ICT into practice has a major impact to facilitate and improve learning leading to quality enhancements. To create an environment of effective ICT integration,

- Pre service teacher education programs must focus on eliminating barriers.
- Teachers have to feel free and without any restrictions in the teaching environment.
- More generous financial support should be made available to provide the basic ICT infrastructural facilities.
- The educational proposal involves a radical change not only in the ways in which teaching and learning takes place, but also in the manner of thought and of knowledge.
- Orientation programs on the use of computer for information retrieval should be conducted and made compulsory for new entrants into the profession.
- With the technical and pedagogical learning of ICT we would need to create a technological subject to analyze how technologies invented by men "create new worlds for the best and for the worst". (Postman 2002:219).
- Short computer training and retraining programs should be organized from time to time to assist those who do not have knowledge and computer skills. This will also

- aid awareness of computer potentials and capabilities.
- As ICT integration into the teaching and learning process and the whole system of education is rather complicated process, new conceptions, strategies, plans and models have to be developed by the Ministry of Education and Educational administration which make full use of the potential of new technologies.
- Training processes must be re-evaluated in the light of divergent conception of time and place and of its intersection, centered on a cybernetic approach to communication; new learning communities- cyber communities, cyber schools, cyber courses based on new and/or renewed forms of the conception, organization, attainment and assessment of different forms of learning.

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