Role of Information and Communication Technology in Teaching Learning Process

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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 endeavors 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 degree of personal contact with learners. The use of ICT in education lends itself to more student centered learning setting 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 important and this importance will continue to grow and develop in the 21st century .

ICT is a force that has changed many aspects 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.

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 tools. But in recent times factors have emerged which have strengthened and encouraged moves to adopt ICT into classrooms and learning setting. These have included a growing need to explore efficiencies in terms of program delivery the opportunities for flexible delivery provided by ICTs: the capacity of technology to provide support for customized educational programs to meet the need of individual learners; and the growing use of the Internet and WWW as tools for information access and communication .

These factors and many others are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will son large scale changes in the way education is planned and delivery as a consequences of the opportunities and affordances of ICT.

Impact of ICT on Education

The integration of ICTs into teaching-learning process has the potential to enhance tools and environments for achieving these objectives of education and learning at schools. Using ICTs in education means more than simply teaching learners to use computers. Technology is a means for improving education and not an end in itself. Thus ICTs should be used to encourage students to explore. Research has shown that ICTs utilized in classroom allow pupils improved efficiency of learning.

ICTs have promised to expand the basic nature of education. Such as the ability to link written with audio and visual material that can enrich the full range of the learner's senses. The technology also creates a qualitative expansion in the means of education by taking a process rooted in the one way delivery of knowledge and making it more participatory and reciprocal. Computer communication takes a system of learning based in narrow linear, narrative forms, and opens it up to a wide range of nonlinear, exploratory processes that allow the learner to make full use of his or her own multiple cognitive maps. The students mutually constitute their learning environments which grow in the learning process. Similarly the incorporation of ICTs in education the training programs has profound influence in teaching and teacher preparation. The student accesses knowledge and information through Internet, TV, satellite and cable network and digital media to synchronize learning mediated through these multiple delivery mechanisms.

The modern world counts on ICTs in facilities the process of democratization of access to information and knowledge. This may lead to a new more humanistic culture by advances in health and education empowering through networking small players such as NGOs interactive teaching and long distance education, attainment of new employable skills and access to a wealth of knowledge. To re-emphasize more than any other social institution, formal education is fundamentally about knowledge, information, and communication. It is the new information technologies that will help us to build up and open educational system. And in turn the open educational system will bring about dramatic change in the technology of obtaining knowledge owing to more efficient organization of students cognitive activities. The development of online cources, libraries and other information resources, and the marketing of distant or online education by businesses and schools eager to profit from opportunities to expand their horizons, is the beginning of what some see as a revolution in learning.

The role of ICTs is crucial in shaping the services for future in knowledge management. The knowledge management environment embraces the entire information transfer cycle from the creation, structuring and representation of information to its dissemination and use.

Impact of ICT on what is learned : Conventional education has emphasized content. For many years, courses have been written around textbooks. Teachers have through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary

settings are now favoring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is .

ICTs are able to provide strong support for all these requirements and 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 for 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 setting will continue to grow.

Expanding the pool of generic skills: 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 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 on ability to reason formally, to solve problems, to communicate effectively, to be able to negotiate outcomes, to manage time, project management, and collaboration and team work 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.

Impact of ICT on how students learn : Just as technology is influencing and supporting what is being learned in schools and universities, so too 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 facilities 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 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 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 :

> ➢ 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.

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, the influence of the technology on supporting how students learn will continue to increase .

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 away today are those based on constructive 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.

Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource based, student centered setting and by enabling learning to be related to context and to practice. 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.

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 said and traditional in terms of 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 extended from when students can choose to learn to where they learn.

Educational institutions have been offering programs as a distance for many years and there has been a vast amount of research and development associated with established effective practices and procedures in off campus teaching. Use of the technology, however, has extended the scope of this activity an whereas previously off-campus delivery was an option for students who were unable to attend campuses, today, many more students are able to make this choice through technology facilitated learning settings.

In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs. Students are starting to appreciate the capability to undertake education anywhere, anytime and any place. 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 .

As well as learning at anytime, teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Mobile technologies and seamless communications technologies support 24x7 teaching and learning. Choosing how much time will be used within the 24x7 envelope and what periods of time are challenges that will face the educators of the future. 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. Advancements in learning opportunities tend to be held back by the ICT capabilities of the lowest common denominator, namely the students with the least access to ICT. As ICT access increases among students so too will these opportunities.

Emerging Issues

A number of new 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.

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 skills 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 examples, school students studying university courses to overcome limitations in their school programs and workers undertaking courses from their desktops.

Cost of education : Traditional thinking has always been that technology-facilitated learning would provide economics 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 bases courses, and for which there would be savings in delivery through large scale uptake. 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 understand costs in such areas as course development and course delivery.

The cost associated with the development of high quality technology facilitated learning materials are quite high. It has been found to be more than matter of repackaging existing materials and large scale re engineering 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 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.

Influence on stakeholders : While ICTs may not have had a impact to date their use will grow to play a significant role in many aspects of the design, development and delivery of educational programs in the coming years. The various influences that have been discussed provide examples of an agent that has the capacity to influence education at all levels and hence to be an agent supporting and encouraging considerable change. When the future fo education is considered in this way, it is interesting to speculate among the stakeholders, for whom the change will the greatest . Clearly the stakeholders for whom technology would seem to proffer the most influence and change are the students. So while institutions are pondering how they will be influenced in years to come, whatever the outcomes, the beneficiaries of the activity and change will be the students.

Reforming Higher Education System in India

India has 280 universities and equivalent institutions of 14 open universities. The number of students has reached the level of 6.75 million and there are 0.321 m teachers in the higher education system. But the future projection suggests massive requirement of infrastructure. This linear projection will be grossly invalidated by factors like success in secondary education, improvement in economic condition, etc. For the additional enrolment of about 4 million students, India will need a massive new infrastructure. Both center and states are at the end of their wit for more funds for education. The state will neither be able to provide facilities nor will be able to refuse places in higher education.

There is a great hope from ICTs in finding answer to the problems. The educational expertise was concentrated in a few islands of islands of excellence at a time when the country was struggling to build a huge educational infrastructure, find funds and appoint good teachers. ICTs provide answer to the problem and can help to take the lectures of expert educators to remote area, which did not have the required facilities or human resources.

Under CLASS project and in its modified version, all secondary and senior secondary schools are being equipped with modern computing facilities. All fee charging private schools have computers. More importantly, under Sarva Shiksha Abhiyan, Government of India is initiating a new program on computers in elementary schools during the 10th five year plan with simputers. Further, official policy and programs have decided to set up SMART schools on experimental basis.

The University Grants commission has equipped all universities and almost all colleges with computing facilities. Technical and engineering institutions are well equipped with computing facilities.

A digital unlinking facility has been set up at Indira Gandhi National Open University (IGNOU). Development and Educational communication Unit in Ahmedabad has facilities of Training and Development Communication channel for interactive mode. Similar facilities have been set up in Karnataka and Madhya Pradesh. Virtually, the districts in the country are either already connected or will be connected in the near future and together it will be capable of creating country wide virtual classroom. This virtual classroom facility through interactive television is being extensively used by several national organizational like the NCERT (National Council of Educational Research and Training) IGNOU etc. Nonetheless, the most important deterrent is cost of hiring the IGNOU uplink studio, pitched at USD 200 an hour that too not easily accessible due to programs in the Gyan Darshan. In a separate endeavor, IGNOU is equipping all its 600+ study canters with digital reception facilities. It is likely to link its study centers with web based return path whereby learners can communicate through e mail.

The University Grants commission (UGC) has initiated a program to provide electrons access, which will provide the best current and archival periodical literature from all over the world to the university community. Under the initiative UGC is modernizing the university campuses with State of the art campus wide network and setting up its own nationwide communication network named UGC infonet. UGC Infonet will establish a channel for globalization of education and facilitate the universities in marketing their services and developments through INFLIBNET (Information Library Network) a body of UGC primarily to automate and network the university libraries and institution of national importance to share the resources effectively).

The National open school has set up a faculty for development digital multi media software on education curriculum at the school level. India is also working on micro-satellites that can provide localized service on open school programs through uplinked earth stations. The universities, the government agency (the department of electronics) and the National council for Education, Research and Training and the private sector (including the private National Institute for information technologies) are working together to develop computer aided instructional material to be used for both distance and traditional learning programs. NIT works with various state governments in the area of IT education in schools.

Conclusion

It is now widely acknowledged that ICTs have great potential for knowledge dissemination, effective learning and efficient education services e-education systems are being implemented in universities all over the world. Almost all developed countries have successfully experiment ICTs for education.

But there are many challenges and dangers also. ICTs can provide the means to explore new forms of learning that break out of the traditional hierarchies of educational bureaucracy and develop genuine alternatives to rigid passive approaches to learning. But they can also reify those hierarchies if they are applied without a commitment to the principles of equality, participation, privacy, mutual respect, and responsibility that historically provided the foundation for our education system . If educational policies and strategies are not right and if the prerequisite conditions for using these technologies are not met concurrently, the potentials of ICTs will not be realized. This calls for a consensual policy framework that can inform and guide the government in introducing relevant ICT interventions in education.

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