

Challenges of new technologies for teaching and learning

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ABSTRACT

Classroom delivery in the higher education sector is changing with the application of Information and Communication Technologies (ICT). Greater information access, real time communication, cooperation and collaboration, cost-effectiveness and pedagogical enhancement have led to adoption and incorporation of ICTs in classrooms of higher learning. Technological circumstances and socio-economic issues have been a barrier to permeation of ICTs in the echelons of higher learning. This paper discusses the challenges of implementing the new technologies in Universities and sharing the approaches to addressing each challenge.

1. Introduction

In the echelons of higher learning it's difficult to imagine a classroom without technology. There is therefore a tremendous amount of influence of technology in the academia. The influence of technology on higher education can be felt through the writing and presentation of this paper itself. With use of technology came a sense of elation, as it alters the experience of academic work. But in this day and age, when both the teacher and the student have access to the same content, it's time to step back and reflect on the nature of these technological changes that are rapidly taking place and why it's a challenge in the education sector.

As we come close to the change of the millennium, there is a sense of awareness in the advancement of Information Communication Technology (ICT) and the inroads it has made into teaching, learning and research that was previously unimaginable. The aim of the paper is to discuss how technology potentially impacts higher education and the challenges of new technologies for teaching and learning. This paper is divided into a three pronged analysis,

- Higher education and technology in this new age.
- Impact of technology on higher education and

2. Challenges of technological change in higher education

As higher education sector is evolving, the innovation in technology and its pervasive nature into academia is a change that is evident. The role of Information Communication Technology (ICT) to augment the creation, communication and learning of knowledge is palpable. ICT is used to simplify educational concepts and make teaching learning easier. Mass learning can be done through dissemination of educational content through ICT, which leads to flexible learning modes by giving students access to course resources. The blurring of space and time in teaching learning creates a culture of excellence in academic quarters by adding digital communication channels for collaboration to course settings.

Euler (2006), pointed out that universities will become players in the global education scenario, if universities can

efficiently apply new technologies to broaden their services. Study programs can be extended to new audiences and niche segments, which will include international students, part-time and students with disability. A shift in a more collaborative working model in research and education will place the university beyond the mere transmission of knowledge.

3. Higher education and new technology in this age

Institutions of higher learning have always been accredited to be the legitimate "providers" of education and "well positioned" within teaching, learning and the research market. Simultaneously however, higher education has been prone to many different kinds of market dynamism, with new players vying to add educational opportunities to the young adults. A varied range of resources at these institutions enable students to avail themselves of many sources and an amalgamation of information and knowledge in a market driven economy.

In these new knowledge markets, issues of intellectual property right as a way of "production" and "consumption" of knowledge are becoming the norm by faculty members and the institutions. This has an implication as it's a shift from the principal of development of an individual with emphasis on transmission, production and dissemination of knowledge. Faculty members and their students are now seen as knowledge consumers and knowledge producers who function within the market space.

Technology has enabled them to enhance possibilities like exchange and packaging of information, a custodian like slant, which has made research and teaching, products for a new audience. Latchem (2007) points out that technology integration in Japanese higher education moves forward at a snail's pace. Strategic thinking and pedagogy in the universities fail to keep up with technological development and assimilation of ICT in the universities remains a challenge.

ICT has grown with lightning speed and use of handheld devices permeating our lives, makes us understand that the application of technology must be seen in the light of the broader social fabric. More specifically, ICT has become

entrenched in our lives in such a manner that we can't seem to do without it. The "applications" (Apps) that we access on our handheld devices are limitless. Apps for checking grammar, word processing, e-mail, information regarding news, culture, travel, culinary, 24x7 shopping and banking and even getting a degree. Breakthroughs in technology, round the clock which are making lives easier are celebrated for more than one way.

Technology has not only brought about a change in society, but has had a huge impact in every sector, be it sciences, entertainment or the industry at large. It has spread its arms in the education industry too. Some heralded it as the magic bullet, for transformation of delivery of the educational processes but others feel that this paradigmatic shift will not solve the issues that cast a dark shadow in the educational industry. Technology is a mere tool and all involved in the teaching and learning process need to understand that. Also, "technology as a mere tool", is not a new concept. Each innovation of technology has had success and failures be it the use of radio, films or television. What is significant with use of new technology in education is the ability to quantify the difference in measurements of learning. Examples could be online scores, standardized test, comparative assessment, (Russell, 1997).

Advancement of technology has eased teaching and learning in higher education institutions. Use of technology seems to be the norm of the day for efficiency and ease of access at universities. However, the trend to use new technology without realizing its need for the curriculum and its impact on the students renders the use of technology as unrealistic expectations for the people using it.

Kerres et al (2005) argues that the faculty members are the process owners and gatekeepers of research and teaching in the Universities. Also the academicians are the ones who define the curricula, plan courses and are involved in the teaching learning; this aspect hasn't changed over the years. The change is the all-pervasive technology that has made ICT an integral part of innovation at the Universities.

The world is changing at a dramatic pace in every which way, especially in terms of technological infrastructure. With technological advancement and the commercialization of education globally, there needs to be a change in the higher education system to keep pace with the changes. These new universities must match their footsteps with the global transformation and introduce curricula that are increasingly mobile, multicultural yet local in learning.

4. Advancement of new technologies and its Impact on higher education

Quality of knowledge

Technology affects knowledge at the core, helps mould knowledge and how knowledge is generated and valued. Increasingly knowledge is created, processed and stored with help of technology. Technology has helped in conducting research in different way. The transformation in the nature of knowledge has an impact on the relationships of people in higher education. To elucidate, to be "educated", is a term that has many shades. It pertains to embracing the changes that

are happening with the help of technology and to be well versed with using technology. Technology allows collaboration and knowledge dissemination quickly and easily (e-journals, that bring together people across the globe to write and share research papers and easily accessible across the globe).

With the advancement of technology the knowledge industry has evolved and has laid emphasis on the transmission, production and dissemination of knowledge. The faculty and the students of institutions of higher education are seen more as knowledge consumers and knowledge producers. As new knowledge markets are opening up due to technology, new personnel and policies are also needed to be established and put to use for clarity between higher education institutions and individuals for the ownership and management of academic knowledge.

Teaching and Learning process

The teaching and learning process has also been affected due to the advancement of technology. Uses of new technologies have made changes to traditional teaching and learning activities more productive. This advancement has also brought about a change in the research process opening up new frontiers of access to information and investigation.

Technological inroads can bring a change by redesigning courses to accommodate technological applications. This kind of change can transform the core educational process, in fact the basic essence of teaching and learning. The content and delivery of education undergoes a change with the inroads of technology in obtaining and using knowledge.

Use of technology can make teaching and learning a more active process. The students instead of passive listeners can be an active participant in classrooms. The spatial dimension of time and space becomes irrelevant as students can submit assignments from home within a time period. Also content can be accessed online from home and does not need to be just handouts or physical books seen in class. All these transitions put responsibility on the students to integrate what is taught in class with what they access online and the faculty takes the onus of helping them to go about it.

5. Challenges of implementation of ICT in higher education

The main challenge that is faced in society is with reference to globalization. What comprises a global curriculum and which higher educational institution are ready to teach it? With radical changes to Information Communication technologies, the role and relevance of universities are being questioned by researchers and scholars, Tiffin and Rajasingham (2003), who argue that for universities to survive, the need is to adapt and adopt knowledge that is brought about by technological changes.

The new technologies and different cultural spaces need us to rethink education as a whole, starting from the role of the teacher, the relationship between the teacher and student, assessment and grading, ICT in classrooms and the goals of teaching itself. Education and learning with the help of ICT also possess a problem such as copyright and ownership of educational content. The technological revolution forces us into

thinking of issues like knowledge, identity and reality in virtual environments. Therefore, education must be reconstructed and redesigned to meet the challenges of a new high tech economy.

For any organization to integrate ICT, they need to have a comprehensive and clear **plan** as the process of implementation of technology is complex. A well-defined policy and a strategic plan to acknowledge and involve all the interests of the stakeholders of the organization before implementing ICT is imperative. But in many Universities, ICT integration has been embraced in fits and starts without a clear plan. A number of issues that need to be considered before implementing ICT are, the necessary infrastructure, skill levels of the people involved, cost-effectiveness and the most important is choice of the correct technologies as per the need and requirement of the institution.

Besides a plan another issue with relation to technology in higher education is the **access** constraint. Effective ICT integration will only take place with access to equipment and internet for all the stakeholders. If there is restricted computer lab time or restricted internet access, example only through LAN cables at certain points, then the persistent use of educational technology is not feasible. (Warschauer, et al, 2014), many students don't have access to a computer regularly. Without access to basic hardware and software, it is very difficult for faculty to integrate technology into existing curriculum.

Acquiring, installing, operating and maintaining ICT requires **involvement of high costs**. Setting up ICT systems in universities of developing countries is more expensive than in developed countries. Software that is licensed is quite expensive to buy and using unlicensed software is not only problematic but also has legal implications.

With briskly changing global scenario, organisations find it a challenge to get the necessary resources to support the steady innovative changes. It is more challenging in the Higher Education sector as funding in this sector is steadily diminishing. Due to rising costs and shrinking funding, Universities apportion lesser budgets for faculty to be involved in technologically transforming courses, which included travelling to conferences on technological innovations, upgrading existing technological systems on campus, provide incentives to faculty who are keen and willing to learn and use technology in classrooms. Also not all universities will adopt ICT due to differences in their mission and financial apportioning. Liberal arts departments may not have funds to have smart classrooms or computer labs linked to internet at all.

According to Ertmer et al, (2012), insufficient professional **training** is a common reason for lack of technology implementation. For effective technology integration administrators must seek assistance to get ongoing technology training. Not all academicians are tech savvy as their students and blending ICT into their syllabi is a competence challenge and not all academicians are geared for this. Many research studies (**Kerres et al. 2005; Allen and Seaman 2007**) validate

the point that the e-competency of faculty members is a major reason for the slow penetration of use of new technologies for teaching and learning. Many faculty members lack the capability and knowhow of ICT usage. This shortfall is highlighted during seminars on pedagogical and technical aspects which have highlighted weakness in efficiency of ICT teaching learning.

Kerres (2006) has pointed out that the ICT capabilities of academic staff are not connected to the actual teaching learning contexts. But faculty development programs, online courses and classroom trainings of learning modules with mentoring at various levels will lead to upgradation of technology skills in faculty members.

The stakeholders of the institution need to be well informed of the existing ICT available on campus with regard to their area of work. Tusubira and Mulira (2004) stated that stakeholders have little or no knowledge regarding ICT, also some construing that ICT involves a lot of financial involvement and extremely advanced skill sets. They fail to comprehend that ICT creates efficiency and cost effectiveness too. Dearth of awareness goes a long way. An upbeat attitude viz a viz ICT is a pre requisite for the implementation of ICT effectively (Woodrow, 1992). In the implementation of ICT, the involvement of stakeholders is a key to bringing about **awareness and changing attitudes**. Visiting institutions with ICT facilities and undergoing short term training leads to awareness and better attitude towards the facilities and services. Faculty members using technology in pursuit of educational pedagogy rests mainly on their attitudes and beliefs. The faculty must develop their capacity to make use of ICT in classrooms and should overcome fear of technology and language. Most online content is in English and all people in every country are well versed in English.

Weaving technology into teaching and learning process needs **administrative support**. Incentives, resources and ICT policies are provided by the administration at the institutions. The keenness and commitment of the top functionaries towards the fruitful implementation of ICT is very critical factor. Research done by Cameron and Ulrich (1986) states that the involvement of leadership during a change at the institution leads to adaptation of the change. Integration of ICTs fail in many institutions because faculty members try to use ICTs as a replacement for traditional teaching and learning. For new technologies to be integrated into a system all stakeholders need to be involved so that the integration process is effective. As put forth by Bates, (2000), if technologies are to be successfully adopted for teaching and learning, alterations and modifications need to be done in the current practices.

Effective implementation and integration of ICT requires some stakeholders to know some basic **trouble shooting skills**. This aspect of implementation is important in the education sector, as the basic technical support is mandatory to know for a smooth functioning. Proper strategies should be in place for including recruitment and training of technical staff to ensure smooth integration of ICT.

According to the New Media Consortium's *Horizon Report: 2017 Higher Education Edition* two challenges are major. One the obsolescence of human knowledge and, the second is the changing role of the educator. The first point in the report is elucidated by, "Staying organized and current presents a challenge to academics in a world where educational needs, software, and devices advance at a strenuous rate. New developments in technology hold great potential for improving the quality of learning and operations. However, just as faculty and staff are able to master one technology, it seems a new version launches. Institutions must grapple with the longevity of technologies and devise back-up plans before making large investments. There is added pressure to ensure that any tools selected are in service of deepening learning outcomes in ways that are measurable." The role of the educator is becoming more like the mentor and less only as a teaching faculty. It's important for faculty members to embrace this role and support students with aid of new technologies.

Some other challenges faced in many universities across the globe is the availability of basic requirement of electricity and telephonic network.

For universities that have been around for decades need to have a connection with the contemporary society in which it operates. The challenge therefore will be to teach cost-effectively the dynamic curriculum to whom, how and with what effect. Also with the education models changing to lifelong learner controlled model it is the Universities challenge to effectively align their resources with expectations of learners so that they are in business (Rajasingham, 2010).

Many universities find themselves facing new challenges in this technology driven economy. These included also how to arm students with education that is adequate in their field of study and also how to transfer skills and knowledge to leverage technology effectively in the workplace. As faculty members and administrators, we need to create a path for students to keep content shared with help of new technologies meaningful.

6. Conclusion

With the dynamic environment of higher educational institutions there has been an increase of both competition and cooperation amongst universities. The universities are evolving themselves to re-structure and to develop institutional profiles that are clear. This is also compelling universities to validate their teaching and educational research performance through use of online documentations and of measurable means of evaluation in management systems. Integration of educational technologies into the universities and the competencies of faculty are woven into complex interrelated environment of innovation processes in higher education. The advancement of

technology and its adoption into teaching learning have to be tailored to serve the actual learning needs interests of the staff. There needs to be an involvement of the academic staff from training sessions in ICT to developing competence that the institution recognizes, supports and incentivizes.

Technological development tends to outpaces strategic thinking and pedagogical design in universities, and the sustainable integration of ICT into higher education establishments remains a major challenge. The advancement of technological inroads into higher education sector depends on the institutions willingness and the involvement of all stakeholders- their resources, professional interests and the specific locations. The only confident prediction that can be made is that technology will have a far reaching impact on higher education if implemented effectively. Though the task of integration of technology presents significant challenges in higher education, efforts to adopt and adapt to new educational technologies in the will go a long way in being beneficial to the teaching and learning process.

All innovations are fraught with challenges and promises. Potential promises are achieved satisfactorily when all the stakeholders are involved while addressing and overcoming related challenges (Waddoups et al, 2001). New technologies deserve opportunities to satisfy and deliver on the promises and meet their potential.

Embracing technology in classrooms has a significant effect on higher education. Over the next few decades, new technologies will give education an opportunity to reach many individuals around the globe. Also education with the blend of technology will see a move in the right direction towards more specialization in curriculum and teaching methodologies. With these come challenges of ensuring that infrastructure and operations at the universities are in place to adopt and adapt to technology. It is inevitable that ICT will be an integral part of higher education. The spiraling demand for higher education in many countries has lead to the growth in both public and private education sector leading to ICT policies developing into strategies for effective ICT sustainability.

The most important question in the academic world that one will face is, what it will mean to be an educated person in the 21st century. The sweeping changes that the new technologies will bring will change the skill sets of the future workforce. Societies, as a result will need to think how to make most of these new opportunities and ensure that students emerging from places of higher learning remain competitive in the global marketplace.

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