

# **Learning and Technology: Emerging Trends to Democratise Education**

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Esteemed Prof. CH. Hanumantha Rao, Chairperson of Prof. G. Ram Reddy Memorial Trust, Prof. Haragopal, Secretary, Prof. V. S. Prasad and other Members of the Trust, Dr. P. Prakash, Vice Chancellor, Dr. BRAOU, members of the family of Late Prof. G. Ram Reddy, distinguished guests, faculty and staff of Dr. BRAOU, ladies and gentlemen, at the outset I would like to humbly submit my gratitude to the Chair and members of the Prof. G. Ram Reddy Memorial Trust to have selected me to receive this honour and stand before all of you. It is indeed a humbling experience to be amidst distinguished scholars of our times. My basic training is in the field of Library and Information Science, and when I decided to join as a faculty of the discipline of open and distance learning (ODL), I received blessings of some of my teachers in the University of Delhi, who encouraged me to take up the new challenge and give my best. My teachers would be happy to know about this Award, and it further gives me more responsibilities to perform better. With the blessings of my parents and support of my family members, I hope to continue to be worthy of the Award and the responsibilities that come with it. I am also thankful to the Indira Gandhi National Open University (IGNOU), where I served over 17 years in various capacities. IGNOU provided me the scope and space to experiment, innovate and undertake research in unexplored areas of distance education. Over the years, I am lucky to have received the blessings of many of the stalwarts of distance education, who have always encouraged me to strive for excellence. I never had the opportunity to meet Prof. G. Ram Reddy, who was always like a distance teacher for me, whose contributions to education and specially creating the discipline of ODL in India remained an inspiration all through.

Prof. Ram Reddy, the father of distance education in India, is a phenomenon that happens once in a blue moon. Many of you know him personally, and can give more vivid descriptions of his thinking and passion for improving access to education and empower people. I, as a student of distance education, have studied his works and have listened to a series of anecdotes about his life. Many of these are lessons to all of us, within the context of *Power, Politics and Pedagogy*. Today, as tribute to Prof. Ram Reddy, I will delve upon Pedagogy in the contexts of Technology, which is my primary area of interest. In the process, I will use some of my previous works to make this presentation. I would like to declare my personal disposition on the theme. I believe that 'Learning is intuitive, and everyone has the innate abilities to learn. Societies at different times have responded differently to the innate needs of human beings to create systems and processes to help people learn. Therefore, education is the process of optimisation of human potential already present in them'.

## **Learning**

Learning is a change in behaviour due to experience (Das, 1998). "Learning occurs when experience causes a relatively permanent change in an individual's knowledge or behaviour" (Woolfolk, 1998). According to Driscoll (1994), learning is a "persisting change in human performance potential" that is a result of learner's interaction with the environment. In order to understand the meaning of learning, we should focus on few keywords in these definitions:

- a. Behaviour/ knowledge/ human performance
- b. Experience

- c. Environment (Teacher, society, colleagues, objects/ technology)
- d. Interaction
- e. Change

Learning assumes that there is a desired behaviour/ knowledge/ human performance that can be achieved through interaction with the environment. The experience gained in the process results in change from one state (say ignorant) to another state (knowledgeable). Therefore, a learned individual will demonstrate higher order capabilities to perform a given task. How this learning takes place has been a subject of research for years resulting in three major approaches – behaviourism, cognitivism, and constructivism, though there are many other philosophical strands that can be grouped in one of these approaches. Irrespective of the theory of learning we believe in, it is important for us to realise that learning is something that happens in our brain (neural network), often referred to as memory.

### **Memory and Learning**

Memory is considered as the outcome of learning. External stimuli enter our brain through our five senses – though primarily through eyes, and ears in the educational setting. We also receive external stimuli through activities that we do. In order to receive a stimulus, we need to direct our conscious attention to it. As a result, the information moves to the working memory or short-term memory (STM).

Information in short-term memory can stay for relatively short duration, less than 20 seconds, unless it is repeated (Gagne et al, 1988). Its storage capacity is also limited, and therefore, information that is required to be retained for longer duration must go to the long-term memory (LTM). The transfer from STM to LTM requires conscious attempt by the individual, and is called semantic encoding or classification. Some of the techniques of semantic encoding that take place before the information is stored in the LTM are focussing question/objectives, highlighting, underline, analogy, imagery, mnemonics, cues, association, etc.

Information in the LTM is organised as continuous arrangement of neural networks, coded into specific patterns and stored in various parts of the brain. Before any new information is stored in the LTM, similar information already stored in the brain is retrieved and matched to map it in the correct place. The process is something like a library in the logical sense of its operation in organising documents. The LTM is of two types – Procedural and Declarative. Procedural memory records the step-by-step procedure of how-to-do type of information and is related to skills. Declarative memory on the other hand is our ability to store and recall information that we can speak or write. They are of two types (Reyna et al, 2000) – gist memories (eg. concepts, patterns, elaboration, inferences) and verbatim memories (eg. exact values, facts, figures, appearances of graphics and figures). The verbatim memory is also called pictorial memory.

Learning is specific to individual as it takes place within the brain. The locus of control to learn, therefore, remains within one-self, which makes self-learning so popular. As learning is individualistic, it is important to teach the meta-cognitive processes and activities (Lin, 2001).

### **Learning and Technology**

Technology has been pressed into the service of education for optimising human learning. This has resulted in the emergence of a new specialization called educational technology (encompassing technology of and technology in education). The role of technology in education has become more prominent with the rapid growth and development of distance learning, which is primarily a technology-mediated teaching and learning environment. Keegan (1990) emphasises the use of technical media as one of the seven characteristics of distance learning. Before we look into the relationship between technology and learning, we should clarify a few terminologies (methods and media), often used interchangeably in the context of learning and technology.

In teaching and learning situations, instructional methods are the procedures and activities used to help learners to achieve the objectives of the lesson. Some commonly used instructional methods are lecture/ presentation, demonstration, tutorial, discussion, drill and practice, simulation, games, discovery, problem solving, cooperative learning, and collaborative learning. Media are “carriers of information between a source and a receiver” (Heinch, Molenda, Russell & Smaldino, 1999). According to Kozma (1991) “media can be defined by its technology, symbol systems, and processing capabilities”. The symbol systems used in media are text, graphics, audio/sound, video/motion picture, animation and multimedia. It is one or more of these symbol systems that differentiate one medium from another. The technology of a medium enables or constrains its symbol systems and processing capabilities. For example audio as a symbol system can be delivered through cassette or radio, thereby limiting the usage and processing capabilities. A television can provide a very rich pictorial symbol system. But, if only a ‘talking head’ is used to present a programme then its processing capabilities are reduced and can be used like that of radio. It is difficult to differentiate between media and technology, as they are inseparable. According to Bates (1995), any attempt to differentiate media and technology would be “less meaningful as they become integrated into single machines or transmission systems” with the advent of multimedia computers.

### **Do media influence learning?**

It is perhaps one of the most widely researched topics in the field of educational technology. These research studies called media comparison studies have actually revealed that learners equally learned well, irrespective of the means of presentation. Clark (1983) emphasizes that “media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries cause changes in our nutrition” (p. 445). He suggested that research should focus instructional methods that are crucial in learning, whereas Kozma (1991) refuting Clark’s assertion recommends examination of how media influence learning. Notwithstanding the debate on influence of media on learning, media and technologies are here to stay in education as they “do create different cognitive processes at different levels of efficiency (with regard to speed, ease, effectiveness). In other words, the form in which information is presented can determine how it is processed in a mind, and hence how it can be learned” (Cobb, 1997). There is also need to appreciate the fact that learning is a soft science, and any question of effectiveness need to ascertain the similarity of the conditions of learning, which is rather difficult to achieve considering the systems, processes and the variety of stakeholders involved. Thus, it is not just the technology or media; rather it is our understanding of learning as an individual activity/process in every human, and how the systems enhance the learning possibilities.

So, let’s see how learning applications of technology can be organised. We can categorise these into three main groups – learning *from* technology, learning *in* technology and learning *with* technology.

### **Learning *from* Technology**

Learning *from* Technology, is a situation where different media are used as carriers to deliver information from which we learn, e.g., reading a textbook, listening to radio and watching a television programme. We learn from all these sources of information. Meaningful learning here is a generative process requiring learners to select relevant information from what is presented, organise it into a mind map and integrate the new map with prior learning. However, most of the time learning from technology is passive, and thus can be said to be least effective. To enhance learning from technology, it is important that the source (media) of learning be designed specifically for learning, making best use of its own symbol system. In order to learn from television, that uses iconic symbol system to represent knowledge, it is necessary that the learners have some prior experience on the topic through media notes to establish relevance of

the topic to individual learner. The use of learner control over media also enhances learning, as the learner can pause and play the programme to think, reflect, analyse and assimilate new learning.

### **Learning *in* Technology**

Learning *in* Technology is an environment facilitated by the use of technology to learn from. In such a situation, technology is integrated rather than used as a stand-alone media. Thus, learners learn in a technological environment through multiple media. Such a situation is very much like a distance learning situation, or a teleconference based teaching-learning environment that enables a virtual classroom situation. The use of web-based learning or online learning also falls within this category. The learning environment demands certain kinds of responsibilities from the learners and assumes self-regulation and internal motivation as essential components of successful learning. Participation in the technological environment becomes crucial for learning to happen and can facilitate collaborative and cooperative learning through the use of new information technologies such as e-mail, discussion boards, and chatting facilities available on the Internet. The learning in technology is an improved approach towards effective learning and subsumes learning from technology. It is a much demanding situation for instructional designers and course developers, as planning and implementation of instructions are separated, where planning takes more time and effort.

### **Learning *with* Technology**

Learning with Technology is a creative use of technology to allow learners to learn by working with technology, which means instead of watching a video programme or interacting with a multimedia, the learners are engaged in preparing the video or developing the multimedia. The new information technologies, particularly computer and the Internet provide this opportunity to learn with technology. For example, to learn web-based learning, students can work directly on a learning management system to create a web-based learning environment. Resnick (2002) argues that technology should be used to creatively express the hidden potential of the learners, and thus demands digital fluency. This approach goes with the constructivist approach to learning. Learning with technology envisages students' interpretive representation of knowledge expressed through appropriate and creative use of technology such as multimedia, TV or radio. Such an approach towards learning has been proved successful in training rural women to use video by the Deccan Development Society, India and develop literacy-training materials in the Commonwealth of Learning – Literacy Project in India. Bonk et al (1996) reported that in an experiment of learning with technology, fifth and sixth grade students created multimedia on weather. The results show significant gain in student learning and interest in learning Science. The learning with technology puts the students in a more active role, where they creatively engage in understanding and identify the hard spots with appropriate meta-cognitive solutions to tackle the difficult part. As learning by doing is the essence of this approach, it is definitely superior to the other two applications of technology in learning. However, it requires considerably high resources for implementation.

### **Emerging Scenarios**

Now let me turn to the emerging scenarios of learning and technology. While the face-to-face system of teaching and learning is the predominant form of learning the world over, the ODL system has been contributing significantly to provide access to education in the developing countries. Asia alone has about 70 single mode distance teaching universities, with India's share at 15. India is also host to the world's largest Open Schooling system<sup>1</sup>. In Indian higher education system, about 25% enrollment is covered by the ODL system. The popularity of ODL

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<sup>1</sup> <http://www.nios.ac.in> [2013/11/26]

is largely due to its cost-effectiveness and asynchronous nature of educational transaction that provide flexibility to the learners to take advantage of the opportunity to learn at their own pace, place and time.

The ODL system of education is quite old in the western and developed world contexts, and dates back to early 19<sup>th</sup> century. In India, the ODL in its correspondence *avatar* emerged in 1962 at the University of Delhi. However, establishment of the UK Open University in 1969 is said to be the beginning of the modern ODL. In India, modern ODL started with the foundation of Dr. BRAOU (then APOU) in 1982 by Prof. Ram Reddy. While we have moved from the first generation (print only) of distance education to the fourth generation (web and Internet-based), the pace of change elsewhere in the world has been significant to take note and learn.

The *Horizon Report 2013* on higher education<sup>2</sup> lists six trends that will impact higher education systems in near-term (one year or less), mid-term (two to three years) and far term (four to five years). The report identifies Massive Open Online Courses (MOOCs) and Tablet Computing as the emerging trends in the near-term, while gamification and learning analytics are indicated to the technologies for mid-term. The report also predicts that 3-D printing and wearable computing will become available for adoption in higher education sector in the next 4-5 years. Interestingly, the MOOCs have already become a phenomenon, and the New York Times<sup>3</sup> declared 2012 as the Year of MOOCs. The Commonwealth of Learning (COL) has developed a prototype of a tablet, named Aptus which can be used as a server, deploy a Learning Management System and provide last mile connectivity to learning resources through Wi-Fi<sup>4</sup>.

### ***Massive Open Online Courses***

The Massive Open Online Courses (MOOC) emerged in 2008, when University of Manitoba opened a course offered there to over 2000 students elsewhere in the world for free. MOOCs take the advantage of the digital world and Internet to deliver teaching and learning to large number of students, and therefore are based on the principles of economies of scale as in ODL. In addition, these courses are open to anyone with access to Internet and interest to study a course/subject.

In its present form, these are free courses; designed to be accessed by large number of students across the world; students are expected to learn through cooperation in the cyberspace; and the course credits are only for certifying certain competencies.

### ***Online Learning***

The recent report entitled “Changing Course: Ten Years of Tracking Online Education”<sup>5</sup> in the US, indicated that 6.7 million students there take at least one online course, which is about 32% of the total course enrollment. In fact, online learning is on the rise all over the world. We at CEMCA has concluded a study recently on “eLearning in Commonwealth Asia 2013”, which revealed that over 80 different types of programmes ranging from Social Science to Engineering and Technology are offered through online, although mostly in a blended eLearning mode (Pulist, 2013). In fact, in the Indian situation, a full-fledged online programme started in 2001 at the IGNOU on Resettlement and Rehabilitation for development workers (Mishra & Jain, 2002). I had the privilege of being the instructional designer for that programme, which created a web-based platform like a current day Learning Management System. The platform was based on an eclectic model of learning (Mishra, 2002), and provided opportunities for the learners to study, discuss, experience as well as undertake project work online. When I started developing the Post Graduate Diploma in eLearning (PGDEL) at IGNOU, we started to think differently. Another

<sup>2</sup> <http://www.nmc.org/pdf/2013-horizon-report-HE.pdf> [2013/11/26]

<sup>3</sup> [http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?\\_r=0](http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?_r=0) [2013/11/26]

<sup>4</sup> [http://www.col.org/progServ/programmes/KM/Documents/Flyer\\_Classroom-Without-Walls.pdf](http://www.col.org/progServ/programmes/KM/Documents/Flyer_Classroom-Without-Walls.pdf)

<sup>5</sup> <http://files.eric.ed.gov/fulltext/ED541571.pdf> [2013/11/26]

new development was rocking the ODL field -- the Open Educational Resources (OER) that helped us in our thinking. Since the field of online learning has been fast developing, we thought it prudent to use already existing materials in OER in the course, rather than develop new materials. The courses were designed in a way to facilitate critical thinking as well as skill development through actual online project work.

### ***Open Educational Resources***

The use of teaching-learning materials in education has progressed from program learning to self-learning to now, resource-based learning. Initially, educational technologists emphasized that the teaching-learning materials should be designed in a behaviourist learning design to give feedback and help the learner to repeat tasks and learn by practice. With the emergence of distance teaching institutions, the type of learning materials used shifted to align the learning outcomes to different theories of learning, leading to three types of materials: tell and test (behaviourist), dialogic (cognitive), and reflective-action guide (constructivist). Open universities in the process of adopting an industrial model as propounded by Otto Peters usually adopted a uniform material design. Theoretically this is an improvement over earlier practice. The third phase of resource-based learning became prominent with the emergence of the Internet and digital delivery of learning materials. As sharing of information on the web became easy, more institutions started depending on what is available on the web. This led to the emergence of open content in 1998 and MIT OpenCourseWare was announced in 2001. The MIT OpenCourseWare released its first set of 50 courses in 2002. During the same year, UNESCO organized a *Forum on the Impact of the Open Courseware for Higher Education in Developing Countries* that created the term Open Educational Resources (OER). Of course, the Commonwealth of Learning was already developing and sharing learning materials by that time through its STAMP 2000+. The 2002 UNESCO meeting, nevertheless, became a landmark in the history of the OER movement, where Prof. V.S. Prasad represented India, and said “The Open Courseware concept is based on the philosophical view of knowledge as a collective social product and so it is also desirable to make it a social property”<sup>6</sup>.

Since the Forum in 2002, that coined the term OER and defined it as “the provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for no-commercial purposes” (UNESCO, 2002), there have been huge impetus to the growth and development of OER. The participants at the Forum agreed to develop together a universal educational resource available for the whole of humanity. Such a vision led to development of over 250 OER initiatives around the world.

In June 2012, UNESCO again convened the World OER Congress along with the COL and with the financial support of Hewlett Foundation to celebrate the progress of the OER movement and completion of 10 years of the term OER. This yet again proved to be a landmark development. Through a consultative process, the congress released OER Paris declaration, which defined “OER as teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the existing framework of intellectual property rights as defined by relevant international conventions and respects the authorship of the work”.

The Declaration endorsed that OERs promote lifelong learning, contribute to social inclusion, gender equity and education for the special needs, and improve cost-efficiency and quality of teaching and learning. It also recommends that educational institutions

- a) Promote awareness and use of OER
- b) Improve media and information literacy

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<sup>6</sup> <http://unesdoc.unesco.org/images/0012/001285/128515e.pdf> [2013/11/26]

- c) Develop institutional policies for OER
- d) Educate stakeholders on open licenses and copyright
- e) Promote quality assurance and peer review of OER
- f) Develop strategic partnerships to avoid duplication of work as well as technologies
- g) Encourage and support research on OER
- h) Develop tools to facilitate access to OER

There are several OER initiatives that deserve mention apart from the widely known MIT OpenCourseWare. Some of these are Connexion, OpenLearn, Japan Open Courseware Consortium, the China Open Resources for Education, and the National Programme on Technology Enhanced Learning (NPTEL), the Indian Government's OER project through IITs. In the recent issue of *EduComm Asia*, we have listed top ten MOOC platforms<sup>7</sup>. While these projects were initiated for education as a public good, it also helped the institution in their marketing and student recruitment as additional advantages.

### **Need for an Ecosystem of OER through MOOC**

OER in abundance does not make learning happen. Had it been so, libraries would have replaced educational institutions, and the WWW would have replaced teachers! Teachers are still required to design and develop OER to help students learn. Another issue is about the quality of these materials. Being open, and are subjected to reuse, revise, remix, and re-distribute without legal hassle, there is lack of a quality assurance process. Most of the times, it is left to the users to decide whether a piece of OER fits the purpose or not. Many resource initiatives remain incomplete, as it depends on the motivation level of the volunteer developers. Without any reward mechanism for production of OER, teachers take this as an additional work, and therefore, may not put in the needed time and energy to develop quality OER. We at CEMCA has been looking at quality assurance of OER through a consultative process to develop guidelines, and the version 1 of the same is now available<sup>8</sup> and being adopted for testing by stakeholders.

Another problem at this stage of development is the integration of OER in the teaching-learning process, and certifying students based on learning from OER. The OER University<sup>9</sup> promoted by the OER Foundation in collaboration with like-minded institutions such as Athabasca University, University of Southern Queensland (USQ) and Otago Polytechnic, to some extent addresses this problem by creating an ecosystem to provide certification through accredited institutions. The responsibility of quality assurance of OER remains both at the institutional and consortium level, and the new model expects the students to use the OER to study as self-directed learners, and appear for assessment by credible organization, much like that of the examination model to provide access. Instead of books to be purchased from the market, now there are reviewed and matched freely available OER and non-OER organized for self-study by the learners. The OER university model indicates towards separation of content, teaching-learning services, and assessment, usually done by a single agency such as the universities teaching at a distance and on-campus. In future, these three services may be done by separate agencies/institutions. Such a scenario is not new, as at the secondary education level, this is already in practice. That the curriculum and examination is controlled by the state, teaching and learning carried out by schools (either public or private), and the learning content is mostly controlled by the private sector publishers.

Thus, the emerging scenario through MOOC offers us the potentials of the conventional distance education in the digital world. Thanks to the increasing access to the Internet through broadband and mobile, students anywhere can now have access to these courses, providing

<sup>7</sup> [http://www.cemca.org.in/ckfinder/userfiles/files/EduComm%20Asia\\_Nov%202013%20Final.pdf](http://www.cemca.org.in/ckfinder/userfiles/files/EduComm%20Asia_Nov%202013%20Final.pdf) [2013/11/30]

<sup>8</sup> [http://www.cemca.org.in/ckfinder/userfiles/files/OERQ\\_TIPS\\_978-81-88770-07-6.pdf](http://www.cemca.org.in/ckfinder/userfiles/files/OERQ_TIPS_978-81-88770-07-6.pdf) [2013/11/26]

<sup>9</sup> <http://oeruniversity.org/> [2013/11/26]

access to large numbers. The number game on the web has attracted many to MOOC, as it has also the potential to generate revenue. Even if the course is available for free, with such large number of students the potential for revenue generation is enormous and unexplored. One way is to collect fees for certification. There are other ways such as employee recruitment, sponsorships of students, tutoring services etc.

The cost and economics surrounding the MOOCs are yet to be known to us fully. But, we can be sure of few things to come in future. That educational service on the Web will be available through few platforms as service to many institutions. Platforms will continue as consortia of many educational institutions, as no one will have the power to attract large numbers individually to have the economies of scale to operate the infrastructure. A variety of courses will be available, and quality assurance of these courses will continue to be a major debate as in any field of education.

From pedagogical perspectives, we can see the trends in MOOC in two directions: cMOOC and xMOOC. The approach in cMOOC is to provide a platform to the learners to connect to individuals and resources and emphasizes learning through creativity, autonomy and social networking. On the other hand the xMOOC approach is to focus on traditional video presentation and testing. To understand the developments in the pedagogic model, I joined one of the xMOOCs, and found video lectures converted into flash plus built in interactive quizzes. Needless to say that I lost interest in the middle before completing the free course and preferred to become a dropout. The platform never bothered to provide any support or tried to understand why I could not complete the course. The phenomenon of drop out is actually very high in the MOOC as that of the ODL system. This is an area that needs serious thinking and reflection. Considering the absolute number of successfully completed learners at 23,000 in the Stanford MOOC on Artificial Intelligence, many think this as the panacea for the problems of education today.

While MOOCs using OER may transform the educational scenarios, several issues of concerns remain as is, and will continue to be discussed. The issue related to student assessment will remain on top of the discussions. The C in MOOC is commonly understood as Courses, while there are others who believe it as Conference, Conversation or Certification. What is important to note here is the rigour of the assessment tasks associated with the MOOCs. These are kept at a low level to help large number of people successfully complete and receive self-gratification. In the US survey of institutions in 2012 many indicated that credentialing of MOOC would increase confusion in higher education. This indicates towards concern over the current practice of examinations, and resistance to change. There is a need to rethink education in the context of the network learning in the era of OER, and help MOOCs to be game changer. If we consider education as conversation and sharing, and one goes through the experience of learning through exploration, interaction and collaboration, then MOOCs are an excellent vehicle to help people learn new skills to update and upgrade themselves. We need to create the new learning ecosystem online using OER and MOOC.

### **Implications of the Emerging Scenario**

The technological developments are overwhelming. At the same time the response of educational community is cautious, but experimental, as always. Considering the size of Indian education system, especially the higher education system, our responses have been in the expected lines. In spite of having the technical capabilities, we have not jumped into the bandwagon. We have taken steps to create need-based models like online content for the basic sciences and engineering courses through the NPTEL<sup>10</sup>, and have a national mission in place for education through ICTs<sup>11</sup>. A variety of institutions are offering online programmes (Mishra,

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<sup>10</sup> <http://nptel.iitm.ac.in/> [2013/11/26]

<sup>11</sup> <http://www.sakshat.ac.in/pdf/missiondocument.pdf> [2013/11/26]



2009), and some national level institutions have come forward to create and share learning materials as OER. For example, the National Repository of Open Educational Resources<sup>12</sup> (NROER) of NCERT uses Creative Commons BY-SA license for all its materials, while the National Institute of Open Schooling<sup>13</sup> and the NPTEL use CC-BY-NC-SA license. The NPTEL has initiated MOOCs too, while the IIT, Kanpur offered a MOOC on Mobiles for Development<sup>14</sup> in partnership with the Commonwealth of Learning. If we look at MOOC as a phenomenon that attracts large number of students to benefit from the same, we need to consider the demand and supply of courses. “If we build they will come” attitude many not work here. One of the ingredients of a successful MOOC is the availability of star professor, who is like a celebrity coming from elite institutions. Thus, offering courses through MOOC is not only about technology and platforms, it is also about teachers of repute and capabilities of the teachers to adopt and adapt to the emerging scenarios. Also, let’s look back and reflect on the teleconference model of education provided at some of the open universities. The increase in number of students in a class had direct impact on the student-teacher interaction (see Mishra, 1997). When we started using the Learning Management Systems, the same was also a matter of concern, and we focused on increasing the number of tutors to have effective interaction in asynchronous discussions. While student-student interaction and peer learning can take some share in the process of learning, student-teacher interaction is also important. How to integrate this into the MOOC is a challenge both for the teachers and for the MOOC developers. As our response to MOOCs, we need to first position ourselves as to what is our perspective to education, and then prepare our faculty to use MOOCs to spread education. Considering the early developments, I proffer some suggestions for consideration:

- **Working in Collaboration and Consortia Mode:** Certainly travelling alone in the MOOC world is not an option, and therefore, it is better to collaborate in platform development, where institutions can continue to have their relevance as teaching-learning service provider. The NMEICT may consider creating a platform for MOOC using the courses that it is engaged in developing currently.
- **Focus on OER Development:** Having open course is a prerequisite to have successful MOOC. Thus, educational institutions may focus on development and integration of OER in course development both for on-campus and distance education delivery.
- **Appreciation for Open License:** Openness in education has more virtues to create a learning society. We need to create the philosophical understanding about open licenses as against a market oriented approach to commodification of learning materials.
- **Engagements in Learning Design:** Teaching is both an art and science. Writing good educational material requires skills beyond the subject domain. Teachers need to appreciate the importance of media and technology, as well as appropriate instructional design practice to offer courses to help the students become self-directed learners.
- **Quality Improvement:** While the educational transaction and the outcomes are in the open domain, not having a continuous concern for quality improvement would be detrimental to the overall goals of education. Systematic approach to ensure quality as a planned process will ensure success in the emerging scenarios.
- **Institutional Preparedness:** Adoption of eLearning in Indian institutions could face difficulties, if we do not focus on institutional preparedness, especially from the point of view of capacity building of teachers on use of ICTs, and creating the necessary infrastructure, including access to personal computers and high bandwidth Internet. With the progress of National Knowledge Network (NKN), the bandwidth issue in Indian

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<sup>12</sup> <http://nroer.gov.in/home/> [2013/11/26]

<sup>13</sup> [http://oer.nios.ac.in/wiki/index.php/NIOS\\_Copyright\\_Policy](http://oer.nios.ac.in/wiki/index.php/NIOS_Copyright_Policy) [2013/11/26]

<sup>14</sup> <http://m4d.colfinder.org/> [2013/11/26]

colleges and universities has diminished to be a concern. However, if the faculty members are not adequately trained and provided with access to digital technologies and training, the bandwidth would not be fully utilized. Our research indicates one of the barriers for adoption of eLearning is lack of institutional preparedness (Panda & Mishra, 2007), and therefore, every institution must develop eLearning policy and put appropriate resources in place.

### Concluding Remarks

This discourse is an attempt to reflect on emerging trends of digital distance education, and how it may change both conventional distance education and face-to-face education practices. I tried to focus on learning, and how technologies are deployed on the services of educational transaction, while there have been debates on their effectiveness. Numerous research on 'no significant difference' shows that learning at face-to-face and learning through technology mediated systems such as distance education and online learning can be comparable, if not equivalent. Local experiences and research show that key to effective use of technology for learning lies in understanding the affordances of the technologies, and design interventions accordingly. I propose three ways of technology use – learning *from* technology, learning *in* technology and learning *with* technology, as typology of technology use in education, each encompassing the other as a ladder. A best possible situation is where learners are engaged/immersed deeply with technology, in creation of knowledge. I have personally designed and demonstrated similar contexts of student learning, and have observed and researched into such contexts, and see the power of technology to foster sustainable learning.

I have also tried to critically analyse the emerging scenarios of technology and learning, especially the emergence of MOOCs, development and integration of OER, and adoption of eLearning. While the OER have the potentials to provide increased access to knowledge resources, its use in the MOOCs will provide opportunities to receive credentials through formal and informal learning. Thus, teaching and learning services and certification may get separated, as is already happening in some examples. The implication of these developments for India is tremendous, and given the right kind of impetus, we can improve access and quality of available education. Several projects and initiatives are in place to help us further democratise education.

Thank you for your kind attention.

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