Initiative of MOOCs for Technical and Vocational Education

Rahul Chandra Kushwaha
DST- Centre for Interdisciplinary Mathematical Sciences,
Banaras Hindu University,
Varanasi, India

Achintya Singhal
Department of Computer Science,
Banaras Hindu University,
Varanasi, India

Abstract: Information and Communication Technology (ICT) have taken revolution in modern education. Students are not only dependent on textbooks but they also want to get more knowledge beyond the textbooks. ICT helps them to access large learning content through World Wide Web. Recent advances in online education and Massive Open Online Courses (MOOCs) have enable democratization of education, allowing everyone to receive the same high quality education whether they live in any part of the world. MOOCs are very popular source to provide quality education in free of cost or very less cost. Now MOOCs are very useful to create online courses for technical and vocational education. In this paper we have describe the planning and implementation of MOOCs for technical and vocational education.

Keywords: ICT in Education; MOOCs; Technical education; Distance Learning; Learning Management System, Learning technologies

I. INTRODUCTION

The educators and researchers are trying to integrate technology in education to improve educational qualities and student learning from long periods. One of the technology is to use internet to deliver courses is known as E-learning [1]. There is a big change in education after emerging of Information Technology. Students are not only dependent on textbooks; But also they want to get more knowledge beyond the textbooks. ICT helps them to access large learning content through Internet. There are many learning management system like Moodle, Blackboard etc. are running all over the world. Many educational software like Geogebra, Mathematica etc. enriches the educational contents for teaching and learning [2],[3].

During last decades government organizations of many countries are trying to develop ICT infrastructure into their institutions (schools, colleges and universities). ICT infrastructure includes computers, internet connectivity, software and other equipments [4]. In particular, one among these countries, India is implementing ICT into their institutions through their scheme National Mission on Education through Information and Communication Technology (NMEICT). The India government is implementing this mission to empower students through implementation of ICT in education and enable them to access and implementation of ICT into their learning. Through this mission 400 universities and 19851 colleges have connected through broadband internet connections. To empower teachers to implement ICT into teaching learning ICT training program has organized. Government is planning to provide low cost laptop 'Akash' to access educational contents. NMEICT plans to focus on to implement appropriate pedagogy of e-learning, providing open courseware for various courses, providing facility of experiment through virtual laboratories, online testing and certification. Sakshat learning portal, Gyanvani radio channel, DTH and Edusat are started to facilitate to access e-content by any person, at anywhere in any mode [5],[6].

International Experiences with Technology in Education (IETE) survey has done on 21 countries (such as, Australia, France, Japan, Belgium, England etc.) to find out the implementation of technology in education to share international experiences. Many other countries which are participating in International Experiences with Technology in Education (IETE) is implementing ICT into their education system [7]. The US Department of Education has issued ICT based education into their National Educational Technology plan. IETE survey has done on 21 countries and 20 countries have key priority to implement ICT in primary and secondary schools. These countries have key priority to access computer to students and teachers to access ICT contents. In some countries they have developed nationwide Learning Management System to develop online courses and deliverer online instructions [7].

The term Massive Open Online Courses (MOOCs) was first introduced by George Seimens and Etephen Downes in 2008 [1]; but its gain popularity after first taking free MOOCs class by Stanford professor Sebastian Thrun. Any person having internet connection can join MOOC and they can access, interact and share their experience to other scholars. MOOCs made democratization of education. MOOCs concerns about homogeneous and depersonalization of education. MOOCs have influenced the involvement of corporate into academy and online learning. Many MOOCs are non- commercial and designed by prestigious institutions to market their institutional brand globally [8]. MOOCs are of two types; xMOOCs and cMOOCs. xMOOCs follow cognitivist-behavioral approach. xMOOCs are composed of video recording of classroom lectures, lecture notes, quizzes and assignments. Examples of xMOOCs courses are Machine Learning, Introduction to Data Sciences, Introduction to Mathematical Philosophy etc. run by Coursera or such types of courses run by many other MOOCs. These courses are prepared by instructor based on course syllabus, which consists of video lectures, learning materials such as textbooks and notes and articles, quizzes and assignments (Belanger& Thronton, 2013; kaul, 2012). Students engaged in learning through weekly learning plan by watching video lectures, reading assigned textbooks, discussion with other students via online forums, submitting assignments and preparing assigned projects. Students may submit their problems and queries to instructor through the provided E-mail ID [1].

cMOOCs are designed with the philosophy of connectivism. This is based on the concept that learning is a process of seeking information from human or non-human sources (Rodriguez, 2012). In these MOOCs the participant is connected to each other and each participant has some knowledge. The participant who want to learn something, connect to that person who have some knowledge related to that topic and share their experiences. It may be also possible that the student is connected to some other non-human sources like intelligent tutoring system, and then student put their query to the tutoring system and tutoring system responses according to students' learning experiences.

MOOCs are very popular for professional courses. In a report it was found that there are very large number of students engaged on MOOCs is undergraduate students; after that graduate and researchers. In these students mostly students are engineering and technical background; large numbers of MOOCs users are working professionals who are using MOOCs for advanced professional courses.

Government of India has initiated the development of MOOCs for higher education. The Ministry of human Resource Development (MHRD), GOI, with IISc and IITs has initiated a MOOCs project National Programme on Technology Enhanced Learning (NPTEL) for Technical Education. NPTEL is very popular among scholars of Engineering and Technology. Many prestigious institutions of india, like IIT Bombay and IIT Delhi has initiated their MOOCs with Edx platform.

II.   BRIEF HISTORICAL DEVELOPMENT OF MOOCS

Massive Open Online Courses (MOOCs) have taken a revolution on education to access enormous information without any border, race, gender, class and income (See nature.com/hanoau). Over the past few years, there are big changes in advancement in E-learning. One specific initiative that emerges popularly among students, teachers, researchers and self learners is Massive Open Online Courses (MOOCs) [1]. Hew and Cheung (2014) stated that initiative of MOOC may be situated within framework of large digitized open educational resources which are freely offered and open to students, teachers, researchers and self-learners for teaching, learning and research. Recent advances in online education and Massive Open Online Courses (MOOCs) has indicated that a revolution in education is about to happen. In particular, a common claim is that these technologies will enable democratization of education, allowing everyone to receive the same high-quality education whether they live in any part of the world. MOOCs like Edx, Coursera, MEC etc are spreading knowledge through-out the world [9],[10],[11].

Yuan and Powell (2013) described the issues is the quality of contents, completion rate and awarding credit of MOOCs courses. Low completion rate of has been recorded into MOOCs [12]. Ezektel J. Emanuel described that a survey on MOOCs users across the more than 200 countries of the world have done and it was observed that most of the MOOCs students are already well educated and they use MOOCs for the advancement of their career [10]. University of Pennsylvania, USA has done a survey in July, 2013 on 34,779 students on 32 different courses of Coursera. Coursera Inc. is the most popular commercial MOOCs (Http://www.coursera.org). It was found that 83% of the surveyed MOOCs students are already had taken 2 to 4 years degree. It was observed that prior educational level of MOOCs students is higher than general population

(source: www.barrolee.com) [15]. The dispersion in education level among 'BRICS' countries (Brazil, Russia, India, China and South Africa) are very high. These countries are developing countries which economy is growing fast and therefore these are most prominent countries for MOOCs education. In these countries, 80% MOOCs belongs to very rich family and their educational standards are top 6% among the whole population. It was also found that 70% of MOOCs scholars are already in employment [10].

MOOCs were originated by Prof Sebastian Thrun, professor of Computer science at Stanford University and many other MOOCs are also developed by Computer Science person. Therefore, major MOOCs courses are focused on computer science courses. Karen Head has stated that she had done a survey on a course funded by Gates Foundation, 15000 students were enrolled but only 238 students have successfully completed their course and got certificate. This result is very disappointing, only ~10% of whole population has successfully completed their course on MOOC. The report presented by Karen is very problematic. She stated that 21,934 students have enrolled in the course and only 14,771 students were involved in active participation. The most preferable 26 videos were viewed 95631 times. Students submitted their assignment 2942 times for evaluation and 19,531 peer assessments have completed to evaluate their writing. Out of this huge enrollment only 238 students had received the satisfactory scores and provided completion certificate. Another survey had done by Jason Freeman on Music Technology MOOCs for Coursera. 24,000 Students signed up, 13,000 visited the course and 900 had successfully completed the course. It seems better completion rate. MOOCs companies have set the goal for democratization of education. Their aim is access MOOCs to those peoples who could not get education. It was observed that MOOCs prefers by most undergraduate students and popularity of MOOCs is replacing physical college campus [9].

III.   MOOCS FOR TECHNICAL EDUCATION

MOOCs are very popular for technical education. Many universities make their courseware through MOOCs and students having internet connection access easily their contents. The government of India has started MOOCs for technical education named NPTEL (National Program on Technology Enhanced Learning) fund supported by Ministry of Human Resource Development (MHRD) and managed by IITs and IISc. This program is very popular among engineering students of India. There are very large numbers of courses related to science and technologies in video lectures and slides are available on this website.

There are many popular MOOCs like Coursera, Edx and Udacity runs online courses for technical education. Coursera has also launched many online courses related to technical education. The courses run by Coursera are very popular all over the world. The video lectures on major MOOCs are 5 to 20 minutes long. The courses are launched using weekly planed and about one month long. After each unit of course the assignment are provided. The assignments are in many types. Some assignments are quiz type, some assignments are project. Students solve the assignment and submit online. After successful submission the credits are awarded. There are many methods are adopted to evaluate the performance of the student. When students submit the assignment the assignment are evaluated by an evaluator but when there are large number of students registered in a course then this is very tough to evaluate the assignment by a single person. Then peer evaluation method is adopted. In this method the assignments are evaluated by peer students in online social community.

There are online social networks of students for social learning; Students can create questions and other students can put their opinions on that question. After fulfilment of minimum criteria for successful completion by the students the course certificate may be awarded by the organizing institution [13],[14].

IV. MOOCS FOR VOCATIONAL EDUCATION

MOOCs are also useful for vocational education. Government of India has started MOOCs for vocational education under their program NMEICT supported by MHRD. The major problem in India as well as other developing countries is low bandwidth of internet. In rural areas there are not good connectivity of internet. Therefore, this is very challenging to implement MOOCs in rural areas. But in rural areas there are very large number of unemployed people and this problem can be solved by implemented skill development program for those unemployed people.

In a report in European Union it was found that there are very big problem of employment after post secondary education. Therefore, this is very useful to conduct vocational courses for skill development for students. The MOOCs are very popular among undergraduate students. The MOOCs are the single source to provide quality education and there is no other method. Therefore, MOOCs may be useful to create vocational courses for such students. So that the quality education will be provide to those students in free of cost or very less cost.

V. MOOCS IMPLEMENTATION

We are developing MOOCs for Technical and Vocational Education at Banaras Hindu University (BHU), Varanasi, India. The various courses related to computer science like, Computer Programming in C, Data Structure and Algorithm, Database Management System and E-Commerce etc. has developed and scheduled to the students.

Key features to the MOOCs:

A. *Video Lecture*

Video lectures of duration 3-10 minutes are recorded and provided to the participants. We can upload these videos on YouTube and provide access into the MOOCs. Video lectures are the main part of the MOOCs. This is vary challenges to the teachers to make an interactive video lectures on their course. According to a study, to prepare a one hour good quality video lecture, we need four hundred hours time to work on the video. To record video lectures we need noiseless room and good quality camera. Once video lecture recorded then there are many types of editing work on studio to prepare high quality video lecture. Teacher can also prepare video lectures using their power point presentations and notes using screen record.

B. *Assignment*

After completion of each module, an online assignment is provided to the participants. Students can submit their assignment online within the given duration. Teachers can plan many types of assignments like they can give some questions or it may be to make a project and submit within the time. The teacher can also provide any audio-visual assignment, like student can make a video for their assignment and submit to the teacher.

C. *Quiz*

After completion of the course online quiz is conducted for the participants. Participants solve the quiz and submit within the time. There are many types of quizzes may conducted. We prefer multiple choice quiz but we can provide fill in the blanks, matching sentence, short answer and descriptive answer type quizzes.

D. *Forum*

A discussion forum for social learning has provided. The participants can post their views on forum and other participants may respond. Forums may play very vital role for learning. Students can interact to each other through the forum and the teachers can also schedule their time to the forum, where the students may ask their query to the teacher and teacher may respond; other participants can also comment on their view. Thus forum may be as learning ingredients.

E. *Chat*

Participants can also contact privately through chat. They can connect to the other participants privately and send their message to each other.

VI. CONCLUSION

Information and Communication Technology (ICT) have changes the learning style in our society. Thus MOOCs are rapidly growing as a new model of delivering quality education to people worldwide. We have discussed the impact of ICT on educational technology adopted into different schemes to implement ICT enabled education by India as well as other countries. We also discussed different MOOCs implemented by industries and academia. MOOCs are the most emerging technology for democratization of education and providing quality education to every part of the world for free or very less cost. MOOCs are very much popular for distance education but low completion rate is its shortcoming. In very less time MOOCs are popular in all over the world. We can see that MOOCs are broadly used by many prestigious universities and institutions. Due to emergence of MOOCs industries are also involve into education sector. Now there are many industries working in collaboration with educational institutions. There are many MOOCs like Coursera, Udacity etc. are running their courses in collaboration with many prestigious institutions. The major courses provided by these institutions are technical and professional courses. At the end we have discussed our experience with the MOOCs on Technical and vocational education.

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