MASSIVE OPEN ONLINE COURSES (MOOCs) : A NEW ERA OF HIGHER LEARNING

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ABSTRACT

One of the major technological advancements in online learning is Massive Open Online Course. It is a platform for learners around the world to have access to quality education through the internet. The main objective of this article is to know about MOOCs and its role in Higher Education. It explains briefly about how internet is becoming an integral part of Higher Education in the current scenario. MOOC emerged with a promise to reach to a global domain of learners, and promulgate knowledge in an efficient digital platform, besides intertwining a massive network of students, teachers, scholars, or basically anyone who may be interested in learning. The courses offered through MOOC are diverse and wide-ranging. The paper concludes that MOOCs and online education has a huge potential which would help in accelerating and ensuring social cohesion and sustainable growth.

KEY WORDS : Massive Open Online Courses (MOOCs), E-learning, Coursera, Open Educational Resources (OERs), Education

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INTRODUCTION

Internet helps in democratization of education, by facilitating everyone to access knowledge that has been accumulated by mankind. Internet gives a very flexible access to any kind of data, based on the needs of the learner. It can be knowledge-based, skill-based or attitude-based learning and learning through internet can have impact on all these. This has resulted in a facility, wherein learners can access any content at any time, place and pace, based on their convenience. Many educational organizations have begun offering various courses *via* web in different formats.

A massive wave of opportunity has knocked the door of formative education in the form of MOOCs which stands for Massive Open Online Courses. This revolutionary step towards providing versatile education has yielded some impressive results. The term MOOC was derived in 2008 by Dave Cornier of the University of Prince Edward Island and Bryan Alexander of the National Institute for Technology in Liberal Education. MOOCs are of a very recent origin in distance education, started somewhere around mid of 2011. They are called 'massive' because they are available for the masses. These courses can be fully taken online aimed at unlimited participation and open access via the web. Initially, the movement began in North America with its interests rapidly growing across the world. Proliferation of technology helps us to aid to the growing cost of traditional higher education as well as easy access to it. A staggering fact by the UNESCO estimates results which shows 80 million more people seeking higher education using this new technology.

Modular Object Oriented Dynamic Learning Environment (MOODLE) is an important learning management system through which Massive Open Online Courses (MOOCs) are structured. An e-conference through MOODLE facilitates group discussion. It also helps to update assignments and hence proves to be effective for interaction and comprehension. The usual problems of group meetings can be avoided through MOODLE, but it does have a drawback, wherein nuances in speech and body language are missing. In spite of this, it still serves as a good tool for effective communication.

The universities are rapidly experimenting with online learning but the question is whether they are using a coherent strategy for the same or running downside risks. There is a large possibility that MOOCs can improve the quality of pedagogy. The pedagogic strategy of introducing MOOCs cannot be worked out impeccably because some universities are local re-distributors of online courses, adding tutorials in local language and providing a local credit certification. The MOOCs allow the learning industry to un-bundle courses to be re-bundled again and taught as internal programmes. The Figure 1 shows about the clear picture of MOOCs.
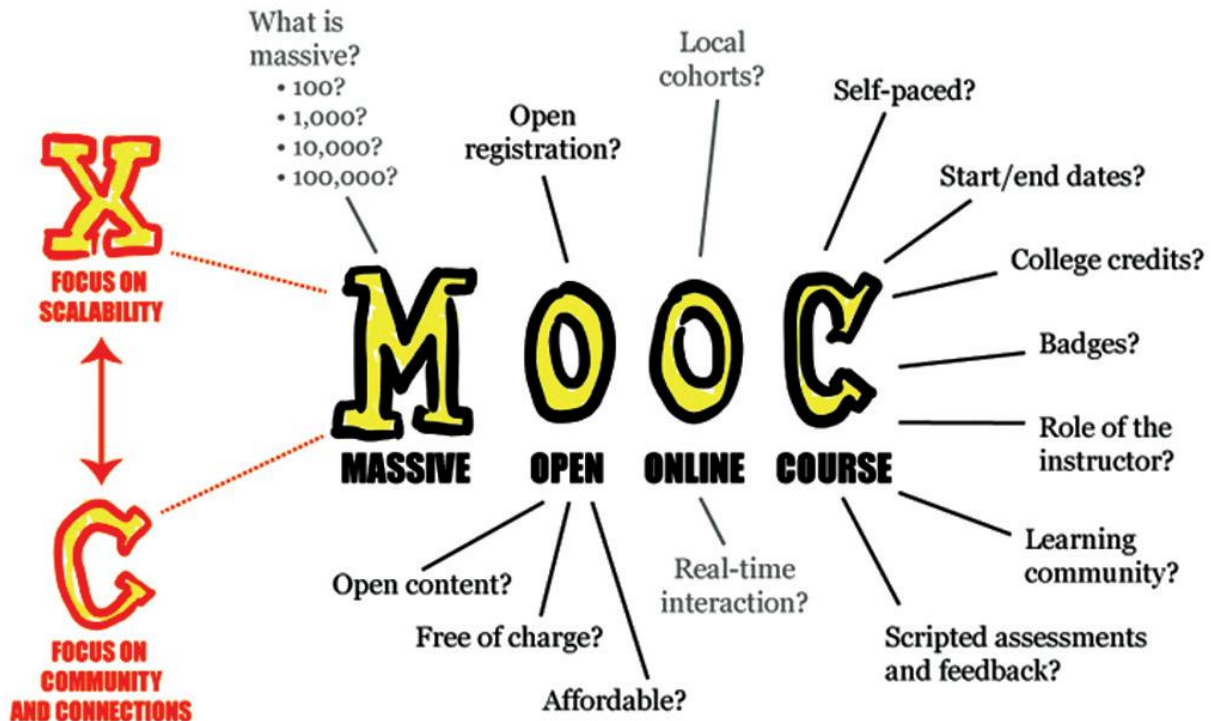

Figure 1. shows Massive Open Online Courses (MOOCs)

Two broad categories of MOOCs have been defined, based on different pedagogical emphases and organizational model :

❖ cMOOC : These are courses based more closely on the original 'connectivist' distributed peer learning model. Courses are typically developed and led by academics through open source

web platforms. Examples include various courses exploring developing online education practice, such as the original MOOC, Connectivism and Connective Knowledge. Initially, MOOCs were guided based on specific pedagogical approach. Later this phenomenon started spreading out without following the pedagogy. This lead Siemens in 2012 to distinguish between connectivist massive open online courses, viz. (cMOOCs) and Coursera and edX massive open online courses, viz. xMOOCs. Thus cMOOCs were developed with aim of exploring the pedagogy that takes the advantage of Web 2.0 for learning. The pioneers of cMOOCs, viz. Siemens and Downes articulated some psychological assumptions that were known to be a new learning theory called connectivism. This led to the proposal of the pedagogy in 2008 that gave birth to the first MOOC. Thus cMOOCs represent highly distributed peer learning and is a part of the open educational resource movement. cMOOCs are based on connectivist ideals. It is less structured and influenced by learners' empowerment. It provided access to learning materials to individuals who might wish to learn. The cMOOC is an independent start-up set up by academics. Various online resources are the focal point for specialists with shared interest.

❖   xMOOC : These courses are typically structured around more conventional lecture formats and are increasingly delivered through proprietary learning management platforms with contractual relationships with institutions and individual academics. 'xMOOC' typically describes courses offered through the Coursera, edX and Udacity platforms. Both cMOOC and xMOOC accommodate their growth by limiting synchronous learning opportunities and personalized academic feedback to students. Though the courses have a weekly structure, the management system permits to allow the students and educators to share and complete their exercises at their own pace. Both models provide feedback and assessments and emphasizes on participation in the course. Automated peer assessment exercises are made available. Specifically xMOOCs uses automated multiple choice quizzes as exercises at the end of short video exercises. This helps in knowledge retention and in final assessment. Peer learning is highly made use of, by both the models for course delivery. cMOOCs consciously restructures the bond between course leader and students resulting in good feedback from participants who have good professional knowledge and creativity. In xMOOC, it is a hierarchial relationship wherein an expert dissipates knowledge to a relatively inert class. However, xMOOC also considers the personalized feedback from the peer groups.

E-LEARNING AND HIGHER EDUCATION

E-learning has created a huge breakthrough in the human capital development. It is a means by which humans can sustain in this fast expanding global environment. In India, we find that at the University level, opportunities for E-learning have increased comparably. Globalization with modern trends and developments are forcing the conventional education system to review and amend the procedures and policies that are currently existing. Professors and students are attracted towards it due to its flexibility of learning anytime and anywhere at one's own pace. A study carried out for a software engineering course to evaluate the E-learning effectiveness in relation to the performance of conventional learning indicated that E-learning is as effective as the conventional method of learning. As a part of a new strategy in E-learning in tertiary polytechnic education, the E-team supported the E-learning and m-learning. Use of mobiles in m-learning makes it easy to use and had positive impact on learners due to its ease in usage as well as satisfaction among users. This served as a catalyst to the entire institution for the adoption of social constructivist pedagogy. It also facilitated lecturers to move from non-engagement to full participation within the E-learning community, thus enabling the constructivist learning environment among students. Similar models can be applied to other contexts of higher education. Similarly, Garrison has explored extensively and expressed the pedagogical, technological and organizational implications of E-learning in his book "E-learning in the 21st Century." Apart from guidance, this provides various practical models that can be used by researchers, educators and senior administrators appropriately to adopt E-learning in their institutions. There are many such models available and hence the moot point is about the authenticity and reliability of these models. The student experiences pointed out that the feedback was timely, well organized, easy to follow and helped in revision for further study. Simultaneously, this also helped teachers in getting feedback on students' progress, thus enabling them to make modifications in their teaching, so that better student learning support system can be evolved. In spite of all the above mentioned potentials of E-learning, there are some important issues waiting for solution like; Quality, cost effectiveness, dropout rate etc.

COLLABORATIVE E-LEARNING

Another appealing pedagogical approach is the collaborative E-learning. It comprises of a didactic model integrating multimedia, collaborative tools and assessment. It involves

educational activities given in two sets. Set one is proposed by the teacher, and students need to review the multimedia. Set two invites the students to create their own multimedia resources and also assess the ones created by their peers. This obviously brings out collaborative communication among students. It also leads to dynamism, motivation, creativity and enhanced learning for students and teachers. One of the drawbacks of collaborative E-learning is that, it stresses on group work and group discussion, due to which individual learner support is neglected as a whole. This is overcome by cloud computing technology, where all the documents are stored in cloud storage. This can be accessed by others who are interested.

STUDENT'S SATISFACTION

When a lot of technology enhanced learning is presented to students, whether they satisfied with E-learning, is the immediate question. Students motivation and satisfaction levels are crucial factors that helps in evaluating the success and effectiveness of any E-learning program. A study that involved 1114 university students from Southern Spain was conducted to determine and analyze the satisfaction level of students with E-learning. Findings showed that the course design and contents, facility for accessing and visualizing information on the teaching platform, along with the possibility of interactions were the key aspects for their satisfaction. The study also showed the perception of the professor as a motivational image. Successful completion of the course taken by the students relied largely on the professors. Another study to determine the quality of E-learning course was carried out in Singapore to get answers to questions like, are the E-learning programs meeting the learning objectives, do students like E-learning, were their learning objectives met and did they use the knowledge. To ascertain the effectiveness and quality of E-learning programmes quickly, a simple framework has been proposed.

MOOCs PLATFORM

The following MOOCs platforms are available for distance learners free of cost:

ALISON

➢   ALISON is considered to be the first MOOC.

➣   It is a non-profit world's leading provider of free online courses with certificates providing 600

➣   courses to 4 million online learners registered worldwide.

➣   Commenced in 2007, it provides free, high quality resources to help working class; students expand needed certified workplace skills.

➣   The mission of ALISON is to enable people anywhere in the world, to learn and get certified new skills among hundreds of free courses to adopt from business & enterprise, languages, personal development and IT using their free, interactive multimedia.

COURSERA

➣   Commercial company initiated by USA professors Andrew Ng and Daphne Koller from Stanford University in 2013. It is considered to be the largest MOOC provider.

Figure 2. Different Coursera (Screenshot)

➣   It collaborates with top universities and organizations in the world to offer free courses online for anyone with the aim to make world-class education accessible to distance learners. It is equipped with lectures taught by world-class professors, where learners may learn at their own pace, evaluate their knowledge, and rejuvenate concepts through interactive sessions. (Fig. 2)

➢ teach millions of students Their technology enables their associates to teach millions of students.

EdX

➢ EdX is a non-profit online initiative taken by Harvard and MIT during May 2012 which seeks to provide highest quality education, both online and in the classroom for students and institutions through cutting-edge technologies, innovative instructions, and demanding courses.

➢ It offers free interactive online courses and MOOCs in collaboration with world's best universities including MIT, Harvard, Berkeley, etc., in areas of biology, business, chemistry, computer science, economics, statistics, etc. (Fig. 3)

➢ There are almost 415 courses available on edX till date.

EXPLORE FREE COURSES FROM EdX UNIVERSITIES

Figure 3. EdX (Screenshot)

EduKart

➢ EduKart.com is India's leading online education company started in 2011.

➢ It delivers high quality and industry relevant online distance learning degree, international programs and certificate courses.

➢ All the courses are supported by telephonic doubt-solving and certification at affordable pricing in collaboration with leading industrial bodies, so that working professionals and students pursuing higher education can easily learn relevant industry required skills and become amore valuable workforce.

Iversity

➢ European online platform started working in 2011, and furnished a new direction to the existing teaching methods and formats by providing online interactive teaching and distance learning.

➢ It works in close association with universities, individual course instructors and knowledge based companies to build high-quality open courses covering a range of subjects comprising computer science, design, economics, law, medicine, physics, and philosophy.

➢ Any registered individual may watch lecture videos, interact and participate in quizzes and exams and discussions may be made with fellow colleagues and professors.

➢ Iversity platform provides an organised course environment that features multimedia teaching materials; assessment features such as multiple choice and peer review in order to keep students occupied and provide them with quantitative and qualitative feedback; a discussion board where students can engage in peer-to-peer learning by interacting questions or sharing links, references and general observations.

THE EMERGING MOOC 3.0 ERA

As a large amount of near-immediate student behavioural data has been collected specifically by the MOOCs, lots of innovation in online pedagogy has been implemented. There has been a great innovation in integrating hMOOCs into academic programs. The Universities in UK and

MOOCs in US follow four major credentialing models such as recognition of prior learning, articulation and credit recognition, content licensing and reciprocal arrangements.

CREDIT RECOGNITION AND PRIOR LEARNING RECOGNITION

As MOOCs started to grow, many individual colleges and universities have began accepting MOOCs for credit. This has been done with faculty approval and or assessments given by the University. The first University to adopt this model was the University of Helsinki in Finland during 2012. During January 2013, Georgia State University announced its consideration to grant credits for MOOCs. Other Universities have followed suit. A form of credit called "Special Recognition" has been awarded by edX for some of its courses. For this, students are required to pay a fee. For students who pay for an authentication of identity, Coursera offers special upgraded certificates. In the interest of Universities, identity authentication and exam proctoring might be of interest for considering acceptance of a MOOC for credit transfer. Not much data exists about pre admission consideration of MOOCs. A possible scenario is to use MOOC completion as additional information in any university admission process.

MASSIVE OPEN ONLINE COURSES (MOOCs) IN INDIA

Educational policies in India shifted focus on the use "educational technology" in learning much early with National Policy on Education 1986, 1992. Soon "ET" was replaced by the term "ICT", thus widening the scope of technology in education. The National Policy on ICT in Education expressly recommended use of open educational resources and launch of free and open courses. National platforms like NPTEL and NROER not only became repositories of open educational resources, but also platforms for offering online courses that were free of cost. The growing relevance of OERs and online courses piqued interest of public as well as private institutions.

HarvardX and MITx conducted a research study in 2014, according to which 10.5 million of the total enrolled students in Coursera were that of India origin. This made India students the second largest community of online learners, after United States of America. Going by this data, India has a large pool of learners, who would be future users of online learning platforms.

Birla Institute of Technology and Sciences (BITS) Pilani has collaborated with the MIT & Harvard's MOOC platform edX to offer MOOCs to its own on-campus and off-campus students as well as students outside BITS. Online education company Coursera had also announced Coursera Learning Hubs which offered people physical spaces where they can access its MOOCs for free. In India, Coursera has alliance with Lady Sri Ram College (New Delhi), Learning Links Foundation and Bluebells Schools International (New Delhi). Such an initiative goes off well in India, where a large population still don't have access to reliable internet connections. Jaaga, a Bangalore-based company had begun Jaaga study, a one-year course on computer programming, which uses MOOCs from numerous sources (Codecademy, TeamTreeHouse, CodeSchool, Udacity, Stanford, Harvard and MIT) online to manage classes offline.Visvesvaraya Technological University (VTU) in alliance with Microsoft research had also started the trial of supplying free online certification to Engineering students on algorithm, design and analysis. The Indian Institutes of Technology (IITs) Chennai, Delhi, Guwahati, Kanpur, Kharagpur, Mumbai and Roorkee and the Indian Institute of Science Bangalore (IISc Bangalore) as a part of a project National Program on Technology Enhanced Learning (NPTEL) funded by the Ministry of Human Resource Development (MHRD) have joined hands to deliver MOOCs. NPTEL has also launched the NPTEL Online Certification (NOC) in collaboration with Google and National Association of Software and Services Companies (NASSCOM).

EVALUATION IN MOOCs

Research has shown that MOOC students project good learning and prefer studying in groups. This gives a social facilitation in the study groups and helps learning difficult concepts in a pleasing manner. A study has been carried with on-campus flipped classroom environment, where students watched and studied MOOC videos together. Findings showed high level overall satisfaction in this environment. Students liked being synchronized in the group. However, a balance between video interaction, degree of conversation and synchronization was important and added to effectiveness of learning in such groups.

Universities around the world accepted MOOCs during 2012-2013. This was in collaboration with the companies that provided infrastructure. MOOC trend show enthusiastic reactions. MOOCs and its types seem to be varying in its openness and massiveness. Online teachers who

have studied reactions of the students to online education for a decade or more have some surprises. There are over 60 evaluation studies by students of the pros and cons of online techniques done by The International Research Review of Online and Distance Learning. Due to the increasing costs of infrastructure with diminishing resources faced by policy-makers and educators, such a circumstance is created wherein data are simply dumped into communication channels. It is noticed that technology is maximized while human contact is minimized along with amplification of isolation and psychological distance. The most disturbing fact is that major MOOC providers have not hired people trained in instructional design, sciences, educational technology or other educational specialties to design the courses.

FUTURE OF MOOCs WITH SPECIAL REFERENCE TO INDIA

Future is a thought of probability and chance, and probability always has a risk of happening or not happening, same way it can be seen that MOOCs as a risk, that turn out to be an asset or a failure. There is no doubt that MOOCs have shown its scale of outcomes that have been hugely positive which needs to be thoroughly evaluated and regarded and considered by faculties, administrators and policy makers. The MOOCs providers have huge funds that can be put to great use if they are invested unbiased with the thought of betterment.

The University Grants Commission (UGC) along with the HRD (Human Resource Development) Ministry has launched a program on MOOC in India for higher secondary, bachelor's and master's degrees. For this purpose, a new portal called 'Study Webs of Active-Learning for Young Aspiring Minds' or SWAYAM, has been launched in 2017 with at least 350 online courses that the participants can take for free. To provide further information on SWAYAM and MOOCs in general, Professor A. K. Bakshi, Chairman of the Centre for E-Learning, said, "These online courses have been developed by a team of senior academicians and are expected to enhance the gross enrolment ratio in higher education without compromising with the quality. These courses will also help in bridging the digital divide in the country."

SECURITY THREATS AND SOLUTIONS IN MOOCS PLATFORMS

Based on our security analysis and observations we have listed some of the key issues or problems in MOOC platforms at different stages. The solution for these security threats are also

listed briefly in Table 1 based on our literature survey and academic knowledge. Most of these solutions are being implemented in the industry and by many online portals for better security. Implementation of these security solutions may lead to better MOOC services and will ensure the trust of the public and industry.

The following Table shows Possible Security Threats and Solutions in MOOC Platforms

Stage	Possible Threats	Possible Solutions
Course Registration	Fake user or dummy user	Biometric authentication. Multiple user authentication schemes (Kumar & Doja, 2007).
	Verification of Prerequisites	Collaboration with local centres /agencies. Uploading of earlier certification/degrees for verification.
	Online payment security issues	Secure payment/protection of users details. Multifactor authentication. End-to-end encryption (Makrushin, 2013; Elefant)
	Weak password policy	Standard password policy should be followed (SANS Password Protection Policy, 2014).
Course Delivery	Fake attendance	Time Monitoring and Attendance Tracking software
	Electronic copyright Protection	Content filtering, protocol blocking, blocking access to infringing online location.

		Digital Rights management
	Secure submission of Work	Encryption, separate and secure channel for such submissions, end-to-end encryption (Miguel, et. al., 2015; Elefant)
	Confidentiality and nonrepudiation	Hash Function, Digital Signature, Policy framework (Ayodele, et al. 2011; Furnell & Karweni, 2001).
Examinations and Continuous Assessments	Confidentiality of student grades	Safe storage and retrieval of information, firewall, Intrusion detection system (Furnell et al., 1998; Furnell & Karweni, 2001).
	Verification of identity in exams/tests	Video recording of exams, verification of photography, collaboration with local centres for physical examinations and secure learning assessment, live proctoring.
	Plagiarism or cheating in assessments	Anti-plagiarism software, additional audio or video recording of solutions.
	Repeating assessment (Retrieving Questions)	Location and IP based monitoring, firewall and Intrusion detection system (Furnell et al., 1998; Furnell & Karweni, 2001).
Certifications	Verification of certificate	Requirement of photography

	Integrity	at the time of registration and examination, Digital Signature, collaboration with local centres (Furnell & Karweni, 2001; Chen and Wu, 2013)

CONCLUSION

E-learning is greeted all over the world, especially for academics, as the benefits are very satisfying. Compared with face-to-face learning, E-learning is very effective due to its benefits like Moodle, NG-eBook, collaborative E-learning, m-learning, cloud computing etc. Almost all the countries are involved in developing, implementing and upgrading E-learning, at various segments of education and at various levels of development. The sharing of ideas and exchange of E-learning programs between countries is not gaining momentum to a greater extent. This will definitely save time, energy and money for all the countries. The errors can be avoided and good ideas can be implemented. The above studies show that each country has concentrated in improving different fields of higher education and so when these ideas are exchanged, definitely there is a considerable, overall, fruitful growth and benefit for all. The International E-learning Association (iELA), New York and other new organizations need to come forward and take the world together in E-learning. They can create numerous opportunities and provide a platform so that E-learning ideas gets culminated to grow higher and higher. MOODLE is a good learning management system that supports the MOOCs to be structured. MOOCs have evolved and developed through these years as Coursera, Edx, Udacity, Future learn etc. Understanding the learner background is a very important aspect of MOOC. Continuous feedback from these students is also crucial in creating much more effective MOOCs. Universities in UK and US have introduced MOOCs to support some of their University teachings.

The MOOCs and online education have huge potential which would help accelerate and ensure social cohesion and sustainable growth.With little efforts by the India government, online education can be extended to every individual. The education system managed through advanced technologies and online studies will definitely help India to nurture its growth. MOOCs could

help make science and technology education accessible to masses but require to develop technical skills among students. The thirst for MOOCs is invasively burgeoning among Indians and they have opted MOOCs for making global classrooms a reality. For Indians, who have a thirst for quality-based western education, MOOCs are proved exemplary in this direction. Hence, it would be appropriate to refer to active learners of these platforms in order to understand the actual growth of MOOC learners. MOOCs providers have to play an important role as there is a significant demand for MOOCs and the inherent challenges of the internet must be addressed to provide quality education.

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