# GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES

## MASSIVE OPEN ONLINE COURSES IN ENGINEERING EDUCATION AND ITS CHALLENGES

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### ABSTRACT

The paper reveals the concept and development of MOOCs and also highlights their structure and features. The paper explains the challenges and roles of academic librarians in providing the best services to the MOOC environment. The challenges of academic librarians in the implementation of MOOC are obtaining copyright clearance, the possibility of providing instruction in information science education literacy to the MOOC community and promoting Open Educational Resources (OER) to MOOC. This research article will be explaining and discuss the future of MOOC and its implementation in engineering education in India.

**Keywords:** Massive Open Online Courses (MOOCs), Engineering Education, Online Learning, ICT, OCWs, OER.

## I.    INTRODUCTION

Internet and the development of fast-growing ICT Tools like smartphones, palmtops, and book readers have changed the student-teacher relationship completely. It is possible to record the world's most elite faculties to upload their teachings and communicate them to the mass beyond their conventional classrooms. Over the past decade, MOOCs are very much popular. MOOCs are breaking the geographical, political, and ethical boundaries between teachers and students. MOOCs are high-quality course supplements available to students around the clock. The only disadvantage of MOOC is the lack of personal touch and eye contact between students and faculties but that can be overcome by this virtual classroom teaching using different technology and ICT tools based on the need felt. The MOOCs and technology can never replace classroom interactive teaching but it can only work as a supplement to classroom teaching. In India and internationally, MOOCs are being used by students and they are getting well-informed in today's competitive world.

## II.    STRUCTURE AND FEATURES OF MOOCs

MOOC offers anyone to understand courses from any academician without any required course prerequisite. These courses present a stipulated period of duration and follow a set of syllabi. As the courses are free and open to all, the number of takers is usually at most engaged thousands of students. Also, dropout rates are the maximum. At most MOOCs have completion rates of single-digit percent. That percentage, however, represents a maximum number of students than a maximum no of professors would teach in person in a lifetime. (Schwartz, 2013).

In order to ensure all courses are implemented in a well-organized manner, MOOC needs platforms or providers. Among major MOOC providers are for-profit and non-profit establishments such as Udacity, EdX, Edemy, Khan Academy, and Coursera. Coursera, with its inception in April 2012, has partnered with 62 elite institutions and "registered 2.8 million students". Coursera offers over 300 courses, in a wide range of subjects including humanities, human science, and science & technology (Empson, 2013).

Participants or students in MOOC have to follow alongside of the course over a set length of time. The teaching process includes the use of recorded web lectures, an online reading list, weekly homework problems, and final exams. Students may complete as little or as much of the courses as they wish and at their own pace (Martin, 2012).

MOOCs are at this moment still offer on a course-one-by-course basis. However, with a growing demand for recognition and transferable credits, San Jose State University (2013), for example, is collaborating with Udacity to offer several online courses for credit. American Council on Education's College Credit Recommendation Service (ACE CREDIT) recently, in February 2013, completed an evaluation of five courses offered through Course and recommended all of them for college credit (Kolowich, 2013).

### Role of Librarians In MOOC
There are many potential roles in that librarians can be involved in MOOC. The MOOC creates unique challenges and its opportunities for academic libraries (Wu, 2013). However, as it is important to recall that this MOOC concept is very useful at an infant stage, the research on librarians' roles is very limited. The roles of librarians in MOOC, obviously, are not comparable and significant with the traditional courses and higher education environment. Among the roles and challenges to ensure this MOOC becomes effective, are obtaining clearing copyrighted content, promoting open content and Open Educational Resources (OER) to the MOOC community, and teaching information literacy skills. It was noted that MOOCs provide opportunities and librarians are working with academics to assist in transition from the traditional teaching to suit the teaching requirements of a MOOC environment. Some librarians are involved in the development of MOOCs and some are taking advantage of the available MOOCs in librarianship to develop professionally. The major challenges faced are copyright issues. The author recommends that librarians should be involved in copyright clearance, offering information literacy and alerting users on the available MOOCs, making MOOCs accessible to all users including the physically challenged. Librarians should develop a collection of open-access materials that they can recommend for MOOCs.

### Copyright Clearance
Obtaining copyright clearance is a most critical and important challenge for librarians in a MOOC environment. Copyright clearance is about seeking permission, licensing negotiation, and fair use determination (OCLC Research, 2013). Librarians must ensure that all instructional materials such as online lectures, learning modules, and quizzes are cleared of copyright issues. All materials to assign as readings also must be cleared of copyright issues. This may be not an issue in a traditional class environment. However, in a MOOC environment, the use of copyrighted materials in a MOOC does not fall neatly within the descriptions of fair use exemptions (Butler, 2012).

Although the universities are non-profit organizations, the platforms and providers such as Udacity and Coursera themselves are for-profit organizations. Hence, allowing the use of materials in a traditional class might constitute an infringement in it. Recently, in April 2014, Copyright Clearance Center, Inc. (CCC), a global licensing and content solutions organization, launched a MOOC Content Licensing Solution. Its partnership with leading course materials providers, CCC's solution provides copyright-cleared course content to participants enrolled in a MOOC, relieving the faculties or academicians of the burden of securing permissions and distributing content (Copyright Clearance Centre, 2014). This is one of many directions for librarians to obtain and retrieve copyright-cleared course content and references for the MOOC environment. Librarians in a MOOCs environment also have to locate alternative sources such as open sources materials, creative commons materials, and other free sources for academicians to develop courses, modules, and assigned readings. They must take full advantage of widely available Open Educational Resources (OER) to locate any information resource which may be appropriate for the courses. The bottom line is that librarians are very much careful to review the proper and legal use of each and every resource used in a MOOC to make sure there is not license agreement violation or copyright infringement. (Gloria & Carolyn, 2013).

### Promotion of Open Educational Resources (OER)
The difficulties in obtaining copyright clearance have led many institutions to shift their academic resources to open or public-domain content. Librarians should promote academicians who are involved in MOOCs to obtain their resources from the open content domain. The value of OER can be promoted in many ways. The idea is probably a face-to-face conversation between librarians and subject experts (Butler, 2012).

Convincing academicians to publish their academic writings is another task for librarians in a MOOC environment. This effort, however, is not very difficult as MOOC itself is an 'Open Content' in nature. Most of the video lecture

recordings, readings, quizzes, and discussions are available for free or under an Open Access (OA) license such as the ones promulgated by Creative Commons. University of California (UCI), for instance, recently announced that its entire undergraduate chemistry curriculum is available on YouTube and its Open CourseWare website. The University offers 15 video courses (22 hours per course) covering the entire UCI undergraduate chemistry major (Matkin, 2013).

Skills that librarians possess such as evaluating, organizing and selecting information resources are essential in the order appropriate OER can be selected as sources and reading materials in MOOC. Librarians should be able to advise and recommend academicians the best OER for particular courses in MOOC.

According to Kleymeer, Kleinman, and Hanss (2010) "librarians have relevant skills, including outreach and education, curriculum development, and instructional support, which could benefit OER programs." The authors also added that library infrastructure and assets such as search and discovery capabilities, copyright expertise, data storage, metadata and indexing, institutional repositories, and preservation could potentially benefit university OER initiatives.

**Information Literacy Skills on MOOCs**
Besides helping their institutions properly use resources, librarians should be also involved in teaching and promoting information literacy skills to students taking MOOCs (Mahraj, 2012). One module of search techniques, for example, may be included in a pre-recorded lecture in the course. A subject-based screencast or a YouTube video on plagiarism and citation can be also used in supporting MOOC students in their courses.

Mahraj (2012) also suggested that librarians can teach MOOC students by scanning student blog posts to find where students are having problems evaluating sources and then providing comments on the posts. This effort, indeed, could take an extraordinary amount of time and work. It is also suggested that more efficient ways to reach MOOC students could be modeling appropriate citations, providing information-literacy skills, self-assessment tools, and creating online information literacy tutorials. The concept of an embedded librarian may also be applied to this new learning environment. Embedded librarian typically participates in online discussions, respond to student post (in the forum), offer classroom-type instruction using web conferencing, and even troubleshoot problems using desktop sharing software (Hoffmann and Ramin, 2010).

**Other Roles**
There are other roles that libraries and librarians can be involved in the MOOC environment. The University at Albany's University Libraries and the Center for Distance Learning at SUNY Empire State College (ESC) have collaborated to offer a new Massive Open Online Course, 'Metaliteracy MOOC'. 'Metaliteracy' is the reinvention of information literacy for open learning and social media environments (University at Albany State University, 2013). MOOC for librarianship also may provide an opportunity for librarians or those related to information management 'to brush up on their skills to get hired, promoted, or just do their jobs better' (Schwartz, 2013). Besides academic libraries, public library also must play their roles in the MOOC environment. Public libraries can become host institutions for local MOOC students to gather and learn. Other roles are supporting the production of MOOC content and learning materials and preserving MOOC content.

**MOOC in INDIA**
India is top 2nd in terms of the percentage of visitors visiting such MOOCs" (Alexa, 2015). Now in India, the first time MOOC course was started by IIT Mumbai with the title "Introduction to Computer Programming". The course is divided into two parts and IIT offers learners with basics in Computer Programming. The second course started by IIT Mumbai was in Mechanical Science titled "Thermodynamics". IIT Mumbai started courses on the EdX platform in the academic year 2015. Now 20+ courses are offered by IIT Mumbai. IIT Delhi also started MOOCs. In India, 2015- 2016 Massive Open Online Courses (MOOC) is the very buzzword for higher education and skill development programs. Now in India is having some MOOCs that are renowned and acceptable nationally as well internationally such as- IITBombaiX, NPTEL, SWAYAM, IGNOU Moocs, etc. The INFLIBNET Centre is one of the institutes for imparting training on MOOC regularly.

## III.    THE FUTURE

As mentioned in the earlier part of the paper, there is a strong and growing demand towards offering forcredit MOOCs by institutions. Hence, in the next few years, there will be more MOOCs to be credited. Secondly, in the future, MOOCs will be accepted as universities' existing on-campus curricula. MOOCs will be used to enhance traditional teaching methods with the introduction of MOOC blended learning. Thirdly, there will be more corporate institutions joining the MOOC movement. In May 2013, the Georgia Institute of Technology announced that American Telephone & Telegraph Company (AT&T) has contributed funds to enable them to launch a professional online master's degree in computer science via the MOOC platform Udacity (Young, 2013). There will be an in-person examination for the course. The cost for this course will be a lot cheaper than the traditional full-time course. As MOOCs evolve towards for-credit, curriculum-embedded offerings and participation of the corporate sector, the roles and requirements for the services of librarians are set to increase (Gore, 2014).

## IV.    CONCLUSION

MOOCs are a new concept and changing the concept from a traditional classroom to a visual online classroom. Besides that, research needs to be done to determine the effectiveness and benefits of MOOCs to society. Various issues such as the sustainability of MOOCs, determining the best instructional designs and teaching pedagogy, quality and completion rate, assessment, and credit must be experimented with and evaluated thoroughly to achieve the best impact of MOOCs. Academic librarians need to be prepared for direct involvement in supporting their institutions in implementing MOOCs. They should start to develop a deeper understanding of MOOCs in their institutions. Collaborative efforts and actions among librarians must be taken to understand this worldwide movement in education. MOOCs definitely will be one of the tools in democratizing education to society.

## REFERNCES
1. Butler, B. (2012). "Issue Brief: Massive Online Open Courses: Legal and Policy Issues for Research Libraries." http://www.arl.org/storage/ documents/publications/issuebrief-mooc22oct12.pdf. (Accessed on 03 May 2023)
2. Al-Atabi, M. DeBoer, J., (2014). Teaching entrepreneurship using Massive Open online Course (MOOC). Technovation.
3. Copyright Clearance, C. (03 April 2023). Copyright Clearance Center Launches MOOC Content Licensing Solution. Business Wire
4. Mackness, J. Sui Mak, and Williams, R. , The ideals and reality of participating in a MOOC. http://www.lancaster.ac.uk/fss/organisations/ n e t l c / p a s t / n l c 2 0 10 / a bs t r a c t s / PD F s / Mackness.pdf (Assessed on 21 May 2014)
5. Matkin, G. (2013), Open Educational Resources in the Post MOOC Era.eLearn Magazine, (April 2013), available at http://elearnmag.acm.org/ featured.cfm?aid=2460460 (Accessed on 11 May 2023)
6. Schwartz, M. (2013). Massive open opportunity. Library Journal, 138(9), 22. Retrieved from http:/ / s e a r c h . p r o q u e s t . c o m / d o c v i e w / 1349332984?accountid=48462
7. Wu, K. (2013). Academic libraries in the age of MOOCs. Reference Services Review, 41(3), 576. doi:10.1108/RSR-03-2013-0015
8. Schwartz, M. (2013). Massive open opportunity. Library Journal, 138(9), 22. Retrieved from http:/ / s e a r c h . p r o q u e s t . c o m / d o c v i e w / 1349332984?accountid=48462
9. Kolowich, S. (2013), "American Council on education recommends five MOOCs for credit",The Chronicle of Higher Education, available at: http://chronicle.com/article/article-content/ 137155 (Accessed on 12 May 2022).