

Massive Open Online Courses (MOOC) Offered by NPTEL and IIT Kanpur: An Overview

K. S. Shivraj

University Librarian, KL University, Andra Pradesh, India

E-mail: ksshivraj@gmail.com

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Abstract - Massive Open Online Courses (MOOCs) are free and open online courses offered by some of the country's leading universities and institutions including Harvard, Massachusetts Institute of Technology (MIT), and Stanford. In recent years, there have been a growing number of MOOCs on the Internet. This paper introduces an overview about the MOOCs courses offered by NPTEL and IIT Kanpur. And also reveals the impact of MOOC in the Academic Library Environment.

Keywords: Online courses, MOOC, Academic Libraries.

I. INTRODUCTION

Massively open online course (MOOC) is a model for delivering learning content online to virtually any person - with no limit on attendance -who wants to take the course. Participants can be students enrolled at the institution hosting the MOOC or anyone with Internet access. The "open" students, who pay nothing to participate, can join in some or all of the course activities, which might include watching videos, posting on discussion boards and blogs, and commenting via social media platforms, though anything hosted by the institution's LMS would likely be off-limits. Although "open" participants receive no credit for the course and may get little or no direct feedback from the instructor, their involvement can add a dynamic to the course that benefits all students. While a MOOC might accommodate enrollment in the thousands, some of these courses enroll far fewer—the "massive" part of the name speaks more to the potential to include vast numbers of students than to the actual size of the class. Massive Open Online Courses (MOOC) is a course aiming at across-the-board interactive participation and open admission via the web. MOOC differs from OCW and OER in that it opens up opportunities for learners to take part in education performance, rather than creation of resources or courseware openly accessible.

A. Open Educational Resources

Open Educational Resources are digital materials that can be used, re-used and repurposed for teaching, learning or research. These resources are made freely available online through open licenses, such as Creative Commons. Most ER have been designed to be used by teachers or instructors for teaching (Falconer et al, 2013). However, an intensive area of use of OERs is by learners themselves.

B. OpenCourseWare

Open CourseWare are course resources that are openly available free of charge from universities. The first major OCW initiative was started at MIT in 2001. Now many universities make their course resources available to teachers and learners around the world.

The idea of a MOOC originated from the Open Educational Resources group. The main idea was to provide Open Educational Resources freely accessible and to run Massive Open Online Courses. MOOCs would support learners to use these resources, by involving with OERs and with other people who were also learning (Daniel, 2012). The design of the MOOCs were based on an approach to networked education, termed connectivism (Siemens, 2005). The term MOOC was first used in 2008 during a course on "Connectivism and Connective Knowledge" run by Canadians George Siemens, Stephen Downes and Dave Cornier (CCK08, 2008; Downes, 2008). This course was designed and offered for 25 students with fee, but 2300 others joined in this course for free, participating by using a range of social media tools they had chosen, including RSS feeds, blog posts, virtual worlds and synchronous online meetings.

II. HISTORY OF MOOC

For many, the concept of MOOCs is not well understood. What originated as open online courses (OOCs) using web technologies to present an open education experience suddenly morphed into an experience for the masses when 2,200 people signed up for Siemens and Downes' Connectivism and Connective Knowledge course in 2008 [CCK08] (Fini, 2009; Rodriguez, 2012). Shortly thereafter companies such as Coursera, which launched in April 2012, began coordinating a growing number of MOOC offerings.

Individuals involved in the early development of MOOCs as an instructional strategy included Siemens and Downes' CCK08; the University of Illinois' not-for-credit course with 2,700 participants in 2011; and Thrun and Norvig's Artificial Intelligence course (CS221) with 160,000 students enrolled from 190 countries (Carr, 2012; Rodriguez, 2012). As a result of his experience, Thrun launched Udacity in 2012, a for-profit company providing alternative lifelong learning options primarily in computer science and math. In May 2012, Harvard and MIT launched the non-profit, edX, with the University of California at Berkeley joining soon after. They were clear that their

agenda was to explore innovative ways to improve classroom education, not to replace it (Kolowich, 2013a). Also in 2012, the for-profit company Coursera was founded by Stanford professors Koller and Ng (Carr, 2012). Coursera partners with leading universities to provide educational access to all.

Some suggest that the MOOC revolution is the past repeating itself, although with a very different delivery model. Carr (2012) reminded readers of the radical change in higher education in the early 1900s. Essentially, access to higher education was provided to anyone with a mailbox through correspondence courses. However, academic rigor and course completion remained a major concern and a number of educators questioned the instructional quality.

III. HOW THE MOOC WORKS

Although the curriculum for a MOOC might be identical to that of a standard course, learning activities are typically restructured to better match the dynamic of a large and fluid group of participants. Course activities could be scheduled or asynchronous, and a flexible structure is valuable because students can choose their level of participation and many will do so in an à la carte manner.

A MOOC is typically hosted on easily accessible sites such as a wiki, blog, or a Google site. In addition, course interactions might take place in blogs, tweets, and other public, online venues. Public announcements regarding the course are generally made on blogs, academic websites, or professional organizations. Open students register online so that they can receive information and announcements.

In 2008, George Siemens and Stephen Downes co-taught a class thought to be the first to use the term MOOC. The course, called “Connectivism and Connective Knowledge,”

was presented to 25 tuition-paying students at the University of Manitoba and offered at the same time to around 2,300 students from the general public who took the online class at no cost. Since that time, most MOOCs have been taught on subjects in the education or technology spheres, but a few topics have been designed for wider appeal. Early this year, for example, Jim Groom led a team of instructors in offering “Digital Storytelling” as a for-credit course at the University of Mary Washington and as a free online course to the public. Students in both groups set up online spaces, told their stories, and published them using assorted digital media. To date, those MOOCs that have drawn the largest crowds have been taught by high-profile instructors on popular topics. A recent MOOC at Stanford University, “Introduction to Artificial Intelligence,” taught by AI experts Sebastian Thrun and Peter Norvig, drew a world-wide open enrollment well in excess of 100,000 students.

IV.SIGNIFICANT OF MOOC

A MOOC throws open the doors of a course and invites anyone to enter, resulting in a new learning dynamic, one that offers remarkable collaborative and conversational opportunities for students to gather and discuss the course content. To manage the often extremely large student base, instructors sometimes depend on social media tools to foster collaborative, participatory, and peer-to-peer learning. Such an approach has the benefit of distributing responsibility for teaching throughout the class rather than laying it wholly on the instructor. Because participants can include degree-seeking students, vocational learners, and people of all ages and locations, the course benefits from a rich diversity of ideas arising from many regions, cultures, and perspectives. At the same time, the MOOC allows the hosting college or university to open its curriculum to a wider audience, extending the institution’s voice into the community at large as it removes barriers to learning.

TABLE I LIST OF XMOOC PROVIDERS

MOOC Provider	URL
Coursera	https://www.coursera.org
Edx	https://www.edx.org
Udacity	https://www.udacity.com
Futurelearn	http://futurelearn.com
Openstudy	http://www.openstudy.org
Codecademy	http://www.codecademy.com
Openlearning	https://www.openlearning.com
NPTEL	http://nptelonlinecourses.iitm.ac.in
Khan Academy	https://www.khanacademy.org
Udemy	https://www.udemy.com
ALISON	http://alison.com

TABLE II LIST OF CMOOCS

cMOOC	URL
Inclusive Technologies for Reading	http://www.load2learn.org.uk/training/onlinecourse/
#etmooc – Educational Technology & Media	http://www.etmooc.org
Open Learning Design Studio MOOC	http://www.olds.ac.uk/home
A Gentle Introduction to Python	http://www.mechanicalmooc.org
Differentiating Instruction through technology	http://www.diffmooc.com
MOOC Maker Course (in German)	http://www.howtomooc.org
Contemporary Latin American Literature (in Spanish)	http://www.eberkeley.org/mooc/
DS106: Digital Storytelling	http://www.ds106.us
Open Course in Technology Enhanced Learning (OCTEL)	http://www.octel.alt.ac.uk
Spanish MOOC	http://www.spanishmooc.com
Think Tank – Ideal City of the 21st Century (Leuphana Digital School, Leuphana University)	http://www.digital.leuphana.de
Introduction to Complexity (Funded by Sante Fe Institute)	http://www.communityexplorer.org
Power Searching	http://www.powersearchingwithgoogle.com/course/aps
Advanced Power Searching	http://www.powersearchingwithgoogle.com/course/aps
MoocMooc	http://www.moocmooc.com

A. Some of the companies offer MOOCs

1. Coursera([Www.Coursera.Org](http://www.coursera.org)) was started by Daphne Koller and Andrew Ng. They are offering more than 200 courses engaging with more than 30 Universities.
2. Edx ([Www.Edx.Org](http://www.edx.org)) offers 15 courses partnership with Harvard, MIT, University of California at Berkeley, University of Texas System, Wellesley College, and Georgetown University.
3. Udacity(www.udacity.com) started by Sebastian Thrun with Mike Sokolsky, David Stavens, and David Evans. It offers more than 20 courses as of 2013.
4. Udemy(www.udemy.com) founded by Eren Bali and Oktay Caglar, who have built a platform to offer MOOC courses with individuals rather than institutions.

V. ACADEMIC LIBRARIES AND THEIR SUPPORT FOR MOOC COURSES

So far academic libraries appear to be serving two related roles in support of the MOOC courses provided by their campuses. First, as always, these libraries are serving faculty by supporting their need for material to use in their lectures and to assign for students' independent reading. From images to essays to software, research libraries are helping faculty to identify and locate resources that are appropriate for their teaching needs. Second, and very closely related, academic libraries have been asked to work

with faculty and campus counsel to navigate the copyright issues raised by teaching in the open, online environment.

Academic libraries often have a reputation on campus as copyright experts, so they are being asked to work with faculty to determine whether it is necessary to seek permission to use a given work in the context of MOOC teaching, and where necessary, seek to secure permissions. In some cases academic libraries are facing significant challenges and delays in seeking licenses for uses that would have been considered fair use or otherwise exempt in the traditional teaching context. Some publishers, museums, and other content owners are asking extraordinarily high prices or refusing to license for MOOC teaching, citing the for-profit nature of the platforms as well as the unprecedented scale. Others are simply not responding to these requests.

Campus counsel at one library has advised that fair use is not an option in the context of MOOCs. As a result, some faculty are becoming frustrated with the process of translating courses they've taught for years, and for which they've developed tried-and-true slides, handouts, and other materials, into MOOC offerings. Where possible, academic libraries are also working to help faculty identify and locate alternative materials that are free of copyright constraints either because they are in the public domain or because they are made available under Creative Commons or analogous open licenses.

VI. INSTITUTIONS OFFERING MOOC IN INDIA

A. NPTEL

National Programme on Technology Enhanced Learning (NPTEL) has launched a new e-learning course in association with IIT and IISc.

As of now, it offers a certified course on programming, data structures and algorithms targeted at second year college students, with an option to attend a test in-person at the end of the course in May or June 2014. The course will run over ten weeks with 2-3 hours of lectures per week and online

assessment of work. The course is powered by Google's open-source MOOC (Massive Open Online Courses) platform Course Builder and it runs on App Engine and Compute Engine.

The programme is an initiative by the Ministry of Human Resource Development and it has tied-up with several other companies in the online education field such as btechguru.com, myopencourses, and Classle. That said, it's not clear what these tie-ups mean, or how much information these websites contribute to NPTEL and vice-versa. It already offers more than 700 courses, though most of them are just e-books or YouTube videos on specific topics. With the new course, NPTEL is looking to operate like other MOOC providers in the market by offerings lectures, assignments and tests.

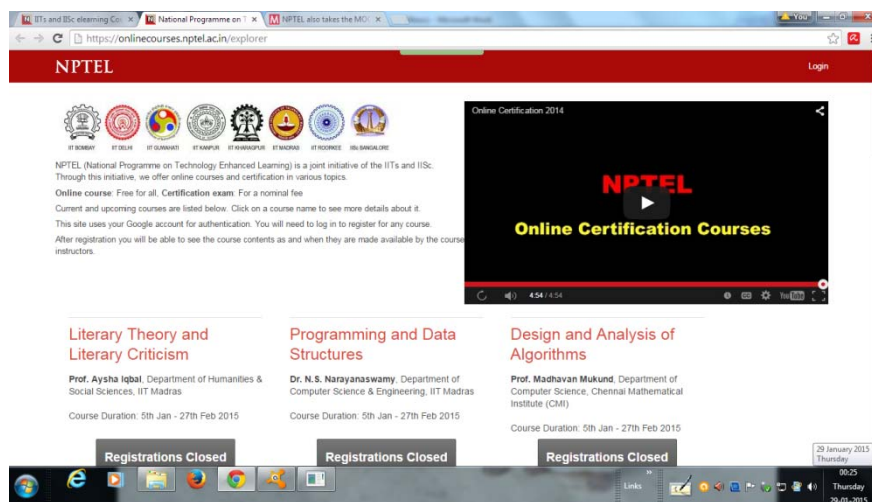


Fig.1 NPTEL online courses

The following courses are offered by the NPTEL.

1. Basic Electrical Circuits
2. Introduction to Programming in C
3. Programming, Data Structures and Algorithms
4. Literary Theory and Literary Criticism
5. Programming and Data Structures
6. Design and Analysis of Algorithms
7. Introduction to Operations Research
8. Language and Mind
9. Introduction to Time-Frequency Analysis and Wavelet Transforms
10. BioMEMS and Microfluidics
11. Digital Circuits and Systems
12. Strategy: An Introduction to Game Theory
13. Introduction to Electromagnetism
14. Introduction to Information Security – I
15. Dynamics of Ocean Structures
16. Health, Safety and Environmental Management in Offshore and Petroleum Engineering

17. Engineering Mechanics – Statics and Dynamics
18. Appreciating Carnatic Music

B. Indian Institute of Technology Kanpur

IIT Kanpur is developing its own platform for Massive Open Online Courses (MOOCs) called MOOKIT. Under MOOKIT, the institution will develop MOOCs around verticals like agriculture and computer science among others.

The first two trial courses to run on this platform include Arch4Cloud, an online course on building cloud based applications, and Mooc on Moocs, a course about key concepts, methods and practices in MOOC programs. The educational institution mentions this program saw over 2300 students participate and is currently offering two more MOOC programs. It is also currently offering a 'MOOC on Mobiles' program.

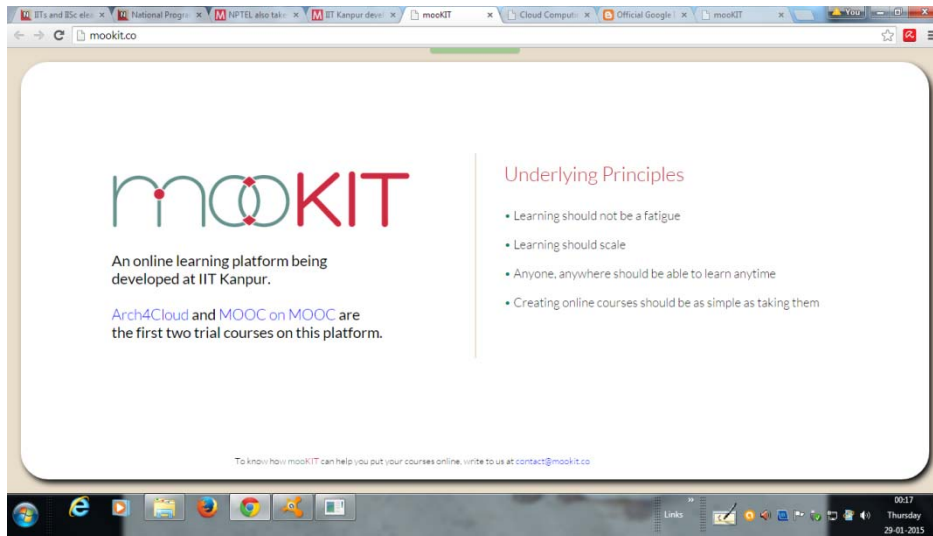


Fig.2 Web portal of Mookit

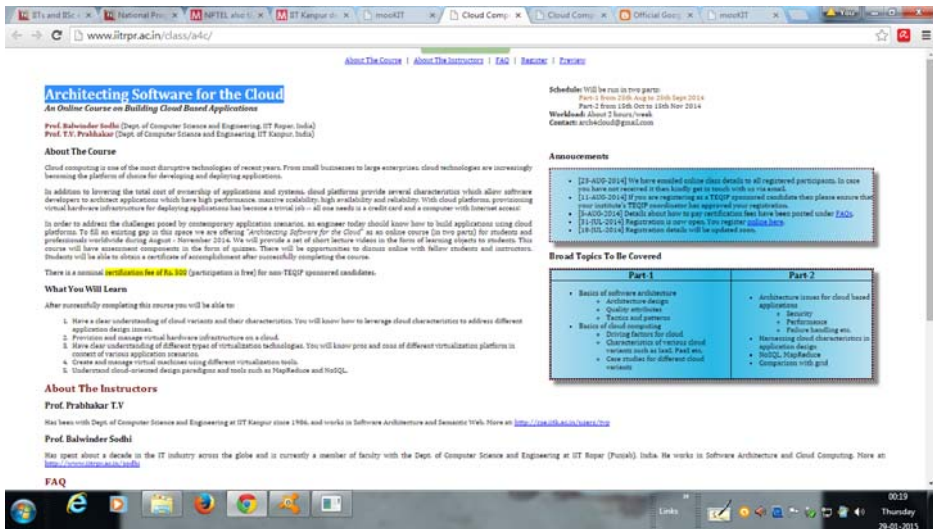


Fig. 3 Architecting Software for the Cloud course

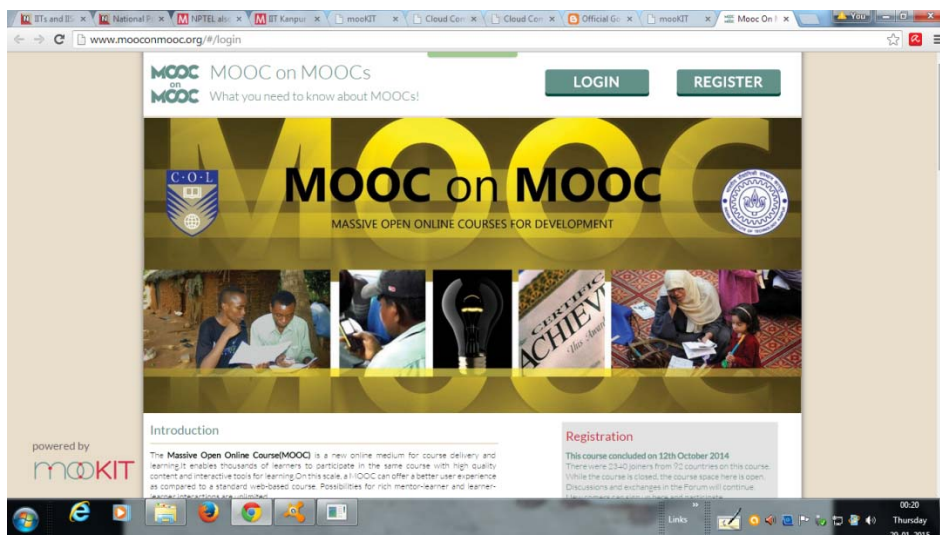


Fig.4 Mook on Mook course

Content of the course MOOC on MOOCs

1. Architecture of a MOOC: lectures, interactions, assessment, certification, identity management and analytics
2. MOOCs and university education: opportunities and challenges
3. Costs and resources management: business models
4. MOOC platforms and components
5. How to design and run a MOOC
6. MOOCs in developing countries

At the end of the course, a participant knows about:

1. Different types and styles of MOOCs
2. Key aspects of content authoring and pedagogy
3. A variety of methods for grading, assessment and certification
4. More effective peer-to-peer learning and online mentoring
5. Technology components that go into a MOOC and platforms
6. How to participate in a MOOC more effectively
7. The basics of copyright and intellectual property matters in MOOC content
8. Costs and resource management of a MOOC
9. Different types and styles of MOOCs

Learner commitment and support

A learner is expected to commit about four hours per week on the average. Instructors and mentors will be available to support learners online. Two real-time chat sessions with instructors will be organized.

Certificates

Learners who fulfill the minimum participation criteria will be issued certificates of participation. Those who complete online assessments in addition to fulfilling minimum participation requirements will receive certificates of competence. Certificates will be jointly issued by Continuing Education Programme IIT Kanpur, COL and TEQIP.

About The Institutions

Indian Institute of Technology Kanpur (IITK), a premier research university in India, is a pioneer in offering MOOCs. It is among the top 50 Asian universities in QS Rankings. Commonwealth of Learning (COL) an inter-governmental organization in the Commonwealth family, is globally known for its efforts and advocacy to improve access to learning at all levels.

Technical Education Quality Improvement Programme (TEQIP) is a national programme of India, under the Ministry of Human Resources Development. The aim of this programme is to enhance the quality of teaching faculty

in institutions of technology in the public sector. KIT (Knowledge Incubation for TEQIP) offers a platform to host quality courses, specialist lectures, research interactions and workshops. According to IIT Kanpur, the underlying principles of MOOCs are to ensure learning is not a fatigue, learning should scale and creating online courses should be as easy as taking them. As of now, the institution ties up with IIT Ropar to jointly give students who successfully complete the Arch4Cloud course certificates of accomplishment, while providing learners completing its MOOC on MOOC course with certificates of participation.

VII.CONCLUSION

The Government of India has already established an open education website in NROER, and it is supposed to be India's flagship initiative in open education efforts and its aim is to empower all by providing resources in multiple languages and formats. Indian government also operates Sakshat, as part of its national mission on education through ICT. All services provided on the website, such as e-books, virtual classes and testing services, are available freely under the creative commons license. The Department of MHRD may consolidate all its education offering less than one roof instead of creating multiple websites each with its own resource set. The government has managed to compile a lot of good education material on these websites, and by offering them on single websites it will become easier for students to find the right resource for their need.

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