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Oleksandr Marchenko,*PhD Student**Borys Grinchenko Kyiv University**Kyiv, Ukraine*FUNCTIONAL COMPARISON OF OPEN EDX
AND MOODLE PLATFORMS

This research provides the main overview of general possibilities of two massive open online courses edX and Moodle MOOC. The presented results show the comparative analysis of Open edX and Moodle MOOC pointing out different categories. The short discussion of performed analyses is also presented. The future research will be focused on the analysis of advanced features which both environments provide.

Keywords: *Massive Open Online Course (MOOC), edX, Moodle, learning management system, extensions, learning platform component.*

The term MOOC (Massive Open Online Course) coined during 2008 and it was related to an online course “Connectivism and Connected Knowledge”, designed by George Siemens and Stephen Downes. According to “Massive open online courses: Digital ways of knowing and learning” [1], MOOC integrates the advantages of social networking, a collection of open educational resources and the support of experts in a relevant field. “Massive” refers to the number of the course’s participants, as well as the capacities of the course in terms of allowing access to a large number of activities. George Siemens defined “massive” as: “Anything that is large enough that you can get subclusters of self-organized interests. Three hundred plus students could be one benchmark; another could be Robin Dunbar’s number of 150 people, which is the maximum after which the group starts to create smaller fractions.” [2, 26]. “Open” usually refers to free access to individual courses, and sometimes it also applies to open or open content platform. “Online”

refers to MOOC access via the Internet. “Course” means organizing content in a given time interval, from a subject area, which contains a set of resources with clearly defined goals and outcomes.

By the end of 2013, most top universities had started to offer some sort of MOOC. Now, we are starting to see the MOOC product move into both the corporate and the private realm. Companies like Google and Tenaris are using MOOCs for training their employees, MongoDB is educating developers through the MOOC medium and thousands of private instructors are teaching classes on sites like Udemy or etc.

With the increased expansion MOOC imposes the choice of the platform for the creation of courses. This article analyzes Moodle Mooc [3] and edX platforms. Moodle LMS has been used for about thirteen years in the educational process. Taking into account the needs of teachers regarding examination and application of Moodle possibilities, a short and structured MOOC was created. It is called “Learn Moodle”. The aim of this course is to introduce teachers with a way the students understand the activities, as well as with the features that Moodle provides. EdX platform provides a huge number of courses in different fields in one place. EdX courses are organized by prestigious universities, with the possibility of obtaining the certificate. With the necessary Internet connection, participants receive in one place learning materials, consultation with the teacher, and the possibility of evaluating the acquired knowledge. There is a large number of studies dealing with the use of MOOC. A way of facilitating the integration of ICT tools in teaching through open environments is described in “Evaluation of MOOC: Hands on Project or Creative Use of ICT in Teaching” [4]. The authors plan the preparation of MOOCs together with the preparation of creative activities with the evaluation of the individual characteristics of the courses, the success rate, etc. Their research demonstrates that the organization of communication activities during the course, highly affects course performance. Starting from this point of view, special attention was placed on the course activities that enable communication between teachers and students in the course, as well as among the participants themselves. The other researchers are engaged in open learning environments for their openness beyond existing learning management system [5]. There are a large number of the researches dealing with the possibilities of MOOCs. Bearing in mind that Moodle is a free LMS system which is

predominantly used at universities, it has been selected for the analysis. According to statistics the number of Moodle users is approximately 69,602,223 [6]. On the other hand, the last few years there is significant increase in using MOOCs. According to MOOCs: [7], edX aims to reach no fewer than one billion of users, and is used by the prominent institutions such as the Massachusetts Institute of Technology (MIT) and Harvard University.

Recently we decided to explore the edX platform. It's an open source Learning Management System (LMS) and authoring tool. EdX is one of the most popular MOOC platforms alongside Coursera and Udacity, but unlike the two others their code is open source and you can host your own MOOC platform. EdX has been created by MIT and Harvard and is listing other well known universities as contributors. Also, in September 2013, Google, who was previously experimenting its own LMS (Google Course Builder), decided to join the open edX platform as a contributor too. The platform is implemented mostly in Python and they created their own component architecture called XBlock. On paper edX sounds great, but how does it compare to Moodle or Totara? Does it fulfill the criteria our clients are targeting?

Main core of edX-MooC platform contains the following features:

1. Interactive video lectures with subtitles and indexing on subtitle (downloadable).
2. Study materials like books, notes, cheat sheets, etc (downloadable).
3. Online test of different types like video embedded quiz, practice sessions, midterm exam, final exam, etc.
4. Virtual Laboratory with interactive interface for user to view the expected simulation.
5. Calendar based schedule.
6. Multi lingual support.
7. Discussion forums.
8. Wiki edits for implementing collaborative learning.
9. Progress reports and other kinds of embedded analytics.
10. Different kinds of assessment systems for submitted assignments (open response problems). It includes:
 - Peer Grading.
 - Self Grading.
 - Staff Grading.

- Machine Grading.
- Emails and Notification facilities for registered student.
- Provision of certification.
- Registering and deregistering from a course.
- edX meetups.
- Contacting authors through mailing.
- Support for a large traffic (Users at particular time).

Also, there are at least six ways to extend Open edX:

1. XBlocks

An Xblock is an extensible system written in Python that processes user input, stores course content, displays it, etc.

2. LTI components

Open edX supports LTI 1.1, and LTI 2.0 is in development. It is the external standard and applicable to platforms such as Canvas. The following is an overview of how to integrate LTI (Learning Tools Interoperability) components. Once we have the required authentication parameters such as the consumer key and consumer secret, in addition to the launch URL and possibly context and resource link IDs (depending on the LTI tool).

3. JSinput

This extension is good to grade and display new types of problems. Unlike XBlocks, JSinput runs on the browser which means that instructors can take advantage of it without modifying the platform on the server.

4. Hacking on core code

You can change anything, although it is not easy. As stated in “4. Open Source Initiative”, you must keep Open edX’s AGPL license in mind. However, the XBlock API works under a more permissive license, Apache 2.0.

5. Open edX REST APIs

Open edX includes a suite of APIs that allow you to build applications that interact with the edX platform. These REST APIs, which use OAuth 2.0 for authentication, are rapidly growing and evolving. They are described in the edX Platform API documentation. Currently the Open edX Platform includes the following APIs: course structure, enrollment, mobile, profile images, user and data analytics.

6. Custom grader

Grading does not necessarily have to take place on the main server. This allows the instructors to return and render elaborate dynamically

created HTML blocks as answers as opposed to just letters or numbers. Depending on the extension points used, difficulties and costs will appear. UC Berkeley offers a good example of what adding extensions to edX is like. Their instructors and students use HTML5, JavaScript and Python to add new functionalities to courses.

Moodle is an open-source learning management system (LMS) that allows users to build and offer online courses. It was built for traditional online classrooms rather than MOOCs, which attract a large number of students. It tends to be easier to install than edX, and there are hosted or one-click install options available.

Moodle is suited for organizations that want a full-featured, customizable LMS. The platform offers more than edX in terms of educational tools, analytics and SCORM compliance. The trade-off is that the platform is over 10 years old. The number of configuration options can be daunting, and system performance suffers with larger numbers of students.

Moodle contains the following features:

- upload existing content, other web resources can be linked to, or create and edit new content in Moodle;
- stimulate, extend and record discussions outside the classroom;
- test and report on students learning, encourage students to learn and self-test, deliver exams;
- quickly gather feedback from students;
- facilitate the sharing, storing and dissemination of knowledge.

Other than the above features also some more features we have those are shown below:

- assignment submission;
- discussion forum;
- files download;
- grading;
- moodle instant messages;
- online calendar;
- online news and announcement (college and course level);
- online quiz.

The following is an assessment of five popular free MOOC (and MOOC-like) platforms (*Table 1*).

Table 1

Assessment of five popular free MOOC (and MOOC-like) platforms

	Max. class size	Brandable	Custom analytics	Monetization	Mobile	Hosting
edX	300 000	+	+	+	+	Self-Hosted
Moodle	10 000	+	+	+	+	Self-Hosted or 3 rd Party
CourseSites by Blackboard	Unlimited	-	+	-	+	Hosted
Udemy (free)	Unlimited	-	-	+	+	Hosted
Versal (free)	Unlimited	-	-	-	+	Hosted

Also, we have additional reasons to choose Open edX platform for building online courses.

Reason 1. The Google / edX relationship will mean that edX will be able to take advantage of the scale of Google's cloud computing infrastructure. We will see this first at <http://mooc.org/>, which will position edX as a free, a multi-tenant cloud-based offering for any educational entity that wants to offer open courses.

A University (or some other entity that wants to offer a course) could choose to locally host their own instance of edX, or they could use the MOOC.org platform and not incur hosting and bandwidth costs. This should lower the barriers for creating, and possibly finding, open courses once MOOC.org begins to gain some traction.

Reason 2. Like on Moodle and Totara, you can have discussion forums for a course. There is a nice WYSIWYG editor with the possibility to preview your post first. A nice feature of edX is the ability to comment any exercise or theory page and allowing others to upvote / report those. It's a pity though that the comments aren't ordered by upvotes by default. Students can find study buddies using Meetup communities. EdX can also

integrate Google Hangouts. And edX comes with basic social reporting tools. One can generate for example the list of enrolled students and the grade reports. Compared with Totara's custom reports feature, edX has still plenty of room for improvement.

Conclusion

EdX does less things than Moodle but does them nicely. It's also better suited for open education which can be achieved in Moodle and Totara too but the user and learning experience seems to be better on edX. Sever configuration, user management, access restriction, internationalization and reporting, all those things are easier to set and ready to use out of the box with Moodle (reporting especially on Totara) and cannot be neglected. Some might say that Moodle does too many things but from a business point of view it's easier to adapt client's requests that way. Also the community around Moodle is bigger, which is a great thing from a developer point of view. But to end on a positive note, edX provides a roadmap on what they are working or will work on, thus we will keep an eye on this innovative platform and check if their improvements could fit future client requests.

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