

# TRANSFORMING OPEN EDX INTO THE NEXT ON-CAMPUS LMS: AN ONGOING PROJECT

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## ABSTRACT

Open edX is an incredible platform to deliver MOOCs and SPOCs, designed to be robust and support hundreds of thousands of students at the same time. Nevertheless, it lacks a lot of the fine-grained functionality needed to handle students individually in an on-campus course. This short session will present the ongoing project undertaken by the 6 public universities of the Region of Madrid plus the Universitat Politècnica de València, in the framework of a national initiative called UniDigital, funded by the Ministry of Universities of Spain within the Plan de Recuperación, Transformación y Resiliencia of the European Union. This project, led by three of these Spanish universities (UC3M, UPV, UAM), is investing more than half a million euros with the purpose of bringing the Open edX platform closer to the functionalities required for an LMS to support on-campus teaching. The aim of the project is to coordinate what is going to be developed with the Open edX development community, so these developments are incorporated into the core of the Open edX platform in its next releases. Features like a complete redesign of platform analytics to make them real-time, the creation of dashboards based on these analytics, the integration of a system for customized automatic feedback, improvement of exams and tasks and the extension of grading capabilities, improvements in the graphical interfaces for both students and teachers, the extension of the emailing capabilities, redesign of the file management system, integration of H5P content, the integration of a tool to create mind maps, the creation of a system to detect students at risk, or the integration of an advanced voice assistant and a gamification mobile app, among others, are part of the functionalities to be developed. The idea is to transform a first-class MOOC platform into the next on-campus LMS.

## KEYWORDS

MOOC; platform; LMS; on-campus; Open edX

# 1. INTRODUCTION

Open edX is an incredible open-source Learning Management System (LMS) created for Massive Open Online Courses (MOOC) and Small Private Online Courses (SPOC) delivered to hundreds of thousands of students at the same time. It has been widely adopted by universities, governments and NGOs and it is used to deliver more than 55000 courses to more than 55 million learners (Open edX 2023).

It has a very good user interface, created with sound instructional design principles and it is modular and scalable, but the platform is designed to deliver courses to massive audiences and, when used as a traditional LMS, it lacks a lot of the fine-grained functionality needed to handle students individually in an on-campus traditional course.

## 2. THE PROJECT

A consortium of 7 public universities from Spain (the 6 public universities of the Region of Madrid plus the Universitat Politècnica de València (UPV)) has launched a project to improve the characteristics of Open edX as an on-campus LMS. This project has been launched in the framework of a national initiative called UniDigital, funded by the Ministry of Universities of Spain as part of the Plan de Recuperación, Transformación y Resiliencia with European Union funds.

The project, led by three of these Spanish universities (Universidad Carlos III de Madrid (UC3M), UPV and Universidad Autónoma de Madrid (UAM)), is investing more than half a million euros with the purpose of improving the Open edX functionalities required for an LMS to support on-campus teaching properly.

As Open edX is an open-source platform, the aim of the project is to coordinate with the Open edX development community what is going to be developed in the project framework, so it is incorporated into the core of the Open edX platform in its next releases.

The consortium has launched a public tender to hire the services of one or several Open edX developers that, following the rules of the open-source community, develop the functionality enumerated in the next section.

### 2.1 Functionality to be developed

#### 2.1.1 Redesign of the platform's statistics system to offer aggregated and disaggregated information in real-time

Open edX has a fairly complete statistics system when it comes to tracking a course as an entity, but it does not offer the ability to jointly analyze various courses, nor the granularity that allows teachers to carry out the individual monitoring of their students in a comfortable way, or students to have an idea of their performance compared to the average performance of their group. The system does not allow real-time tracking.

To offer a real-time tracking feature to both teachers and students, this item will include the creation of a mechanism that uploads in real time the events recorded by the log and the grades to a data-lake enabled for the processing of big-data, and that updates in real time the intermediate tables used for real time statistics.

#### 2.1.2 Modification of grouping of students and teachers to include a flexible system of group creation that accommodates the enrollment groups used in the Spanish university system

The Spanish university system is articulated based on courses divided into enrollment groups, which are used in many ways, from the assignment of groups of students to different teachers, in case of courses with many students enrolled, to the creation of different groups for laboratory sessions. The same course can have several sets of groups in parallel (in the style of what happens with the OpenedX teams tool).

This item includes the development of a group creation mechanism that allows the creation of parallel sets of groups (to which both teachers and students can be assigned (students exclusively in the groups of the same set, teachers may be assigned to several or all groups in the set). It will be possible to configure these groups to have differentiated access to the content and forums of the course and will allow sending an email to the whole group (such as cohorts). If a teacher is assigned to a group, he or she will only have access to the grades and follow-up of the students included in the groups assigned to him/her. It will be possible to assign the groups to specific exams and ORA activities.

### **2.1.3 Creation of an interface with the custom automatic feedback system On-task learning or similar**

The Open edX platform lacks an advanced automatic personalized feedback mechanism, which allows a message to be sent automatically to a student based on his/her activity when certain conditions are met (depending on his/her performance in the evaluations or their interaction with the platform). This item proposes the integration with the open-source system On task Learning (<https://www.ontasklearning.org/>) or another of the same characteristics that is determined.

### **2.1.4 Open Response Assessment module functionality improvement**

The Open Response Assessment module allows you to carry out evaluations with a lot of flexibility, but it has certain shortcomings that we want to improve with this item.

The first task of this item is the integration of Turnitin, a plagiarism detection tool. It will be valued that the mechanism provided for the integration allows the use of other plagiarism detection tools.

Other required functionality is the improvement of the ORA tracking panel that appears in the instructor's section of the LMS, adding the possibility of using the pair grading and the team grading, giving a weight to each one (so that the pair grading is not always overridden by the team grading), the implementation of continuous ranges in rubrics and the possibility to have ORA tasks independent of learning sequences.

### **2.1.5 Extension of platform grading capabilities**

Open edX allows you to create individual problems using a simple markup language, but these problems must be created one by one, either in an exam or in a problem collection component. Problem collections can be exported and imported, but only in XML format, which is beyond the reach of many teachers. A mechanism that allows instructors to import sets of questions created in the simple markup language of Open edX will be incorporated into the exams and collections of edX problems, with a WYGIWYS editor to edit these problems incorporating HTML with images and tables.

Other improvements will be adding a late delivery date for exams, adding the possibility to grade individual units instead of subsections, or restricting from which Ip addresses the exam can be taken and incorporating the completion API into the grading, among others.

### **2.1.6 Expansion of communication capabilities with students**

The student communication tools offered by Open edX are suitable for massive courses but fall short for the use of the platform in more personalized environments such as on-campus use.

In this item, the possibility of sending messages to individual users using their email will be implemented. The team will be able to send emails to a list of users and they should be able to search for users by their name or part of it, not just by email address.

It will also be possible to send email notifications when someone contributes to a specific forum thread that has been flagged, not just for those created by the user and not just for the first response.

### **2.1.7 Improvements to the graphic interface and the operation of the platform**

Under this heading, several improvements to the operation and interface of the LMS will be implemented.

Adding a filtering and sorting tool for the list of courses in the LMS panel, so that the user can select and sort a part of the courses in which he is enrolled based on different parameters (part of the name, the code, if they are current or archived, by topics), extending the video viewer so that it accepts links from other platforms, such as Vimeo, Microsoft Stream and other providers, incorporating the possibility of disabling and adding any tab from the top menu, creating an accordion component for the unit pages to avoid very large vertical displacements or creating a wysiwyg css editor that gives access to the different classes and elements used in an edX course will be added, among others.

### **2.1.8 Changes to the general interface of Studio**

The general interface of Studio is very uncomfortable when handling a large number of courses or libraries, so this item includes the creation of a course selection system that allows you to filter those that show by its name, institution or code, and sort the courses shown by any of these parameters (the interface will allow you to continue differentiating between active and archived courses). For problem collections (libraries) a similar mechanism will be implemented.

A tool is also requested to customize the style of the different elements of Studio, with a button that allows you to return to the default style.

### **2.1.9 Integration of Limesurvey's Opensource survey system**

This item will include the creation of a mechanism that creates an entry in the survey user table for a survey embedded in the course, using the Openedx Anonymous userid, when a user first accesses the survey and that passes the Anonymous user id to the Limesurvey each time the user accesses the survey again.

A mechanism to embed the Limesurvey survey creation interface in the instructor section of the OpenedX LMS and that includes the possibility of creating the user table of a survey from the Anonymous user ids of the course users will be added.

### **2.1.10 Creation of a mechanism to create fully multilingual courses**

In this item a system will be developed to create groups by language (using the mechanism commented in a previous item) and that automatically assigns to them those enrolled in a course depending on the language they have selected in their profile. All those students who have a language not included in the created groups will be assigned to a default group, whose language will be selected by the course team.

In addition, Open edX components of each type will be created (video, html, problems, ORA, etc.) that allow the course team to present a different content for each defined language (in the style of what internationalization tools such as Transifex do).

### **2.1.11 Remodeling of the file management system**

The file management system available in Studio is very inflexible and its integration with the LMS using URLs is very cumbersome for teachers to handle. For Open edX to become an option to the LMS currently used on university campuses, it is necessary to change it, in a way that can be integrated directly into the Open edX LMS on an optional basis for instructors (for example, as an option in the top menu) and that lets faculty upload files and links, change the name presented to users, activate and deactivate the visibility for students of a file or link and set start and end dates for viewing a resource by students. It should also support the creation of a folder structure to organize resources and provide options for sorting and filtering resources by different fields.

### **2.1.12 Creation of a component that presents and edits H5P content natively without resorting to an external component**

In this item, a mechanism will be developed to upload an H5P file to the openedX platform and view it directly in the LMS without the need for an external server, and a component for Studio to create and edit H5P content directly in Open edX will be created.

### **2.1.13 Creation of a component to create and present mind maps**

Mind maps are a very interesting tool for a wide variety of topics. A component will be created that allows students to create mind maps interactively and teachers to evaluate them. This same tool should allow teachers to create a static mind map to include as course content.

### **2.1.14 Creation of a widget for content evaluation by students and system of badges for punctual achievements**

A component will be created that allows students to assess the content and technical realization of a unit of a course using a system of 1 to 5 stars and allows the student to add a text comment if desired and another that allows teachers to check the results of their students' evaluations in a section of the instructor panel.

A component will be created that allows the student to obtain a badge for a specific achievement not linked to passing a graded subsection.

### **2.1.15 Creation of a Student Failure Prediction System**

A simple system of prediction of students at risk will be incorporated from the comparison of the metrics of interaction with the platform and the grades of a student with his/her group, which will present in a simple way (with colors for the status of each student, for example) the information of an entire group to the faculty in the instructor panel.

### **2.1.16 Creation of an interface that allows the use of the platform with an advanced voice assistant**

"Skills" or applications will be developed for the conversational assistants of Amazon (Alexa) and Google (Google Home) so that users can consult their personal metrics and important aspects of the course through voice. The assistant will provide general data, such as score within the platform, position in the ranking of students, if the student's evolution is positive or negative, pending exercises, students at risk, important dates, etc. The skills will make use of voice profiles so that a third user cannot obtain data from the owner of the smart speaker or that several users can obtain their respective information using the same smart speaker.

## **3. CONCLUSION**

This project intends to make Open edX one of the most advanced Learning Management Systems for on-campus use, adding extra functionality to the platform in coordination with the open-source development community, so it is incorporated in the core and maintained in next releases.

## **4. REFERENCES**

Open edx web site, <https://openedx.org/> (accessed March 2023).