

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

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ABSTRACT

Open edX is a popular platform for delivering MOOCs and SPOCs, designed to support hundreds of thousands of students simultaneously. However, it lacks a lot of the fine-grained functionalities required for managing students individually in on-campus courses. This session will present an ongoing project undertaken by six public universities in the Region of Madrid and the Universitat Politècnica de València, as part of a national initiative called UniDigital. This project, funded by the Ministry of Universities of Spain within the European Union's Plan for Recovery, Transformation, and Resilience, is led by three Spanish universities (UC3M, UPV, UAM) and involves investing over half a million euros to enhance the Open edX platform's functionality for on-campus teaching. The project aims to collaborate with the Open edX development community to incorporate these enhancements into the platform's core for future releases. The proposed enhancements include a complete redesign of platform analytics for real-time reporting, dashboards based on analytics, customized automatic feedback, exam and task improvements, grading extensions, graphical interface enhancements for both students and teachers, expanded emailing capabilities, redesigned file management systems, integration of H5P content, mind map creation tool integration, a student risk detection system, and advanced voice assistants and gamification mobile apps, among others. The goal is to transform this MOOC platform into the next-generation on-campus LMS.

KEYWORDS

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

1. INTRODUCTION

Open edX is an open-source Learning Management System (LMS) designed for Massive Open Online Courses (MOOCs) and Small Private Online Courses (SPOCs), capable of delivering content to hundreds of thousands of students simultaneously. It has gained widespread adoption among universities, governments, and NGOs and is currently utilized to offer over 55,000 courses to more than 55 million learners (Open edX 2023).

Its user interface, modularity, and scalability have made it the platform of choice for delivering courses for hundreds of organizations, but it lacks some of the fine-grained functionality required to manage individual students in traditional on-campus courses when used as a traditional LMS.

After using Open edX to deliver their institution's MOOCs and on campus courses, the authors believe that its interface, designed with sound instructional design principles, adapts better to the student's learning process than the rest of LMS used on their campuses. This belief is also supported by some studies (Liapis et al., 2022).

Although most LMS offer similar services, one of the key differences between them is how they organize the learning process for students, and consequently, how their interfaces are designed. Open edX prioritizes the concept of learning sequences, which is a powerful tool for clearly presenting information to students and facilitating their autonomous learning. While other LMS can also adapt to provide similar experiences, Open edX offers a distinct user experience that sets it apart from the competition. As such, we believe it is particularly noteworthy that this platform is continuing to evolve and establish itself as a compelling alternative to existing LMS solutions.

2. THE PROJECT

A consortium of seven public universities in Spain (including the six public universities in the Region of Madrid and the Universitat Politècnica de València) has launched a project to enhance Open edX as an on-campus LMS. This project is part of a national initiative called UniDigital, which is funded by the Ministry of Universities of Spain as part of the Plan for Recovery, Transformation, and Resilience, supported by European Union funds.

The project, led by three of these universities (Universidad Carlos III de Madrid, Universitat Politècnica de València, and Universidad Autónoma de Madrid), will invest over half a million euros to improve Open edX's functionalities for effective on-campus teaching.

As Open edX is an open-source platform, the project aims to collaborate with the Open edX development community to incorporate the developed functionalities into the core of the Open edX platform for future releases.

The consortium issued a public tender to hire one or several Open edX developers to implement the functionalities listed in the following section, in compliance with the rules of the open-source community. Edunext was awarded the tender and is currently developing the functionalities in coordination with the Open edX development community.

2.1 Functionalities

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

While Open edX has a comprehensive statistics system for tracking individual courses, it doesn't allow joint analysis of multiple courses or provide the granularity necessary for teachers to monitor individual student progress or for students to compare their performance against the class average. Moreover, the system lacks the ability for real-time tracking.

To provide both teachers and students with real-time tracking functionality, this item proposes creating a mechanism that uploads log events and grades in real-time to a data-lake that supports big-data processing. The mechanism will update 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 organizes courses into enrollment groups, which are used in various ways such as assigning groups of students to different teachers and creating groups for laboratory sessions. Additionally, the same course may have multiple sets of groups in parallel.

This item involves developing a group creation mechanism that allows the creation of parallel sets of groups to which teachers and students can be assigned. Students will be exclusively assigned to groups in the same set, while 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 course content and forums, and to send emails to the entire group. If teachers are assigned to a group, they will only have access to the grades and progress of the students included in the groups assigned to them. It will also be possible to assign 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

Open edX platform lacks an advanced automatic personalized feedback mechanism that allows for automated messaging to be sent to students based on their activity when certain conditions are met, such as their performance in evaluations or interaction with the platform. This item proposes integrating with the open-source system On-task Learning (<https://www.ontasklearning.org/>) or another system with similar characteristics.

2.1.4 Open Response Assessment module functionality improvement

The Open Response Assessment module provides flexible evaluation options but has some shortcomings. This item proposes integrating Turnitin, a plagiarism detection tool, or an equivalent tool. It will also improve the ORA tracking panel that appears in the instructor's section of the LMS by adding the option of using pair and team grading, giving weight to each one (so that the pair grading is not always overridden by the team grading), implementing continuous ranges in rubrics, and allowing ORA tasks to be independent of learning sequences.

2.1.5 Extension of platform grading capabilities

Although Open edX allows the creation of individual problems using a simple markup language, problems need to be created one by one either in an exam or in a problem collection component. While problem collections can be exported and imported, only XML format is supported, which can be challenging for many teachers. This item aims to incorporate a mechanism that allows instructors to import sets of questions created in Open edX's markup language to exams and problem collections, with a WYSIWYG editor for editing problems incorporating HTML, images, and tables.

Other improvements will include adding a late delivery date for exams, enabling grading of individual units instead of subsections, restricting access to exams from specific IP addresses, and incorporating the completion API into grading.

2.1.6 Expansion of communication capabilities with students

While Open edX offers adequate student communication tools for massive courses, they fall short in personalized environments, such as on-campus use. This item aims to implement the possibility of sending messages to individual users or user groups using their emails, names or partial names. Additionally, email

notifications will be sent when someone contributes to a flagged forum thread, not just for threads 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 enhancements will be made to the LMS operation and interface. These include adding a filtering and sorting tool for the list of courses in the LMS panel, extending the video viewer to accept links from other platforms, such as Vimeo and Microsoft Stream, and adding the ability to disable or add tabs from the top menu. An accordion component for unit pages will be created to prevent excessive vertical scrolling. A WYSIWYG CSS editor will also be added to give users access to different classes and elements used in an edX course.

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). A similar mechanism will be implemented for problem collections. Additionally, a tool will be added to customize the style of different Studio elements with a reset button to return to the default style.

2.1.9 Integration of Limesurvey's Opensource survey system

This item will create a mechanism to generate an entry in the survey user table using the Openedx Anonymous userid for a survey embedded in the course. The mechanism will pass the Anonymous user id to Limesurvey each time the user accesses the survey. The Limesurvey survey creation interface will be embedded in the instructor section of the OpenedX LMS, allowing users to create a survey user table from the Anonymous user ids of course users.

2.1.10 Creation of a mechanism to create fully multilingual courses

This item will develop a system to create language-based groups, which will automatically assign users to groups based on their selected language in their profile. Students with a language not included in the created groups will be assigned to a default group, with the language chosen by the course team. Open edX components of each type will be created to allow for different content to be presented in each defined language, similar to internationalization tools like Transifex.

2.1.11 Remodeling of the file management system

The current file management system in Studio is inflexible and integrating it with the LMS using URLs is cumbersome for teachers. To make Open edX a viable option for university campuses, the file management system needs to be improved. It should be integrated directly into the Open edX LMS on an optional basis for instructors (for example, as an option in the top menu). This new system should allow faculty to upload files and links, change the names presented to users, activate or deactivate visibility for students, and set start and end dates for viewing a resource. It should also support the creation of a folder structure to organize resources and provide sorting and filtering options for resources based on different fields.

2.1.12 Creation of a Component for Native Presentation and Editing of H5P Content

A mechanism will be developed to upload an H5P file to the Open edX platform and view it directly in the LMS without the need for an external server. Additionally, a component for Studio will be created to allow the creation and editing of H5P content directly within Open edX.

2.1.13 Creation of a Component for Creating and Presenting Mind Maps

Mind maps are an important tool for a 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 a Badge System for Punctual Achievements

A component will be created that allows students to evaluate the content and technical realization of a unit of a course using a system of 1 to 5 stars. Students can also add a text comment if desired. Teachers can check the results of their students' evaluations in a section of the instructor panel. Additionally, a badge system will be created that allows students to obtain badges for specific achievements not linked to passing a graded subsection.

2.1.15 Creation of a Student Failure Prediction System

A simple system for predicting students at risk will be incorporated by comparing the metrics of interaction with the platform and the grades of a student with his/her group. This system will present the information of an entire group in a simple way, with colors indicating the status of each student (for example, green for those doing well, yellow for those at risk, and red for those struggling). This information will be presented to 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 conversational assistants such as Amazon's Alexa and Google's Google Home. These assistants will allow users to consult their personal metrics and important aspects of the course through voice. The assistant will provide general data, such as the user's score within the platform, position in the ranking of students, whether the user's evolution is positive or negative, pending exercises, students at risk, and important dates. The skills will make use of voice profiles so that a third user cannot obtain data from the owner of the smart speaker, and multiple users can obtain their respective information using the same smart speaker.

3. CONCLUSION

This project aims to enhance Open edX as a highly advanced Learning Management System for on-campus use by adding new functionality to the platform in collaboration with the open-source development community. The goal is to integrate these features into the core of the platform and ensure that they are maintained in future releases.

4. REFERENCES

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