How to Select an Accessible Learning Management System for Distance Education

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Abstract

The fast development of Distance Education (DE) and Blended Learning generates a wide, diverse, and fast-changing offer of Learning Management Systems (LMS). Selecting the right LMS for setting up distance education programs gets more challenging, in particular when specific requirements of teachers and learners with disabilities have to be taken into account. This was the challenge that the InSIDE project faced at the beginning of its execution. This project aims to implement DE programs accessible for visual, hearing, and motion disabled people in 11 universities of the Maghreb region. This paper presents the methodology, results, and lessons learned from the selection of the LMS to base the delivery of the DE on.

Keywords: Digital Accessibility · Tertiary education · Distance education · eLearning · Learning management systems.

Motivation

This desk research is part of the project InSIDE: Including Students with Impairments in Distance Education (https://www.inside-project.org/) which aims to implement accessible Distance Education (DE) programs in 11 universities in North African countries (Algeria, Morocco, and Tunisia) to support the inclusion of students with visual, hearing and motor disabilities. Consequently, at a certain point, a decision had to be made on which Learning Management Systems (LMS) to use as a foundation for the provision of DE.

The answer to what LMS best suits an educational project is not trivial. Three factors contribute to the complexity of this question. Firstly, the ecosystem of software implementations for DE delivery changes quickly pushed by the constant evolution of DE and innovations in educational institutions. Secondly, the features of LMSs are quite diverse and difficult to match when comparing. This fact may be explained due to the different teaching methodologies used to ground implementation and disparity in targeted learner profiles. Thirdly, each educational project has its own priorities and requirements. The establishment of appropriate criteria and to weight the desired features for the selection of the LMS is of paramount importance and one of the key points for the success of a distance educational project.

For the specific case of the InSIDE project, the selected LMS had to fulfill the following requirements, which are ordered by importance:

- suitable for the provision of distance higher education,
- accessible for visual, hearing and motor disabled people,
- customizable,
- independent from third parties, which means it could be self-hosted and modified freely.

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Methodology

Due to the complexity of the task, it is divided into a 5-steps procedure to ensure valuable, reliable, and precise results. Those steps comprise market research, system requirement elicitation, available options filtering, comparison of the most interesting alternatives, and the final selection.

A Search of Most Widely Used LMS

In order to provide a first approximation to the problem of finding the right LMS, this first step consists of an extensive search of the most widely used software solutions. For this purpose, a list of all found available options is created. The only restriction applied is that the outcomes of the solutions listed should seem as much as possible as the ones of a learning management system.

LMS Basic Requirement Elicitation

In this step, the desirable features of the chosen system are prioritized and set. Thus, this step comprises all the necessary actions to obtain the system's functional requirements. This step is of paramount importance, due to the resulting requirements that are the basement of the following steps and greatly influence the final decision. Therefore, actions taken here should enable an educated selection of the LMS in the end.

Candidate Screening

At this stage, the listed LMSs are filtered using the output from the previous step. This reduction in the searching set allows for better further comparative analysis.

Comparative Analysis of Selected LMSs

The comparative analysis attempts to highlight the differences between the selected alternatives. Additionally, the comparative should focus not only on showing differences in general features but also on those features that are key for the project. Those key features can be extracted from the project requirements set in the 2nd step.

It begins by gathering detailed information of each LMS compared. Due to the large amount and variation of features, it is necessary to do this previous step. Then, it is possible to proceed with the match of features testing each compared alternative when possible or searching in the available documentation. Finally, each feature can be evaluated and graded.

Final Decision

At this final stage, not only the output of the comparative analysis but also the project requirements for the system and the detailed information of compared systems are available. There is no “best one fits it all solution,” so the goal here is to make the best possible choice, the educated, good one. It is advised to take a holistic approach when deciding using those resources and the context in which the projects are being developed.

InSIDE Development and Results

Here are the results of the application of this methodology for the selection of a LMS for the InSIDE project.

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A search of Most Widely Used LMSs

Below are listed all LMS and companies that provide DE found during the third quarter of 2019.

- aTutor
- Blackboard Learn
- Canvas
- Claroline
- Cornerstone OnDemand
- Desire2Learn or Brightspace
- DoceboLMS
- eCollege
- Edmodo
- EduNxt
- eFront
- Engrade
- EthosCE
- GlobalScholar
- Glow (Scottish Schools National Intranet)
- Google
- Grovo
- Growth Engineering
- Halogen Software
- HotChalk
- ILIAS (Integriertes Lern-, Informations- und Arbeitskooperations-System)
- Inquisiq
- itslearning
- Kannu
- LAMS
- LearningCart
- LON-CAPA (Learning Online Network with Computer-Assisted Personalized Approach)
- Moodle
- Open edX
- OpenOLAT
- Sakai
- Schoology
- Skillsoft
- Spongelab
- SuccessFactors
- SumTotal Systems
- SWAD (Shared Workspace At a Distance)
- Taleo
- Totara Learn
- Udutu
- Uzity
- WeBWorK
- WizIQ

LMS Basic Requirement Elicitation

As the complexity of the inside project is high because InSIDE involves many different actors, it was decided to conduct a survey focused on DE and inclusion. This was the starting point for the requirements acquisition procedure.

The developed questionnaire consists of 10 questions formulated with the aim of providing grounded information of participating universities on actual needs and specific local requirements, social inclusion and background, experience, and competence in DE. At the end of this section, in Table 1, we display the questions and the summary of the answers given by participating universities.

Answers show that the selected system should have the following features:

- Multilanguage support.
- Accessible for visual (VI), hearing (HE), and motor disable (MO) people.
- Lessons with rich multimedia content, audio and video.
- Advanced means of communication, like forum and chat.
- Free of charge for students and universities.

Finally, it is worth to mention that Moodle stood out as the most popular LMSs through the project's participants.

Candidate Screening

In this step is reduced the alternatives to enable a further sensible comparison. The criteria used to keep only the most interesting LMSs were:

1. The system should be accessible to VI, HE, MO disabled people. Alternatively, it must allow modifications in order to achieve the desired level of accessibility.
2. It must be able to deliver full distance higher education programs. That implies the system should be able to handle rich media content, grading management, and advanced communication features like chat and forum.
3. It should be licensed as Free and Open Source Software (FOSS), which implies no cost for students and no cost of acquisition or use to universities. This assures freedom of system customization and modification. Thus, it is possible to implement specific local requirements and fix accessibility issues without the permission of third parties.
4. Moodle must be included due to its popularity among participants. The strong expertise that participants have in this system was of noticeable benefit for the project if this alternative was selected in the end.

Finally, we kept the following 7 LMSs on our list:

- Moodle [1]
- aTutor [2]
- Open edX [3]
- Canvas [4]
- Chamilo [5]
- Totara Learn [6]
- Edmodo [7]

Table 1. Questions and results of answers from the 10 completed questionnaires.

Question	Answer (when apply order is by frequency and descendant)
What is the official language in your institution?	French, Arabic, English, Greek, German
Is DE available at all in your institution?	Yes, 9, No, 1
At what level does your institution provide DE?	Internal purposes, continuing education, bachelor and master programs
Estimate the ratio of courses at your institution that is provided as DE.	< 20% of the total educational offer, 8 20% of the total educational offer, 2
In what languages does your institution provide DE courses?	Arabic, French, English, Greek, German
Which software are you using for providing DE services now?	Moodle, 10 Big Blue Button, 2 Google Classroom, 2 edX, 1 WizIQ, 1
What features are crucial for a successful DE platform?	File repository Lessons with video, audio Grading feature Courses and student management Advanced communication features like chat and forum Free cost for students and provider
Is your institution part of any DE network, pool, or initiative?	No, 10
Does your institution have services for students with disabilities?	Yes, 8, No, 2
Are students with disabilities studying in your institution?	Physical disabled Blind or visually impaired Deaf or hard of hearing

Comparative Analysis of Selected LMSs

This comparison aims to ease the decision-making focusing on differences of general features and accessibility. Each of the filtered alternatives has to be studied in more detail to assess each feature regarding the project context and goals. Table 2 summarizes the results.

Table 2. Comparison of LMS by features

LMS features	Moodle	Open edX	aTutor	Chamilo	Totara Learn	Canvas	Edmodo
Usability	+	++	+	++	+	++	+
Authoring tool	++	+	O	+	++	+	++
Interoperability	+	++	O	++	+	+	+
File repository	++	+	O	++	O	+	++
Video	++	++	+	++	++	++	++
Audio	++	+	+	+	+	+	+
Forum	+	+	+	+	O	O	+
Chat	+	+	+	+	+	+	++
Task and marks	+	++	+	++	++	+	+
Reports	++	+	O	+	++	+	+
Analytics	++	++	-	+	++	+	+
Student mgmt.	++	++	+	++	++	+	++
Open learning	+	+	+	+	+	+	+
Private learning	+	+	+	+	+	+	+
Internationalization	++	+	+	++	+	+	+
Accessibility compliance	++	+	++	O	+	++	+
Keyboard-only	+	+	++	O	O	++	++
Screen reader	++	+	++	O	O	++	++
Subtitles	+	+	+	O	O	++	O
Maintenance	O	++	+	++	O	++	+
Documentation	++	+	O	++	++	++	+
Community	++	+	-	++	+	+	++
Own-hosted	+	+	+	+	O	O	O
SaaS	Third-party	+	Third-party	+	+	+	+
License	GPLv3	AGPLv3	GPL	GPLv3	GPLv3	AGPLv3	GNU/ GPL

Final Decision

In the end, taking into account all information gathered and the comparison made, it was agreed that Moodle[1] was the most recommendable system to be used in the InSide project. It meets all requirements in terms of accessibility, functionality, usability, customization and license. However, what influenced the final decision most was that most of the project participants had some expertise in working with it.

Moodle, despite its advantages, specifically in digital accessibility, has a number of limitations. The biggest one is regards to its complexity and usability. It is not easy to manage in the beginning and lacks simple-to-obtain support – if it is not used as a service hosted by an external provider. In the frame of InSIDE, this downside is mitigated thanks to the experience of participants. Other alternatives were considered seriously as aTutor [2], Open edX [3], and Canvas [4], but in the end, they did not provide extra advantages.

Conclusion and Follow-up

To sum up, the current offering of LMS could easily overwhelm and confuse those who try to make a decision on which LMS to use to implement accessible DE. The combination of aggressive selling found the myriad of teaching methods, and specific requirements make this task a hard endeavor. The presented procedure addressed these issues with the aim of a specific DE implementation. The presented approach offers some methodological help in DE implementations, providing not only a limited set of good options to start with but also a procedure to tackle the search with their own requirements.

Recent developments of distance work/education due to COVID-19 encourage a review of the methodology and an update of results with the post-pandemic offer of LMSs.

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