

Comparison of Learning Management System Platforms For Choosing A Suitable Platform For Users In Research Administration

Alicia Alva^{#1}, Fiorella Flores Medina^{*2}, Hugo Obispo Mego^{#3}, Enrique Lee Huamani^{#4}, Avid Roman-Gonzalez^{#5}

#Image Processing Research Laboratory (INTI-Lab), Universidad de Ciencias y Humanidades, Lima, Perú

¹aalva@uch.edu.pe, ²fflores@uch.edu.pe, ³hobispo@uch.edu.pe

Abstract — *The present paper is a comparison of three types of e-learning management systems. In the research administration of the University of Sciences and Humanities, a platform of online courses is aimed to achieve training and project courses that will be focused on the institution's researchers. For this purpose, it is necessary to use tools adapted to the way of working that are user-friendly and can be adapted to the users' requirements. Therefore, the three platforms' comparison was performed by measuring the following points: Description of the platforms' characteristics, description of the functionality, and the comparative analysis. This research is made to be implemented in the Image Processing Research Laboratory (INTI-Lab) server and to use the platform at the beginning of the year 2020. Online courses have become a tool that allows people to obtain knowledge rapidly, and as researchers, to adapt to these modalities makes the distribution of information faster and easier.*

Keywords — *e-learning, system, comparison, platforms.*

I. INTRODUCTION

The development of information technologies over the past few years has generated a diversity of content and tools that are used in learning and the education sector, known as electronic learning or e-learning. Interest in online courses has been increasing in recent years and continues to spread worldwide due to its low cost and the number of students it supports [1].

Universities have the role of providing an environment of support inspired by the web by means of the use of online systems and tools [2], and for this purpose, the learning session tools are used. In this research, we intend to select our platform without resorting to the one currently managed by the University of Sciences and Humanities.

Learning Management System (LMS) methods are used for the administration, distribution, and control of activities in the e-learning of an institution or organization, achieving asynchronous work among the participants [3]. For this reason, the research direction wants to implement an LMS, which can be managed by themselves without resorting to the university's implemented platform to have control over the management of users and courses.

One of the reasons to choose an own platform is because of the training done to users outside the institution, and these pieces of training will be related to projects implemented by the research direction. Having an own platform, it will be possible for the research department to add new users and training sessions and make the platform available to them. Moreover, there is the case of external researchers who can become a bit complicated, although they are not part of the institution. Thanks to a platform's choice, they will be free to choose the users who can enter it.

Therefore, having an own LMS platform will be beneficial for the University of Sciences and Humanities' research direction.

In this study, a comparison of three platforms, Chamilo, Moodle, and Google Classroom, is made. These tools aim to consolidate academic processes and have expanded to the point of being the best known in the market.

II. LEARNING MANAGEMENT SYSTEM (LMS)

Learning Management System (LMS) allows us to administer, monitor, and evaluate the different activities designed and programmed within a virtual process (e-learning) or blended learning.

LMSs are mostly used by companies that want to train their employees and educational organizations, and schools. Currently, there are many platforms; in this research, three platforms will be explained to choose the one that fits the needs of the research manager for diverse use, which will also be used for online training to users who have implemented a project and can use this platform for good training.

This section is based on a general explanation of the platforms and technical characteristics for their implementation.

A. Chamilo

It is an open-source platform created in 2010 and developed to improve access to education and knowledge, allow any user or company to create, study, and modify courses, among other activities. Chamilo is a less ambitious system where its purpose is e-learning, and that is more friendly and simple to learn how to use and



manage in turn, is currently the 4th most popular Open Source in the higher education sector [4], Fig. 1 shows its platform image.



Fig 1: Chamilo E-learning Platform

The technological tools to be used in its implementation are the following with respect to Table 1.

**TABLE I
CHAMILO TECHNICAL FEATURES**

Name	Minimum version required
Apache	2.2
MySQL or MariaDB	5.1 y 5.0
PHP	5.4

Regarding the operating system, Chamilo can be kept in an ecosystem under Windows or Linux as long as Apache is properly implemented from version 2.2.

B. Moodle

It was created in 2002 and is a free platform focused on online teaching. The system is robust and covers various aspects of e-learning, generally using it as a blog, social network, and even support for the educational system [5]; Fig. 2 shows its platform image.



Fig 2: Moodle E-learning Platform

The technological tools to be used in its implementation are the following in Table 2.

**TABLE II
MOODLE TECHNICAL FEATURES**

Name	Minimum version required
Apache o IIS	2.2
MySQL, MariaDB, PostgreSQL, MSSQL or Oracle	5.31, 5.3.5, 8.3, 9.0 y 10.2
PHP	5.4

C. Google Classroom

This platform was launched on August 12, 2014, is an e-learning platform that works from the cloud, is free, and can be used by users who have Gmail accounts or non-profit organizations. This platform can be used in the web

version, compatible with the main browsers, or through the mobile applications for Android and IOS. Since Google worked with educators across the country to create this platform, it is a tool (Google apps for education) agile and easy to use by teachers to create and organize tasks, provide feedback, and communicate rapidly with students [6].

Google classroom links Google Docs, Drive, and Gmail to help teachers create and collect assignments without using paper, and they can also see who performs the task and interact in real-time with students inside or outside the classroom; Fig. 3 shows its platform image.



Fig 3: Google Classroom E-learning Platform

III. DESCRIPTION OF LEARNING MANAGEMENT SYSTEM FUNCTIONALITY

A. Chamilo - Functions

The following features are explained below:

- Interaction: (photos, chats, file sharing, announcements, groups, tasks, wiki, users, surveys, personal notes, social networks, glossaries).
- Content: (lessons, course management, evaluations, attendance, links, glossary, document management, thematic progress, exercises in the form of questions, and time-controlled tests).
- Administration: (blog management, course configuration, and maintenance, reports, documents).

B. Moodle - Functions

There are about 20 different activities. Among them, we have forums, glossaries, wikis, assignments, surveys, and databases. Each one can be adapted to the need of each course. Moodle allows the combination of the activities in sequences and groups, helping the teacher guide the participants.

C. Google Classroom - Functions

The following features are explained below:

- Create and collect tasks (Google Docs, Drive, and Gmail).
- Improve communication in class (announcements, questions, and comments).
- Stay organized (Drive folders for each assignment and each student).

IV. COMPARISON ANALYSIS

In the previous description, each virtual platform's main characteristics, functions, and benefits developed in this work were mentioned. This description will serve as a guide to identifying which platform to implement in any institution or work center.

As we can observe in the comparison, virtual platforms allow us to create and manage complete courses for the web without knowing programming or graphic design. Besides this, it is necessary to be informed about virtual platforms to know their advantages and disadvantages and to be able to make a correct decision when implementing these.

For the comparison, Moodle was considered a base since it is currently the most used LMS platform worldwide. From Moodle, four main topics were considered to organize the characteristics that an LMS should have according to the institution's requirements, such as personalization of the learning proposal, user support, student tools, and collaborative learning promotion.

When personalizing the learning proposal, we consider platforms with discussion forums, file sharing, internal mail, online notes, online chat, and work process calendar.

In the user support, we consider that you have authorization to courses and installation manual.

Concerning student tools, we need to create working groups, constant self-evaluations, and portfolios.

Finally, we need the platform to allow teachers to attach complementary academic material to fulfill the promotion of collaborative learning.

Table 3 shows the platforms with all the requirements and the ones that do not meet the specific conditions.

Overall, as these platforms are open source, it puts them on an equal footing in profitability as they are free-of-charge. In addition, these platforms have a large community that increases the possibilities of adapting the tool to our needs. We considered those needed in the institution in terms of features, so the main criterion will be to choose the platform that best suits these requirements.

In the comparison, it can be deduced that Moodle meets the assessment factors addressed as it can be installed on any computer and does not necessarily require the Internet to be used.

Finally, it was concluded that the selection process of a learning management system should be done according to the institutional needs, although at the same time, it should consider online training standards, as well as aspects associated with the quality of the software.

Regarding this first comparison, we can see more functionalities in Moodle and Chamilo platforms. Therefore it is necessary to compare with other researches; that is why we give reliability to the work of [7], which shows in graphic form the use of the LMS platform from 2016 to the present. In Fig. 4, we can also see a comparison between these 2 LMS platforms.

**TABLE III
TECHNICAL FEATURES COMPARISON AMONG THE THREE PLATFORMS**

FEATURES/LMS		Moodle	Chamilo	Classroom	
1	Discussion Forums	x	x	x	Personalization of the learning proposal
2	File exchange	x	x	x	
3	Internal mail	x	x	x	
4	Online Journal/Notes	x	x		
5	Online chat	x	x		
6	Work Progress Calendar	x		x	User support
7	Courses Authorization	x	x		
8	Has an installation manual	x	x	x	Student Tools
9	Working group	x		x	
10	Constant self-evaluation	x	x		
11	Portfolio	x	x	x	Promotion of collaborative learning
12	Allows teachers to attach complementary academic material	x	x	x	

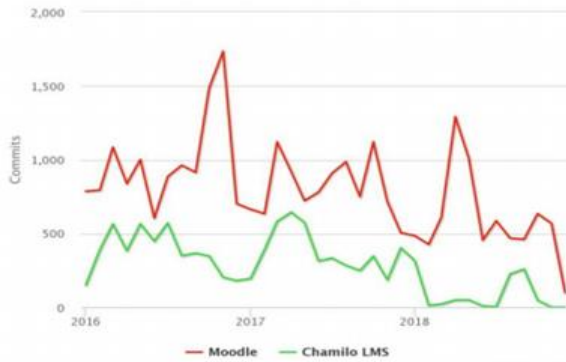


Fig 4: Moodle and Chamilo platform comparison

V. DISCUSSION

All the platforms are shown in this work fulfill a common objective to determine the functionality of each one of them. However, an important difference between some platforms is that they are open source without any cost. Therefore, we need to consider their features, functionalities, and benefits at the time of implementation. Comparing the 3 platforms analyzed, It is referred that all the platforms are shown in this work fulfill a common objective that is to determine the functionality of each one of them. However, an important difference of some platforms over others is that they are open source without any cost. Therefore, we need to consider their features, functionalities, and benefits at the time of implementation. Comparing the 3 platforms analyzed, Moodle stands first worldwide and is the most used by more than 70% of users.

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