Analysis of web platforms of learning management systems for distance education in the face of social isolation

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ABSTRACT

Education is one of the sectors that were affected by the Covid-19 pandemic that forced citizens to keep us isolated in our homes, however, education had to adapt to circumstances and as a result Online Classes were implemented. in the different educational centers for which it is necessary to know the best online learning system to be able to implement in the institutions. In this work, a work methodology based on Analytic Hierarchy Process (AHP) was applied to be able to compare the different LMS shown in this article. In this case study, three different LMS platforms were evaluated. The results of this study indicated that the best LMS platform to implement in schools was Moodle. Based on these results, educational institutions could apply this LMS to their online teaching modality since it offers better characteristics compared to Chamilo and Google Classroom.

Key words: AHP, LMS, Online Classes.

1. INTRODUCTION

Distance education is an important field in which teachers and students are part of cognitive learning. Today, in the face of this social isolation, we can see that there are several schools and institutes that do not have a web platform for the LMS learning management system, which analyzed the different platforms available below[1].

There are many methodologies that help optimize the problem for each investigation. In this scientific article, the LMS will be discussed using the AHP methodology, since it is used for the administration, distribution and control of activities in the online learning of an institution or organization, achieving asynchronous work among the participants [2].

For this reason, we want to analyze the different web platforms for online learning management, due to the crisis that our country is going through, but the variety of tools that exist makes it difficult to choose just one. Each tool has particularities that make adaptation flexible according to what the company or organization requires [3].

Within this scientific article, we will detail three learning management system web platforms and discuss the AHP methodology. These tools are aimed at consolidating academic processes and have been expanded to the point of being the best known on the market [4].

This work is structured as follows, in the next section number II the methodology used for the analysis of E-learning platforms will be described in detail. In section III the results obtained will be evidenced and finally in section IV the own results will be discussed and the conclusions will be presented.

2. METHODOLOGY

This section will detail the steps that will be followed for the analysis of web platforms for the learning management system, for this we have the AHP methodology that was developed by Saaty. This method is successfully applied to different types of MCDM problems. Although popular, AHP is criticized for its inability to handle uncertain and imprecise evaluations of decision makers. To face uncertain judgments, comparisons of alternatives and criteria can be expressed as fuzzy sets or fuzzy numbers that incorporate the vagueness of human preferences. This fuzzy set can be provided by the most popular MCDM method which is Fuzzy (Analytical Hierarchy Process) [5].

E-Learning platforms have to comply with some rules to be effective and also some platforms can be really effective within a well defined scenario. This is a multi-criteria decision problem. Next, the steps to follow will be detailed [6].

A. *Definition of the elements.*

In this case, the first level is the selection of the best E-Learning platform for the selected scenario.

This step is made up of features that take into account the LMS, technological and usability aspects.

B. *Sort the Items*

The third step is to sort the items from the highest level

to the lowest level that are generally in the element priority range.

C. *Compare the Elements*

The fourth step is to compare the set of elements automatically assigned in each comparison.

D. *Review and Improve*

Having made the comparisons, the consistency is determined using the eigenvalue, the elements must be reviewed and improved [7].

In this case, the usability function is of great importance, also the tools for adapting the learning path are important because the target group could be very heterogeneous. So according to the AHP approach we have to compare several platforms with each other for each characteristic and scenario as shown in Table 1 [7].

Table 1: Characteristics considered ordered by importance

ECDL Course	Blended Course	Professional Trainning
Management	Management	Usability
Management and enjoyment of interactive learning objects	Management and enjoyment of interactive learning objects	Adaptation of learning path
Usability	Collaborate Approach	Management and enjoyment of interactive learning objects
Adaptation of learning path	Usability	Management
Collaborate Approach	Adaptation of learning path	Collaborate Approach

3. CASE STUDY

In this section, an analysis will be made of 3 web platforms of the E-learning management system, which are Chamilo, Moodle and Classroom to know which one meets all the student's functionalities, which we will start by talking about LMS and we will detail them then.

A Learning Management System (LMS) is an online learning management system, which allows us to administer, monitor and evaluate the different activities designed and programmed within a virtual process (e-learning), or blended learning (Blended Learning).

LMS are used mostly by companies that want to train their employees as well as by educational organizations and

schools. Currently there are many platforms, in this research 3 platforms will be explained in order to choose the one that suits the needs of the school for a diverse use which will also be used to train teachers online in this social isolation and in turn they can use this platform for a good academic performance.

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

3.1 Definition of the elements

A. *CHAMILO*

It is an open source platform created in 2010 and developed with the aim of improving access to education and knowledge, allowing any user or company to create, study and modify courses, among other things. Chamilo is a less ambitious system where its purpose is e-learning and which is more pleasant and easier to learn to use and manage in turn, it is currently the 4th most popular Open source in the higher education sector[8]. His image of the platform is shown below in Figure 1.

Figure 1: PlatformE-Learning Chamilo

B. *MOODLE*

It was created in 2002, it is a free platform focused on online teaching, it is a robust system that covers various aspects of e-learning that generally use it as a blog, social network and even as support for the educational system[9]. Next, Figure 2 shows its referential image.

Figure 2: PlatformE-Learning Moodle

C. *GOOGLE CLASSROOM*

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

being compatible with the main browsers or through the mobile applications for Android and IOS.

Google worked with educators from all over the country to create this platform, being an agile tool (Google apps for education) that is easy for teachers to use, where they can create and organize assignments, provide comments and communicate quickly with students[10].

Classroom intertwines google docs, drive, and Gmail to help teachers create and collect paperless assignments, they can also see who completes the assignment and interacts in real time with students inside or outside of class, in Figure 3. Its referential image is displayed.

Figure 3: PlatformE-Learning Classroom

3.2 Features

A. CHAMILO

Regarding the operating system, Chamilo can remain in an ecosystem under Windows / Linux as long as the Apache server is properly implemented from version 2.2 onwards.The technological tools to be used in its implementation are the following with respect to Table 2.

Table 2: Technological tools

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

B. MOODLE

Regarding the operating system, Moodle will depend on Windows / Linux, a web server and a database, while the apache server is implemented in its version 2.6.

The technological tools that must be used in its implementation are as follows in Table 3, which we will see below.

Table 3: Moodle requirements

Name	Minimum version required
Apache o IIS	2.6
MySQL,MariaDB,PostgreSQL, MSSQL u Oracle	5.31, 5.3.5, 8.3, 9.0 y 10.2
PHP	5.4

C. GOOGLE CLASSROOM

Regarding Google Classroom, its characteristics at the time of its implementation is that you must have a Gmail and internet account to be able to access it and thus enjoy its benefits, in terms of its server, it works directly from the platform and does not need a specific version In order to be updated, among some novelties that the Classroom offers us are:

- Google Docs
- Drive
- Gmail

3.3 Sort the Items

Regarding the order of the elements, in this case the E-learning platforms have a rank of positioning worldwide, the selection of the best LMS is based on a bar graph, where we can visualize the position of each open source platform, such as shown in Figure 4.
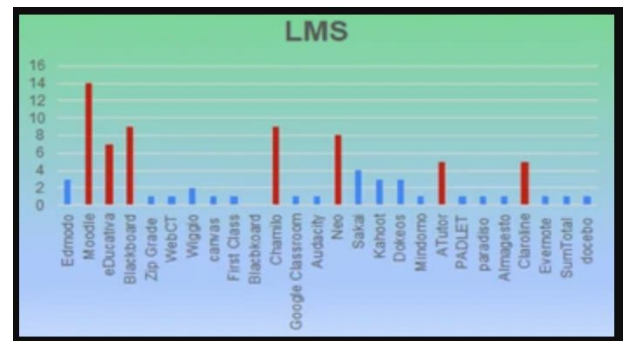

Figure 4: E-learning platform range

3.4 Compare the Elements

Lastly, we have the technical characteristics of the 3 platforms mentioned above, where they will be compared to each other to find out which is the most appropriate to use, mentioning the customization of the learning proposal, user support, student tools and learning promotion collaborative[11]. As Table 4 below shows.

Table 4: LMS Technical Characteristics

FEATURES / LMS		Moodle	Chamilo	Classroom	
1	Discussion forums	x	x	x	Personalization of the learning proposal
2	File sharing	x	x	x	
3	Internal mail	x	x	x	
4	Diary / Notes Online	x	x		
5	Chat online	x	x		
6	Work progress calendar	x		x	
7	Authorization to courses	x	x		User support
8	It has an installation manual	x	x	x	
9	Workgroup	x		x	Student Tools
10	Constant self-evaluation	x	x		
11	Briefcase	x	x	x	
12	Allows teachers to attach complementary academic material	x	x	x	Promotion of collaborative learning

4. RESULTS AND DISCUSSION

4.1 About the Case Study

As a case study we have learning management platforms that are designed for a better understanding and easy development by the user, they are also used to comparing results between elements that make up web platforms. The analysis is performed by comparing the 3 learning management web platforms for a better understanding and easy use by the user, using agile techniques for each platform. Next, we will see the functionality of learning management systems.

A. CHAMILO FUNCTIONALITY

As for Chamilo we have the following description:
- Interaction: (photos, chats, file sharing, announcements, groups, tasks, wiki, users, surveys, personal notes, social networks, glossaries).
- Content: (lessons, managing a course, assessments, attendance, links, glossary, document management, thematic progress, exercises in the form of questions and time-controlled exams.
- Administration: (blog management, configuration and maintenance of courses, reports, documents) [12].

B. MOODLE FUNCTIONALITY

As for Moodle, you have the following:
- There are around 20 different activities, among them we have forums, glossaries, wikis, tasks, surveys, databases, among other things, and each one can be adapted to the needs of each course.
- Moodle allows combining the activities in sequences and groups, helping the teacher to guide the participants [13].

C. GOOGLE CLASSROOM FUNCTIONALITY

Next, the functionalities of Google Classroom are explained:
- 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 for each student) [14].

4.2 About the Methodology

As a methodology we have the architecture of the analytics of learning based on teachers and students using LMS. The learning analysis system is the customized one that users use for the algorithm and parameters. The LMS can also invoke the analysis customize interface to provide adaptive learning, function based on the analysis result[15]. As Figure 5 shows.
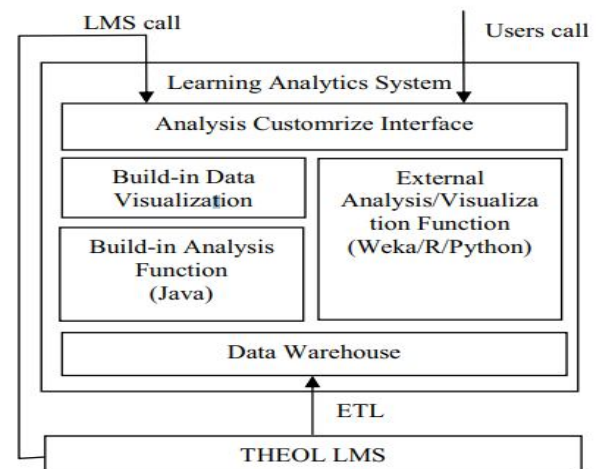

Figure 5: The learning analysis system architecture

As another methodology we have the AHP hierarchical analytical process, based on the evaluation of teaching in universities, where it requires that the decision-maker provide subjective evaluations regarding the relative importance of each of the criteria and then specify their preference regarding each of the decision alternatives and for each criterion[16]. As shown in Figure 6.
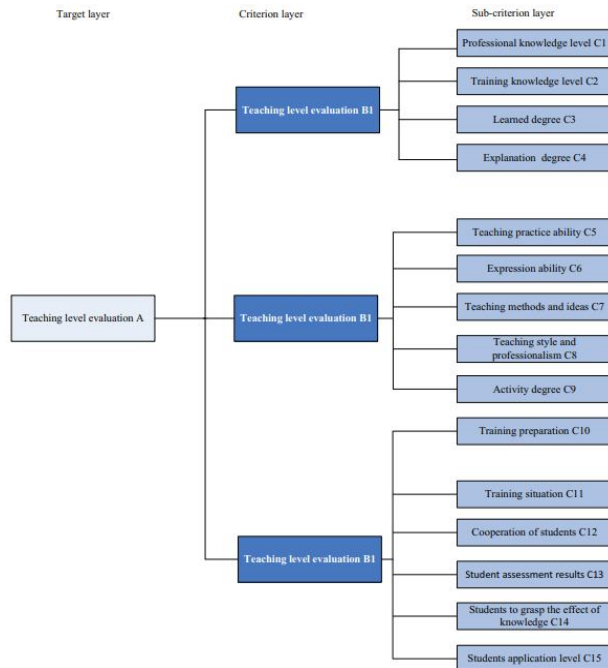

Figure 6: AHP hierarchical analytical process

5. CONCLUSIONS

In this article, we were able to analyze various learning management system platforms with the AHP tool, which shows the steps to be followed in order to carry out said analysis in the face of the social isolation produced by COVID, helping to achieve a better solution for schools and institutions. educational. Regarding the role of the student, they will have materials that allow them to develop their knowledge (such as audio, photo, chat, videos, etc.) and they will even be able to carry out the activities in the virtual classroom and do their homework, without the need to expose themselves.

The applied methodology was the most concrete, since it seeks to compare various platforms and characteristics, managing to use the AHP tool for the management of each web platform, giving a series of functionalities, benefits and requirements for its installation for the benefit of the student in the face of this tragedy, ensuring that development is not impaired in any case.

As future work it is desired to implement the various web platforms of learning management systems for the use of schools and institutes, taking into account their characteristics, functionalities and benefits at the time of implementation. Comparing the 3 platforms analyzed, Moodle ranks first worldwide and is the most used by more than 70% of users.

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