LMS, CMS AND LCMS: THE CONFUSION AMONG THEM.

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ABSTRACT: *With the huge development in educational technologies, most educational organizations and institutes have implemented at least one of several e-learning platforms to enhance teaching, learning, and management activities. Popular e-learning platforms include Learning Management Systems (LMS), Course Management System (CMS), and Learning Content Management System (LCMS). Even though these e-learning platforms have been widely implemented among educational organizations, the terminologies used to refer to these e-learning platforms are often misunderstood and misused in the literature, leading to confusion. This review paper aims to clarify this confusion between these platforms technologies by looking to their origins, definitions and basic functions. A comparison of all these platforms has been presented and discussed in detail based on the literature review. This paper also discusses some critical issues that should be considered prior to implementing any of these e-learning platforms along with the advantages and the barriers associated with them. The results of this study provide institutions with the information they need about these e-learning platforms to meet specific aims and objectives.*

1.   INTRODUCTION

Globalization, innovation and the quick expansion of technology are current trends that have led to the implementation of the latest technologies in most sectors, and especially in the educational sector [1]. This is due to the need for ICT technologies to shape Educational organization/institutes in keeping with the innovations of technologies and learning in the twenty-first century. While technology in education is developing, new tools of online learning in classes have been introduced by many ICT specialists, which results in changing the learning environment [2]. E-learning platforms technologies influence teacher performance and student learning as the use of some software applications link students and their teachers, among students themselves, and also between learners and the learning tools that they deal with.

Nowadays, most educational organization and institutes have implemented some software applications in which a web-based education is delivered to their students. Some of these software systems include Learning Management System (LMS), Course Management System (CMS) and Learning Content Management System (LCMS). Each of these software applications provides a specific type of support and functions for the educational organization/institutes who implemented them. However, even though these software applications are known and have been widely adopted and implemented, the names of these applications, such as LMS, CMS and LCMS, have been often misused in the literature and caused confusion [3-4]. The main cause of this confusion is due to the similarities in their terms and functions among them.

These review paper intents to clarify the confusion between these applications; LMS,CMS and LCMS. It will begin by looking to the definition and some functions of each platform. Then, a comparison between these applications has been discussed in detail. Some issues that should be considered when implementing these e-learning platforms, as well as

some advantages and barriers that are associated with them, have been presented and discussed deeply.

2.   Methodology

This research study was carried out by applying a critical review, which is a framework used for critically reviewing the existing literature on LMS, CMS and LCMS, and their different roles and functions in academic activities. The objective of reviewing the existing literature is to summarize and present a critical analysis of the existing literature that is being investigated in relation to a particular issue [5]. The main aim is to assist the reader to be aware of the latest existing literature regarding a particular topic and to build the basis for meeting another objective, such as the justification and need for carrying out more researches in that particular field. The ideal review of the literature should involve gathering the information regarding a particular issue from several different resources. Furthermore, the review of the literature should also be well written, correctly structured and planned using a clear research selection strategy [6].

Thus, all of these aspects have been considered while doing this current review. The main aim of this study is to wipe the confusion that exists in the terminology used in LMS, CMS and LCMS in the literature. Therefore, this study has reviewed the recent related articles that have focused on LMS, CMS and LCMS roles and functions in supporting the academic activities, in order to understand the differences that exist amongst them. The critical review on LMS, CMS and LCMS and their integration in the academic world has been perfumed, which covers all of these aspects; the role and different functions of them, the issues that should be considered before implementing them, the advantages and the limitations that are associated with their integration in the academic world.

Through the analysis of all of these aspects, it becomes easier to understand the differences between these e-learning platforms despite that they look similar and are often misused. It also eliminates the confusion that exists among them in the literature. Further, it would assist the organization

in choosing the suitable e-learning platform based on the function and the role that particular platform can provide as a modern method for enhancing the teaching and learning activities. This study provides the body of the knowledge for the overall concept of e-learning platforms, namely LMS, CMS and LCMS, and clearly distinguish them from each other   Additionally, the methodology caters a new perspective for decision makers who have an interest in e-learning platforms and the differences that exist between them in terms of their function and roles, Thus, selecting the most convenient platform that meets the organizations' objective.

3.   Learning Management System (LMS):

Learning Management System (LMS) has its another own original term, Integrated Learning System or ILS, which refers to certain functionalities with the instructional contents such as tracking and management, integration with the system, and personalized instruction [7]. The term ILS was originally coined by Jostens, while LMS originally was used for describing the management system functions of PLATO learning system k-12 [8]. However, the term LMS is used currently for describing several educational platforms which are often described incorrectly, causing confusion. The following sections from this review will discuss and differentiate LMS from other similar terms, namely CMS and LCMS, which cause confusion. However, prior discussing that, it is worthy to understand what LMS is by looking into its definition, functions and some examples of it.

Starting with its definition, LMS is a web-based technology assisting in planning, disrupting, and assessing any learning process. It is an environment software application designed for managing the learners' interactions as well as delivering learning resources to the users/learners [9]. Goh et al. [10] added that LMS is a type of course application which manages and provides users with 24/7 access to the materials of the course and facilitate the report and monitor activities of the users. It is a platform used for assessing, communicating, sharing the knowledge and monitoring the users' progress [10]. LMS focuses on managing learners, monitoring the track of their performance and progress with the activities. It focuses on administrative tasks such as reports to teachers/instructors and providing human resources but is not used for creating the contents of the materials. In simple words, the main key to differentiate LMS from other educational platforms is to understand the nature of LMS. LMS is a platform application which focuses on all aspects related to the learning process.

LMS has the unique characteristics that differentiate it from other similar educational platforms. According to Ninomiya et al. [4], LMS has these functions:

-    Automating and centralizing the administration.
-    Use self-guided services.
-    Delivering rapidly the learning materials.
-    Consolidating the initiatives of training on the scalable web-based application.
-    Supporting the standards and the portability.
-    Enabling the reuse of knowledge and personalizing materials.

On the other hand, Bailey [11] shows the main general characteristics of LMS in education as follows:

Lesson objectives are linked with each individual lesson. Lessons should be incorporated in the standardized curriculum Courseware provides different grade stages with a consistent manner. The system management registers the students' performance results. Lessons are equipped based on the progress of students' learning.

There are numerous examples of LMS, but the most popular example is Moodle. Moodle is an open source application which was developed in 2002 by Dougiamas [12]. The term refers to the Modular Object-oriented Dynamic Learning Environment. It was developed based on the terms of the GNU which refers to General Public License GBL, meaning that any change can be made to the source code as long as the license of the original source is not changed (Embi, [13]).

4.   Course Management System (CMS):

A review of the literature shows that the term Course Management Systems (CMS) is often used inappropriately as being LMS. These Course Management Systems are implemented mainly for blended or online learning, supporting placement course materials in the online environment, associating the learners with the materials, tracking the performance of students, storing the submissions of students, and mediating the communication that exists between students and their instructors [3]. As we can see, some of these functions are similar to the functions that LMS provide learners with. Therefore, it is understandable why misuse and misunderstandings between the two terms LMS and CMS exist. However, the LMS nature of such systems does not limit its functions to the functions of CMS.

It is worthy of looking at the definition of CMS and some examples of it for differentiating it from LMS term. CMS provides instructors with a framework and tools set which allow them to create the contents of online courses and subsequent management and teaching of these courses which include the interactions with learners who take these courses [14]. From this definition, it is clear that the focus of CMS is to provide some features and tools that allow instructors to create the content of online courses and arrange teaching and interaction with their students. There are many examples of CMS platforms such as Blackboard, Sakai and Angel. Blackboard is the most commonly used among these examples in institutes and organizations, but is mostly mislabeled in the literature and referred to as an LMS.

The two words "Blackboard LMS" entered into Google Scholar returned 887 articles that identify Blackboard as being LMS, whereas the company of Blackboard its self-identify Blackboard as a CMS. According to Blackboard company website, "Blackboard's online learning application, the Blackboard Learning System, is the most widely-adopted course management system among U.S. post-secondary institutions" [15]. Moreover, the functionalities of CMS do not take in consideration organizational issues, and natures of the courses focused on in the applications are not systematic. Hence, even though CMS can be seen as being a part of LMS, it is certainly not equivalent to LMS. According to Carliner [16], the development of these technologies is meeting other needs, even if some functionalities are certainly shared.

5.   Learning Content Management System (LCMS):

The term LCMS is often conflated with LMS and considered as being a newer LMS version. However, these two applications are different, as they complement each other and their focuses are on different functions. The keyword that can show the difference between these two terms can be seen in the one word that separates them, namely content. Paulsen [17] defines LCMS as an environment where instructors/developers are able to create, store, manage, reuse and deliver the contents of learning from the repository of the central object. In general, LCMS deals with contents which are based on the model of the learning object. On the other hand, Oakes [18] defined LCMS as an application that is used to "create, store, assemble and deliver personalized e-learning content in the form of learning objects" (p. 73). The main focus of LCMS is content, as it takes into consideration the obstacles of the creation, reuse, management and delivery of the content [18]. However, the main focus of LMS is the organization and learners. The main concern is to manage learners, the activities of learning, and the mapping competency of the organization [18]. It is clear that LCMS and LMS have different focuses even though they integrate together; LCMS focus on creating the contents and the delivery of the learning objects whereas LMS focus on managing the process of learning. Connolly [19] states that "LMS provides the rules and the LCMS provides the content" (p. 58). There are several examples of LCMS but the most popular one is SharePoint.

6.   The comparison between LMS and LCMS:

In this part, a comparison between LMS and LCMS, which are similar to each other and whose terms are used interchangeably in literature, will be presented. The focus of LCMS is to manage the course content rather than the activities of learners, Mclntosh, [20]. Greenberg [21] presented the similarities and differences in the functions of LMS and LCMS which are shown the below Table (Table1):

Table 1: What makes LMS and LSMS similar and different, as adapted from a study of Greenberg [21]:

As shown in the table, it is clear that LMS and LCMS are similar in providing most functions, except in these few functions where they are different. For example; LMS defines curricula whereas LCMS does not. Furthermore, LCMS is able to support the creation of content, developing the content navigation/user interface, and creating templates, while LMS cannot provide all of these functions. Other than that, LMS and LCMS are similar and that makes it understandable why their terms are used changeable in the literature, which sometimes causes confusion.

	Features	LMS	LCMS
1.	Facilities for enrolling in a course and for activity and learners administration online	Present	Present
2.	Online Payment facility	Present	Absent
3.	Imports learners	Yes	Yes
4.	Instructor-led registration of learners	Yes	Yes
5.	Schedules courses	Yes	Yes
6.	Defines curricula	Yes	No
7.	Defines learning path	Yes	Yes
8.	Plans reading materials	Yes	Yes
9.	Supports online courses	Yes	Yes
10.	Supports information on offline events	Yes	Yes
11.	Supports upload of digital resources	Yes	Yes
12.	e-mail facility	Present	Present
13.	Chat room	Present	Present
14.	Discussion Forums	Present	Present
15.	Supports Webinars (i.e. online seminars)	Yes	Yes
16.	Supports learners collaboration	Yes	Yes
17.	Allows assessments	Yes	Yes
18.	Analyzes results	Yes	Yes
19.	Creates and administers tests	Yes	Yes
20.	Tracks results	Yes	Yes
21.	Supports content creation	No	Yes
22.	Develops content navigation controls and user interface	No	Yes
22.	Creates templates	No	Yes
23.	Organizes reusable content	Yes	Yes

Caniëls et al. [22] differentiate the process of LMS and LCMS and considered LCMS as a platform that has an authoring process, while LMS has a managing process. The following Table (Table 2) shows the different process for LCMS and LMS:

Table 2: Educational Processes Set and Typical Application Solutions, adapted from Caniëls et al. [22].

Categories of Educational Processes	Processes	Examples of Current Systems
1. Authoring Process (LCMS)	Develop the content (tasks) Store and manage contents	Macromedia Author ware, Total LCMS, Web Publisher
2. Management Process (LMS)	Design the courses by packaging the contents into courses, Allocate learners and instructors to courses and provide an evaluation of students	Lotus Learning Space, Docent, WebCT

Fernandez et al. [23] explain that e-learning platforms have progressed with three evaluation stages, which can be seen in the following stages:
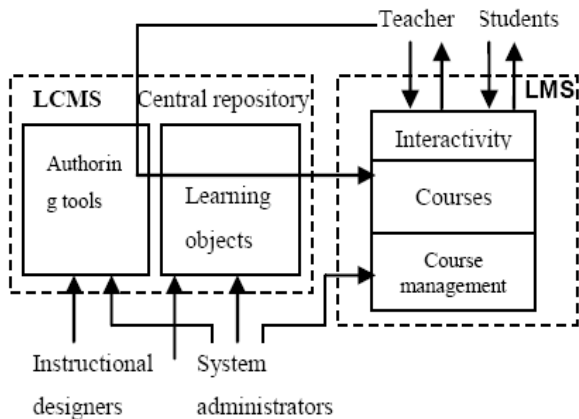
First stage: A Content Management system (CMS) is the basic platform that allows generating a dynamic website. The purpose of such these platforms is to create and manage online information such as texts, graphics, images, videos etc.

Second stage: A Learning Management System (LMS), comes after CMS and provides the environment that makes updating Web, maintenance, and implications possible for collaboration with multiple users.

Third stage: A Learning Content Management System (LCMS) is a platform that integrates the functions of both LMS and CMS, incorporating the content management for personalizing the recourses for each learner, and where companies can do their own editing entry, with self-sufficiency for the content publication. In simple words, these platforms are quick and offer efficient solving of problems that the previous platforms have. LCMS has added the technique of knowledge management to LMS platforms in a designed and structured environment which makes organizations/institutes able to implement their own process and make the practice better with the support of creating content, materials, and online courses.

Finally, LCMS can be integrated to LMS platforms as seen in the following schematic diagram (Fig1)

Figure1: Schematic diagram of LMS and LCMS integration, adapted from a study of Orueta & Pavón [24].

7.   DISCUSSION

Issues should be considered prior to the adoption of e-learning platforms:

There are several e-learning platforms available and organizations/institutes can choose from any of these available educational platforms. However, it is not an easy step to just pick a platform based on only its features or price. Many other issues should be taken in consideration before implementation.

According to Colace et al. [25], educators who consider the implementation of any educational technology platforms should carefully evaluate it prior to providing it to use with the population of students. The adoption and selection of LMS platforms by any organization/institutes should perform such analysis for some basic parameters which often includes these features; technical support issues (e.g., the required hardware infrastructure, programming language etc.), the functions availability (e.g., integrated streaming functions, discussion forums etc.), supported formats (e.g. PDF, HTML, different encoding video, etc.) the standards compliance of learning technology (e.g., SCORM) [26]. Choosing the right e-learning platform which provides users with a usable

environment could lead to improved performance and significant saving [27]. Regarding teaching and learning activities, providing a usable and efficient LMS potently reduces the time invested by teachers for managing, setting up the course, and improving learners' experiences. As a result, both instructors and learners do not have to struggle with any technologies. Instead, focus only on the contents [26].

Holsapple & Lee Post [28] added that picking and choosing e-learning platform relies on several aspects such as number of users, user characteristics and their needs, the objectives and courses types to be given, content which will be taught and methodology that will be followed (less or more interactive), and the method of evaluation to be used. Focusing on these aspects leads to the most convenient and suitable platform for an organization, and the huge benefits of platforms can be gained by instructors and learners. Collis [29]. presents some requirements that should be considered when an organization plans to implement an e-learning platform. These requirements are shown in the following table:

Requirements when selecting an eLearning Platform, adapted from a study of Collis (1996) [29].

1- USERS
- Numbers
- Age
- Socio-cultural characteristics
- Skills or interface use
- Educational needs
2- COURSE
- Type
- Students numbers
- Objectives
- Content
- Methodology
- Evaluation
3- TECHNICAL CHARACTERISTICS
- Software needs or server hardware
- The hardware of software needs for the users
- Number of possible online users
- Access and security control
- Technological infrastructure which needed by platform
- Necessary technical knowledge
- Surfing by the platform
- Design strategies.
- User license contracting methods.
4- MANAGEMENT OF FORMATIVE OFFERS
- Management of course offers
- Management of student enrollment and cancellation.
5- TEACHING/LEARNING PROGRESS
- Teacher learning method
- Teaching-learning method
- Type of content to be taught
- Index of content
- Glossary of terms
- Content searching tool

- Content available in various formats
- Multimedia possibilities
- The possibility of consulting content OFFline
- Evaluation of teaching/learning process
- Initial evaluation
- Formative or continuous evaluation
- Student help system
- Course design tool for teachers
- Course management tools for teachers
6- COMMUNICATION TOOLS
- Must facilitate collaborative work and communication between teachers and students.
- Asynchronous: discussion forums, electronic mail, calendar etc.
- Synchronous: shared electronic board, audio conference, video conference, chatting.

8. Advantages and some limitations:

For any technology, there are some advantages and limitations that are associated with them. In this part, some of advantages and limitation of e-learning platforms applications will be presented and discussed. Starting with its huge advantages, according to College Board [30], Young [31], and Kim & Bonk [32], the advantages of implementing e-learning platforms can be seen in the following features:

- They offer open and flexible learning with no limitation to time or space. Hence, a rigid timetable and distance problems can be avoided as well as offering improvement in access to information.
- They could enable instructors to incorporate new resources for learning, elaborating learning materials, automating marking systems, elaborating the class assistance resources and so on with greater quality and ease of presentation.
- Materials can be managed and digitalized with reduced cost and relative ease such as making them in CD-ROMs, external USB memory and so on.
- Student to student and instructor to student communication can be improved with the tools of incorporated communication.
- Providing incorporating tools for students to follow-up and make an evaluation.
- Instant updating of materials can be done by instructors and their students.
- The interaction with any experts in any area is possible without considering where they are located by using some features such as a mean of a video conference.
- Collaborative work in teaching and research can be promoted by these platforms. Group work could be facilitated by people from different institutes, universities or even companies who could be located in different countries.
- They allow the results of research to be published in worldwide which lead to a quicker circulation in knowledge.

However, even though the e-learning platforms can provide the huge benefits which are shown above, there are some limitations associated with it as stated by Kim & Bonk [32], Naidu, S. [33], Sun et al. [34], and shown below:

- Lack of the preparation of teachers when dealing with such these platforms. Some of the teachers have "technophobia" when using a new technology. They are required to do some efforts to learn how to deal with them, giving same structures in materials cannot be transferred. Some of them may have a fear about the expectation and possible results of integrating these platforms with their teaching.
- More time is required (especially in the beginning) when making a virtual material.
- Teachers are required to care about the learning process by considering more previous details when compared to traditional methods.
- Teachers should put more efforts with those who have no access and assist in access them (digital divide increases).
- Barriers that students might face and come across should be anticipated. Resources that assist them to overcome these obstacles must be available to them.
- "Face to Face" communication is often missing with these technologies, which leads to a loss of personal and social relationships between instructors and students or even among students themselves.
- It may be difficult for instructors to keep students motivated and engaged in each lesson and at the same time to keep those who might drop out from participating in the lessons.
- Students should be steady, mature and responsible for their learning through these platforms. Some may prefer traditional methods in which they can play more passive roles in the learning process.

9. CONCLUSION:

Most institutes have implemented certain e-learning platforms such as LMS, CMS and LCMS. Even though they are widely implemented and used, their terminologies are often misused in the literature due to the similarities between them, leading to confusion. This paper addressed this confusion by defining each term and discussing the unique functions of each platform. Comparisons between all of these platforms have been discussed based on the literature. Certain critical issues to be considered prior to implementation have been presented. This study has discussed the huge benefits and the limitations of these e-learning platforms. Further studies should focus on how to overcome these limitations to reap the substantial benefits of e-learning platforms and ensure successful implementation.

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