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CHARACTERISTICS OF LEARNING MANAGEMENT SYSTEM (LMS) AND ITS ROLE IN EDUCATION OF ELECTRONICS

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***Abstract**: The present article will study the characteristics of Learning Management System (LMS) and its role in education of electronics. For this purpose, we point to an introduction of a history, related researches and a specific definition of LMS. We continue with distinguishing LMS from similar terms such as Content Management System (CMS) and Learning Content Management System (LCMS) that, in many cases, are being confused with. Meanwhile, we will refer to a brief elaboration of definitions of the terms, explain the role of LMS in education and also clarify the function of LMS as well. Finally, in addition to an explanation of the contemporary usage and current features of the present LMS, we sum up the topic by determining the processes and giving recommendations and advices for future researches.*

***Keywords:** Learning Management System, Learning Content Management System, Content Management System, Educational Learning*

I. INTRODUCTION

By developing tele-learning or distance learning, network education appears and enables us to overcome the time limitations and physical circumstances constraints. Learners can study freely ever in every time and place via internet which contains various informational sources. In the knowledge and economy era, people face with challenges caused by scientific and technological developments and daily business necessities, thus, continuation of study and job education have been the main methods for restoring knowledge and learning skills. Education and learning are proceeding and growing gradually in a direction as a life-long process [1]. Learning Management System (LMS) is an approach to use computer's application for education, but the potential and important concepts are often misinterpreted and contain the misused word. The history of using computer for learning is full of different words such as Computer Based Instruction (CBI), Computer Assisted Instruction (CAD) and Computer Assisted Learning (CAL) which generally explain the programs of repetition and practice, intensive lessons and more individually education, by sequence [2]. LMS has also history in another word, means Integrated Learning System (ILS) that represents the applicability beyond education content like managing and following-through, personalized education and combination and coordination in the whole system [3] [4] [5] [6]. The term ILS is created by Jostens and LMS was firstly used for explaining the component of LMS of PLATO K-2 which lacked content and separated from lesson ware. At the present time, the word LMS is used to describe some different educational functions of computer [7].

II. RELATED RESEARCHES

The era of electronic learning systems have become researchers' central point of attention in previous years. More precisely, various learning systems, based on web [8] are made in which the aim

of all was facilitating the user's learning by time saving. The Learner's model (user's background), the Adjusting model (adjusting filter), distinguishing mechanisms, educational viewpoints (monitor's engine), the range of content (lesson plan) and feedback, are the components of a structure for fulfilling electronic learning's platform which are noticed in the works of Alrifai and counterparts (2006), Garzotoo and Cristea (2004), Papasalouros and counterparts (2003) and also Zkharia and counterparts (2003). Moreover these, Brusilovsky and counterparts (2005) have used the main components of structure-like added values services, the servers of Student's modeling and the connecting factors based on the subject matter. In O'Conner and counterparts' work (2004), the text translator is used as a factor who helps in "translating" the text and automatic processing of "interpreted content", in addition to normal structure [9] [10] [11] [12] [13]. Incidentally, various approaches are used for personalizing electronic learning system in order to reach to adaptability that is accomplished by using observing and evaluating methods in learning's ways. For instance, it can be used as Student's Modeling Server [14], explicit or implicit input of user in Detection Mechanism [10] or an adaptable filter which delete the unnecessary implicit information for user [12]. In the work of Juvina and Van Oostendop (2004), another method is used which shows that modeling the managing web is possible by studying individual differences and behavioral metrics by using Latent Semantic Analysis (LSA) [15] [16]. On the other hand, some researches are used in Bayesian Network in order to support user as a method for quantitative and qualitative evaluation of user's behavior in his background's system and updating [17]. It means that, the method of Bayesian Network lets us to have a simple approach but efficient for making and controlling statistical models [18].

III. WHAT IS LMS?

The key point to understand the difference between LMS and other computer-based educational terms is the know-how of the systemic nature of LMS. LMS is a framework which controls all aspects of learning process. LMS is an infrastructure that presents and manages the educational content and also determines and evaluates the educational object or individual and organizational study purposes; it also follows up the trend of improvement towards the fulfillment of those purposes in addition to collecting and presenting data in order to appraise learning process of an organization as a whole unit [16]. LMS gives the content while at the same time, accomplishes the registration and management of educational course, analyzes skills' gap and fulfills follow-up and reporting [18]. Bailey (1993) introduces the following general characteristics for LMS in education:

- Educational purposes are in a relation with lessons one by one.
- Lessons are attached in a standardized lesson plan.
- Lesson ware extends several grade levels in an adaptable and fixed way.
- The Management System gathers the results of students' performances.
- Lessons are presented based on each student's improvement in learning.

American Education and Development Society [20] have advised the following functional necessities for a corporate LMS:

- The ability of combination with human resources' system.
- Containing tools that make following cases possible: Managing registration and developing user's index; Preparing lesson plans and ways of issuing license; Appointment of teachers and preparing lesson content; Management of budget; Preparing a schedule for learners, teachers, classes.
- Providing accession to presenting content includes environment (class, online), method (with teacher's leading, self-direction) and learners (employees, clients).
- Development of content includes compiling, preservation and stocking.
- Combining content with Third Party's lesson ware.
- Evaluating gaps between learner's competence and managing skills and the place of expertise.
- Providing and supporting evaluations compilation.
- Following standards such as SCORM and AICC which are allocated to content entering and the lesson ware that regardless of compiling system, follows standards.
- Supporting configuration of LMS for working with present systems and internal processes.
- Creating security like password and making code [7].

IV. COMPLICATIONS OF TYPES OF LMS

The present LMSs can be located in one of these four levels regarding to their complications: 1) The most fundamental of these products, are just a tool to present the lesson. In fact, it is not a LMS but a Player for online lesson. These are the tools which install to show the products of a producer. 2) The low-level LMSs; these kinds of tools solely handle the presentation and management of lessons. They determine who have used the lessons or passed them completely and present some reports from the way of this lesson's usage. 3) In addition to low-level LMS' facilities, the LMSs in the intermediate level provide facilities of packing lessons for preparing educational and special courses of learner to these courses. 4) In addition to other levels' facilities, LMS in high level, provide the complete facilities of an educational portal. These facilities are responsible for accomplishing the presentation and supporting different kinds of electronic education and other classical way of education [21].

V. COMPONENTS INVOLVE IN CONSTRUCTION OF LMS

LMS is a completely generalized model [21], consists of seven parts as follows: Follow-up Server, Delivery Server, Profile-Learner Server, Educational Course Management Server, Content Management Server, Test/Evaluating Server and Sequence-Tracing Server. These services provide applicability of pursuit Learner/Learning, Content Delivery, Incoming/Outgoing elements of educational course and Content Sequence-tracing. The Follow-up Server receives learner's request and follows his state of learning while Delivery Server, presents the content of learning to the learner.

VI. DIFFERENCES BETWEEN LMS, CMS AND LCMS

Whereas computer's function in education is full of non-standard words, so without any doubts, the sense of confusion happens that which word is suitable. For this purpose, it is important to determine the ways that the LMS is properly used in them for describing distinct, but interrelated technologies.

6.1. Course management system (CMS)

Maybe an inappropriate usage of the word LMS, has the most connection with functional computer programs which we call it Course Management System (CMS). In fact, these systems are used for online or mixed learning, supporting of putting lesson topics of online course, acquainting students with courses, following students' performances, storing students' presentations and moderating the relationship between students and teachers. A part of this functionalism is seen in LMS context, so the occurrence of confusion is understandable. Hence, the systemic nature of LMS does not limit its functionalism to the extent of CMS' functionalism. CMS gives a collection of tools and framework to the teacher that creates the possibility of making a quite simply content of online course and sequence teaching and managing that course, includes different interactions with students of the course [23]. The examples of CMS consist of Blackboard, Angel, Sakai, Oncourse and Moodle. But in the meantime, Blackboard is a good example for related confusion of these words because it is generally called LMS in common texts. By searching in Google Scholar, thirty-six articles are found for the phrase "Blackboard lms" which had introduced Blackboard as LMS while Blackboard's company itself, calls its product a CMS: "Blackboard's functional program of online learning, the learning system of Blackboard, are the most functional CMS among American academic institutes" [25]. Whereas the learning system of Blackboard does not consist their whole academic collection, the products that are supporting better management of educational object, samples of student's works and making online portals and called Networked Learning Environment in all [25], do not have complete

function to be known as LMS. So, while CMS can be known as a part of LMS, it is not equivalent with LMS. Technologies are made depend on so different reasons, even if share special functions [26].

6.2. Learning content management system (LCMS)

Although Learning Content Management System (LCMS) is confused most of the time with LMS, we can compare them in a simpler way, because they are suitable to join together. LCMS is often used instead of LMS or considered as a new version of LMS. In fact, both usages concentrate on different functions and are complementary as well. The main difference between these two technologies is as simple as a word which separates them from each other, means the word content. Oakes reports that IDC presents the following definition for LCMS: The system which uses for "making, storing, unifying and delivering the personalized content of electronic learning in the form of Learning Object (LO). The concentration in LCMS is content because this usage involves in construction challenges, second use, management and presentation of content. But concentration in LMS is the learner and organization: LMS has connection with learner's management, learning activities and depicting the plan of organization competence [27]. Definitely, the orientation of LCMS and LMS is different, but they are well-combined; LCMS gives the permission of construction and presentation of educational object, while LMS in general, manages learning process and inserts LCMS in it [28]. Or as Connolly (2001) asserts: "LMS provides regulations and LMS provides content" [29] [7].

VII. THE SIGNIFICACE OF LMS' ROLE IN EDUCATION

The significance of recognition of LMS and its appropriate technologies lies in its role in the future-oriented educational approaches, since present day learner's need cannot be met by current approaches. Society has been transformed from industrial era to informational era [30] [31] [32]. The present day educational system leaves the responsibility of learning upon masters, makes students to remain passive, behaves them in such a way that they are alike and obliges them to fulfill the same works in specific time span [30]. This causes learners to have different achievements. Those who do not have remarkable success will be left behind others and those who have gained more success will improve [33]. Success can be left unchanged in regards to skill level instead of keeping the time constant and making the learning process as compulsory in a fixed rate. In an educational pattern of informational era, much more time is given to learners for achieving skill that necessitate speed and sequence of ordered-manufactured education [34]. Education is led to a student-based approach and teachers give up working as a source of knowledge and take the role of a guide, an instructor and a motivator in the form of someone who facilitate acquisition of knowledge and students become more active in their learning process [35]. Technology should play a key role in which the learning process becomes ordered-manufacture for each student. Schlechty asserts that technology should follow the improvement of each student towards skill and becoming a master, evaluate his learning, help in understanding the needed guidance to teachers, present the education and put it into sequence properly, store the documents of success and combine each function methodically. It is obvious that this background has close harmony with functions of a LMS. In educational model of informational era, LMS evaluates students' level of knowledge and their present skill, cooperates with teacher and student for determining proper educational object, specifies education and puts it in sequence appropriate with each student, evaluated the end result of student's performance, store documents which indicate success, supports cooperation and prepares reports for presenting necessary information in order to maximization of the whole learning's organization's efficiency. While, now LMS do some of these functions but there are limitations which prevent the fulfillment of complete part of LMS' capability.

Existence of open-source technologies is another potential advantage which distributes the source-found for construction, updating and keeping these technologies among global community of constructors and designers instead of one or two private companies.

Eventually, LMS should:

● Provide more structured education by concentrating on flexible goals that are determined by the learner [30].

● Support participatory learning in and out of institution to expand the learning atmosphere to homes and involve parents more than before [36].

● Consider better personalized evaluation, improvement following, reporting and answering learners' needs.

● Become actually systemic, combine system as a whole in order to provide optimum cooperation in all systems and among participants [37].

● Increase support for professional distinction and professional expansion for participants such as teachers.

● Increase cost-effectiveness and betterment of the leverage of present resources in institutions and LMS [6].

VIII. CONCLUSION

LMS is a powerful technology which still has not reached to its full potentiality and is important for the position of educational pattern in informational era. Because of the term's importance, more precision and comprehension should be noticed while using it. By understanding the nature of LMSs and the state of combination of complementary technologies in these systems, researchers and experts can disseminate more efficiently the condition and future position of computer in education. Nevertheless, recognition and compatible function of terms do not suffice alone for realizing the potentiality of computer technologies in education. There is a real need to a comprehensive and well-argued research work about LMS. Studies about discussed LMS' application and productions' efficiency in essays and researches are needed. These studies should cover more precisely and in detail the kind of characteristics that are offered by these productions and determine other required characteristics. Also more researches are needed in compiling purposes of learning and following up the standards. Looking at present learners' requirements and the state of technology's maximization to meet the needs in more efficient way and conducting researches to help the directing decision and future functions of technology is important.

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