

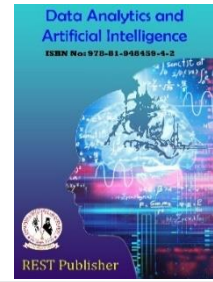


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Learning Management System

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Abstract-In the recent years, there has been increasing demand in joining of new technologies into educational processes. Learning Management System (LMS) as a web based technology in educational programs, provides support to instructors to reach their pedagogical goals, organize course contents and support students. This study is an attempt to investigate the factors influence the success of LMS. Research model was developed by examining the relationship between students' outcomes (perceived usefulness) and information quality, system quality, and readiness for online learning through system use and user satisfaction. The respondents chosen for this study were all the students from Adhiyamaan College of Engineering in Hosur. Sample of this study identified based on number of students in each faculty. The quantitative data are gained through questionnaire. The analysis of data indicated that all relations from independent variables to dependent variable are significant, except the relation between readiness for online learning and system use. The most influencing path was information quality on user satisfaction and perceived usefulness and the least influencing path was readiness for online learning, system use and perceived usefulness. The managerial implications and limitations of current study were also discussed.

Keywords: Learning Management System, e-learning, information, study.

1. INTRODUCTION

Schools and universities are investing amounts of money and time in developing education methods alternatives to traditional types of learning systems [1]. E-learning helps to apply information technologies/systems to facilitate student learning, enhance instructor teaching performance and reduce educational costs [2]. There are different software's, tools and techniques that help to implement e-learning. Examples of e-learning systems are Course Management Systems (CMSs), Learning Content Management Systems (LCMSs) and Learning Management Systems (LMS). LMS is defined as set of networks and tools integrated together to support online learning [3]. LMS allows students to view multimedia lectures and each other's in learning communities, read course materials, take online quizzes related their study [4]. Many academic institutions have invested heavily in LMS implementation to support online teaching [5]. A number of studies have investigated the success of information technologies application in education from the learner's perspective, however, none of these studies, provided an examination of all major issues related to LMS success [6]. Therefore, the objective of this study is to investigate the factors that influence the learning management system success among students. A learning management system (LMS) is a software application for the administration, documentation, tracking, reporting, automation, and delivery of educational courses, training programs, materials or learning and development programs. The learning management system concept emerged directly from e-Learning. Learning management systems make up the largest segment of the learning system market. The first introduction of the LMS was in the late 1990s. Learning management systems have faced a massive growth in usage due to the emphasis on remote learning during the COVID-19 pandemic. Typically, a learning management system provides an instructor with a way to create and deliver content, monitor student participation and assess student performance. A learning management system may also provide students with the ability to use interactive features such as threaded discussions, video conferencing and discussion forums. There can be no doubt that technology has transformed the way education is delivered to people across the globe. We now live in an interconnected world where the traditional concept of formal learning, taking place in a single physical location, is becoming increasingly less relevant. Modern learners are becoming dissatisfied with the stand-and-deliver approach to education that dictates attendance times, learning venues, and modes of participation. The emergence of sophisticated communication technologies and mobile devices has enabled a new generation of information consumers to satisfy their demands for knowledge without the need to meet in a physical location. Software vendors,

open-source developers, and educational institutions, cognizant of this development, have embraced systems that can facilitate the management of courses and engagement with students remotely. Learning management systems were designed to identify training and learning gaps, using analytical data and reporting. LMSs are focused on online learning delivery but support a range of uses, acting as a platform for online content, including courses, both asynchronous based and synchronous based. In the higher education space, an LMS may offer classroom management for instructor-led training or a flipped classroom. Modern LMSs include intelligent algorithms to make automated recommendations for courses based on a user's skill profile as well as extract metadata from learning materials to make such recommendations even more accurate. LMSes are frequently used by businesses of all sizes, national government agencies, local governments, traditional educational institutions and online/eLearning-based institutions. The systems can improve traditional educational methods, while also saving organizations time and money. An effective system will allow instructors and administrators to efficiently manage elements such as user registration, content, calendars, user access, communication, certifications and notifications.

2. THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

In order to find the factors influencing LMS success, the DeLone and McLean information system success model [7] was utilized in this research. This model is one of the most widely refereed IS success model in the literature [8; 9] and can be used to assess LMS success due to its solid theoretical foundation and the numerous successful empirical studies done based on it. This model consists of six variables: (1) system quality, (2) information quality, (3) service quality, (4) use/intention to use, (5) user satisfaction and (6) net benefits. In the following section, the DeLone and McLean IS success model dimensions will be reviewed and adapted to address LMS success.

System Quality: System quality is the performance of the system from individual perception. On the other hand, from an e-learning perspective, the system quality is measured in terms of both the various software applications designed for their intended use and needs and the hardware available to the user [10]. In terms of relationship between system quality and system use, some studies found the direct relationship between system quality and system use from different aspects. For instance, system quality has affected both system use and user satisfaction [11]. Thus, system quality has a significantly positive influence on user satisfaction. Learning content has different quality based on each teacher; producer's ability. Therefore, e-learning content is a direct evaluation to user satisfaction [12]. Thus, the following hypotheses are proposed: H1: Learning management system quality characteristics positively affect system use.

H2: Learning management system quality characteristics positively affect user satisfaction.

Information Quality:

Halawi et al. [10] pointed that "information quality refers to measures of IS output, namely the quality of the information that the system produces primarily in the form of reports". Based on the study by [13] the quality of the information produced by the online learning system is more important than the hardware and the software components of the system. The essential needs of students are access to support materials and learning concepts [14]. Information quality is represented by content quality in e-learning. Wu and Wang [15] found that information quality have a significantly positive influence on user satisfaction. Therefore, it can be theorized that information quality will be highly correlated with user satisfaction and system use, particularly when the course material is accurate, easy to understand, relevant and timely. Thus, the following hypotheses are proposed:

H3: Information quality characteristics positively affect system use.

H4: Information quality characteristics positively affect user satisfaction.

Readiness for Online Learning:

The concept of readiness for online learning was proposed by [16]. They defined readiness for online learning in terms of three aspects: (1) students' preferences for the form of delivery as opposed to face-to-face classroom instruction; (2) students' confidence in using electronic communication for learning and, in particular, competence and confidence in the use of Internet and computer-mediated communication; and (3) ability to engage in autonomous learning. Other studies found that there is relationship between readiness for online learning and student satisfaction, this relationship match with previous results which are (1) a learner's self-regulatory learning strategy is a very important variable related to learner's satisfaction and (2) a learner's computer self-efficacy is also a very critical component too [12]. Thus, the following hypotheses are proposed:

H5: Readiness for online learning characteristics positively affects system use.

H6: Readiness for online learning characteristics positively affects user satisfaction.

System Use:

System use is an important measure of information system success [17; 11; 18]. This construct is defined as “the extent and nature of use of an IS” [18]. Results of the study by [19] suggest that students who continuously access a Website will perform better in an online class than those who do not.

User Satisfaction:

The measurement of users’ satisfaction with information system is still main concern to researches. Based on previous study, user satisfaction measures are categorized in terms of three perspectives such as:

- (a) user attitudes towards IS;
- (b) user satisfaction in terms of information quality; and
- (c) user satisfaction in terms of perceived IS effectiveness [20].

In the online learning system context, user satisfaction can be described as the extent to which learners believe the online learning system meets their online learning needs. In this study, user satisfaction is a measure of the successful interaction between the online learning system and its users. Research results by [22] and [22] provided evidence that heavily used systems are positively related to user satisfaction. Thus, the following hypothesis is proposed:

H7: System use characteristics positively affect user satisfaction.

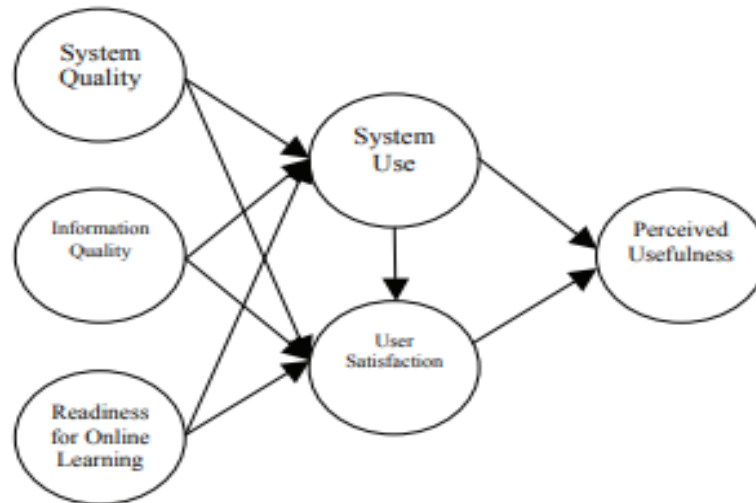


FIGURE 1. Research Model

3. RESEARCH METHODOLOGY

The methodology adopted in this review, draws on the strengths of two main approaches to literature reviews: narrative and systematic. According to Rother (2007), a narrative review is a critical analysis of the literature of a chosen topic. Narrative reviews are broad in nature and do not describe in detail the methods employed to collect and analyse the literature selected for examination (Henry et al. 2018). By contrast, systematic reviews are characterized by explicit, transparent methods that can be reproduced by other researchers (Collins and Fauser 2005). The strengths of systematic reviews include the narrow focus of the research question, comprehensive search for evidence, and criterion-based selection of relevant evidence. This review adopts a narrative approach to address the research aims and applies some of the rigour of systematic review methodologies to the selection and inclusion of the published articles referred to in this paper. Literature reviews drawing on the characteristics of systematic and narrative approaches have been widely used in the analysis of a wide range of information technology-related studies such as social media (Best, Manktelow, and Taylor 2014; Robinson et al. 2016; Sarmiento et al. 2018), online learning (McCutcheon et al. 2015; Sinclair et al. 2016) and human engagement with computers (Boyle et al. 2012; Fleischer 2012).

Search inclusions and exclusions:

The databases used in this review were A+ Education, Education Research Complete, ERIC, Vocational Education plus (VOCEDplus), Teacher Reference Centre, Scootle, Vocations and Career Collection, and Mental Measurements Yearbook. The databases were chosen because they covered educational journals. Only peer reviewed journal publications were included in the searches. Given the rapid advances in LMS technology and use over the years, it was pertinent to limit the age of publications included in this review to ensure that the included papers had a contemporary focus. Accordingly, results were restricted to a five-year period (2014–2018) and only full text papers written in English were included.

Selection process and search results:

Based on the title and abstract, publications were initially screened for inclusion depending on their relevance to LMS usage and impact. After reading each article, a short list of publications was compiled according to the following six criteria: the publication critiqued the use of LMSs in a post-secondary institution; the publication was based on empirical evidence, not expert accounts of other studies; the publication was an empirical study, not an analysis of other works; the research methodology was identified and discussed; there was an adequate description of the context in which the research was carried out; and the data analysis was sufficiently rigorous. Figure 1 depicts the search strategy used in this review.

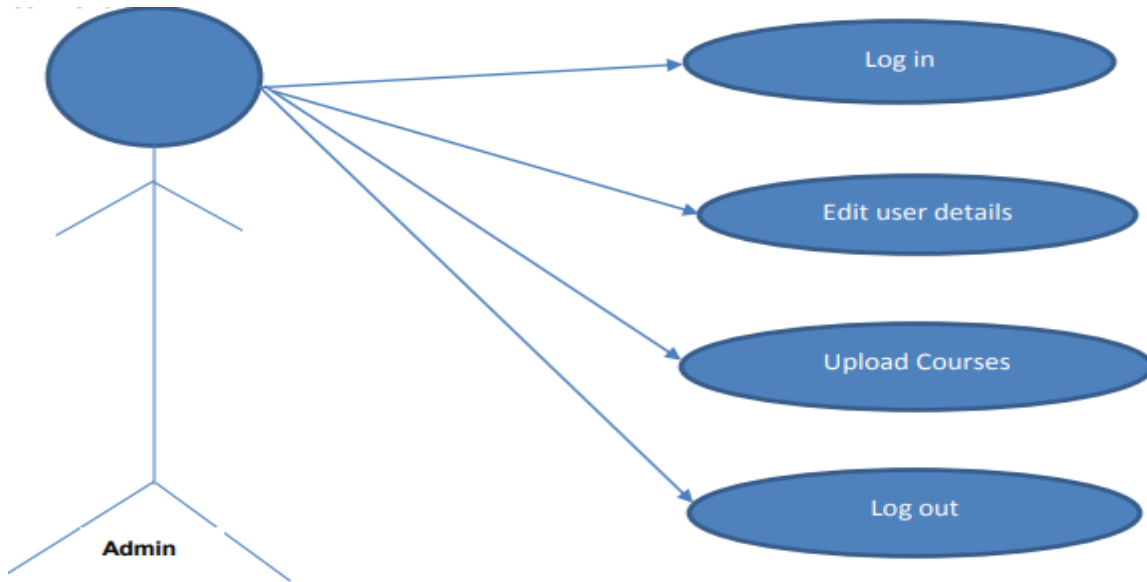


FIGURE 2. Admin Case Diagram

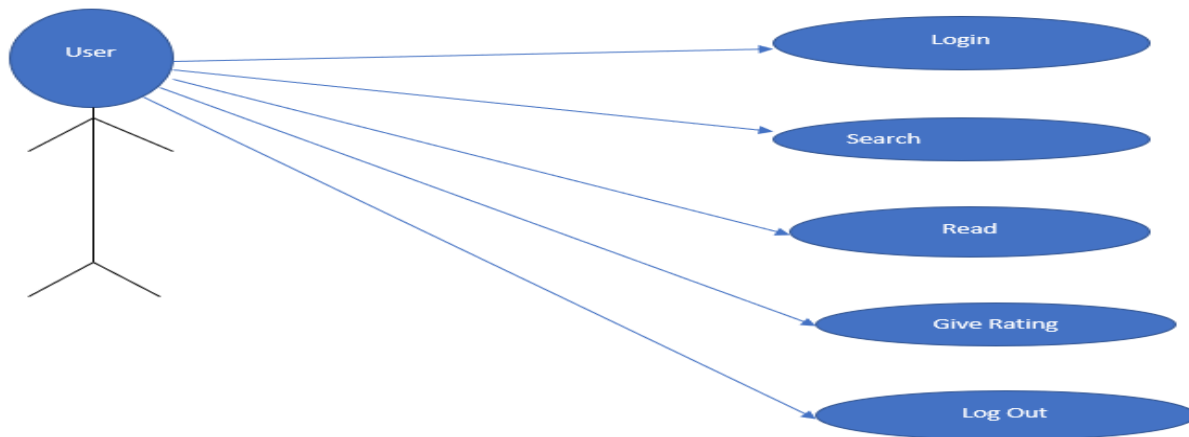


FIGURE 4. User Case Diagram

The system design will be structured with a mass communication section. This is to ensure easy dissemination of information to the entire student body. Also, upcoming events can be posted on the LMS to effectively notify the university community of scheduled events. Online forums would also be made available for academic discussions.

4. EXPERIMENTAL RESULTS

During the course of this research it was realized that building an LMS is a rigorous task. Consequently, a system that

will provide real-time access to lecturers/students and course materials, announcement of information and dates relating to the learning process across to a larger percentage of the student population was developed. Furthermore, this research project advocates the importance of simple and yet attractive design. The design allows users to easily navigate the site and carry out tasks with minimal hindrances. An attractive layout also ensures that the user does not get bored while using the system. In addition, the quiz component of the LMS provides a faster way of handling large classes. It leaves no room for mistakes with respect to students not writing down the appropriate question or missing something the lecturer said. The system also eradicates the commotion that arises when it is time for submission of quizzes taken.

5. CONCLUSION

This article presents an empirical study of the qualities of 36 modern LMS platforms. The study was carried out in two stages. In the first step, the state-of-art literature was discussed, and the criteria for analysis of e-learning systems were selected. In the second step, we focused on the choice of LMS platforms for investigation. We used specific keywords in Google and Bing search engines for the selection of such software. As a result of this study, we can conclude that most LMS systems have similar features. All of them support the use of multimedia elements, creating and editing the lectures, exercises and course assignments. Only 86% of the studied systems meet the SCORM standard, and no evaluating systems of the learners' knowledge are possible in 5% of them. An interesting result that only 46% of all the systems provide chat support and only 68% of them have forum support. This result confirms the trend that the LMS platforms without any communication support for users are more suitable for a blending learning tool. The lack of communication support leads to using web forums and social networks out of the LMS, which contradicts to the concept of a unified learning environment system. Despite the significant advances in software development and the relatively long period of use of e-learning systems, they still do not meet all the criteria for an LMS, although their authors defined them as e-learning systems. This can further confuse the end-users, e.g., teachers, pupils/students and parents. As a future trend of LMS systems, we can point to the enhancement of real-time communication between individual users, the use of these systems as cloud services and the inclusion of added and virtual reality to their capabilities. Furthermore, this research project advocates the importance of simple and yet attractive design. The design allows users to easily navigate the site and carry out tasks with minimal hindrances. An attractive layout also ensures that the user does not get bored while using the system.

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