



The Impact of Learning Management Systems on Students' Efficiency within Blended Higher Education

أثر نظم إدارة التعلم على كفاءة الطلاب في التعليم العالي المدمج

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Abstract

The rapid development of computing platforms and Internet technologies has had a major impact on modern educational systems in universities and scientific institutions that are facing continually new technological challenges. The usage of the virtual environment takes many formats, for example, the teaching-learning system, which is available online. The spread of mobile devices recently has created the technological sphere for the teacher. Therefore, a student can get an advantage from the various online information, communication, collaboration, and sharing with others. This paper investigates and evaluates the outcomes of adopting e-assessment and e-exams integrated into blended learning. Examining scholarly research benefits along with usage LMS platform (DoceboLMS) based on Cloud and HTML5 technology, by (122) undergraduate students' feedback according to (18) different questionnaires. The analysis of results from the survey reveals that more than half of the students (59.0%) are fans and are willing to use mobile devices as a learning tool. They have the motive to learn via online learning tools, which make existing electronic-examine content more accessible (29) Multiple Choice questions, as well as summative evaluations at the end of each course, could be used to assess their learning.

Keywords: LMS, e- examination, m-learning, e-content, Blended Learning

الملخص

كان للتطور السريع لمنصات الحوسبة وتقنيات الإنترنت تأثير كبير على أنظمة التعليم الحديثة في الجامعات والمؤسسات العلمية التي تواجه تحديات تكنولوجية جديدة باستمرار. يأخذ استخدام البيئة الافتراضية العديد من التنسيقات ، على سبيل المثال ، نظام التدريس والتعلم المتوفر عبر الإنترنت. أدى انتشار الأجهزة المحمولة مؤخرًا إلى خلق المجال التكنولوجي للمدرس. لذلك يمكن للطلاب الاستفادة من المعلومات المتنوعة عبر الإنترنت والتواصل والتعاون والمشاركة مع الآخرين ، تبحث هذه الورقة وتقيم نتائج اعتماد التقييم الإلكتروني والامتحانات الإلكترونية المدمجة في التعلم المدمج. دراسة فوائد البحث العلمي جنبًا إلى جنب مع استخدام النظام الأساسي (LMS (DoceboLMS استنادًا إلى تقنية Cloud و HTML5 ، من خلال ملاحظات (122)



طالب للمرحلة الجامعية وفقاً لـ (١٨) استبياناً مختلفاً. يكشف تحليل نتائج الاستطلاع أن أكثر من نصف الطلاب (٥٩,٠٪) هم معجبون ومستعدون لاستخدام الأجهزة المحمولة كأداة تعليمية. لديهم الدافع للتعلم عبر أدوات التعلم عبر الإنترنت ، ، التي تجعل محتوى الفحص الإلكتروني الحالي أكثر سهولة في الوصول إليه من خلال (٢٩) أسئلة ذات الاختيار من متعدد ، وكذلك التقييمات النهائية في نهاية كل دورة ، يمكن استخدامها لتقييم تعلمهم.

1. Introduction

Nowadays, with the advent of technology and the Internet, education is undergoing significant changes, with new methods of teaching and learning being considered. One of the most extensively utilized methods of teaching to increase knowledge is the employment of virtual environments, which are available in a variety of formats. Most universities are moving in the world to the increasing use of interactive e-learning techniques due to its great importance in enriching the level of higher education in all disciplines of study, taking the advantage of the current development of Information and Communication Technology (ICT) especially in the higher education sector. The ICT approach will impact on expanding the perceptions of learners and their use of tools and resources were not available to them previously. Learning technology is mixed from communication, information and related technologies that can be used to support learning, teaching, and assessment. Learning technology is the "systematic application of a body of knowledge to the design, implementation, management, and evaluation of teaching and learning" (ALT, 2018). The key to effective design an eLearning course with lasting effect by clearly is to define the expectations of the customers, understanding your audience, devising an effective learning strategy, and selecting the right tool for its development. A Learning management system (LMS) today is a one-stop-shop of hosting, which are soft wear application, assigning, managing, reporting and evaluating eLearning courses. LMS can be used for a wide range of educational, deployment and administrative purposes. One of the purposes used. Assessments can be included after every module or within the module to test the understanding of a particular learning objective. Feedback can be instant and effective. Improves learners' ability to self-assess their understanding on the subject matter and facilitate better learning. Data stored in the LMS can help evaluate the effectiveness of the curriculum and learning outcomes. Helps in training evaluation and future designing of courses. Assessments can be during the course or at the end of the course. Assessments during the course is included at the end of every module or concept. (Cammlab, 2016). According to today's standards, an online examination system is critical for the educational institution's preparation of exams, as it saves time and effort associated with examining exam papers and preparing results reports. The online examination method enables educational institutions to track their students' progress and maintain a pulse on their academic performance.

1.1. Research problem

Despite the relative expansion in the use of e-learning technology, still a large segment of university professors who have weaknesses in the real understanding and practical application of teaching methods using educational technology and adapted in the service of students, orientation towards the use of information technology to solve the problems of different education.



As a result, keen researcher on the use of teaching methods of modern style of e-learning interactive and practically implemented in several subjects at the University of Sakarya uses an interactive educational content, interactive e- classes teaching , electronic interactive systems evaluation and exams electronic.

Addition to the use of an integrated of Learning Management system (LCMs) of education to serve as a portal to the university or college and to be used by teachers and students to get to the course materials and lectures, as well as a multi-feedbacks and quarterly and final exams. And be practical as a model that can be used in Iraqi universities and other universities and the impact on the level of graduate students in them.

1.2. Research objective

The research concentrates on a set of main objectives leading to conclusions:

1. Reviewing various learning technologies and techniques.
2. Interactive teaching methodology by using e-learning tools.
3. Implement effective Learning Management System.
4. Implement interactive e-Assessments and e-Exams.
5. Integrated into blended learning online course relying on both synchronous and asynchronous technologies allows educators to provide collaborative activities and learning resources to online students, as well as supporting F2F learning.
6. Explore research benefits, students' feedback, and suggest recommendations.

1.3. Research importance

The importance of research lays in that they apply the experience leader in providing e-learning services in an integrated manner.

1. Use of Learning Management Systems (LMS).
2. The use of sophisticated electronic systems exams.
3. Provide sophisticated scientific solutions to the problems of higher education including universities keeping up with technological developments in the field of learning.
4. Propose ways of implementing e-learning in all universities.

1.4. Research limitation

Current search limits committed to the following:

1. Objective limits: it depends on the nature of the e-contents and chose in (Fizik2) from the department of Physics Science
2. Human limits: limited the application of the proposed model for the current research on a group of undergraduate students in Physic departments in Sakarya University.
3. Spatial boundaries : use of e-classroom experience in Sakarya University in Turkey.

1.5. Review of Literature

Numerous studies have been conducted to improve the management of e-exams and e-learning systems. Several of these studies concentrated on specific aspects of the system; these studies can be summarized as follows:

In (2003) Dietinger looked at an e-learning web based system and searching all types of requirements for e-learning environments such as simply offer and grade The researcher used



design, development and e- learning as an example and proposed using (General Networked Training and Learning Environment) GENTLE for future with it is integration of communication. The system of server used by students. And contain questions to answer with various strategies automatically, then those students interpret the results for databases access by CGI scripts. It also gives an integrated web based training environment for students, web-based examination system is an effective solution for mass education evaluation. (Dietinger, 2003). In (2005) Margit studys about online course have been developed for accurate product design. The goal of this study is to provide vocational training for professionals in product design and then describe the concept of design in learning course. In this, an evaluation has been made for the whole course in order to ensure the efficiency of this system and meet needs of the concerned group. All participants found that the online tutor was helpful and very important for their work .(Margit, 2005).In (2007) Graf, paper is proposed on the Internet based exam system Adaptivity in Learning Management systems. This study was depended on a course using learning management system Moodle (version 1.6.3) which taught to undergraduate students in the second semester of information systems and computer science. This course consists of (127) students had contributed in this study and (5) assignments had to be submitted and a final exam by students for evaluation their performance. With the help of this study, student can learn more effectively and facilitated better for them exam and enhancing LMSs to enable teachers continue holding their courses in LMS and taking advantages of them .(Graf, 2007),

In (2010) Kybartaitė, works in his thesis lead to develop campus for Biomedical Engineering (BME). The aim of this project was to develop and evaluate sustainable and dynamic solutions for the e-learning field. In this thesis, four various approaches were applied, i.e. theoretical, practical, evaluative and developmental. All the courses within the campus have provided information and links about relevant literature. An Internet exam can be used in all these courses. A questionnaire has been developed to collect information from (66) students who participated in the course. quantitative and qualitative data have been evaluated. The result was that the traditional classroom students preferred live classroom lectures (Kybartaitė, A., 2010) .In (2010) Adebayo & Abdulhamid assess the experiment. Six Nigerian Universities already use e-Exams. The researcher studied the present electronic-examination system's implications, problems, and security flaws. The researcher interviewed and surveyed 20 students who took the e-exams. Anomalies in the present electronic examination system were uncovered through interview analysis and research of the existing electronic examination system. The new technology also allows students to review their own corrective answers following exams. And employs biometric fingerprint authentication to screen the stakeholders and data encryption to safeguard the questions delivered to the e-Examination center through the internet. (Adebayo& Abdulhamid, 2010).An Indonesian university's blended learning strategy for elementary school teachers was established by Setiadi and Ganda (2010). This system was chosen for a learning platform that includes texts, tests,



assignments, and lectures. This study intends to determine the impact of face-to-face and blended learning on student outcomes and attitudes. This study's subjects are split into two classes. First class is face-to-face, second class is blended. Both classes held lectures for 16 meetings, 14 lectures, and 2 examinations. Through SPOT exam. (Setiadi & Ganda, 2010). In (2017), Hameed & Abdullatif are used an open source framework to design the e-exam in 2018. Universities and institutions can readily adopt the proposed online examination System (OES) to make the exam more safe and flexible, although it took longer to program. The system is made up of two main subsystems (student and administrator) that work together to maximize the system's benefits. Because each subsystem may be maintained and developed independently of the others, the proposed system is easy to maintain and build. (Hameed & Abdullatif, 2017). In (2018) Haag's study sought to gather experimental data on the general usefulness of m-learning in military education and training, as well as problems and concerns. Both the pretest and posttest required students to answer 25 questions. Then the questions would be fewer to improve the user experience. Less than half of the participants preferred the mobile version to the e-learning version (Haag, 2018)

1.6. Method

The research used the application of descriptive research methodology, as well as an experimental search approach when applying the system to detect the impact's effectiveness and efficiency.

And used the quantitative method consisting of exams that held in the winter semester

The context of the study was an undergraduate level university elective online course that was delivered via DoceboLMS in the winter semester 2018/ 2019 the course is offered by the Physics Department at the Arts Science Faculty in Sakarya University, Turkey. The total number of students who completed the application was equal (122) students. The survey presented a total of (18) specific questions which were corrected by the arbitrators and improved to collect data. The analysis of the result was performed using the SPSS program. The evaluation of the LMS process is based on the Likert-type scale. It consists of five-level scale types to measure the success of the learning process.

2. Description of the E-Learning Platform and General Introduction

The LMS records student data and reports to the teacher on the learning process (measures academic progress). This model outlines a way for deploying an e-Learning infrastructure/environment, as well as a digital content methodology for effective e-Learning implementation. A digital curriculum (e-content) will be produced and accessible via an e-LMS for online distribution and F2F for classroom use.

This needs to be followed up with systematic implementation of the design online education platform (DoceboLMS) approach by developing a product with an appropriate storyboard, including a mobile application and real-time collaboration features. Assessment tools generate tests; provide direct student feedback, interactive rubrics, and built-in reports.

Docobo is a learning system that is based on a cloud. The user can log on to that platform using a web browser to organize, manage, and track learning content without downloading special



software. Docobo supports all types of learning including blended learning, which may include some face-to-face between lecturer and students and mobile learning initiatives. It promotes seamless classroom online chatting, gamification, and apps and widgets that can be added or removed. (Pappas, 2016), (Docebo, 2016)

3. DoceboLMS Learning

Docebo Learning Management system is providing necessary tools during the e-Learning process such as content authoring, content management, user management, etc. Students can access the online learning content via the Internet, and also learn offline. There are several benefits of DoceboLMS, the most important of them:

- Docebo allows the user to upload and share training materials in many types of formats including PDT, PPT, video, SCORM, and Tin Can files. PPT, PDF, ODP, and PPTX files can be converted into slides or a sequence of snapshots.
 - Easy to navigate User Interface/Experience - Carefully designed for ease of use and fast adoption for admins and learners alike.
 - The Docebo LMS system does not need a high bandwidth network connection
- The overview of the DoceboLMS learning system is an authoring tool user interface for managing Learning Object creation with these authoring tools:
- HTML pages tool: Create and share HTML5 pages containing formatted text and pictures
 - Link lists tool: Creates lists of sites to visit within an educational context
 - Glossaries tool: Creates lists of terms with selection by letter, keyword, and search engine
 - Surveys tool: Creating surveys with results aggregated by class in the form of a histogram
 - Test tools: this tool is supporting time test, display the results achieved by the student and have 9 types of questions (Single Choice, Multiple Choice, fill in the blank, find the right term, find the wrong term, select an option from a pull-down menu, Association, load File, open-answer text).
- On the other hand, DoceboLMS will show learners how much time they spend in a course and their progress, as well as generate custom reports. Reports and analytics are the most effective approach to determine the success of training materials and the amount of knowledge gained by participants. Reports can be standard, summary, or custom and can be exported as CSV or XLS files.

Docebo LMS after an assessment provides learners with the ability to earn certificates based on skill development, compliance requirements, and course completion (CAMMLAB, 2016), (Docebo, 2018), (Chunwijitra, 2013).

In the Course Navigation menu each button or link accesses either a DoceboLMS tool (a specific function such as Dashboard, Users, Groups, Reports, newsletter...etc.) or a courses area (a location for posting the content files such as a syllabus or interactive videos, links, online quiz, survey, etc...).

In using DoceboLMS delivery software, the rules and procedures are all clearly outlined under "Fizik-II" courses and "How Course Works." These two areas can be reached from tabs, or buttons, on the course homepage.

3.1. Management and operations of online DoceboLMS platform

DoceboLMS course site is a critical step in effectively using a course management system. The online template course on DoceboLMS platform can be seen at

<https://saulearning.docebosaas.com/lms/> (Sakarya university learning). The instructor provides the students with a fully functional course site with all materials. Each learner can access the Website when they provide ID and password sent from the email of the LMS site.

3.2. Course organization

Students in online courses are indeed in need of a clear organizational structure. It is crucial to think about how to appropriately organize the course to encourage student participation and facilitate student learning. (Aiken et al. 2002)

To digitalize the content in DoceboLMS The objective is to design the online course according to the best practices and international TINCAN API standards. (sometimes known as the Experience API or xAPI) is a brand new specification for learning technology. Its new version of SCORM but the Tin Can API is simple and flexible. It lifts many of the older restrictions.

The entire subject must be managed by an LMS that will create all the learning sessions. The target is to host all the online content areas on a courses section include (course documents, course information, video, link...etc.).

The (Figure 1) Contents chart design helping in new registered online students by giving them a schema similar to print media. The information divided into discrete in title "Fizik-II" creates online sessions (chapter-1, chapter -2 & chapter-3) based on clustering all materials.

The methodology will divide the various sessions among the various groups in order to achieve a healthy load balance. In order to get the most out of online learning, the inspector must be able to track and monitor the activity of his students.

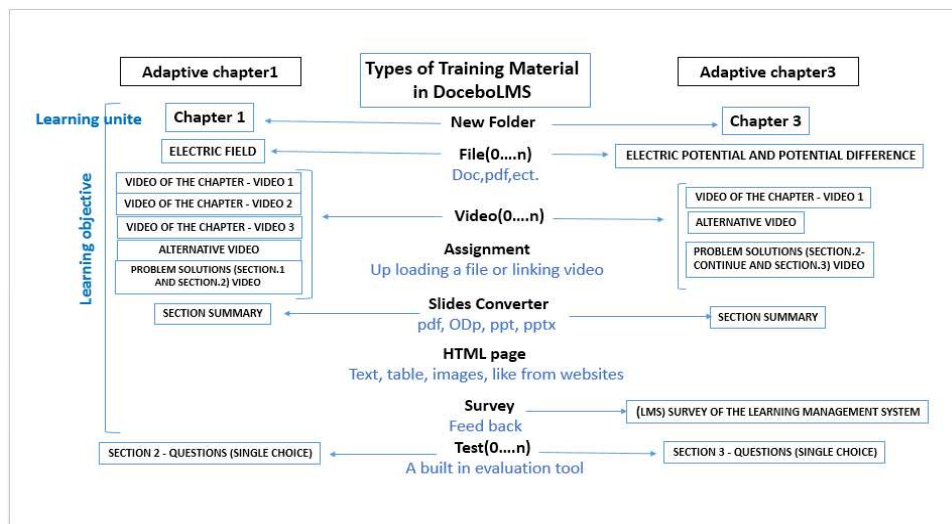


Figure 1. General Stricture of DoceboLMS for training material (Fizik-II)

3.3. Assessing Student online learning

Assessment tests help in the achievement of learning objectives. In self-paced online learning, workout exercises and tests mainly consist of questions associated with response options and



feedback. Questions should be established for important topics or tasks and should use informative feedback to reinforce learning. (Ghirardini 2011)

3.4. DESIGN ONLINE TESTS

The instructor can be clear from the beginning about what is allowed and what is not permitted when students take an exam online.

DoceboLMS platform allows the instructor to limit the time that students may view test questions and posttest answers, the students can jump to the next or previous page of the exam questions, see the final score and solutions after the test is complete, while this can be a useful learning tool for students. That can measure the amount of diversity or the transfer of the students' attitude depending on the learning material and the knowledge accumulated in the online lesson or a certain group of learning objects. (El Kadhi & Al-Sharrah 2011)

3.5. MEASURING ONLINE LEARNING EFFECTIVENESS

Assessing if your course is "effective" provides insight into what students find beneficial. Four phases for evaluating online learning efficiency provide an advantageous framework for considering the types of data the instructor can use to measure the course's effectiveness. Additionally, the steps below outline some specific assessment methodologies.

-Enrollment

When a learner enrolls in a course, the instructor is aware of the learner's initial access date, last access date, and completion date. If students are not enrolling in the course, it is possible that they are unaware of the course or do not know how to enroll in the course.

-Activity

At this step, the instructor can be observed the following three cases:

- **Not yet started:** it means the learner until now did not enter into the course.

- **In progress:** Generally, if the course topic is appealing to the students, they will proceed at a respectable rate. The instructor may notice that students advance quickly and then stop at a specific place. Such data is useful in assisting the instructor in assessing the usability, relevance, and performance of the course content.

- **Completion:** If the student finish the course , that student can provide a good feedback. In DoceboLMS platform, the instructor can accurately track which students have completed all the course work.

- **Scores** Multiple evaluation in an online educational environment allows the instructor to scale incremental progress toward the end learning goal, allowing the instructor to measure what specifically a student scored well on and where they fell short. (Aiken et al. 2002)

All these four steps can be viewed full report extracted from DoceboLMS in (Appendix .2 for chapter-1, (Appendix .3) for chapter-3, And (Appendix.4) for Total reports for three chapters.

4. Results and discussion

Data analysis is the process of developing answers to questions through the examination and interpretation of data. The basic steps in the analytic process consist of identifying issues, determining the availability of suitable data, deciding on which methods are appropriate for answering the questions of interest, applying the methods and evaluating, summarizing and communicating the results.



Analytical results underscore the usefulness of data sources by shedding light on relevant issues. The Statistics by using SPSS programs depend on analytical output as a major data in descriptive research methodology.

Data analysis also plays a key role in data quality assessment by pointing to data quality problems in a given survey. Analysis can thus influence future improvements to the survey process. The following is analysis of presenting data in tabling form.

Data analysis was conducted using the following statistical measures have been chosen because they allow for meaningful data analysis .

1. Cronbach's alpha
2. Descriptive statistics

1. Cronbach's alpha

It was critical to recognize the real survey instrument's strength. The internal consistency of LMS surveys is measured by Cronbach's alpha. This essentially assesses how effectively survey questions are related to one another, providing insight into the usefulness of assessing a given underlying construct.

Tables (4) determining the Cronbach's alpha show that LMS survey (0.986) Strong reliability means that the survey items were well related to each other. Typically the minimum acceptable reliability in research is around (0.70).

Table 4. Cronbach's Alpha Analysis of online learning surveys

Survey Name	Case Processing Summary		Reliability Statistics		
			N of Items	Cronbach's Alpha	Percent
LMS	Cases	Valid	122	0.986	100.0
		Excluded	0		0
		Total	122		100.0

2. The descriptive statistics including Number of sample mean and Std. Deviation were calculated to provide a general picture of study results. Basic descriptive statistics were used to determine the mean and standard deviation survey scores. The descriptive statistics of LMS student survey mean and standard Deviation are reported in Table (1) respectively, and the frequency reported in Table (2) & (3), respectively, note that the value of mean scales from (1) Strongly agree to (5) Strongly disagree for multiple question survey.

Table 1. Means and standard deviations of students' use of LMS

Paragraph-LMS	N	Mean	SD
The most device used for Internet Access	122	2.49	0.808
Period of time using LMS / Day	122	2.23	0.824
Information is easily found.	122	4.08	0.637
All interactive links are working well	122	3.81	0.760



The courses arrangement is easy to understand.	122	3.90	0.720
The course information was easily accessible.	122	4.22	0.557
Test Questions (quizzes) are systematically organized.	122	4.09	0.743
The time taken to complete the course material was reasonable.	122	4.19	0.767
I felt comfortable when learning this material with someone else.	122	3.62	0.816
I wish that all courses material are offered online.	122	3.90	0.697
The layout of the LMS is well presented.	122	3.93	0.559
The sequence of pages is well organized.	122	4.22	0.640
It is easy to navigate content in LMS platform.	122	4.00	0.680
Images and text content are clearly visible.	122	4.11	0.682
The information in the course is easily understandable	122	3.90	0.679
I found the course visually attractive	122	3.86	0.781
The online course was effective and helped us to achieve the learning objectives.	122	4.08	0.711
I need to use this platform system in other courses.	122	3.96	1.149

As shown in Table 1. The highest value for the standard deviation for the mean was, (1.149), "I need to use this platform system in other courses" and the lowest value for the standard deviation for the mean was (0.557), " The course information was easily accessible."

Table 2. Frequency and percent for students' use of LMS

Paragraph	Choices	Frequency of Students	% of Students
The most device used for Internet Access	Desktop/PC	20	16.4
	Laptop	26	21.3
	Smart phone	72	59.0
	Tablet	4	3.3
Period of time using LMS / Day	Less than 1 hour	18	14.8
	1 hour	70	57.4



	2 hours	22	18.0
	More than 2 hours	12	9.8

From the above Table (2). We notice that (59%) of the students use Smart phone device for internet accessing. considering the duration of time using LMS platform it has been found that (57.4%) of students spend one hour in LMS platform. It is the highest degree. This demonstrates the platform's simplicity of use and interoperability with smart phones, and students' use of it as an hourly rate comprises a significant portion of communication with the subject.

Table 3. Frequency and percent for students' use of LMS

Paragraph	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	present	Fr eq.	present	Fr eq.	present	Fr eq.	present	Fr eq.	present	Fr eq.
Information is easily found.	28	23.0	78	63.9	14	11.5	2	1.6	0	0
All interactive links are working well	22	18.0	60	49.2	36	29.5	4	3.3	0	0
The courses arrangement is easy to understand.	24	19.7	64	52.5	32	26.2	2	1.6	0	0
The course information was easily accessible..	36	29.5	78	63.9	8	6.6	0	0	0	0
Test Questions (quizzes) are systematically organized.	38	31.1	60	49.2	22	18.0	2	1.6	0	0
The time taken to complete the course material was reasonable.	44	36.1	62	50.8	14	11.5	2	1.6	0	0
I felt comfortable when learning this material with someone else.	20	16.4	42	34.4	54	44.3	6	4.9	0	0
I wish that all courses material are offered online.	22	18.0	68	55.7	30	24.6	2	1.6	0	0
The layout of the LMS is well presented.	18	14.8	78	63.9	26	21.3	0	0	0	0
The sequence of pages is well organized.	40	32.8	72	59.0	8	6.6	2	1.6	0	0



It is easy to navigate content in LMS platform.	28	23.0	66	54.1	28	23.0	0	0	0	0
Images and text content are clearly visible.	34	27.9	70	57.4	16	13.1	2	1.6	0	0
The information in the course is easily understandable	22	18.0	68	55.7	30	24.6	2	1.6	0	0
I found the course visually attractive	26	21.3	58	47.5	34	27.9	4	3.3	0	0
The online course was effective and helped us to achieve the learning objectives.	30	24.6	76	62.3	14	11.5	2	1.6	0	0
I need to use this platform system in other courses.	48	39.3	44	36.1	16	13.1	8	6.6	0	0

It is clear that from the above Table.3, that the item " The access to the course information was satisfactory", "The time takes to complete the course material was reasonable", "The sequence of pages is well organized", "Images and text content are clearly visible", " The online course was effective and helped us to achieve the learning objectives" and "I need to use this platform system in other courses", have taken the choice of "Strongly agree" by the students.

In addition, the all table shows that the "Agree" answer was the most used site followed by "Neutral" and "Strongly agree". These paragraphs demonstrate a high level of student satisfaction with the platform, indicating the ease of access to the educational material's content and their desire to use the platform to exhibit further educational information

We can discover that more than half of student's enthusiast and willing to use mobile device as a learning tool. In the analysis, the data have shown that most survey items were on "Agree" and "Strongly agree". This lead to the fact that big number of the students should be motivated to learn by LMS, which provide easier access and downloading the video and audio lesson and access to the exam by using cloud and HTML5 technologies.

3. Questions Type

The type of questions used to test students is Multiple Choice type content (29) questions (10) questions for (chapter 1), (10) questions for (chapter 2), and (9) questions for (chapter 3) used to check their learning, as well as summative assessments at the end of each chapter. As shown in (Appendix .2, Appendix .3, and Appendix .4)

5. Conclusion

With the help of a Learning Management System, virtual learning becomes more authentic and structured. LMS is widely used in higher education institutions, and it will continue to grow in the future, thanks to advances in technology. It not only enhances and integrates online teaching and learning, but also hybrid and web-enhanced teaching and learning settings. The use of a learning management system (LMS) to encourage interaction increases learning capacities and helps higher-order learning skills including problem solving, critical thinking, and collaboration. This paper emphasizes the importance of implementing and designing for active learning, selecting technologies based on representation and communication requirements, and describing the



combination of e-learning and m-learning functions for new online learning approaches to be a flexible instrument, as well as preparing the environment and learner for online learning activity. The results of the students' responses to the implemented questionnaire suggest that the most focused uses of the DoceboLMS are 'Download materials' and 'Deliver assignments,' with 'Texts' and 'Slides' being the most often utilized information subjects. Furthermore, students place a higher value on 'Videos' and 'Assignments.'

The online examination system is a critical issue for educational institutions when it comes to exam preparation because it saves them time and effort in verifying test papers and creating performance reports. Students can just use their iPhones to answer questions and take lessons. This paper's overview was an effort that points to the role of LMS in teaching and learning pedagogy, access and flexibility, and cost effectiveness in higher education, and it is suggested that higher education institutions integrate LMS into their teaching and learning process in order to achieve effective learning outcomes.

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APPENDIX 1: Items of LMS Survey

Paragraph	Strong Agree	Agree	Neutr al	Disagr ee	Strongly Disagree
Information is easily found.					
All interactive links are working well					
The courses arrangement are easy understand.					
The course information was easily accessible.					
Test Questions (quizzes) are systematically organized.					
The time takes to complete the course material was reasonable.					
I felt comfortable when learning this material with someone else.					
I wish that all courses material are offered online.					
The layout of the LMS is well presented.					
The sequence of pages are good organized.					
It is easy to navigate content in LMS platform.					
Images and text content are clearly visible.					
The information in the course easily understandable					
I found the course visually attractive					
The online course was effective and helped us to achieve the learning objectives.					
I need to use this platform system in other courses.					



Devices used most for internet accessing
Desktop/pc
Laptop
Smart phone
Tablet
Others
period of time using LMS platform
Less than 1 hour
1 hour
2 hour
More than 2 hour



Userid	date_inscr	date_first_access	date_complete	date_last_access	Progress	sessionTime	status	Score
pinar	16/02/2018 13:38:21	26/02/2018 19:31:25	-	28/02/2018 08:50:00	67%	2h 48m	In progress	33.33
furkan	16/02/2018 13:38:21	20/02/2018 17:55:27	-	20/02/2018 17:57:33	0%	0h 2m	In progress	0.00
samet	16/02/2018 13:38:21	27/02/2018 16:32:31	-	27/02/2018 16:37:20	17%	0h 5m	In progress	99.99
mohamma d	16/02/2018 13:38:21	26/02/2018 20:59:18	-	27/02/2018 11:50:33	50%	0h 16m	In progress	0.00
abduhakim	16/02/2018 13:38:20	27/02/2018 20:37:23	28/02/2018 21:00:05	28/02/2018 21:00:06	100%	4h 17m	Completed	99.99
yaren	16/02/2018 13:38:21	28/02/2018 13:59:04	-	28/02/2018 22:52:59	17%	0h 7m	In progress	99.99
fatma	16/02/2018 13:38:21	26/02/2018 15:46:47	-	27/02/2018 14:58:07	83%	3h 0m	In progress	88.88
ahmet	16/02/2018 13:38:20	27/02/2018 14:49:38	-	27/02/2018 14:54:19	17%	0h 5m	In progress	99.99
sedef	16/02/2018 13:38:21	27/02/2018 10:07:35	28/02/2018 17:25:02	28/02/2018 17:26:14	100%	3h 22m	Completed	99.99
asli	16/02/2018 13:38:20	28/02/2018 16:04:55	-	28/02/2018 16:07:00	17%	0h 2m	In progress	99.99
elif	16/02/2018 13:38:21	27/02/2018 14:31:16	-	27/02/2018 14:41:55	17%	0h 4m	In progress	99.99
gulsah	16/02/2018 13:38:21	27/02/2018 14:03:47	-	27/02/2018 14:10:01	17%	0h 6m	In progress	99.99
gulsen	16/02/2018 13:38:21	27/02/2018 20:15:40	28/02/2018 22:02:10	28/02/2018 23:24:03	100%	2h 30m	Completed	99.99
ebru	16/02/2018 13:38:21	27/02/2018 10:28:04	-	28/02/2018 20:51:36	83%	1h 24m	In progress	99.99
ecemnur	16/02/2018 13:38:21	27/02/2018 20:11:11	-	27/02/2018 20:54:27	33%	0h 5m	In progress	99.99
sema	16/02/2018 13:38:21	27/02/2018 20:22:33	28/02/2018 19:46:10	28/02/2018 19:46:12	100%	4h 20m	Completed	88.88
esra kovar	16/02/2018 13:38:21	27/02/2018 14:21:14	28/02/2018 17:41:15	28/02/2018 17:41:19	100%	3h 29m	Completed	99.99
esra	16/02/2018 13:38:21	28/02/2018 19:16:38	-	28/02/2018 20:48:34	50%	0h 7m	In progress	99.99
rabia	16/02/2018 13:38:21	27/02/2018 14:02:33	28/02/2018 17:45:08	28/02/2018 18:00:06	100%	2h 31m	Completed	99.99
berat	16/02/2018 13:38:21	27/02/2018 14:53:52	28/02/2018 18:19:26	28/02/2018 18:19:31	100%	4h 17m	Completed	99.99
kubra	16/02/2018 13:38:21	27/02/2018 10:48:35	-	28/02/2018 18:42:28	83%	0h 15m	In progress	99.99
aylin	16/02/2018 13:38:20	27/02/2018 12:34:11	27/02/2018 14:48:20	27/02/2018 14:48:28	100%	0h 46m	Completed	99.99
zeynep	16/02/2018 13:38:21	21/02/2018 09:49:01	-	28/02/2018 19:17:20	83%	0h 22m	In progress	88.88
ayse	16/02/2018 13:38:21	27/02/2018 10:08:09	28/02/2018 19:34:46	28/02/2018 20:01:34	100%	3h 14m	Completed	99.99
beyza	16/02/2018 13:38:21	22/02/2018 20:05:39	-	27/02/2018 20:14:08	33%	2h 11m	In progress	99.99
umran	16/02/2018 13:38:21	27/02/2018 20:19:45	28/02/2018 22:39:39	28/02/2018 23:19:01	100%	1h 43m	Completed	99.99
salih	16/02/2018 13:38:21	27/02/2018 17:57:20	-	28/02/2018 22:11:46	67%	1h 46m	In progress	0.00
berkay	16/02/2018 13:38:21	21/02/2018 09:52:00	-	28/02/2018 18:57:00	67%	2h 11m	In progress	99.99
rukiye	16/02/2018 13:38:21	26/02/2018 19:56:02	26/02/2018 21:36:42	26/02/2018 21:37:20	100%	1h 41m	Completed	88.88



zeynep kap	16/02/2018 13:38:21	27/02/2018 17:08:29	28/02/2018 18:40:31	28/02/2018 18:40:34	100%	2h 12m	Completed	99.99
kubra cey	16/02/2018 13:38:21	28/02/2018 15:48:19	-	28/02/2018 18:24:50	67%	0h 16m	In progress	99.99
feza	16/02/2018 13:38:21	27/02/2018 10:16:38	28/02/2018 18:14:13	28/02/2018 18:14:20	100%	2h 17m	Completed	99.99
oguzhan	16/02/2018 13:38:21	28/02/2018 20:40:03	-	28/02/2018 20:43:33	17%	0h 4m	In progress	99.99
tihani	16/02/2018 13:38:21	25/02/2018 18:32:52	-	27/02/2018 12:58:34	50%	1h 15m	In progress	99.99
nihal	16/02/2018 13:38:21	16/02/2018 21:12:17	28/02/2018 18:09:10	28/02/2018 18:09:21	100%	3h 5m	Completed	99.99
mona	16/02/2018 13:38:21	27/02/2018 18:03:29	27/02/2018 18:22:21	27/02/2018 18:50:33	100%	4h 31m	Completed	99.99
furkan bal	16/02/2018 13:38:21	28/02/2018 19:02:09	-	28/02/2018 19:21:01	67%	1h 5m	In progress	99.99
musa	16/02/2018 13:38:21	27/02/2018 20:28:24	-	27/02/2018 20:29:56	17%	1h 2m	In progress	99.99
emine	22/02/2018 09:26:52	-	-	-	0%	-	Not yet started	0.00
humeyra	22/02/2018 09:26:51	25/02/2018 14:19:39	27/02/2018 11:04:01	27/02/2018 11:06:01	100%	0h 56m	Completed	99.99
yesim	23/02/2018 12:33:11	27/02/2018 14:53:53	-	27/02/2018 15:13:35	50%	0h 19m	In progress	99.99

APPENDIX 2: DoceboLMS Test reports & quiz scores for chapter-1 inscription:

Userid	date_inscr	date_first_access	date_complete	date_last_access	Progress	sessionTime	status	Score
pinar	16/02/2018 13:38:24	26/02/2018 22:51:14	-	28/02/2018 08:50:14	14%	0h 10m	In progress	60.00
furkan	16/02/2018 13:38:23	-	-	-	0%	-	Not yet started	0.00
samet	16/02/2018 13:38:24	27/02/2018 16:23:50	-	27/02/2018 16:32:04	14%	0h 8m	In progress	80.00
mohammad	16/02/2018 13:38:23	26/02/2018 8 20:58:18	-	28/02/2018 06:50:49	29%	0h 4m	In progress	80.00
abduhakim	16/02/2018 13:38:23	27/02/2018 8 21:02:32	-	28/02/2018 21:06:30	86%	0h 17m	In progress	100.00
yaren	16/02/2018 13:38:24	28/02/2018 8 13:59:31	-	28/02/2018 22:58:46	29%	0h 3m	In progress	90.00
fatma	16/02/2018 13:38:23	27/02/2018 8 14:54:14	-	27/02/2018 15:03:23	14%	0h 5m	In progress	80.00
ahmet	16/02/2018 13:38:23	27/02/2018 8 14:56:42	-	27/02/2018 14:59:12	14%	0h 3m	In progress	100.00
sedef	16/02/2018 13:38:24	27/02/2018 8 10:21:05	-	28/02/2018 17:39:40	86%	0h 4m	In progress	80.00
asli	16/02/2018 13:38:23	28/02/2018 8 16:09:20	-	28/02/2018 16:10:37	14%	0h 1m	In progress	100.00
elif	16/02/2018 13:38:23	21/02/2018 8 14:16:35	-	27/02/2018 14:46:45	14%	0h 5m	In progress	80.00
gulsah	16/02/2018 13:38:23	27/02/2018 8 14:15:10	-	27/02/2018 14:17:52	14%	0h 3m	In progress	80.00
gulsen	16/02/2018 13:38:23	27/02/2018 8 20:58:01	-	28/02/2018 23:23:03	86%	0h 21m	In progress	100.00
ebru	16/02/2018 13:38:23	27/02/2018 8 10:25:45	-	28/02/2018 20:46:50	57%	0h 43m	In progress	100.00



ecemnur	16/02/2018 13:38:23	27/02/2018 20:45:53	-	27/02/2018 21:00:00	43%	0h 3m	In progress	90.00
sema	16/02/2018 13:38:24	27/02/2018 21:05:29	-	28/02/2018 23:04:59	86%	0h 51m	In progress	100.00
esra kovar	16/02/2018 13:38:23	27/02/2018 14:58:53	28/02/2018 17:39:21	28/02/2018 17:39:21	100%	0h 15m	Completed	100.00
esra	16/02/2018 13:38:23	28/02/2018 19:25:52	-	28/02/2018 20:41:30	57%	1h 16m	In progress	90.00
rabia	16/02/2018 13:38:24	27/02/2018 13:22:53	28/02/2018 17:47:20	28/02/2018 18:00:38	100%	0h 35m	Completed	80.00
berat	16/02/2018 13:38:23	27/02/2018 15:26:04	28/02/2018 18:35:53	28/02/2018 18:35:53	100%	0h 24m	Completed	100.00
kubra	16/02/2018 13:38:23	27/02/2018 10:50:39	-	28/02/2018 18:45:01	71%	0h 2m	In progress	100.00
aylin	16/02/2018 13:38:23	27/02/2018 13:54:57	-	27/02/2018 14:51:10	86%	0h 21m	In progress	90.00
zeynep	16/02/2018 13:38:24	27/02/2018 15:09:10	-	28/02/2018 19:22:33	71%	0h 10m	In progress	90.00
ayse	16/02/2018 13:38:23	27/02/2018 10:05:13	-	28/02/2018 20:01:07	86%	0h 8m	In progress	80.00
beyza	16/02/2018 13:38:23	27/02/2018 20:36:48	-	27/02/2018 20:48:12	14%	0h 11m	In progress	100.00
umran	16/02/2018 13:38:24	27/02/2018 21:02:36	-	28/02/2018 23:18:53	86%	0h 5m	In progress	100.00
salih	16/02/2018 13:38:24	27/02/2018 20:36:45	-	28/02/2018 22:11:57	71%	0h 12m	In progress	90.00
berkay	16/02/2018 13:38:23	27/02/2018 21:13:53	-	28/02/2018 20:37:17	43%	0h 52m	In progress	100.00
rukiye	16/02/2018 13:38:24	26/02/2018 21:37:47	26/02/2018 23:21:05	26/02/2018 22:52:36	100%	0h 46m	Completed	80.00
zeynep kap	16/02/2018 13:38:24	27/02/2018 17:32:03	28/02/2018 18:56:14	28/02/2018 18:56:17	100%	0h 14m	Completed	100.00
kubra cey	16/02/2018 13:38:23	28/02/2018 15:53:41	-	28/02/2018 18:34:16	57%	1h 23m	In progress	80.00
feza	16/02/2018 13:38:23	27/02/2018 10:32:17	-	28/02/2018 18:16:24	86%	0h 12m	In progress	100.00
oguzhan	16/02/2018 13:38:23	28/02/2018 20:46:36	-	28/02/2018 20:48:46	14%	0h 2m	In progress	90.00
tihani	16/02/2018 13:38:24	27/02/2018 13:07:08	-	27/02/2018 13:13:33	29%	0h 6m	In progress	90.00
nihal	16/02/2018 13:38:23	27/02/2018 10:36:35	-	28/02/2018 18:13:52	86%	0h 7m	In progress	80.00
mona	16/02/2018 13:38:23	27/02/2018 18:51:07	-	27/02/2018 19:22:06	86%	0h 26m	In progress	70.00
furkan bal	16/02/2018 13:38:23	28/02/2018 19:14:04	-	28/02/2018 19:37:19	29%	0h 11m	In progress	80.00
musa	16/02/2018 13:38:23	27/02/2018 20:53:41	-	27/02/2018 20:55:37	14%	0h 2m	In progress	100.00



emine	22/02/2018 09:26:52	-	-	-	0%	-	Not yet started	0.00
humeyra	22/02/2018 09:26:52	25/02/2018 19:04:03	-	28/02/2018 19:42:55	71%	0h 38m	In progress	90.00
yesim	23/02/2018 12:33:12	27/02/2018 15:23:31	-	27/02/2018 15:35:00	57%	0h 11m	In progress	100.00

APPENDIX 3: DoceboLMS Test reports & quiz scores for chapter-3

APPENDIX 4: DoceboLMS Total reports for three chapters

Course name	Category	Course code	Status	Credits (CEUs)	Subscribed users	Not started	%	In progress	%	Completed	%	Total time
Chapter 1		110	Published	0.00	42	1	2.38	25	59.52	16	38.10	26h 33m
Chapter 2		120	Published	0.00	42	2	4.76	26	61.90	14	33.33	14h 19m
Chapter 3		130	Published	0.00	42	2	4.76	35	83.33	5	11.90	11h 59m