Challenges of Learning Management Systems and Current Trends

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Abstract— Information and communication technologies (ICT) and Learning Management Systems (LMSs) are important multifunctional tools developed for higher education institutions, but in fact, the success of these systems largely depends on a detailed understanding of the challenges and factors that influence the e-learning of their users. During the quarantine period due to Covid-19 in the world, Learning Management Systems were used worldwide in Higher Education as software or method to promote the course delivery. Since it was the first experience of many Egyptian higher education institutions with the use of the learning management systems during the pandemic, challenges were expected. This research aims to examine the challenges faced by LMS use and the factors influencing its use among teachers and students. The results of this research could help researchers, policy-makers, and practitioners from public and private universities to gather insights on the successful application and use of LMS during and after Covid19.

Keywords— LMS; Covid-19; e-learning; ICT.

I. INTRODUCTION

During the pandemic period "Covid-19", the past year's events showed the importance of finding out a well-designed platform acting as a gate to ensure the communication between various parties of different types of organizations to improve their employees' skills.

When it comes to the digitization era attention has to be paid to learning premises in developing countries, which face many challenges of the educational process starting from the student's registration, scheduling online sessions, discussion groups, quizzes and exams, final results, etc.

Hence the urgent need for an online system to change the education nature from face to face and instructor-centered to open and freely learner-centered based on material that could be accessed from anywhere anytime to satisfy the student's needs and to coop with the digitization technology that reshapes the education system with all its entire processes.

Where the communication between learners and their educational institutions must be done through an official portal that has the ability to manage every single detail which is known as Learning Management System (LMS) defined as a web-based software platform that provides an interactive online learning environment and automates the administration, organization, delivery, and reporting of educational content and learner outcome [1]. Also, it could be considered as a platform or software that provides an online portal to collaborate teaching and learning seamlessly, making it more productive and engaging, and providing the space for educators and learners to collaborate in a way that is progressive and effective [2].

II. LEARNING MANAGEMENT SYSTEM FEATURES

According to the concepts of both the e-learning process and LMS, it is obviously highlighting the deep connection between each other, where e-learning lead the

transformation of content to digital form to easy published through the internet, also based on the LMS concept mentioned before, it has many tasks not limited to automating the administration, tracking, and reporting of training events by registering every single behavior. To achieve the goal of LMS it must be characterized by some common features:

- Robust and available anytime anywhere

- Scalable to accept the future development

- Interoperability to support different resources also can be integrated with current systems.

- Students-Centered with enhancement methods

- Availability of communication tools with both types:

  o Instructor-Student and also,

  o Students-Students' tools through discussion groups, messages, and e-mails.

- Support multimedia content

- Stable and secure: only authorized users can navigate the system.

In addition to a unique feature to each type of LMS, it will be mentioned later in a brief comparison, as there are some common features or characteristics in each category or type that has different vision and target, or how does it affect the quality and strength and could be considered evaluation criterion to LMS which is not limited to: reporting and analytics tools especially when it has customizable reporting options useful in metrics and tracking the competitors, also data migration whatever you develop in a new one or merging both old and new ones, also the collaboration tools to guarantee the full communication among different parties, flexibility to accept the new trends like mobile-based learning, or Artificial intelligence-based learning, etc

III.   LEARNING MANAGEMENT SYSTEM TYPES

Choosing the LMS software is not an easy mission as a result of the presence of a large amount of it, and they are differing from each other in many aspects, especially the source code, development and testing, the way of installation, authentication, flexibility, and cost, also the users or client's type or by another meaning who will be used and where. These types could be listed in different ways it could be as follow:

- Proprietary LMS

- Open–Source LMS

- In house Housing of data LMS

- Cloud-based LMS

Or by another meaning: Self – Hosted LMS (installed), Open- source LMS, Cloud-based LMS, Commercial (corporate LMS).

How to make a decision and on what basis? Which approach should be followed? Proprietary LMS or Open-Source LMS? In-house Housing of Data or Cloud-Based LMS? Each of them has its own advantages and disadvantages and depending on the resources, control degree, security level, cost

3.1   The proprietary

The proprietary is a closed and personalized LMS, it is designed based on the client's needs, the acquisition of this type includes installation and user training, enabling the creation of any course content but has some restrictions in accessing the source code for developing process also has a limited control for testing and it is very expensive you must pay for every single feature. Where the other approach is an Open-Source LMS with a free basic package, and you will pay for advanced features like hosting fees, maintenance fees, back-ups, extra storage space, and more tech support, also it is a personalized, friendly, easy to use package with full access to source code to add a customized feature or to fix any bugs.

3.2   Self-Hosted LMS

Self-Hosted LMS differs from cloud-based LMS, where it is a licensed product the decision-makers in the organization have the full rights and control of the installation, upgrading, entirely deployed, and self-hosted LMS that has a high level of security than cloud-based easy in monitoring the servers. But now and then you must backup your data and the system must be updated.

3.3   Cloud-based LMS

Cloud-based LMS is a flexible, customized system that offers both free and paid backup from data, provides a secure monitor to servers, and full right for installation and upgrading, the client can choose freely the price and storage needed plan based on the business needs, by selecting this type (cloud-based) you gain a high degree of confidence to control the sensitive data and could be accessible from anywhere using any device, but it faces some drawbacks as it requires:

- Full reliable internet connection where the internet speed has a direct impact on the system efficiency.

- Data Safety: there is no full protection but it may be affected by data loss and facing a direct attack.

- Cost fluctuation: charging for features that were once free, such as support services.

- The last drawback to consider when moving to cloud computing is the LMS vendors themselves. There's no getting around the fact that could-based eLearning relies on the professionalism of host platforms, their teams, and their servers.

IV.   EVALUATION CRITERIA AND ASSESSMENT

Most methods developed to evaluate learning management systems combine the key criteria for rating the category, and each system evaluated is then described to determine whether it meets the requirements of the relevant standard [5]. Elaboration of evaluation criteria depends mainly on the different types of functional and technical possibilities, with the addition of financial evaluation criteria.

The key evaluation categories are productivity tools, communication tools, student engagement tools, administrative tools, tools for creating and managing learning content, pricing and licensing rights, and hardware/software requirements [6]. The categories of evaluated criteria and related criteria have been developed to maximize the ability to obtain a comprehensive assessment of the capabilities of the system under study.

All economic parameters remain outside the evaluated components, where receiving a truly comprehensive evaluation including the financial statements requires information on the proposed system price, possibly the cost of separate modules, as well as the period to be used for the subscription and the cost of implementation and integration services for open-source systems. The economic efficiency of learning management systems is a separate direction in the LMS assessment and should be considered and evaluated independently of the technical and functional capabilities of learning management systems. Defining a comprehensive list of assessment criteria for the learning management system is a complicated task. In terms, there are thousands of system functions of the different features and specific requirements of the institutions conducting the pre-implementation assessment. 11 categories of criteria were developed. In order to ensure an effective ex-post evaluation, the organizations applying the learning management system must supplement the criteria with those that are specific to it.

4.1 Develop and Organize Learning

Content tools for building learning content multimedia, and interactive resources that interact with the trainee to the maximum.

1.1 Assessment and Certification

A test complex that provides an assessment of learners' knowledge, skills, and competencies, provides feedback, and tools for administrators to analyze and process results.

1.2 Security with Speedily Access Control

Ensuring the security of personal data, providing access for different types of users, and defining access rights

1.3 Information and Notifications

This is a virtual environment for receiving notifications and informing consumers about upcoming events, expiring deadlines, etc

1.4 Communication

Tools for communication and collaboration between users that simulate the learning process to the maximum.

1.5 Reports and Statistics

Tools provide for reporting, attendance and progress analysis, and success rate for trainees for both training courses and the system as a whole.

1.6 Multi-Platform, Design, and User Experience

System design and usability, adaptive design with accessibility from /to different platforms, device sizes, and mobile access applications.

1.7 Personalized   (adaptive   learning   and gamification)

Tools for creating and delivering customized learning content, and customized learning path for users.

1.8 Supportive

Specifically, SaaS-based LMS platforms, which include tools that deliver additional services ensuring sustainable development and quality.

1.9 Integrity

Tools to build integration with other systems, SCORM support, integration with HR management systems, and authentication systems.

1.10 Usability

Intuitively easy to apply the system.

V. LEARNING MANAGEMENT SYSTEM CONTENT (CMS – LCMS)

In the past two years, the use of the internet is played an essential role in most of aspects in our life, especially during Covid-19 pandemic, where everything and a word became preceded by the letter (e); e-marketing, e-shopping, e-learning, and most of the employees are working from home instead of the premises.

referring to LMS concept the content or learning resources are considered the core of the e-learning process, so the content or course material must be well designed or modified to meet learners' needs and styles.

Many studies declare that e-learning has different scenarios, also the content is created in different formats and styles to facilitate its complexity, so the content must be managed efficiently to achieve the required target by using a content system.

A content Management System (CMS) is a system used to manage the content and contains the most basic functionality, CMS system may also provide tools that allow publishing, editing, modifying content, and maintenance by combining rules, and processes [8].

So, it is considered an effective tool providing an environment that includes full details and information about the organization, the student, and the registration system which helps in creating a professional online course, when the integration between CMS and LMS the Learning Content Management System (LCMS) is produced to guarantee the delivery of the content via LMS to facilitate the efficiency of using e-learning system. [9] it will be summarized in the following lines are the different content formats:

A. Images

(Photos, diagrams, or illustrations) can help the reader

visualize the message

B. Videos

are especially effective for demonstrating a process, such as how something is put together.

C. Webinars

are online-only workshops. They can be presentations, discussions, demonstrations or other instructional sessions and are usually presented by a subject matter expert.

D. Slide Presentations

Traditional slide presentations usually include a presenter speaking to an audience, while the content on the slides holds the listeners' attention and adds visual interest.

E. Podcasts

Is a digital audio file made available online for downloading to a computer or mobile device.

F. Forums

Is a public medium, such as a newspaper column. In a digital sense, forums are websites where ideas can be discussed or solutions to issues can be posted

G. News/Social Feeds

Are new industry developments, research reports, case studies, product launches, and articles. Providing employees with this new and updated content is part of a continuous learning process.

H. Exams/Quizzes

Are an educational staple. Online or in the classroom, they're used to reinforce the information presented in the course and to test the participant's knowledge about it.

I. Games

No one can argue about the incredible popularity of video games. But did you know they can be used to enhance eLearning? Adding gaming to online training can capture participants' attention while challenging and entertaining them—and most importantly teaching them.

J. Infographics

Are visual images that are used to represent information or data. They help explain a complex concept or provide visual clues to support information.

K. Blogs

Is an abbreviated version of "weblog," which is an ongoing series of articles and information. Blogs are often featured on website pages and usually include links to other online sources that support the information they present.

L. Ebooks

Is an "electronic book," which is a digital version of a written manuscript. eBooks consist of text, images, or both—and they can be read on computers, tablets, and mobile devices.

Why Moodle?

The learning process has its own complex nature as it deals with three main axis or pillars: instructors with their various scientific backgrounds, the students with different learning styles, and the content itself, the learning management system could solve this complexity.

Each educational organization has its own vision and strategy to improve its experience and its tools to keep the students motivated and engaged based on the right and accurate selection to LMS that satisfies the need for

instructors to cover every single detail in delivering the content, student's evaluation, as for students in gaining material based on their style, assignment delivery, quizzes, final exams, and the results.

Moodle (Modular Object-Oriented Dynamic Learning Environment) as an open-source LMS is considered one of the top 20 in the educational field according to a recent statistical study, its selection is based on effective and reliable criteria as follow: User interface (UI), Usability, Integrations, and Value for money [10]. During the past years starting from 2019 -2022 many studies declare the importance of Moodle as a most popular environment which has a significant role in reshaping e-learning outcomes and achieving high rates of presence in the market, the study results have been shown in figure (1) representing Moodle's Goal study by [11] clarified the important role of Moodle before and during the quarantine, the research done within the academic year 2019-2020 used both theoretical and empirical analysis methods by filling a Google-form questionnaire to investigate 1- the goals of using Moodle system and, 2- how it could change the attitude, the sample consists of 74 students and 37 professors and the results presented clearly in the following figure 2.

The percentage of all aspects concerning the Moodle goals: using the material for practical work, studying theoretical material, exchanging information, reporting, training, tracking students, and communication indicates the critical role that Moodle played in this issue.

As for the second issue, changing the student's attitude also in this regard, the results also confirmed the importance of the role played by Moodle, where the students have the ability to study in the most convenient place and at a convenient time, friendly user interface as an advantage of the system, ability to immediately view the results of performed work, the possibility to follow up the missed classes and complete the necessary tasks. As per teachers, they change their negative perception towards using this platform in interacting with students also the same with uploading different types of resources.

Another study by [12] investigated the possibility of Moodle as a learning management system to improve the efficiency and ensure the adaptivity of e-learning and how it can fulfill the student's needs, using a well-designed questionnaire that included ten inquiries intended to explore the level of how students accepting e-Learning possibilities and the most appropriate learning styles in Moodle. The proposed system combined Moodle with an adaptive module that provides automatic sequencing of learning material under students' knowledge and learning styles. The sample consisted of 162 students, and the

majority of recipients were satisfied with the quality of eLearning courses with 55%, The question regarding whether the learning style is taken into account during a Moodle course received the most significant number of positive answers with 82%, but the prevailing part of respondents does not get good in self-learning and receiving educational information by ear with 36.4%.
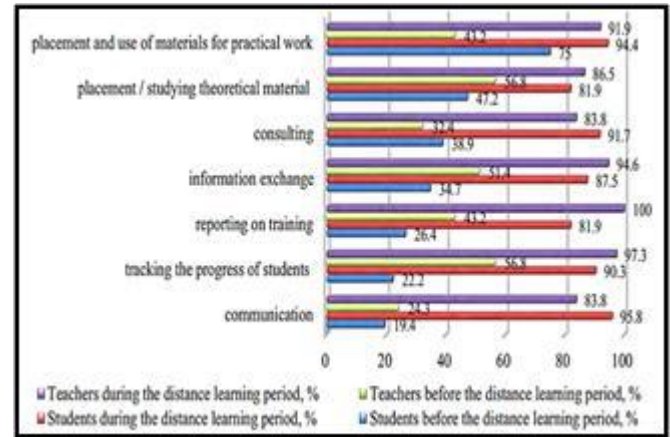

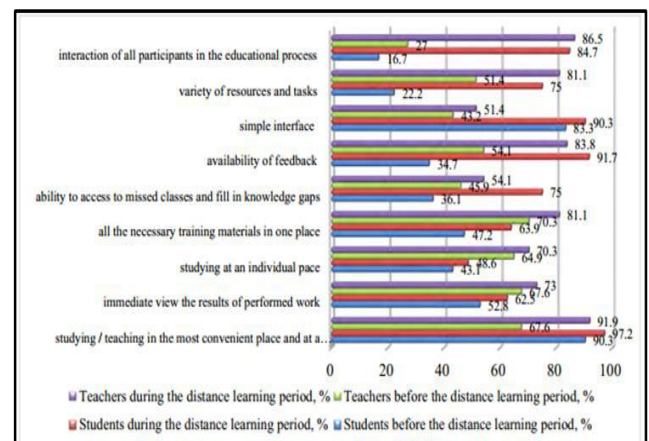*Fig.1 Goals of Moodle LMS Employment, Source [11]*

Fig.2: Assessment of Moodle LMS Advantages, Source [11]

The discussion concluded that the improvement of the model for adaptive eLearning in the Moodle LMS was based on the personalization of a learner's preparation experience.

VI.   INSIGHTS ABOUT THE USAGE, NEEDS, AND REQUIREMENTS BASED ON THE CLIENT' TYPE

The characteristics of learning in the 21st century have new forms because of the utilization of ICT learning [13], digitization, and e-learning [14]. The increasing use of technology and digital learning environments presents

organizations, teachers, and trainers with the challenge of supporting technology in education and training. However, the online course requires time, resources, skills, and knowledge. Utilizing learning management systems is one approach to e-learning [15], which had gained popularity among both the users (student or employee) and the administrator (organizer or institution) as a software application used to plan, implement and review the entire learning process. Also are known as the following titles knowledge virtual learning or learning environments, course management programs, and management systems. [16] Canvas, Moodle, and Blackboard have known LMS software solutions used for online learning. These systems contain features including user registration, tasks, course management, exams, quizzes, course materials upload, messaging, etc. In other words, LMS is a software solution that manages the administration, monitoring, and reporting of online courses and curricula within an organization.

After the COVID-19 became a global pandemic in 2020, many public and private organizations, including institutions, universities, and schools, have been closed down around the world [4]. By using the right tool like LMS, COVID-19 paves the way for a different form of learning and teaching [17].

6.1 Who Needs an LMS?

Any organization wishing to share training, education, or supporting materials with others should consider an LMS. Whether for work or school, using one of the many options available will help it connect with employees or learners from afar. There is now no doubt that LMS now has to be the backbone of every organization aspiring to deliver high-quality, continuous education [18].

6.2 Why do Organizations Need an LMS Today?

With the Learning Management System, the organization can store all its content in one place, reducing the risk of losing critical data and even making the organization a very simple task. Each member of the eLearning management team or other users can then access information, data, or anything else through the cloud storage system [19]. Now coming at the uses for which an organization according to its activity can use its LMS to serve the following purposes:

Distance Education. A method to teach during vacation, during pandemics, to promote education in places with poor infrastructure, or to provide courses, materials, and other important things.

Staff Training. Skilling or giving specific training to your employees. It can help arrange classes, distribute, and test learning modules for progress.

Extended Training. By providing vital knowledge about your product to third-party organizations or to the employees you outsource to your projects, the scenario is vast in the current context of open economies.

Customer Guidance. When introducing new products to customers, the organization may need to train them on some of the more critical aspects.

6.3 What do Organizations Need When Selecting an LMS?

[20] explored, the problem of choosing the platform on which to build the virtual learning environment is critical, and this choice depends on a number of factors: which requirements are placed on the environment, which functional characteristics should be present, for which users the environment is intended and above all, which means that you should buy and maintain the necessary platform. The choice will be the commercial solutions or open-source solutions.

The benefits of commercial software are well known: They are usually reliable products with appropriate user support, regular updates, and new versions. Defects of commercial software are source code is not available for enterprise technical support, so no minor user-level changes are possible. Defects of commercial software, the source code is not available for enterprise technical support, so no minor user-level changes are possible, to perform those changes via the manufacturer will tack a period of time. Besides the high cost of a commercial product, regular payments for a license and an increase in the number of users.

Where the unquestionable advantage of open-source products is the most choice for educational projects because it is based on the idea of collaboration that allows combining the talents and experiences of a large number of teachers and students. In any case, the following minimum requirements must be taken into account when deciding between commercial or open-source software [21]:

a) Learning Object Repository. The learning objects

repository is a central database that stores and manages learning content. From this point on, users will have access to individual learning objects either as individual elements or as part of a larger learning module, which may be part of a complete course; This process is defined according to the individual learning requirements. The end product can be accessed via the web, a CD-ROM, or in a hard copy. Each object can be used multiple times and for different purposes depending on the requirement

b) Automated Authoring Software. Are used to

create reusable training objects, which will then be available in the question bank. The application automates the development process by providing authors with archived samples and samples containing basic design principles for educational content.

c)   Dashboard (Interface for displaying). This

component provides tracking of results, links to relevant information sources, and various evaluation and feedback options from users.

d)   Management Tools. This application is used to

manage user accounts, run courses, track results, compile reports about the learning process, and other

simple administrative functions. This information can be passed along to the Learning Management System (LMS) designed to perform more advanced management functions.

The following table summarizes the comparison of the top recent LMS trends based on the effective criteria and the business needs requirements [22]:

Table 1: A Comparison of Top Recent LMS Trends Table

Criteria	Blackboard LMS	Canvas	Moodle
User Satisfaction	93%.	64%.	79%.
Pricing Model	Free Trial, Subscription	Free Trial, Freemium, Subscription	Free, Subscription.
License	Paid.	Open Source.	Free, Open source.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Overview	Large enterprises (>10,000).	Public administrations.	Large enterprises (>10,000).
	Non-profits.	Small/medium businesses.	Non-profits
	Small/medium businesses.	-	Academic.
	-	-	Public administrations.
	-	-	Small/medium businesses.
Deployment	Self-hosted cloud-based.	Mobile application.	Mobile application.
		Software as a service/cloud.	Self-hosted cloud-based.
		-	Self-hosted system.
Platforms	Apple Safari.	Apple Safari.	Apple Safari.
	Google Chrome	Google Chrome.	Google Chrome.
	-	Internet Explorer.	Internet Explorer.
	-	Mozilla Firefox.	Mozilla Firefox.
Training	Documentation	Documentation.	Documentation.
	In-person.	In-person.	Online tutorials.
	Live online.	Live online	-
	Online tutorials.	Online tutorials.	-
		Webinars.	-

Support	24/7.	24/7.	FAQ.
	Live Online.	Live Online.	Knowledge Base.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Support (cont.)	Online Community.	Online Community.	-
	-	Phone.	-
Activity Grading	-	Gradebook.	Course history.
	-	-	Gradebook.
	-	-	Gradebook audit trail.
	-	-	Gradebook comments.
	-	-	Manual grading (Marking).
	-	-	Multiple grading scales.
User Authentication	Manual accounts.	Self-registration.	Active Directory/ LDAP integration.
	Self-registration.	-	Manual accounts.
	-	-	No login.
	-	-	Self-registration.
User Authentication (cont.)	-	-	Self-registration w. admin confirmation.
Course Categories	-	-	Assign courses to categories.
	-	-	Create new categories.
	-	-	Manage categories.
Criteria	**Blackboard LMS**	**Canvas**	**Moodle**
Course Creation	-	Assignments engine.	Assignments engine.
	-	Built-In authoring tool.	Built-In authoring tool.
	-	Can reuse PPTs, PDFs, videos.	Can reuse PPTs, PDFs, videos.
	-	Changing Course default settings.	Changing Course default settings.
	-	Consume online video content.	Consume online video content.
	-	Scheduling LIVE events	Course backup options.
	-	Tests engine.	Drag & Drop interactions
	-	Upload courses.	Learning paths (Curriculums).
	-	-	Scheduling LIVE events.
	-	-	Survey Engine.
	-	-	Tests engine.

	-	-	Upload courses
User Enrollment	-	Attendance tracking	Attendance tracking
	-	Automated-enrollment (based on user data)	Automated Enrollment (based on User data)
	-	Self-enrollment	Guest Access Settings
	-	-	Manual-enrollment
	-	-	Progress tracking
	-	-	Self-enrollment

VII. CONCLUSION

As stated, ICT and LMS have a vital impact on the Higher education especially during pandemic period, where LMS facing many challenges despite its features based on different types and vision.

There were 11 categories of criteria developed to ensure the effectiveness of the selected LMS the fit the learners' knowledge and skills. Since the content or course material are considered the core of e-learning so it must be well designed to suit the different types of students. The learning Content Management System (LCMS) produced to guarantee the content delivery via LMS with all different formats, to achieve these goals a comparison of the top recent LMS trends had been done to select the most appropriate one, this comparison declared the importance of Moodle as a most popular environment which has a significant role in reshaping e-learning outcomes and achieving high rates of presence in the market.

REFERENCES

[1] Turnbull, D., Chugh, R., & Luck, J. (2020). Learning Management Systems, An Overview. *Encyclopedia of education and information technologies*, 1052-1058 Available:10.1007/978-3-319-60013-0_248-1 [Accessed 30 April 2022].

[2] Ghosh, A., Nafalski, A., Nedic, Z., & Wibawa, A. P. (2019). Learning management systems with emphasis on the Moodle at UniSA. Bulletin of Social Informatics Theory and Application, 3(1), 13-21.

[3] Ouatik, F., & Ouatik, F. (2021, May). Learning Management System Comparison: New Approach Using Multi-Criteria Decision Making. In *International Conference on Business Intelligence* (pp. 239-248). Springer, Cham. Online]. Available: https://g2g.to/noHM. [Accessed: 30- Apr- 2022].

[4] Shkoukani, M. (2019). Explore the major characteristics of learning management systems and their impact on e-learning success. *International Journal of Advanced Computer Science and Applications*, *10*(1). Available: 10.14569/ijacsa.2019.0100139.

[5] Cavus, N., & Zabadi, T. (2014). A comparison of open source learning management systems. *Procedia-Social and Behavioral Sciences*, *143*, 521-526. Available: 10.1016/j.sbspro.2014.07.430.

[6] Al-Ajlan, A. S. (2012). A comparative study between e-learning features. *Methodologies, tools and new developments for e-learning*, 191-214.

[7] Muhammad, M. N., & Cavus, N. (2017). Fuzzy DEMATEL method for identifying LMS evaluation criteria. *Procedia computer science*, *120*, 742-749.

[8] Alia, A. A. H. (2022). The Analysis of a Learning Management System from a Design and Development Perspective. *International Journal of Information and Education Technology*, *12*(4), 280-289. Available: 10.18178/ijiet.2022.12.4.1616.

[9] GmbH. K, "E-Learning-Content", Learntec.de, 2022. [Online]. Available: https://g2g.to/ry7E. [Accessed: 30- Apr- 2022].

[10] Bouchrika, I. (2021). Best LMS for Schools in 2021: Key Features of the Top Learning Management Systems. *Electronic Resource.* Research.com, 2022. [Online]. Available: https://research.com/education/best-lms-for-schools. [Accessed: 30- Apr- 2022].

[11] Egorov, E. E., Prokhorova, M. P., Lebedeva, T. E., Mineeva, O. A., & Tsvetkova, S. Y. (2021). Moodle lms: Positive and negative aspects of using distance education in higher education institutions. *Propósitos y Representaciones*, *9*(SPE2), 1104. Available: 10.20511/pyr2021.v9nspe2.1104

[12] Shchedrina, E., Valiev, I., Sabirova, F., & Babaskin, D. (2021). Providing adaptivity in Moodle LMS courses. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(2), 95-107. Available: 10.3991/ijet.v16i02.18813.

[13] Roungrong, P., & Sonsud, N. (2021). SMART LEARNING FOR HUMAN RESOURCES DEVELOPMENT IN CORRECTIONAL WORK: J. Edu. NU., vol. 23, no. 2, pp. 440–454.

[14] Conde, M. Á., García-Peñalvo, F. J., Rodríguez-Conde, M. J., Alier, M., Casany, M. J., & Piguillem, J. (2014). *An evolving Learning Management System for new educational environments using 2.0 tools. Interactive learning environments*, 22(2), 188-204.

[15] Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and information technologies*, *25*(6), 5261-5280.

[16] World Health Organization. (2020). Coronavirus disease (COVID-19)-events as they happen. *Rolling Updates on Coronavirus   Disease(COVID-19)*. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen.   [Accessed: 29-Apr- 2022].

[17] Mishchenko, E. (2021). *LMS Technical Analysis: problems of choice*. In *E3S Web of Conferences* (Vol. 244, p. 07005). EDP Sciences. Available: 10.1051/e3sconf/202124407005 [Accessed 29 April 2022]

[18] Turnbull, D., Chugh, R., & Luck, J. (2019). *Learning management systems: An overview. Encyclopedia of Education and Information Technologies*. *Springer DOI*, *10*, 978-3.   Available: 10.1007/978-3-319-60013-0_248-1 [Accessed 29 April 2022].

[19] Shaker ,M. (2022) "Explaining Why Companies Need An LMS Today", eLearning Industry[Online]. Available: https://elearningindustry.com/companies-need-an-lms-today-explaining. [Accessed: 29- Apr- 2022].

[20] Learning   Management   System   [Benefits+Features+Types]", Mindster, 2022. [Online]. Available: https://mindster.com/what-learning-management-system/. [Accessed: 29- Apr- 2022].

[21] Mishchenko, E. (2021). LMS Technical Analysis: problems of choice. In *E3S Web of Conferences* (Vol. 244, p. 07005). EDP Sciences. Available: 10.1051/e3sconf/202124407005.

[22] e-Learning Industry " Find, choose and compare the eLearning Industry's Top LMS Software.", eLearning Industry, 2022. [Online]. Available: http://tny.im/ma9eX. [Accessed: 30- Apr- 2022].