

BENEFITS, DRAWBACKS AND FUTURE IMPLICATIONS OF USING LMS IN THE POST-PANDEMIC PROCESS

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ABSTRACT

The proliferation of Learning Management Systems (LMS) has accelerated significantly in recent years, particularly in response to the COVID-19 pandemic, which has necessitated a paradigm shift in educational institutions worldwide. This phenomenon has led to the widespread adoption of LMS among higher education institutions, K-12 schools, and corporate training organizations as an essential tool for facilitating online learning. This paper undertakes an examination of the utilization of LMS in the post-pandemic era, with a particular focus on their advantages and disadvantages. Furthermore, it engages in a detailed discussion of integrating emerging technologies, including Artificial Intelligence (AI), virtual and augmented reality (VR/AR), personalized learning experiences, and gamification elements into LMS. The incorporation of these innovative features has been posited to enhance the efficacy of online learning by providing learners with more engaging, interactive, and tailored educational experiences. However, it is essential to consider the potential drawbacks and limitations associated with each technology, including issues related to accessibility, equity, and pedagogical alignment. This paper draws upon existing research and literature to provide a comprehensive understanding of the subject matter. By examining these factors, educators, policymakers, and stakeholders can make informed decisions regarding the implementation and optimization of LMS in their respective institutions, ultimately contributing to improved student outcomes and enhanced educational experiences.

Keywords: Learning Management Systems (LMS), Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), Gamification, Covid-19 pandemic.

INTRODUCTION

The COVID-19 pandemic has had a profound impact on education systems worldwide. The rapid shift to online learning and the unprecedented disruptions caused by the pandemic have left educators, policymakers, and students struggling to adapt. From this global health crisis, both challenges and opportunities arose. Before the pandemic (pre-2020), education systems were characterized by traditional classroom-based learning, linear curricula, standardized testing, and limited access to technology. Students used to attend physical classrooms, with instructors providing face-to-face instruction. Courses were often structured around a traditional timeline, with students progressing through a set sequence of topics and activities. Educational assessments were typically standardized, with clear criteria for evaluation and grading. While some schools had basic computer labs or mobile devices, access to digital resources was not universal (Kozlov, 2019). However, the pandemic has led to significant changes in education systems after 2020. Hybrid learning models, a blend of online and offline learning, have become increasingly popular, with many institutions incorporating virtual classes and online assessments even in lower stages of education. The determined curricula of the institutions have become more flexible. With the rise of digital tools and resources, educators have had to adapt their teaching methods to accommodate diverse learning styles and abilities. Assessments have become more adaptive. The shift to online learning has led to the development of more adaptive and

personalized assessment strategies, which can adjust to individual student needs. For these reasons, the pandemic has accelerated the adoption of digital tools and resources, making education more accessible to a broader audience (Reuge et al., 2021).

Considering these urges from the pandemic on education systems, some key differences occurred compared to the past. Learning has already begun to shift from teacher-centered to student-centered approach prior to COVID-19 and the pandemic has highlighted the importance of personalized learning approaches, which prioritize students' needs and interests. In addition, digital literacy gained importance and with the rise of online learning, educators have had to develop their own skills in using digital tools and resources. Also, issues of equity and accessibility received a greater emphasis. The pandemic has exposed existing inequities in education systems, highlighting the need for more inclusive and accessible learning environments (Reimers, 2022).

While there have been significant improvements in education systems since the pandemic, challenges remain. The shift to online learning has put additional pressure on educators, who may struggle with the demands of virtual teaching, which leads to increasing burnout and decreasing morale on the side of teachers. Despite increased access to technology, some students and communities still lack the necessary resources or infrastructure for effective online learning. This situation created inequalities and digital divide. Also, flexibility of hybrid models has brought the risk of sacrificing academic standards or compromising the quality of education, which created some difficulties in maintaining academic rigor and quality (Islam & Abiona, 2023; National Center for Education Statistics, 2022)

Therefore, the COVID-19 pandemic has accelerated changes in education systems worldwide. While there have been significant challenges, the pandemic has also presented opportunities for innovation, collaboration, and growth. As educators and policymakers continue to navigate this new landscape, it is essential to prioritize equity, accessibility, and student-centered learning approaches to ensure that all students have access to high-quality education. In this atmosphere, the usage of Learning Management Systems gains popularity in educational institutions with their multifaceted benefits as they provide a platform including various tools for educators and learners.

Related Literature

Learning Management Systems (LMS) have become an essential tool for institutions of higher education, K-12 schools, and corporate training organizations alike. LMS is a software application designed to facilitate online learning. It allows instructors to create, manage, and deliver course materials, assess student progress, and track engagement. LMS typically includes features such as online course creation, grading, discussion boards, email, and content management systems (Hwang & Chang, 2013).

Evolution of LMS

The first learning management system was developed in the early 1990s at the University of Wisconsin-Madison. The system, called "Blackboard," was designed by Stephen Crimmin, a professor of computer science and engineering (Crimmin, 2005). Blackboard was initially used to teach introductory courses in computer science and mathematics. In the late 1990s and early 2000s, LMS began to gain popularity among higher education institutions. The rise of the internet and the need for online learning solutions led to a surge in adoption (Hwang & Chang, 2013). Blackboard was one of the first LMS platforms to offer a comprehensive suite of tools, including course creation, grading, and discussion boards. Then during this period, some notable LMS platforms emerged. Moodle was developed in 1999 by Martin Weller. It is an open-source LMS platform that has gained popularity worldwide for its flexibility and customization options (Weller, 2007). WebCT was introduced in the late 1990s and it was a popular LMS platform used by many institutions before it was acquired by Blackboard in 2006 (Bradford et al., 2007).

Key features and functionalities of LMS

Learning Management Systems have revolutionized the way education is delivered. They have enabled institutions to increase accessibility. By providing online learning options, LMS has made education more accessible to students worldwide. They have improved student engagement. Interactive features such as discussion boards, quizzes, and assessments have increased student engagement and motivation. In addition, LMSs have enhanced instructor support. They have streamlined instructor tasks, allowing them to focus on teaching and mentoring. Today, LMS continues to evolve with advancements in technology bringing advantages or opportunities as well as new challenges.

Advantages and Drawbacks of Using LMS in the Post-Pandemic Process

The pandemic has accelerated the shift toward online learning, forcing educators to adapt to new technologies and pedagogies (Moore & Berninger, 2015). Therefore, LMS has emerged as a vital tool in this transformation. It has brought several advantages for students and educators yet some drawbacks occurred.

As for the advantages, LMS enables educators to create personalized learning paths. With the help of AI-powered analytics, educators can design customized learning experiences that cater to individual student needs and abilities (Kozlov, 2019). By providing personalized learning experiences and flexible scheduling, learners can access high-quality education that prepares them for success in an ever-changing world (Kozlov, 2019). Also, LMS allows learners to access course materials at their own pace, creating flexible schedules that accommodate diverse lifestyles and learning styles. Additionally, by providing real-time support for students with disabilities or language barriers, LMS helps ensure equal access to education for all (Hernández & Maldonado, 2018). In addition, educators can use LMS to collect and provide immediate feedback on student performance, enabling them to adjust instruction and make data-driven decisions. By analyzing learner data, educators can make informed decisions about instructional design, curriculum development, and resource allocation. Moreover, the efficiency of teaching increases with the help of LMS. Educators can streamline administrative tasks, freeing up time to focus on teaching and mentoring students. Another important benefit of LMS is that it enhances collaboration among educators. LMS enables educators to connect with colleagues across the globe, fostering a sense of community and promoting peer-to-peer learning.

On the other hand, several problems arise when LMS is included in teaching and learning procedures although it has become the most preferred platform during the pandemic process. First of all, technical problems, such as connectivity issues or platform compatibility, can hinder the effectiveness of LMS (Hernández & Maldonado, 2018). Secondly, this digital platform may inhibit student engagement. Some students may struggle with online learning, leading to decreased motivation and engagement (Moore & Berninger, 2015). Moreover, not all learners have equal access to technology or internet connectivity. This situation can create a digital divide that can exacerbate existing inequalities. Finally, not all the faculty members are tech-savvy. Educators require training and support to effectively integrate LMS into their teaching practices in the long run.

Future Implications of Using LMS in the Post-Pandemic Process, Benefits and Disadvantages to Consider

After the pandemic, as the world slowly returns to normalcy, educators, policymakers, and learners are left wondering how to rebuild and reimagine educational systems that prioritize student-centered learning, flexibility, and inclusivity. We are able to foresee several developments that will be integrated into LMS; however, these additions may bring their own negative sides which we should consider.

The Role of AI in LMS

The integration of artificial intelligence in LMS is gaining momentum in recent years, with many institutions adopting AI-powered solutions to enhance teaching and learning experiences. AI-powered analytics and adaptive learning tools are becoming increasingly integrated into LMS, enabling educators to tailor instruction to individual student needs. AI is being integrated into LMS through various means. Through Natural Language Processing (NLP), AI enables LMS to understand and process human language, allowing for more effective student support and feedback. Also, by integrating machine learning algorithms, LMS learns from data and improves its performance over time, enabling more personalized learning experiences. Besides, AI-powered adaptive assessment tools can adjust to individual student needs, providing a more accurate measure of student progress. Finally, chatbots and virtual assistants can provide students with 24/7 support, answering common questions and freeing up instructors' time.

The integration of AI in LMS offers several advantages. AI-powered adaptive learning tools can tailor the learning experience to individual student needs, leading to improved engagement and outcomes. Similarly, NLP-powered tools can provide students with instant feedback and support, improving their overall learning experience. On the other hand, AI-powered analytics can help institutions gain insights into student behavior and performance, informing data-driven decision-making and chatbots and virtual assistants can automate routine tasks, freeing up instructors' time for more important tasks.

While the integration of AI in LMS offers many advantages, it also has some drawbacks to consider. The automation of routine tasks through AI-powered chatbots and virtual assistants can lead to job displacement for instructors. AI algorithms can preserve existing biases and inequalities if they are not designed with diversity and inclusion in mind. Besides, as AI-powered tools require high-quality data to function effectively, which can be a challenge in institutions with limited resources or outdated data. Finally, the use of AI in LMS can lack transparency, making it difficult for instructors and students to understand the decision-making processes behind AI-driven recommendations. As a result, while AI-powered tools can enhance teaching and learning experiences, they also raise important questions about job displacement, bias, and data quality.

Integrating VR/AR into LMS

The integration of virtual and augmented reality (VR/AR) in learning management systems (LMS) is becoming increasingly popular, with many institutions adopting VR/AR-powered solutions to enhance teaching and learning experiences. VR/AR are rapidly transforming the way we learn, making education more immersive, interactive, and engaging by simulating real-world scenarios. Similar to artificial intelligence, VR/AR is integrated into LMS through various means. It may be through hardware integration such as high-end VR/AR headsets to computers or gaming consoles or through software integration to allow instructors to create and deliver VR/AR experiences, even without specialized hardware. Also, some mobile apps enable students to access VR/AR experiences on their mobile devices. Therefore, educational content creators develop VR/AR experiences that cater to specific learning objectives, such as anatomy education or language training.

It is obvious that integration of VR/AR in LMS offers several advantages. As mentioned by Hamari et al. (2014) immersive VR/AR experiences increase student engagement and motivation, leading to improved learning outcomes. In addition, VR/AR can provide equal access to education for students with disabilities or those living in remote areas with limited access to educational resources (Carr, 2013). With the interactive nature, it enables students to explore complex concepts and processes in a more intuitive way, improving understanding and retention. Finally, teaching and learning process can go beyond the walls of classrooms and VR/AR can reduce costs associated with traditional teaching methods, such as travel or equipment expenses.

As one can guess, every new development comes with its drawbacks. While using VR/AR through LMS, technical issues, such as hardware malfunctions or software compatibility problems, can disrupt learning experiences (Kim et al., 2019). Besides, the availability of educational content of good quality is still limited and this makes it challenging to develop effective curricula. As mentioned in the section related with AI, instructors require specialized training to effectively integrate VR/AR into their teaching practices. Most importantly, some students may experience discomfort or motion sickness when using VR/AR headsets, which can negatively impact learning outcomes (Kim et al., 2019). In brief, VR/AR tools in LMS seems like an attractive solution for institutions seeking innovative ways to enhance teaching and learning, they also raise important questions to be answered in the future.

Personalized learning in LMS

New learning management systems are emerging that prioritize personalized learning experiences, using AI-powered analytics to create customized learning paths for each student. In LMS, the use of AI can create personalized learning experiences that cater to individual students' needs, abilities, and learning styles. Personalized learning in LMS is created with AI algorithms which analyze vast amounts of data on student performance, behavior, and preferences to identify patterns and trends. This information is used to develop a comprehensive profile of each student (Deng et al., 2018). And, to provide an ongoing assessment of student learning and adjusting the curriculum accordingly, integration of adaptive assessment in LMS helps adjust difficulty level based on individual student performance (Gao et al., 2020). With the data collected from these adaptive assessments, students can be recommended personalized learning pathway, including recommended courses, materials, and activities (Kim et al., 2019). Also, AI-powered intelligent tutoring systems integrated into LMS provide one-on-one support to students, offering real-time feedback and guidance on complex topics (Riedel & Spence, 2017). Undoubtedly, personalized learning experiences increase student engagement and motivation, leading to improved learning outcomes (Hamari et al., 2014; Kim et al., 2019). In addition to that, inclusion of AI-powered adaptive assessments and personalized learning pathways in LMS enable educators to focus on high-value tasks, such as instructional design and teacher support. Besides, this kind of personalized learning through LMS provide teachers with real-time data on student progress, enabling them to offer targeted support and feedback.

However, many LMS systems are still struggling to collect and integrate high-quality data for effective AI-driven personalized learning (Deng et al., 2018). The data they collect may keep the biases and this leads to unequal opportunities for diverse learners (Blodget & Crampton, 2017). Similarly, teachers require training and support to effectively integrate AI-powered personalized learning into their teaching practices.

LMS has the potential to transform education by providing a tailored, adaptive, and interactive learning experience. By leveraging AI-driven technologies, LMS systems will be able to create personalized learning experiences that cater to individual students' needs and abilities, leading to improved outcomes and increased efficiency for educators.

Gamification in LMS

The use of game mechanics and game-like design principles in LMS will increase learner engagement and motivation. Gamification is the process of adding game elements and mechanics to non-game contexts, such as learning management systems (LMS), to increase engagement, motivation, and participation. Gamification involves using game design principles and techniques to create interactive experiences that foster a sense of competition, achievement, and fun. Gamification has become increasingly popular in Learning Management Systems (LMS) as educators seek innovative ways to engage students and promote learning outcomes. The integration of gamification in LMS involves designing and implementing game-like elements and mechanics into the learning process, such as point systems, badges and achievements, leaderboards, challenges and quests. When the users participate in games in LMS to practice assigned topics, they are assigned points for completing tasks or achieving milestones. Also, they have a chance to display badges or achievements for completing specific tasks or reaching certain milestones. Students are ranked based on their performance or progress. In addition, teachers can create challenges or quests that require students to complete a series of tasks or achieve a specific goal (Shute, 2008).

Including gamification elements in LMS provides several advantages to learners and instructors. Gamification can increase student engagement and motivation, leading to improved learning outcomes (Dichev & Dicheva, 2017). It can improve student retention rates by making learning more enjoyable and interactive (Hamari et al., 2014). Gamification can also provide a personalized learning experience for students, as it allows them to set their own goals and track their progress. Also, it can help develop essential soft skills, such as problem-solving, critical thinking, and collaboration.

However, using these kinds of elements a lot may create negative effects for learners. If not implemented carefully, gamification can create an overemphasis on competition of tasks rather than cooperation and teamwork. This situation can hinder the learning process. Besides, if the game-like elements are not aligned with real-world applications or learning objectives, students may lose sight of what is truly important. Technical issues, such as glitches or bugs, can disrupt the gaming experience and lead to frustration for students. Students may become too focused on earning rewards rather than genuinely engaging with the content and practicing the outcomes determined in the curricula.

In the light of benefits and drawbacks of gamification, instructors should consider several issues while integrating such elements in their teaching. First of all, teachers should ensure that gamification elements align with learning objectives and outcomes. They should use real-world examples to illustrate how game-like mechanics can be applied to real-life scenarios. Also, teachers should constantly monitor student engagement and adjust the gamification design accordingly by provide clear instructions on how to participate in gamification activities.

Gamification has the potential to revolutionize learning by making it more engaging, interactive, and enjoyable. However, its implementation requires careful consideration of the advantages and drawbacks, as well as adherence to best practices. By incorporating game-like elements into LMS, educators can create a more dynamic and effective learning environment that promotes student engagement and motivation.

CONCLUSION

Before the pandemic, education was often characterized by rigid structures, limited flexibility, and inadequate support for students with disabilities or learning differences. The traditional classroom model often resulted in a "one-size-fits-all" approach, leaving many students feeling disconnected,

unmotivated, or unprepared (Kozlov, 2019). Educators faced significant challenges in managing multiple tasks simultaneously, including lesson planning, grading, and administrative duties. This made it challenging for teachers to focus on what matters most: delivering high-quality instruction that engages students and promotes deep learning.

In conclusion, the use of Learning Management Systems (LMS) has emerged as a key enabler of transformation in education. By providing personalized learning experiences, flexible scheduling, increased accessibility, and real-time feedback, LMS is helping educators create more inclusive, adaptive, and effective learning environments. While there are challenges associated with using LMS, its advantages far outweigh the drawbacks. As we move forward into a post-pandemic world, it's essential to recognize the potential of LMS to reshape educational landscapes and empower learners to succeed in an ever-changing world. Learning Management Systems have come a long way since their inception. From humble beginnings as online teaching tools to comprehensive learning platforms, LMS has transformed the education landscape. As technology continues to evolve, it's exciting to think about what the future of LMS holds.

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