

The Influence of Technological Progress on E-Learning Management Systems

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Abstract

The advent of technology has revolutionized various sectors, including education. Among these technological advancements, E-Learning Management Systems (LMS) have significantly transformed the way education is delivered and consumed. These systems provide platforms for delivering, tracking, and managing educational courses and training programs, Executive education programs, entire learning journey, making education more accessible, flexible, and effective. The comparison and evaluation of LMSs have gained the attention of a large audience due to their universality. Many factors govern the selection of the most appropriate LMS for delivery ranging from simplicity to scalability, robustness, and cost. Furthermore, on the web, access to e-learning content and learning material of excellent quality for education has become extremely common in distance education. LMS is, in fact, a powerful educational organization tool that incorporates individual education requirements and increases teaching strategies. Also, the utilization of LMS guarantees an environment where learning content and overviews of educational development can be created, sorted, packaged, stored, and reused. The dramatically improved activities, learning materials, imparting of instruction, and assessment changes within e-learning are all made possible by the LMS system. The domain of education has faced rapid developments and advancements with the inception and steady evolution of E-learning practices. As technological enhancements have become more widespread, and more sophisticated E-Learning Management Systems (LMS) are implemented in modern pedagogy, E-learning has become universally popular and is currently growing rapidly in almost all fields.

Keywords: E-Learning Management Systems (LMS), E-Learning Activities, E-Learning Performance, Evaluation and Analysis.

Introduction

Technology has been a transformative force across multiple industries, and education is no exception. E-Learning Management Systems (LMS) such as CANVAS, have emerged as a critical component in modern educational practices, reshaping traditional teaching and learning processes. LMS platforms provide comprehensive solutions for managing, delivering,

and tracking educational content, enabling institutions to offer more flexible, accessible, and personalized learning experiences. This paper explores how technological advancements have influenced LMS, enhancing their capabilities and expanding their role in contemporary education.

Problem Statement

The rapid pace of technological advancements presents a dual challenge for educational institutions: selecting an appropriate LMS that meets current needs while also being adaptable to future changes. Additionally, as LMSs become more sophisticated, the need for institutions to understand their impact on educational outcomes becomes increasingly important. This research seeks to address these issues by exploring the influence of technological progress on LMS, identifying key factors that guide LMS selection, and evaluating the effectiveness of these systems in enhancing educational experiences.

Limitations

While this study aims to provide a comprehensive analysis of technological progress on LMS, several limitations must be acknowledged:

1. **Scope of Technological Review:** This research focuses primarily on significant technological advancements, potentially overlooking emerging technologies with limited current adoption.
2. **Generalizability:** The findings may be more applicable to higher education and Executive Education or corporate training, with limited applicability to other educational contexts, such as Pre education, Primary, Elementary, and secondary schools (K-12 education) or vocational training.
3. **Data Access:** The study may face challenges in accessing proprietary data from LMS providers, which could limit the depth of the analysis.

Literature Review

The literature on LMS and technological advancements is extensive, reflecting the significant impact these systems have had on education. LMSs have evolved from simple course management tools to comprehensive platforms that support a wide range of educational activities, including content delivery, assessment, communication, and collaboration (Watson & Watson, 2007).

Evolution of LMS

Early LMSs were primarily designed to support distance education by providing basic tools for course management and content delivery (Cavus, 2011). However, with the advent of the internet and subsequent technological advancements, LMSs have expanded their functionalities to include multimedia support, mobile accessibility, and advanced analytics (Brown et al., 2013). These enhancements have made LMSs more versatile and capable of meeting the diverse needs of modern learners.

E-Learning Management Systems have evolved from simple content delivery platforms to sophisticated systems that offer a wide range of functionalities, including course management, student tracking, and assessment tools. According to Almarashdeh (2016), the early versions of LMS were primarily used to distribute course materials online, but as technology advanced, these systems began to incorporate interactive features such as

discussion forums, quizzes, and multimedia content. The integration of these features has made LMS a more engaging and effective tool for both educators and learners.

Moreover, the rise of cloud computing and mobile technology has further revolutionized LMS by making them more accessible and scalable. As Eom and Ashill (2016) note, cloud-based LMS platforms allow institutions to scale their services according to demand, providing access to educational resources anytime and anywhere. This flexibility has made LMS an essential tool in distance education, enabling learners to access high-quality content regardless of their geographical location.

Impact of Technological Progress on Education

Technological advancements have played a crucial role in the development and enhancement of LMS (Al Qalhati et al., 2020). Cloud computing, for instance, has enabled scalable and cost-effective LMS deployment, allowing institutions to offer education to a broader audience without significant infrastructure investments (Aljawarneh, 2020). The integration of artificial intelligence (AI) and big data has further enhanced LMS by enabling personalized learning experiences through adaptive learning algorithms (Gros, 2016). Moreover, mobile technology has expanded the accessibility of LMS, allowing learners to engage with educational content anytime and anywhere, thus promoting lifelong learning (Hwang & Fu, 2019).

Technological progress has significantly enhanced the capabilities of LMS, leading to improved educational outcomes. LMS platforms now offer personalized learning experiences through adaptive learning technologies that tailor content to individual learners' needs and preferences. As highlighted by Johnson, Adams Becker, Estrada, and Freeman (2015), adaptive learning systems use data analytics to monitor learners' progress and adjust the content accordingly, ensuring that each student receives instruction that is most relevant to their current level of understanding.

Furthermore, the integration of artificial intelligence (AI) in LMS has enabled the automation of administrative tasks such as grading and feedback, allowing educators to focus more on teaching and mentoring. AI-powered chatbots and virtual assistants, as discussed by Zawacki-Richter et al. (2019), provide instant support to students, answering their queries and guiding them through their learning journey. These advancements have made LMS not only more efficient but also more responsive to the needs of learners.

Challenges in LMS Adoption

Despite the benefits, LMS adoption is not without challenges. The complexity of integrating LMS with existing institutional systems, user resistance, and the high cost of implementation are common barriers (Lonn & Teasley, 2009). Moreover, the rapid pace of technological change requires continuous updates and adjustments to ensure that the LMS remains relevant and effective (Booth, 2012).

The numerous benefits of technological advancements in LMS, there are also challenges that need to be addressed. One of the primary challenges is ensuring the security and privacy of student data. As LMS platforms collect and store large amounts of personal information, they become targets for cyberattacks. According to Watson and Watson (2012), the increasing reliance on cloud-based LMS raises concerns about data breaches and the misuse of sensitive information. Therefore, it is crucial for institutions to implement robust security measures to protect learners' data.

Another challenge is the digital divide, which refers to the gap between those who have access to technology and those who do not. While LMS platforms have made education more

accessible, they also require reliable internet access and digital literacy skills, which are not available to everyone. This issue is particularly prevalent in developing countries, where technological infrastructure may be lacking. As Selwyn (2016) argues, addressing the digital divide is essential to ensure that the benefits of LMS are equitably distributed.

On the other hand, technological progress in LMS also presents opportunities for enhancing educational practices. For instance, the use of big data analytics in LMS allows educators to gain insights into learners' behaviour and preferences, enabling them to design more effective teaching strategies. As Siemens (2013) notes, learning analytics can help identify at-risk students and provide targeted interventions to improve their academic performance. Additionally, the use of gamification in LMS, as explored by Deterding et al. (2011), has been shown to increase student engagement and motivation by incorporating game-like elements into the learning process.

The influence of technological progress on E-Learning Management Systems is profound and multifaceted. While these advancements have made LMS more powerful and versatile tools for education, they also present challenges that need to be addressed to fully realize their potential. As technology continues to evolve, it is essential for educators and institutions to stay abreast of these developments and leverage them to enhance the learning experience.

Research Questions

This study seeks to address the following research questions:

1. How have technological advancements influenced the functionality and effectiveness of e-learning management systems?
2. What are the key factors influencing the selection of an LMS in the context of technological progress?
3. How do technological innovations in LMS impact user engagement and learning outcomes?
4. What challenges do educational institutions face when integrating new technologies into their LMS?

Research Objectives

The primary objectives of this research are:

1. To assess the impact of technological advancements on the development and performance of e-learning management systems.
2. To identify the critical factors that guide the selection of LMS in an evolving technological landscape.
3. To evaluate the effect of technological innovations on user engagement and learning outcomes within LMS.
4. To explore the challenges and barriers faced by educational institutions in integrating new technologies into their LMS.

Research Methodology

This research will clearly explain the effectiveness of the e-learning program. The tools and framework used to perform e-learning will be evaluated on the criterion of the personal experience of instructors or Facilitators of the training and learners.

The teachers' concern that they are not able to trace the learners' activity while their entire teaching session and the learners' question about the validity and reliability of the content delivered in the e-learning process.

(MATEP) to resolve both instructors' and learners' concerns. MATEP tools (such as CANVAS) run over the Web servers with log files where every activity of learners can be captured, and is designed to help instructors to track their learners' activities online. MATEP tools are enriched with the necessary information sourced from academic and social demographic areas. MATEP is a web application that provides a platform for the LMS and e-learning could be performed independently.

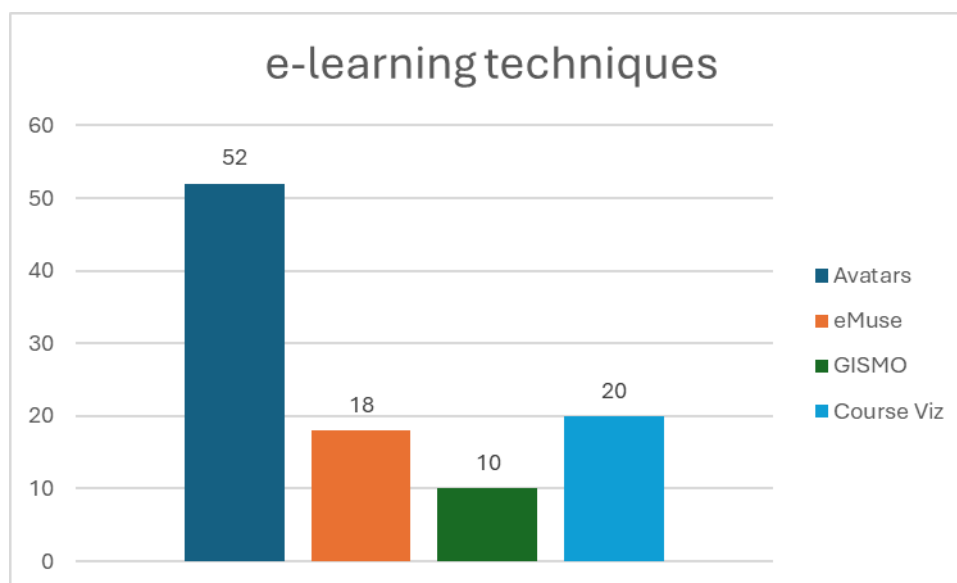
The experiment will make use of samples of a few instructors and e-learners who are using MATEP (such as CANVAS) and Avatars as their virtual framework for learning

A questionnaire was developed and completed according to the responses made by the sample user group. The sample size is set to be 150 people consisting of both instructors and learners, both male and female gender of different ages, different level of experience. The questions are based on the pattern of direct asking and will not use anything that would be disguised to reveal any relevant matter.

There are four open-ended questions which means the reply to such questions will only be direct response to the question. Questions will be the same for all the respondents. Responses received from the questions will be analysed using pie charts, and bar diagrams. and the discussion on each response will be made. The questions put to the respondents are as follows:

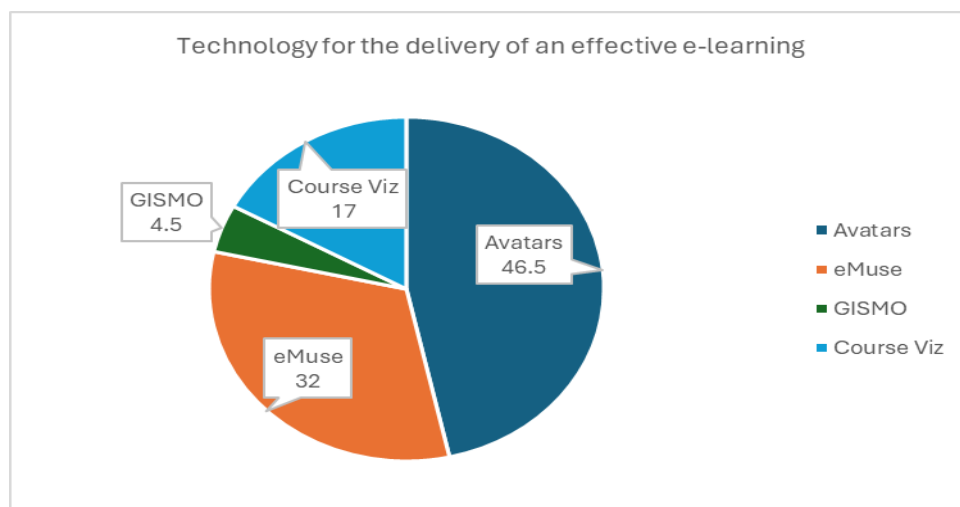
Data Analysis

Q1. What e-learning techniques do you follow?



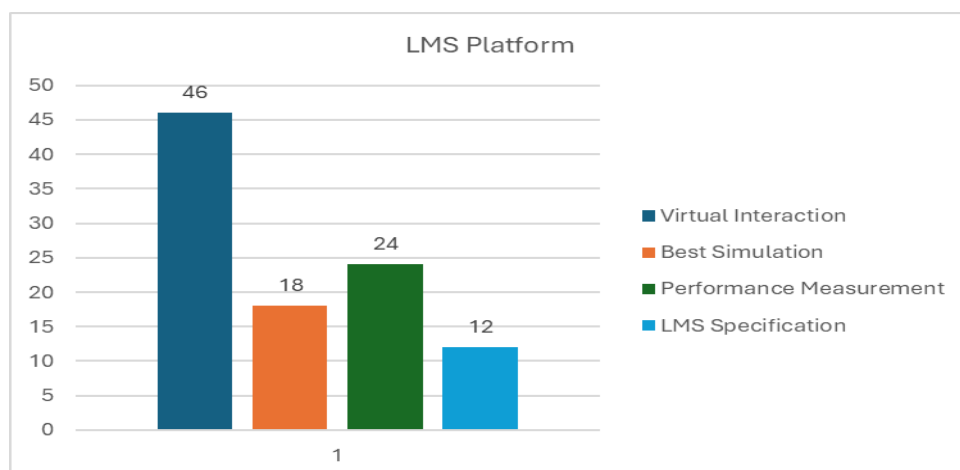
This is a question asked both to the instructors (Facilitators, Trainers) and learners who are following different techniques in the e-learning process. As the graph reveals, from the four categories of techniques: Avatars, eMUSE, Gismo, Course Viz. Avatars are the mostly commonly used technique. This virtual environment technique that is basically used for more dedicated virtual interactions is popular among other techniques with 52% of the respondents using it. Other techniques eMUSE had 18% and Course Viz had a 20% positive response; GISMO had the least of all i.e. only 10% responses.

Q2. What technology seems to be best for the delivery of an effective e-learning program?



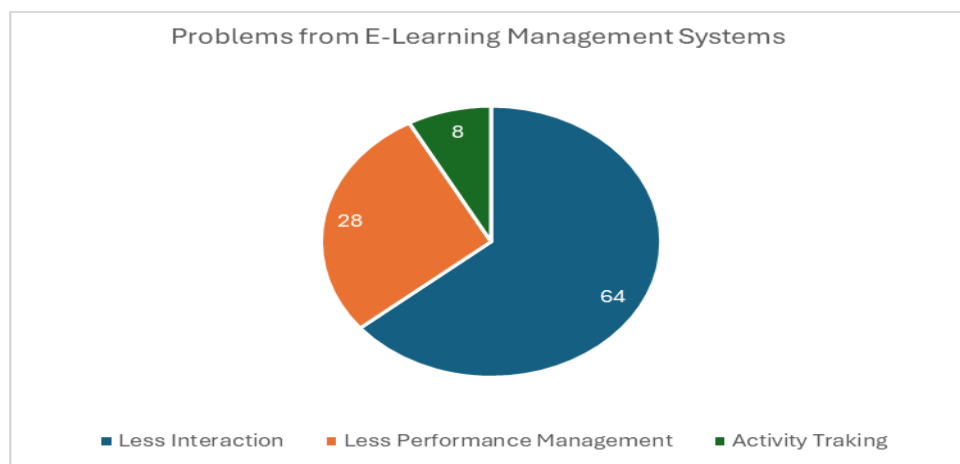
As shown, Avatars techniques prove to be the best and this explains the reason for its popularity among the users worldwide. The pie graph above shows that about 46.5% of the respondents have given positive response in favour of Avatars. Avatars are popular since they are user friendly and the instructor, when interacting with a learner, could also track their activity in the simulated environment. eMUSE is next in the order of preference, which is about 32%, and then the others, it also means that eMUSE is better when using it for sharing knowledge online.

Q3. What are the best virtues you have found in following the MATEP – CANVAS (performance measurement) or another framework?



The best thing that is provided with the measuring and analysis tools for online program is the creation and management of virtual online environment that exactly simulates to a learning environment. Performance measurement (MATEP) - CANVAS is the most significant concern of the people who are attached in the process of e-learning. Instructors and professors with the help of MATEP - CANVAS tools become able to evaluate learner performances, and this is the reason that criterion for performance measurement is second in the line after virtual interaction.

Q4. What are problems you are still facing while following Learning Management Systems?



There are several problems and difficulties still left among the users of virtual techniques who provide online teaching and learning guidance. MATEP - CANVAS tools have proven to be an efficient tool in solving e-learning programs but as the requirements of the e-learning frameworks are increasing becoming difficult for people to follow efficiently. There are results showing that activity tracking (MATEP) - CANVAS is still a problem even after using different tools such as Avatars, eMUSE, etc. It is problematic to track exactly the activities of the learners. More than 60% of the respondents blamed the present MATEP - CANVAS tools for not delivering exactly their requirements.

Findings and Conclusion

The findings of the research study made over the effectiveness of e-learning process are made clear with the responses given by the respondents. The responses to the questionnaire filled by the 150 respondents randomly selected from a randomly chosen executive programs. Findings of the research finally received are recorded with the help of statistical tools such as bar diagrams, and pie charts. These charts are the best ways to depict the respondents in a true sense that could be analysed easily.

This research highlighted the significant role that technological advancements have played in enhancing the capabilities of LMS. These advancements have led to improved user engagement, more personalized learning experiences, and better educational outcomes. However, the research also underscore the challenges institutions face in selecting and integrating appropriate technologies into their LMS, emphasizing the need for continuous monitoring and updating to keep pace with technological changes.

Recommendations

Based on the findings, this paper will offer several recommendations:

1. Strategic LMS Selection: Institutions should prioritize scalability, adaptability, and user-friendliness when selecting an LMS, ensuring it can accommodate future technological advancements.
2. Continuous Monitoring and Updates: Institutions should regularly assess their LMS to ensure it remains aligned with technological advancements and educational needs.
3. Finally, I would add, Leveraging AI and Big Data: Institutions should explore the use of AI and big data to personalize learning experiences and improve educational outcomes.

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