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Learning Management System Adoption in Adults' Continuing Learning: A Bibliometric Analysis

Geng Lintao[1], I Gede Budasi[2], Anantawikrama Tungga Atmadja[3], Ni Wayan Surya Mahayanti [4*]

[1] *Educational Science, Postgraduate Program, Universitas Pendidikan Ganesha, Bali*-INDONESIA
[2] *English Language Education, Faculty of Language and Arts, Universitas Pendidikan Ganesha, Bali*-INDONESIA
[3] *Accounting, Faculty of Economy, Universitas Pendidikan Ganesha, Bali*- INDONESIA
[4] *English Language Education, Faculty of Language and Arts, Universitas Pendidikan Ganesha, Bali*-INDONESIA

*__Corresponding Author:__ surya.mahayanti@undiksha.ac.id

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ABSTRACT

The adoption of Learning Management Systems (LMS) in adult continuing education has gained increasing scholarly attention, particularly in response to the pandemic, which accelerated the transition to digital learning. This study employs a bibliometric analysis to systematically map research trends, identify influential works, and highlight existing gaps in the literature on LMS adoption in adult education. To this end, data was meticulously collected from leading academic databases, and analytical techniques such as citation analysis, co-word analysis, and thematic mapping were utilized to examine publication growth, key thematic areas, and global research collaboration patterns. The findings reveal a significant increase in LMS-related publications from 2019 to 2025, coinciding with the widespread adoption of digital learning platforms. Thematic analysis indicates a strong focus on technology acceptance models, user engagement, and pedagogical innovations, with growing interest in artificial intelligence-driven LMS enhancements. The study also identifies Southeast Asia, Australia, and Europe as key contributors to LMS research, with significant international collaboration. However, the study's findings are tempered by limitations, including database selection bias and the exclusion of grey literature, underscoring the necessity for more comprehensive methodological approaches. The study underscores the significance of longitudinal research, mixed-methods investigations, and AI integration in LMS platforms to enhance user experience and learning outcomes. By mapping the evolution of LMS adoption research, this study provides valuable insights for educators, policymakers, and technology developers, informing future strategies to optimize digital learning in adult continuing education.

Keywords: Learning Management System, LMS Adoption, Adult Education, Bibliometric Analysis, Research Trends, Digital Learning, Artificial Intelligence

INTRODUCTION

Adult continuing education has become a fundamental aspect of lifelong learning and workforce development in a rapidly changing global environment marked by technological advancements and economic uncertainty. Lifelong learning frameworks have evolved to acknowledge that education is not limited to the early stages of life but extends throughout adulthood, supporting professional growth, personal fulfillment, and social well-being. This continuous learning process is critical in an era defined by the fourth industrial revolution, where automation and digitalization demand constant upskilling and reskilling. National initiatives, such as Singapore's SkillsFuture program, demonstrate how targeted policy interventions can empower individuals to remain competitive in a dynamic labor market by promoting a culture of lifelong learning and continuous professional development (Lim

et al., 2024). These initiatives ensure that individuals possess the necessary skills to adapt to evolving job requirements and seize new opportunities as industries transform.

The impact of adult continuing education extends beyond individual career advancement. Adult continuing education plays a vital role in strengthening workforce resilience and contributes to the economic growth and social cohesion of communities. Collaborative efforts among educational institutions, industries, and governments are instrumental in bridging the gap between theoretical knowledge and practical application. These partnerships enhance the overall effectiveness of education by ensuring that learning is aligned with the demands of modern workplaces and emerging industry trends. Research indicates that integrating academic programs with real-world applications results in improved job performance, increased productivity, and sustainable economic development (Jaldemark et al., 2024). Furthermore, lifelong learning fosters social inclusion and active citizenship by equipping individuals from diverse backgrounds with the necessary skills to engage meaningfully in society.

In this regard, Learning Management Systems (LMS) have become essential tools for providing adult learners with flexible, scalable, and personalized learning experiences. LMS platforms offer a structured digital environment where learners can access educational content asynchronously, a feature that is especially beneficial for adults who must balance education with work and family responsibilities. This flexibility allows learners to engage with course materials at times that best suit their personal schedules. Furthermore, the scalability of LMS ensures that educational institutions can deliver standardized yet customizable learning experiences to large and diverse groups of learners. For instance, many LMS platforms offer adaptive learning paths that adjust the content based on the learner's progress and needs, thereby enhancing engagement and improving learning outcomes (Navarro et al., 2021).

Digital technologies have further enhanced the capabilities of LMS platforms by integrating advanced features such as data analytics and artificial intelligence. These innovations enable the creation of hyper-personalized learning experiences, where algorithm-driven recommendations and real-time performance tracking allow educators to monitor learner progress and intervene when necessary. Multimedia resources such as videos, interactive simulations, and podcasts cater to a range of learning styles, thereby enriching the educational experience. Despite these advancements, challenges persist in the widespread adoption and effective use of LMS technologies. These challenges include issues related to digital equity, user resistance, and the need for ongoing training for educators and learners. Addressing these challenges requires concerted efforts from institutions to invest in infrastructure and professional development initiatives so that all learners can benefit from the opportunities provided by digital learning environments (Zhao et al., 2023).

The shift toward digital learning accelerated due to the onset of the pandemic, as traditional face-to-face instruction became impractical. Educational institutions worldwide were compelled to adopt LMS platforms to ensure uninterrupted teaching and learning. This rapid transition highlighted the strengths and limitations of current LMS infrastructures. On one hand, these platforms were instrumental in supporting remote education and enabling diverse pedagogical approaches, including blended and hybrid models that incorporated virtual reality and artificial intelligence-driven tools. However, the abrupt transition to online learning revealed significant disparities in digital access, emphasizing the necessity for comprehensive technological support systems to ensure that all learners, irrespective of their socioeconomic status, could engage fully in remote education (Meda & Waghid, 2022). As institutions continue to adapt to the post-pandemic educational environment, the experiences of the past few years are guiding a renewed focus on flexibility, inclusivity, and innovation in digital learning strategies.

Bibliometric analysis provides a robust methodological approach to address existing research gaps in the field of LMS adoption in adult continuing education. By systematically mapping and quantifying scholarly publications over an extended period from 2004 to 2024, bibliometric methods provide an objective and comprehensive overview of how research in this area has evolved. This approach involves analyzing trends in publication outputs, identifying influential authors, institutions, and countries, and uncovering thematic clusters that define the research landscape. In addition to measuring the growth trajectory of research on LMS adoption, bibliometric analysis identifies under-explored areas and emerging trends that merit further investigation. Through techniques like co-word analysis, citation network analysis, and thematic mapping, researchers can identify key developments and shifts in scholarly focus, providing a comprehensive understanding of the dynamics of knowledge development in this field.

A key benefit of bibliometric analysis is its capacity to consolidate extensive data from multiple sources, uncovering patterns that might be overlooked in conventional literature reviews. By examining co-authorship networks, bibliometric studies can identify collaboration patterns and highlight key research hubs that drive innovation in LMS research. Additionally, citation analysis offers insights into the influence of specific studies, thereby helping to identify seminal works that have shaped current understandings of LMS adoption. This systematic mapping of the literature not only fills critical research gaps but also guides future research directions by revealing areas where further inquiry is needed. As digital transformation continues to reshape educational

practices, bibliometric analysis serves as an essential tool for monitoring research trends and ensuring that scholarly inquiry remains aligned with technological and societal changes.

In summary, integrating adult continuing learning, LMS technologies, and bibliometric analysis creates a robust framework for addressing both current challenges and future opportunities in education. Adult continuing learning is essential for promoting workforce adaptability, economic resilience, and social inclusion in an era of rapid change. LMS platforms have transformed the delivery of education by offering flexible, scalable, and personalized learning experiences, despite ongoing challenges related to digital equity and user adaptation. The experiences during the pandemic have underscored the transformative potential of digital learning and highlighted areas in need of further development. Bibliometric analysis is a valuable tool that can help address these gaps by offering a systematic overview of the scholarly landscape in LMS adoption. By identifying key contributors, influential publications, and emerging thematic clusters, this method offers valuable insights that can inform the design of future research, guide policy development, and support the creation of more effective digital learning environments. In addition to its academic contributions, bibliometric analysis provides practical guidance for educators, policymakers, and LMS developers seeking to cultivate an inclusive and innovative educational environment.

Research Problem

1. How much research exists on LMS adoption in adult continuing learning, and how has it grown over time?
2. What are the main topics and trends discussed in LMS adoption research for adults?
3. How do researchers collaborate across institutions and countries?
4. What gaps remain in understanding LMS adoption for adult learners?

Objectives

The primary objective of this study is to map the growth trajectory of research on Learning Management System (LMS) adoption within the realm of adult continuing education. By methodically examining publications from 2004 to 2024, the study seeks to elucidate the evolution of scholarly interest and attention toward LMS in adult learning contexts over time. Furthermore, the study highlights influential authors, institutions, and countries that have shaped the research landscape and seeks to identify key contributors to the field. This examination encompasses seminal publications that have driven innovation and provided foundational insights into the adoption process. The analysis is designed to uncover thematic clusters that characterize the research, offering a nuanced understanding of prevailing trends and methodological approaches. By integrating these diverse aspects, the study endeavors to present a comprehensive overview of the research domain, thereby providing valuable insights into the progression, key milestones, and critical shifts that have marked the evolution of LMS adoption research in adult continuing education.

Significance

This study offers important implications for various stakeholders, including policymakers, educators, and LMS developers. By presenting a mapping of the research landscape, the findings provide evidence-based insights that can inform the development of more effective LMS adoption strategies. Policymakers can leverage these insights to craft regulations and support systems that facilitate the integration of technology in adult learning environments. Educators can better understand the dynamics of LMS use to improve teaching and learning outcomes. Furthermore, LMS developers can leverage the identified trends and emerging research gaps to drive innovation and tailor their products to meet the evolving needs of adult learners. This study's contribution to the broader discourse on educational technology is twofold: first, by highlighting issues that have not yet been explored, and second, by guiding future research directions to ensure that subsequent efforts are well-informed and strategically aligned with real-world needs.

LITERATURE REVIEW

Key Concepts

It is essential to define the central concepts in this study to develop a clear understanding of the relationships among Learning Management Systems (LMS), adult continuing learning, and technology adoption models. This section synthesizes relevant literature published up to 2023 to clarify these ideas and situate them within the broader context of educational technology research.

Definitions

Learning Management Systems (LMS)

Learning Management Systems are software applications designed to support the administration, documentation, tracking, reporting, and delivery of educational courses or training programs. LMS platforms enable online learning by allowing adult learners to access resources and progress through materials at their own pace. The flexibility offered by these systems is particularly beneficial in adult education, where learners often juggle professional, personal, and academic responsibilities. Researchers have noted the significant role of LMS in supporting lifelong learning by offering personalized learning experiences, facilitating communication among peers and educators, and extending educational opportunities to geographically dispersed populations (Dissanayake et al., 2022; Gupta et al., 2022). As technology becomes more integral to educational practices, LMS platforms have evolved to incorporate advanced features such as adaptive learning paths, real-time analytics, and multimedia resources. These enhancements not only improve learner engagement but also assist educators in monitoring progress and tailoring instruction to meet individual needs. Consequently, LMS are regarded as pivotal tools for propelling educational innovation and ensuring that adult learners are well-equipped to navigate a rapidly changing workforce.

Adult Continuing Learning

Adult continuing learning refers to the pursuit of education beyond the traditional years of formal schooling. This concept is grounded in the understanding that learning is a lifelong process. Adult learners, as theorized by experts such as Knowles, are often described as self-directed individuals who seek practical, experiential learning opportunities that are directly relevant to their personal and professional lives. The focus on self-direction means that adult learners typically prefer learning environments that are flexible and responsive to their unique circumstances. This approach fosters both personal growth and the development of competencies essential for long-term career advancement. Contemporary literature underscores the significance of lifelong learning in maintaining competitiveness in today's dynamic labor market. Adult education plays a vital role in facilitating continuous professional development, helping individuals update and expand their skill sets to meet emerging job demands (Gupta et al., 2022; Dissanayake et al., 2022). Adult continuing education is also closely linked with broader societal benefits, such as enhanced social inclusion, improved civic participation, and overall community development.

Technology Adoption Models

Among the various theoretical frameworks that have been applied to study the adoption of educational technology, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have received considerable attention. The TAM, initially developed by Davis, posits that perceived usefulness and perceived ease of use are the primary determinants influencing users' behavioral intentions to adopt technology (Herlina et al., 2023). In the context of LMS adoption in adult education, the TAM framework suggests that learners and educators will be more inclined to use these systems if they perceive them as beneficial for enhancing learning outcomes and if the systems are user-friendly. Recent studies have applied TAM to assess various aspects of LMS implementation and have consistently found that these two factors play a crucial role in influencing user acceptance (Truxová et al., 2023; Natakusumah et al., 2023).

The UTAUT model builds on the fundamental assumptions of TAM by incorporating additional constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions. These factors offer a more comprehensive understanding of the determinants that influence technology adoption. Performance expectancy captures the degree to which an individual believes that using a particular technology will improve their performance, while effort expectancy measures the ease associated with technology use. Social influence captures the extent to which users perceive that important others believe they should use the technology. Facilitating conditions refer to the organizational and technical infrastructure available to support the technology's use (Wang et al., 2021). Numerous studies have demonstrated that UTAUT offers a robust framework for analyzing LMS adoption in various educational settings. For instance, researchers have employed UTAUT to examine how institutional support and peer influence affect the implementation of LMS in higher education, thereby illuminating the multifaceted nature of technology acceptance (Prockl et al., 2022; Muflih, 2022).

In summary, the effective integration of LMS into adult continuing education depends on a clear understanding of the core concepts and theoretical models that underpin technology adoption. LMS serve as platforms that support flexible and personalized learning experiences, while adult continuing learning underscores the need for ongoing professional and personal development. Models such as TAM and UTAUT provide valuable insights into the factors that drive or hinder the adoption of such educational technologies. The synergy among

these factors influences the development, implementation, and utilization of LMS in adult educational settings, ensuring that technological advancements are aligned with the evolving needs and preferences of adult learners.

Challenges in Adult LMS Adoption

Despite the substantial benefits associated with LMS, the adoption and effective use of these platforms in adult education are not without challenges. A review of literature from 2020 to 2022 reveals several interrelated barriers that impede the widespread implementation of LMS among adult learners. These challenges primarily fall into three broad categories: technological barriers, motivational issues, and accessibility concerns.

Technological Barriers

One of the primary obstacles to successful LMS adoption is the presence of technological barriers. Inadequate IT infrastructure, limited technical support, and insufficient training for both educators and learners have been identified as significant impediments. For instance, Badawood and AlBadri (2021) underscore the significance of robust IT support and technical proficiency as pivotal factors in facilitating successful mobile learning adoption across diverse regions. Similar challenges have been reported in low-income settings, where technical difficulties and financial constraints limit the ability of institutions to invest in state-of-the-art LMS solutions (Thepwongsa et al., 2023). These barriers hinder the effective implementation of LMS platforms and contribute to user frustration and disengagement.

Motivational Issues

Motivation is another critical factor that influences the successful adoption of LMS. The design and quality of the LMS interface can have a substantial impact on user engagement. According to Riyath and Rijah (2022), LMS systems that offer user-friendly interfaces and customizable features tend to generate higher levels of motivation among educators and learners. Conversely, when learners perceive that an LMS does not adequately address their specific educational needs, motivation can decline, resulting in lower levels of participation and overall satisfaction. Research by Htet et al. (2023) indicates that when adult learners perceive an LMS to be misaligned with their learning objectives, frustration and disengagement become more pronounced. These motivational challenges underscore the importance of aligning LMS design with the expectations and requirements of adult learners.

Accessibility Concerns

Accessibility poses a significant challenge in the adoption of LMS, particularly when considering the diverse demographic characteristics of adult learners. Studies have shown that disparities in access to digital devices and reliable internet connectivity create significant obstacles. Lūka (2022) underscores that learners from lower socio-economic backgrounds often encounter challenges in accessing the necessary technological tools, thereby creating inequities in educational opportunities. Furthermore, Thepwongsa et al. (2023) underscore that while LMS platforms are well-suited for remote learning, financial and infrastructural limitations in resource-scarce regions can further impede effective implementation. These challenges underscore the need for substantial investments in technological infrastructure and comprehensive training programs to ensure that all adult learners can benefit from LMS-enabled education.

While LMS offer considerable opportunities for enhancing adult education, several challenges must be addressed to facilitate broader and more effective adoption. Technological limitations, motivational issues, and accessibility concerns are interconnected challenges that can hinder the effective implementation of LMS platforms. A comprehensive understanding of these barriers is essential for developing strategies that support adult learners in leveraging the benefits of digital learning environments. Addressing these challenges necessitates a multifaceted approach, including enhancing IT infrastructure, designing user-centered LMS interfaces, and ensuring equitable access to technology and training resources.

Prior Reviews and Limitations

The adoption of Learning Management Systems (LMS) in educational institutions, particularly within adult education contexts, has been the subject of numerous systematic reviews in recent years. These reviews have provided valuable insights into the factors that influence LMS adoption. However, they also reveal several limitations that necessitate further investigation. This section offers an overview of existing systematic reviews on LMS adoption and highlights the gaps that bibliometric analysis can help address.

Overview of Existing Systematic Reviews on LMS Adoption

Recent systematic reviews have examined a variety of factors that influence LMS adoption, with particular emphasis on user readiness, institutional frameworks, and theoretical models such as TAM and UTAUT. Kuppusamy et al. (2023) conducted a review focused on understanding students' readiness to adopt LMS in higher education. Their analysis identified key factors such as perceived ease of use, perceived usefulness, and user attitude

toward LMS platforms. The study emphasized the need for addressing these factors to facilitate smoother transitions into digital learning environments. In a similar vein, Salgado-Chamorro et al. (2023) investigated the multifaceted variables that impact LMS adoption across different learning contexts. Their findings underscore that user perceptions are critical determinants of whether LMS systems are accepted and effectively integrated into educational practices.

Another systematic review by Çavuş et al. (2022) examined the application of the Technology Acceptance Model within the context of LMS usage. Their review detailed how various studies have utilized TAM to assess factors that influence user engagement and technology acceptance. The consistent use of TAM across various educational settings highlights the robustness of this theoretical framework in explaining LMS adoption patterns. In addition to user-related factors, institutional influences have also been widely discussed. Hardaker and Glenn (2025) explored the antecedents of successful LMS adoption, highlighting the significance of institutional strategies, administrative support, and comprehensive faculty training programs. Their review revealed that institutions that invest in robust technological infrastructures and ongoing professional development tend to achieve more successful LMS integration.

Further empirical evidence has linked LMS implementation with improved cognitive learning outcomes. Aulianda et al. (2023) conducted a systematic review that focused on how LMS platforms impact students' cognitive performance. Their analysis identified several stages in LMS implementation, including introduction, registration, access to learning materials, and evaluation. The review emphasized that a structured approach to LMS implementation contributes significantly to improved learning outcomes. These findings underscore the importance of a meticulous, systematic approach to LMS implementation, one that incorporates not only technological and user-related considerations but also a thoughtful planning process.

Another critical dimension in the literature pertains to user satisfaction. Research by Alkhateeb and Abdalla (2021) examined factors influencing student satisfaction with LMS platforms, focusing on the Moodle system. They identified key dimensions such as system quality, information quality, and the quality of support services. Their findings indicate that user satisfaction is closely linked to the perceived effectiveness and reliability of the LMS. In a similar vein, Brown et al. (2022) underscored the necessity for ongoing adaptation among faculty members to ensure the optimal benefits of LMS adoption. Their review suggests that ongoing professional development is critical for educators to effectively integrate LMS tools into their teaching practices.

In addition to individual and institutional factors, several reviews have focused on the broader context of LMS adoption in blended learning environments. Antwi-Boampong and Anthony's (2021) study examined institutional strategies for adopting blended learning models in higher education. Their review noted that while course-level adoption has been extensively studied, there is a need for research into comprehensive institutional frameworks that support the transition to blended learning. This gap underscores the need for further investigation into systemic factors that facilitate or hinder LMS adoption on a larger scale.

The literature has also noted regional disparities. For instance, Afolabi and Ajani (2023) explored the challenges faced by South African rural students in adopting LMS platforms. Their study highlighted significant infrastructural and cultural barriers that are unique to certain geographical contexts. These findings underscore the importance of tailoring solutions to address the unique challenges faced by different regions, considering their specific cultural, economic, and technological environments.

Existing systematic reviews offer a comprehensive view of the factors influencing LMS adoption. These reviews underscore the pivotal roles of user readiness, theoretical frameworks such as TAM and UTAUT, institutional support, and contextual variables. However, these reviews primarily emphasize qualitative insights and narrative syntheses. There is a need for quantitative approaches that can reveal trends over time and map the complex networks of research contributions in this field.

Bibliometric analysis offers a methodological approach that complements existing systematic reviews by providing quantitative data on research trends, network structures, and thematic evolutions within the field of LMS adoption. Recent studies have demonstrated the value of bibliometric methods in uncovering patterns and relationships that may not be evident from qualitative reviews alone.

For instance, the comprehensive bibliometric study conducted by Dwikoranto et al. (2023) on the utilization of massive open online courses (MOOCs) in LMS contexts reveals significant trends in the integration of technology with education. Their analysis mapped variables influencing LMS adoption and identified significant correlations between technological innovation and educational outcomes. These quantitative insights can help identify areas that have not been thoroughly explored in the literature, providing direction for future research.

Ragazou et al. (2022) further illustrate the utility of bibliometric analysis by mapping publication trends and research networks in the context of strategic ambidexterity within small and medium-sized enterprises. Their study provides a contextual understanding of how specific research topics evolve over time and how scholarly contributions are interconnected. The parallels between their approach and the study of LMS adoption are clear.

A similar bibliometric analysis applied to LMS research can reveal the evolution of key themes, the emergence of new theoretical frameworks, and the influence of seminal works in the field.

Chiroma et al. (2024) have underscored the gap in bibliometric investigations in related interdisciplinary fields, such as the integration of artificial intelligence in the Internet of Medical Things. Their work underscores the value of detailed network mapping and quantitative trend analysis. These methodological insights can be directly applied to the study of LMS adoption, where bibliometric analysis can identify prolific authors, influential institutions, and the most impactful research articles. By mapping these networks, researchers can gain a clearer picture of the intellectual structure of the field and identify emerging areas that warrant further investigation.

Additionally, Jain and Jain (2024) employed bibliometric techniques to examine digital payment adoption. Their findings reveal distinct research patterns and thematic shifts over time. The methodological parallels between their study and potential bibliometric analyses in LMS research suggest that similar techniques can be used to examine trends in user adoption, satisfaction, and system effectiveness. The identification of quantitative trends in the literature on digital transactions offers an analogy for how LMS research could be enriched through systematic mapping of publication data and citation networks.

Sulaiman's (2023) study offers a pertinent example by underscoring factors that influence LMS usage in Arab Gulf countries. His study draws attention to the importance of regional context and cultural influences on LMS adoption. Extending bibliometric analysis to compare research outputs across different regions could identify geographical disparities and contextual factors that shape LMS effectiveness. This approach would contribute to a more nuanced understanding of the challenges and opportunities inherent in the global adoption of LMS platforms.

Gamage et al. (2022) also emphasize the role of bibliometric analysis in tracking usage trends for specific LMS platforms, such as Moodle. Their systematic review identified predominant usage patterns in STEM disciplines and suggested that further exploration of Moodle's adaptive features could lead to improved personalization in learning. The application of bibliometric methods in this context is critical for uncovering the latent trends that drive technological innovation and user engagement.

Finally, integrating bibliometric analysis with systematic reviews fosters a research environment that prioritizes methodological rigor and interdisciplinary perspectives. By quantitatively mapping existing literature, bibliometric methods reveal both the density and the gaps in research networks. This approach enables researchers to develop more targeted inquiries that address specific aspects of LMS adoption, such as the impact of technological advancements on user engagement or the role of institutional support in facilitating effective implementation.

While previous systematic reviews have laid a solid foundation by pinpointing key factors that influence LMS adoption, they are frequently constrained by their qualitative emphasis and narrative synthesis. Bibliometric analysis addresses these limitations by providing a quantitative overview of research trends, network mappings, and thematic evolutions. This dual approach enriches the overall understanding of LMS adoption in adult continuing education by combining detailed qualitative insights with robust quantitative data. The resulting synthesis highlights the current state of research and identifies significant gaps that future studies can target. This integrated perspective is essential for guiding policymakers, educators, and technology developers in creating more effective digital learning environments that cater to the evolving needs of adult learners.

METHODOLOGY

In this study, a bibliometric analysis was conducted to explore the research trends and thematic developments surrounding Learning Management Systems (LMS) and their application in adult and continuing education. Data was systematically collected from the Dimensions database, a highly reputable repository known for its comprehensive indexing of scholarly literature across diverse disciplines. The search strategy employed a series of deliberately selected keywords, including "*learning management system*," "LMS", "*adult education*," "*continuing education*," and "*technology acceptance*," to ensure the capture of all pertinent studies addressing the integration and impact of LMS in adult learning environments. To ensure the integrity and quality of the dataset, the research employed strict inclusion and exclusion criteria: only peer-reviewed journal articles and conference papers were included, the time frame was limited to publications from 2004 to 2024, and the analysis was restricted to articles published in English. This filtration process effectively excluded non-English publications, book chapters, and non-peer-reviewed sources, thereby ensuring the reliability and relevance of the collected data.

The bibliometric analysis was performed using VOSViewer, a specialized software tool adept at visualizing and mapping complex research networks. The software facilitated the construction of co-authorship, citation, and keyword networks, providing insights into collaborative research efforts and influential contributions in the field. The study employed a range of analytical techniques, including co-word analysis to identify interconnected research themes, citation network analysis to trace the evolution of scholarly influence, and thematic mapping to delineate emerging and dominant topics. The integration of these methodologies enabled a thorough examination of the

interplay between technolog ical adoption and educational practices, thereby offering a comprehensive framework for understanding the evolution of LMS research within adult education contexts.

RESULTS

Annual Publication Trends

From 2014 to 2024, there was a lot of research on Learning Management Systems (LMS) being used by adults to continue learning. This research shows how things have changed a lot over time. From 2014 to 2019, there was steady yet small growth in research output. This reflects an emerging field gradually capturing academic interest. But there was a big jump from 2019 to 2021, with publications more than doubled, from 70 in 2019 to 163 in 2020 and 260 in 2021. This big jump probably happened because of the quick move to online learning because of the pandemic. This led to more people using LMS technologies and more people wanting new ways to learn. This increase shows how important it is to study LMSs during a time when traditional learning environments were disrupted around the world.

Figure 1. Publication Trend

From 2022 to 2024, the growth in publications stabilized at around 300 per year. This suggests that the field has matured. It has moved from an initial phase of explosive expansion to one characterized by more in-depth and specialized inquiries. Researchers are now likely focusing on evaluating the long-term effectiveness of LMS platforms, integrating emerging technologies like artificial intelligence and virtual reality, and tailoring learning experiences to better serve adult learners. The shift from rapid growth to stabilization shows a move towards quality and refinement in research. Scholars are building on earlier findings to deal with complex issues and improve LMS use for continuing education.

Leading Journals

The data shows that the International Journal of Emerging Technologies in Learning (iJET) is the clear leader in citations, with 1,342 total mentions. This shows that people in the academic community think iJET's focus on new educational technologies is important, especially in the areas of adult learning and LMS adoption. Sustainability ranks second with 557 citations, suggesting that research on LMS implementation also intersects with broader themes of long-term viability, resource management, and societal impact. The third- and fourth-ranked journals, Education and Information Technologies (391 citations) and the Turkish Online Journal of Distance Education (364 citations), both show the important role that technology and distance education play in modern adult learning environments. Finally, the journal Education Sciences is in fifth place with 287 citations, showing that it uses many different fields of study in its educational theories and practices.

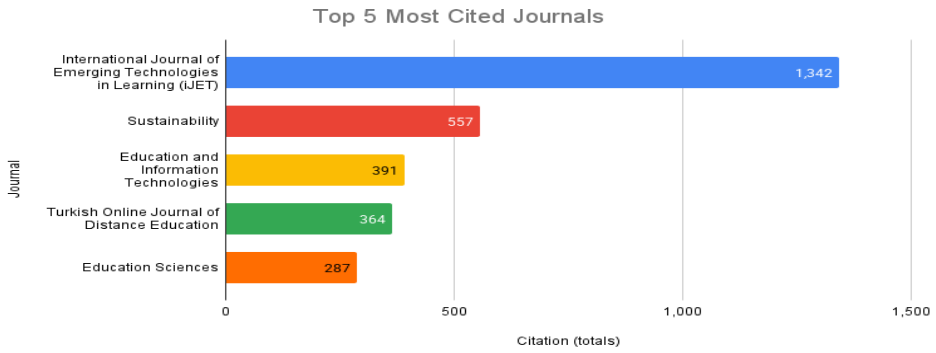

Figure 2. Top 5 Most Cited Journals

These journals show that researchers are paying more and more attention to the important role that LMS technologies play in meeting the changing needs of adult learners. These journals are becoming important sources of new ideas because more and more people are learning remotely or in a mix of online and in-person classes. This is happening because of improvements in digital platforms and a general shift toward lifelong learning. The fact that there are so many technology-focused publications shows that researchers are working together to find practical solutions that improve learner engagement, accessibility, and instructional design. This shows that there is a vibrant scholarly community that is committed to exploring and advancing the ways in which LMS platforms can effectively support adult continuing education in diverse settings around the globe.

Research Categories

The different categories of research on Learning Management System (LMS) adoption in adults' continuing education show the many different fields involved. Curriculum and Pedagogy has the most publications, 908, which shows that a lot of the research is on teaching strategies, course design, and teaching methods for adult learners in digital environments. This shows that there is a lot of academic interest in improving LMS-based teaching methods to make learners more involved, in how lessons are assessed, and in delivering content to adult learners. In second place is Education Systems, with 842 publications. This shows a broader focus on the institutional, policy, and administrative frameworks that support LMS adoption. This category likely includes studies on using LMS in higher education, corporate training programs, and professional development initiatives.

Figure 3. Research Categories

Beyond core education studies, Information and Computing Sciences has 272 publications. This shows the technological aspects of LMS platforms, including system architecture, how users experience the design, and data-driven learning analytics. Specialist Studies in Education has 254 publications. This suggests a niche focus on specific learner demographics or unique educational contexts, such as accessibility for individuals with disabilities or the application of LMS in vocational training. Lastly, Language, Communication, and Culture has 157 publications. This underscores the role of LMS in supporting multilingual education, intercultural learning, and communication strategies in online settings. The diversity of these categories reflects the broad impact of LMS on various dimensions of adult education, illustrating a balance between pedagogical innovation, technological advancement, and systemic implementation in lifelong learning initiatives.

Dominant Keywords

The network visualization created by VOSviewer shows how often keywords appear together in research on Learning Management System (LMS) adoption in adults' continuing education. The network is divided into several groups, each representing a different focus. The blue cluster focuses on LMS platforms like Moodle and their use in training and education, especially for language learning and professional development. It suggests that research in this area emphasizes the structure and implementation of LMS within organizations. The green cluster focuses on teaching methods and learning environments, including topics like blended learning, applications for specific subjects, and new tools like virtual reality in LMS-based education. This shows an interest in improving learning materials and teaching methods.

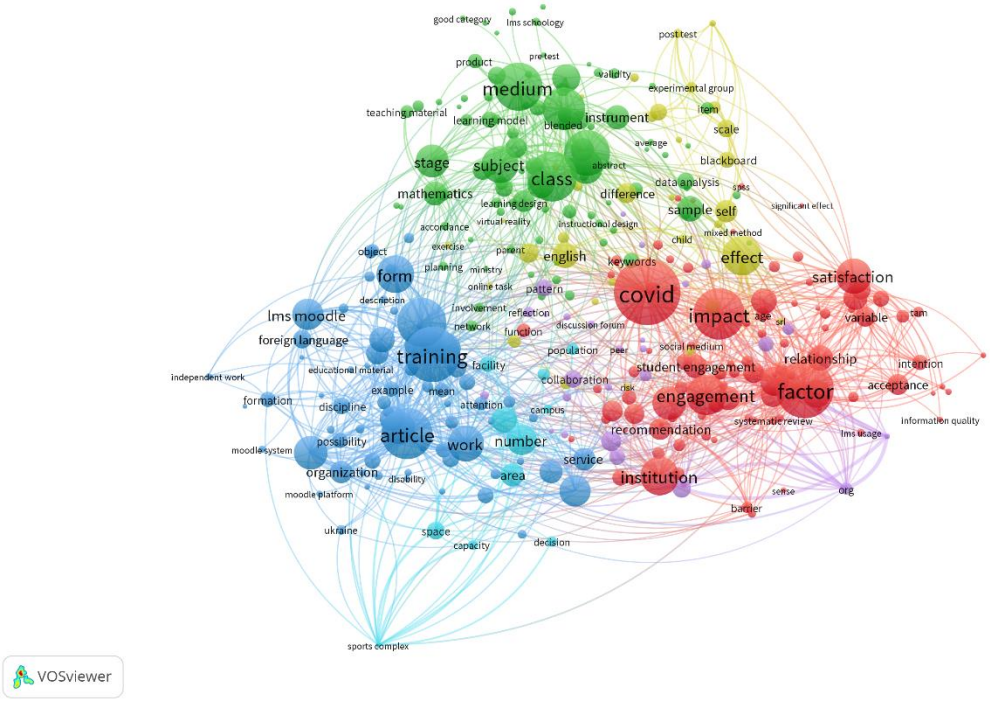

Figure 4. Keyword Co-occurences

The red cluster focuses on engagement, impact, and institutional factors, demonstrating the importance of LMS in getting students to participate and be satisfied. Words like "relationship" and "acceptance" suggest studies on behavioral aspects influencing LMS adoption. The yellow cluster is about assessing and measuring the impact of LMS. This includes words like "data analysis," "post-test," and "scale." These words show research that uses real-world methods to evaluate the effectiveness of LMS. Lastly, the purple cluster addresses challenges in adopting LMS, focusing on barriers to implementation and systematic reviews on usability and user experience. A significant theme across the network is the impact of the pandemic, which appears as a central keyword. This indicates that much of the recent research has explored how the pandemic accelerated LMS adoption and reshaped online learning. Overall, the network shows an interdisciplinary approach, integrating pedagogy, technology, engagement, and assessment in LMS adoption research.

Geographic Distribution of Research Activity

The image shows where research activity and international collaboration in Learning Management System (LMS) adoption in adults' continuing education is happening. The size of the dots shows the number of research papers, and the lines between them show how countries work together on research.

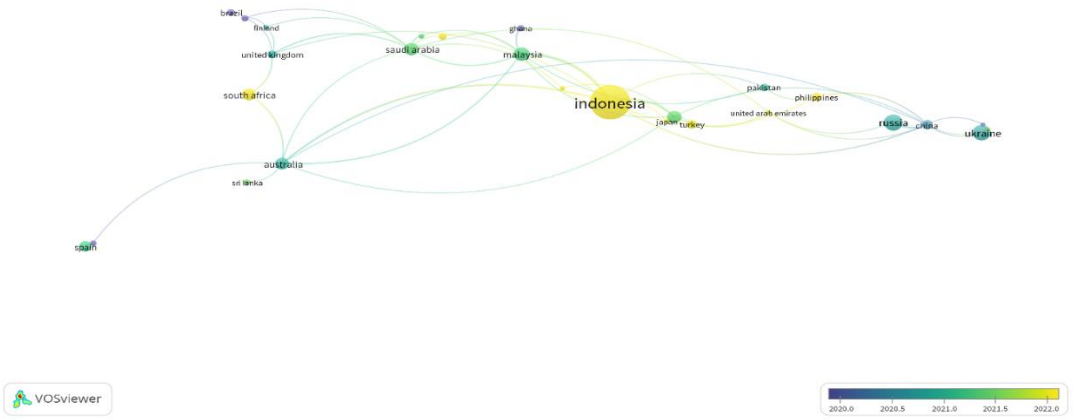

Figure 5. Geographic distribution of research activity

Indonesia appears as the most prominent node, suggesting it has the highest research activity in this area. It has strong collaborative links with Malaysia, Australia, and several Asian and Middle Eastern countries, including Japan, Turkey, Pakistan, and Saudi Arabia. This shows that researchers in Indonesia are working closely with other countries, especially those in the same region.

Australia and South Africa are also important, working together with countries like the United Kingdom, Sri Lanka, and Brazil. Russia, China, and Ukraine are also connected to this network. The timeline shows that research activity has evolved over time, with some regions becoming more active in recent years.

The map shows that LMS adoption research is spread out around the world, with strong research networks in Southeast Asia, Australia, and some parts of Europe. The collaboration patterns suggest that the topic is becoming more popular around the world, with more people and groups working together across borders.

DISCUSSION

A significant growth in research on the adoption of learning management systems (LMSs) in adult continuing education has been observed over the past decade, according to a bibliometric analysis. There were not many publications between 2014 and 2019, but the number of publications more than doubled between 2019 and 2021. This was because of the pandemic. This increase happened because of the sudden need for remote education because of the pandemic. Other studies have also shown that digital learning platforms were being used more during this time (Meda & Waghid, 2022; Zhao et al., 2023). The number of publications stabilized at about 300 from 2022 onward, which suggests that the field is maturing. Researchers are moving from initial explorations to more in-depth analyses of long-term effectiveness and the integration of new technologies in LMS platforms (Lim et al., 2024; Jaldemark et al., 2024).

The analysis also identifies the most important people and groups in this field. Leading journals like the International Journal of Emerging Technologies in Learning and Sustainability are playing a central role in sharing research findings. These journals, along with well-known research institutions in countries like Indonesia, Australia, and South Africa, have created strong networks that encourage international collaboration and the sharing of knowledge. These international partnerships show that LMS adoption is important around the world. They also show that it is important to work together to deal with common problems like digital equity and infrastructure limitations (Sulaiman, 2023; Hardaker & Glenn, 2023).

Looking at the themes in the research, we see that most of the studies focus on how users engage with the platform, how they accept it, and the new ways of teaching that it makes possible. Many studies have used frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate factors influencing how useful and easy users find LMS platforms. These factors are critical in determining whether or not LMS platforms will be adopted (Davis, 1989; Çavuş et al., 2022). The research also talks about how advanced technologies can make big changes, like using artificial intelligence for personalized learning. But there are still big problems with technology and digital inequality (Gupta et al., 2022; Dissanayake et al., 2022). This dual focus is an example of the broader scholarly conversation that tries to balance new teaching ideas with the real-world challenges of using digital learning solutions.

The research is also happening in different places around the world. There are a lot of studies happening in Southeast Asia, Australia, and some parts of Europe. These collaborations have been very important in dealing with challenges in specific regions and have helped us understand more about the things that influence the adoption of LMS in different educational settings. Researchers worldwide agree that digital learning environments are important, but they also agree that we need to adapt our strategies to meet the needs of learners from different places (Lim et al., 2024; Sulaiman, 2023).

Even though we've learned a lot, there are still some things we don't know. Although there has been a lot of research during the pandemic, there aren't many studies that look at what happens over time when people use these platforms. Also, although some research methods like TAM and UTAUT have been used a lot, we need to explore how new technologies like AI and VR can improve LMS functionality and the user experience (Chiroma et al., 2024). Also, there aren't enough studies from some regions. This shows that more studies are needed to address differences in digital access, like infrastructure and the economy (Afolabi & Ajani, 2023).

These findings are important for many different people. It is clear that a design approach that focuses on the needs of users is essential to ensure that learning management systems (LMS) are easy to use and meet the needs of adult learners. When we design these systems based on feedback from users, we can improve how engaged and satisfied they are. To make this happen, we need to offer rewards to get people to build better technology and teach them new skills. This is especially important in places where there is not a lot of technology. Employers, governments, and LMS developers also have important roles to play. By working together and sharing what they've learned, these groups can help create better digital learning environments that are more effective, easier to access,

and fairer. All of these strategies are important for dealing with current challenges and filling in gaps in the current research. In the end, they will lead to better and more lasting LMS use in adult continuing education.

In summary, the findings show that LMS adoption in adult continuing education is a rapidly evolving field marked by significant growth, diverse research contributions, and international collaboration. While the current research provides important insights into user engagement, technological innovation, and teaching methods, more research is needed to explore long-term outcomes, integrate new digital tools, and address differences between regions. These findings answer important questions and provide a plan for future research and projects to improve LMS platforms around the world.

CONCLUSION

This analysis of academic literature has provided valuable insights into the evolving landscape of Learning Management System (LMS) adoption in adult continuing education. The study shows that there has been a lot more research in this area, especially because of the pandemic, which made the world switch to digital learning. The study found that the most important areas are user engagement, new teaching methods, and the use of new technologies. Two important theories that help us understand why people use LMS are the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The study also shows that a lot of the research on LMS is done in Southeast Asia, Australia, and Europe, which shows that many different countries are working together to deal with digital learning problems. These findings contribute to the broader discussion on the effectiveness of LMS and provide a foundation for future research and policy recommendations aimed at improving digital education strategies.

However, the study has some limitations that should be considered. One important limit is that it relies on specific academic databases. These databases may create a bias by giving more attention to indexed journal articles and ignoring valuable information from other sources, such as government reports, institutional case studies, and unpublished dissertations. Also, while bibliometric methods are good at showing trends and networks, they don't provide detailed information about user experiences, how well LMS work, or the social and economic reasons why some people don't use LMS. To address these gaps, future research should include studies that follow how LMS adoption changes over time and should combine different research methods, such as bibliometric analysis and qualitative case studies, surveys, and interviews. Another important area to study is how artificial intelligence (AI) can be used in learning management systems (LMS) to improve things like personalized learning, adaptive assessments, and automated feedback. As digital learning continues to evolve, it will be essential to bring together researchers from different fields, including educational technology, cognitive science, and data analytics. This will help create LMS solutions for adult continuing education that are more effective, fair, and user-friendly.

REFERENCES

Afolabi, O., & Ajani, O. (2023). South African rural students' adoption and use of learning management systems. International Journal of Research in Business and Social Science, 12(4), 410–421. https://doi.org/10.20525/ijrbs.v12i4.2521

Ali, Q., Abbas, A., Raza, A., Khan, M., Zulfiqar, H., Iqbal, M., & Alotaibi, B. (2023). Exploring the students' perceived effectiveness of online education during the COVID-19 pandemic: Empirical analysis using structural equation modeling (SEM). Behavioral Sciences, 13(7), 578. https://doi.org/10.3390/bs13070578

Badawood, A., & AlBadri, H. (2021). Technology-based model of a mobile knowledge as a service to facilitate education community. International Journal of Interactive Mobile Technologies, 15(24), 49–60. https://doi.org/10.3991/ijim.v15i24.27335

Brown, S., Murphy, L., & Hammond, K. (2022). Learning management system adoption by academics. Journal of Open, Flexible and Distance Learning, 25(2), 55–65. https://doi.org/10.61468/jofdl.v25i2.477

Çavuş, N., Omonayajo, B., & Mutizwa, M. (2022). Technology acceptance model and learning management systems: Systematic literature review. International Journal of Interactive Mobile Technologies, 16(23), 109–124. https://doi.org/10.3991/ijim.v16i23.36223

Chiroma, H., Hashem, M., & Maray, M. (2024). Bibliometric analysis for artificial intelligence in the internet of medical things: Mapping and performance analysis. Frontiers in Artificial Intelligence, 7. https://doi.org/10.3389/frai.2024.1347815

Chiroma, J., Meda, L., & Waghid, Y. (2021). Examining emergency remote teaching using the community of inquiry framework. International Journal of Information and Communication Technology Education, 17(4), 1–16. https://doi.org/10.4018/ijicte.20211001.oa17

Chukwuedo, S., Mbagwu, F., & Ogbuanya, T. (2021). Motivating academic engagement and lifelong learning among vocational and adult education students via self-direction in learning. Learning and Motivation, 74, 101729. https://doi.org/10.1016/j.lmot.2021.101729

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Demir, O., Aslan, S., & Demir, M. (2022). Examining the relationship between teachers' lifelong learning tendencies and digital literacy levels. Journal of Educational Technology and Online Learning, 5(2), 379–392. https://doi.org/10.31681/jetol.1034697

Dissanayake, C., Jayathilake, W., Wickramasuriya, H., Dissanayake, U., Kopiyawattage, K., & Wasala, W. (2022). Theories and models of technology adoption in agricultural sector. Human Behavior and Emerging Technologies, 2022, 1–15. https://doi.org/10.1155/2022/9258317

Dwikoranto, D., Surasmi, W., Kurniawan, B., Dawana, I., & Bergsma, L. (2023). Utilization of universities' massive online open courses in learning management system: Research trends and bibliometric analysis. International Journal of Recent Educational Research, 4(3), 383–398. https://doi.org/10.46245/ijorer.v4i3.380

Gupta, S., Abbas, A., & Srivastava, R. (2022). Technology acceptance model (TAM): A bibliometric analysis from inception. Journal of Telecommunications and the Digital Economy, 10(3), 77–106. https://doi.org/10.18080/jtde.v10n3.598

Hardaker, G., & Glenn, L. (2023). Artificial intelligence for personalized learning: A systematic literature review. International Journal of Information and Learning Technology, 42(1), 1–14. https://doi.org/10.1108/IJILT-07-2024-0160

Hasyim, M., & Ahmad, I. (2021). The effectiveness of implementing blended project-based learning using ICT-multimedia in statistic learning. In Proceedings of the 1st International Conference on Education and Social Science Research (ICESRE 2020) (pp. 234–240). Atlantis Press. https://doi.org/10.2991/assehr.k.210413.080

Herlina, H., Widyaningrum, D., & Theotista, G. (2023). Tipologi financial technology paylater: Technology acceptance model (TAM). Formosa Journal of Multidisciplinary Research, 2(1), 207–216. https://doi.org/10.55927/fjmr.v2i1.2417

Htet, A., Liana, S., Aung, T., & Bhaumik, A. (2023). Impact of learning management system on learning process in Myanmar: Student perspective. Journal of Education and Educational Psychology, 1(2), 37–44. https://doi.org/10.56855/jeep.v1i2.686

Jaldemark, J., Cleveland-Innes, M., Lindqvist, M., & Mozelius, P. (2024). Lifelong learning and the transformation of higher education. Nordic Journal of Lifelong Learning, 13. https://doi.org/10.54337/nlc.v13.8497

Jubatova, B., & Baiseitova, D. (2021). Trends and issues of distance education of adults in Japan. Bulletin of the Karaganda University Philology Series, 104(4), 126–132. https://doi.org/10.31489/2021ph4/126-132

Kim, J., Yoon, Y., & Kim, E. (2021). A comparison of faculty and student acceptance behavior toward learning management systems. International Journal of Environmental Research and Public Health, 18(16), 8570. https://doi.org/10.3390/ijerph18168570

Knowles, M. S. (1984). Andragogy in action: Applying modern principles of adult learning. Jossey-Bass.

Kölemen, C. (2023). The effect of distance education on lifelong learning. İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 12(3), 1396–1411. https://doi.org/10.15869/itobiad.1259139

Kuppusamy, R., Amir, M., Yu, C., Din, R., & Othman, N. (2023). A critical review of learning management systems: Identifying students' readiness towards it. International Journal of Academic Research in Business and Social Sciences, 13(12). https://doi.org/10.6007/IJARBSS/v13-i12/20284

Lagat, K., Nuñez, L., Galgo, C., & Tevez, K. (2023). Resilience process of economically disadvantaged households with school children in COVID-19-induced remote learning. Philippine Social Science Journal, 6(1), 18–29. https://doi.org/10.52006/main.v6i1.664

Lim, Z., Yap, J., Lai, J., Mokhtar, I., Yeo, D., & Cheong, K. (2024). Advancing lifelong learning in the digital age: A narrative review of Singapore's SkillsFuture programme. Social Sciences, 13(2), 73. https://doi.org/10.3390/socsci13020073

Lock, J., Lakhal, S., Cleveland-Innes, M., Arancibia, P., Dell, D., & Silva, N. (2021). Creating technology-enabled lifelong learning: A heutagogical approach. British Journal of Educational Technology, 52(4), 1646–1662. https://doi.org/10.1111/bjet.13122

Lūka, I. (2022). Implementation of a multilingual blended learning course for non-formal and informal adult learning during the COVID-19 pandemic. International Journal of Research in E-Learning, 8(2), 1–23. https://doi.org/10.31261/ijrel.2022.8.2.03

Meda, L., & Waghid, Y. (2022). Exploring special need students' perceptions of remote learning using the multimodal model of online education. Education and Information Technologies, 27(6), 8111–8128. https://doi.org/10.1007/s10639-022-10962-4

Misiejuk, K., Ness, I., Gray, R., & Wasson, B. (2023). Changes in online course designs: Before, during, and after the pandemic. Frontiers in Education, 7. https://doi.org/10.3389/feduc.2022.996006

Mohammadi, M., Mohibbi, A., & Hedayati, M. (2021). Investigating the challenges and factors influencing the use of the learning management system during the COVID-19 pandemic in Afghanistan. Education and Information Technologies, 26(5), 5165–5198. https://doi.org/10.1007/s10639-021-10517-z

Muflih, M. (2022). Muzakki's adoption of mobile service: Integrating the roles of technology acceptance model (TAM), perceived trust and religiosity. Journal of Islamic Accounting and Business Research, 14(1), 21–33. https://doi.org/10.1108/JIABR-09-2021-0273

Namu, E., & Mberia, H. (2024). Influence of narrative principles on organizational change adoption of blended learning in selected Kenyan universities. International Journal of Communication and Public Relation, 9(4), 15–23. https://doi.org/10.47604/ijcpr.2853

Navarro, M., Prasetyo, Y., Young, M., Nadlifatin, R., & Redi, A. (2021). The perceived satisfaction in utilizing learning management system among engineering students during the COVID-19 pandemic: Integrating task technology fit and extended technology acceptance model. Sustainability, 13(19), 10669. https://doi.org/10.3390/su131910669

Paguirigan, J., Ripoll, V., & Calzada, M. (2023). Customized learning management system for the students and teachers of Isabela State University-Ilagan Campus, Philippines. Journal of Education and Technology Trends, 14(1). https://doi.org/10.47750/jett.2023.14.01.026

Parrish, D., & Joyce-McCoach, J. (2023). Nurses' and midwives' perceptions and preferences for lifelong learning. ASCILITE Publications. https://doi.org/10.14742/apubs.2023.622

Riyath, M., & Rijah, U. (2022). Adoption of a learning management system among educators of advanced technological institutes in Sri Lanka. Asian Association of Open Universities Journal, 17(2), 161–177. https://doi.org/10.1108/AAOUJ-03-2022-0032

Roberson, D., Zach, S., Choresh, N., & Rosenthal, I. (2021). Self-directed learning: A longstanding tool for uncertain times. Creative Education, 12(5), 1011–1026. https://doi.org/10.4236/ce.2021.125074

Sadiq, N., Fatima, S., Shabnam, N., & Rauf, A. (2024). Empowering health professions educators: Enhancing curriculum delivery through customized e-tutorial training on fundamental digital tools. Frontiers in Medicine, 11. https://doi.org/10.3389/fmed.2024.1342654

Seevaratnam, V., Gannaway, D., & Lodge, J. (2023). Design thinking-learning and lifelong learning for employability in the 21st century. Journal of Teaching and Learning for Graduate Employability, 14(1), 167–186. https://doi.org/10.21153/jtlge2023vol14no1art1631

Sulaiman, T. (2023). A systematic review on factors influencing learning management system usage in Arab Gulf countries. Education and Information Technologies, 29(2), 2503–2521. https://doi.org/10.1007/s10639-023-11936-w

Thepwongsa, I., Muthukumar, R., Sripa, P., Waraassawapati, S., Jenwitheesuk, K., Virasiri, S., & Nonjui, P. (2023). The perspectives of learners at a public medical school on the evaluation of an online learning management system for degree and non-degree courses. Medical Education Online, 29(1). https://doi.org/10.1080/10872981.2023.2299535

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478. https://doi.org/10.2307/30036540

Wang, J., Li, X., Wang, P., Liu, Q., Deng, Z., & Jingzhi, W. (2021). Research trend of the unified theory of acceptance and use of technology theory: A bibliometric analysis. Sustainability, 14(1), 10. https://doi.org/10.3390/su14010010

Yoon, O. (2024). Analysis of lifelong education practice experiences through grounded theory [Preprint]. Research Square. https://doi.org/10.21203/rs.3.rs-5266989/v1

Zhao, Y., Liu, Y., & Wang, R. (2023). A study on improving continuing education in scientific organizations through information technology. International Journal for Infonomics, 16(1), 2152–2163. https://doi.org/10.20533/iji.1742.4712.2023.0226

