

Research Article

A Systematic Review of Artificial Intelligence Adoption in Higher Education LMS: Readiness and Acceptance (2020–2025)

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Abstract: Artificial Intelligence (AI) has increasingly shaped the digital transformation of higher education, particularly through its integration with Learning Management Systems (LMS). Features such as intelligent tutoring, predictive analytics, plagiarism detection, and automated grading are reshaping teaching and learning. However, questions remain regarding the readiness of higher education institutions and the acceptance among lecturers and students. This paper presents a Systematic Literature Review (SLR) of studies published between 2020 and 2025, focusing on readiness and acceptance of AI in LMS. Guided by the PRISMA framework, 220 records were identified, 85 screened, 40 assessed for eligibility, and 20 included in the final analysis. Findings highlight that readiness is largely influenced by infrastructure, digital literacy, and institutional policy, while acceptance is shaped by perceived usefulness, ease of use, trust, and behavioural intention. Although challenges such as ethics, cost, and privacy concerns persist, opportunities exist in the form of personalized learning and intelligent decision-making. The review concludes that while AI adoption in LMS is progressing globally, developing contexts such as Malaysian polytechnics require further research and targeted interventions to enhance both readiness and acceptance.

Keywords: Acceptance; Artificial Intelligence; Higher Education; Learning Management System; Readiness; Systematic Literature Review.

1. Introduction

Artificial Intelligence (AI) has emerged as one of the most disruptive technologies of the 21st century, with significant implications for higher education. In particular, Learning Management Systems (LMS) are undergoing transformation through AI-enabled features such as adaptive learning, plagiarism detection, automated grading, and predictive analytics. These innovations have the potential to make learning more personalized, efficient, and scalable, while also supporting data-driven decision-making by administrators and lecturers.

Despite these opportunities, the integration of AI into LMS raises important questions about the readiness of institutions and the acceptance of end users. Readiness refers to the preparedness of institutions and individuals in terms of infrastructure, digital literacy, funding, and policy support. Acceptance, often studied through the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), emphasizes perceptions of usefulness, ease of use, trust, and behavioral intention to adopt AI.

Although a growing body of literature explores AI in education broadly, there remains a lack of systematic focus on readiness and acceptance within the specific context of LMS. This gap is particularly evident in developing regions such as Southeast Asia and in TVET institutions, where infrastructure and digital literacy vary widely. To address this gap, this paper systematically reviews scholarly works from 2020 to 2025, guided by the following research questions:

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- a. RQ1: What factors influence readiness towards AI in higher education LMS?
- b. RQ2: What factors drive or hinder acceptance of AI in LMS among lecturers and students?
- c. RQ3: What are the major challenges and opportunities of integrating AI into LMS?.

2. Methodology

This study employs a Systematic Literature Review (SLR) approach that follows the PRISMA framework to ensure rigor and transparency. The review process began with a comprehensive search of major academic databases including Scopus, IEEE Xplore, ScienceDirect, SpringerLink, and Google Scholar. The search strategy combined keywords such as “Artificial Intelligence,” “Learning Management System,” “Higher Education,” “Readiness,” and “Acceptance.” To capture the most recent developments, the timeframe was limited to articles published between January 2020 and May 2025.

The selection of studies was guided by a set of inclusion and exclusion criteria. Articles were included if they were peer-reviewed journal papers, conference proceedings, or academic reports that specifically addressed issues of readiness or acceptance of AI integration within LMS in higher education. Studies published before 2020, non-academic sources such as blogs or opinion articles, and works that focused on AI outside the LMS context (for example, robotics or general educational technologies without LMS relevance) were excluded.

The initial database search yielded 220 records. After the removal of duplicates, 85 articles remained and were screened through title and abstract review. Following this, 40 full-text articles were assessed for eligibility based on the defined criteria. Finally, 20 studies were selected for in-depth analysis. These studies formed the basis for synthesizing findings on readiness and acceptance of AI in LMS across different higher education contexts.

To structure the review, data from each study were extracted into summary tables covering author, year, country, research method, and key findings. Thematic analysis was then conducted to identify recurring patterns, strengths, and limitations across the literature. This process enabled the identification of four dominant themes: institutional and individual readiness, user acceptance guided by TAM and UTAUT models, challenges to AI adoption, and opportunities for enhancing learning through AI-driven LMS features.

3. Results

Table 1. PRISMA Flow Summary.

<i>Stage</i>	<i>Count</i>	<i>Description</i>
<i>Identification</i>	220	Records retrieved from databases
<i>Screening</i>	85	Abstracts reviewed after duplicates removed
<i>Eligibility</i>	40	Full texts assessed against criteria
<i>Included</i>	20	Final studies analyzed

The PRISMA summary in Table 1 illustrates the systematic process of study selection. Out of 220 initially identified records, a significant reduction occurred during screening and eligibility stages, leaving only 20 studies for full analysis. This process demonstrates the rigor of the review and ensures that only high-quality, relevant studies focusing on readiness and acceptance of AI in LMS were included. The substantial narrowing down of sources also highlights the scarcity of empirical works directly targeting this niche, suggesting that the field is still emerging and warrants further exploration.

Table 2. Summary of Selected Studies (2020–2025).

<i>Author(s)</i>	<i>Year</i>	<i>Country</i>	<i>Method</i>	<i>Key Findings</i>
<i>Al-Fraihat et al. [1]</i>	2020	UK	Survey (n=320)	User satisfaction predicts success of AI-LMS adoption
<i>Sun et al. [2]</i>	2020	Taiwan	Quantitative (n=210)	Perceived usefulness strongly predicts acceptance
<i>Mukhtar et al. [5]</i>	2020	Pakistan	Case study	Pandemic accelerated adoption but readiness limited
<i>Dicheva & Dichev [8]</i>	2020	USA	Review	Gamification integrated with AI increases motivation
<i>Huang et al. [6]</i>	2021	Global	SLR	Ethics and trust central to readiness concerns
<i>Chen et al. [7]</i>	2021	China	Case study	Lecturer readiness depends on training and support

<i>Khalil & Ebner [9]</i>	2021	Austria	Mixed method	VR/AI improve engagement but require high infrastructure
<i>Alamri & Almaiah [11]</i>	2021	Saudi	Survey (n=400)	Mobile AI tools readily accepted if user-friendly
<i>Sharma & Joshi [13]</i>	2021	India	Comparative	Bandwidth limits acceptance of synchronous AI tools
<i>Ibrahim et al. [10]</i>	2022	Malaysia	Survey (n=150)	Moderate readiness; infrastructure gaps remain

Table 2 provides an overview of the 20 selected studies, covering multiple countries, methodologies, and research foci. The diversity of contexts, ranging from developed nations such as the UK and USA to developing regions such as Malaysia, Pakistan, and India, shows that AI adoption in LMS is a global phenomenon, though readiness and acceptance vary significantly. The mix of survey, case study, and review approaches indicates that both quantitative and qualitative methods are being used to explore this issue. Importantly, several Malaysian studies reveal moderate readiness levels, underscoring the need for more targeted interventions in TVET institutions.

Table 3. Institutional and Individual Readiness Factors.

<i>Factor</i>	<i>Evidence</i>	<i>Impact</i>
<i>Digital Infrastructure</i>	[6], [9], [10]	Determines ability to access and use AI tools
<i>Lecturer Digital Literacy</i>	[7], [11]	Higher literacy leads to greater readiness
<i>Policy and Training</i>	[5], [12]	Policies and workshops enhance preparedness
<i>Funding and Cost</i>	[6], [17]	High costs reduce readiness in low-resource contexts

Table 3 outlines the key factors shaping institutional and individual readiness for AI adoption in LMS. The literature consistently emphasizes that digital infrastructure is a fundamental determinant, as institutions with reliable internet connectivity and sufficient hardware are more prepared to integrate AI tools. Lecturer digital literacy is another critical factor, since the ability to effectively use technology is essential for adoption. Institutional policies and training programs play a major role in enhancing readiness, while funding constraints continue to limit many institutions, particularly in developing countries. This table highlights the interdependent nature of readiness, showing that technology, skills, and policy must align for successful adoption.

Table 4. Acceptance Constructs (TAM/UTAUT-based).

<i>Construct</i>	<i>Studies</i>	<i>Influence</i>
<i>Perceived Usefulness</i>	[2], [11]	Strong predictor of adoption
<i>Perceived Ease of Use</i>	[2], [10]	Essential for willingness to adopt AI
<i>Trust</i>	[6], [17]	Transparency of AI systems affects acceptance
<i>Facilitating Conditions</i>	[4], [7]	Institutional support is crucial
<i>Behavioral Intention</i>	[11], [14]	Positively correlated with actual usage

Table 4 summarizes the constructs most frequently applied in TAM and UTAUT-based studies to assess acceptance of AI in LMS. Across multiple contexts, perceived usefulness and perceived ease of use emerge as the strongest predictors of behavioral intention, indicating that users adopt AI only if it proves valuable and simple to operate. Trust in AI is increasingly recognized as vital, particularly in relation to transparency and fairness in automated grading. Facilitating conditions, such as technical support and institutional encouragement, also shape adoption decisions. This table shows that acceptance is not purely technological but involves psychological, institutional, and ethical dimensions, confirming the complexity of integrating AI into education.

4. Discussion

The findings of this review suggest that readiness for AI adoption in higher education LMS is highly uneven across global contexts. In developed nations, robust infrastructure, policy frameworks, and digital literacy programs have created a strong foundation for AI adoption. In contrast, institutions in developing regions, including Malaysia, continue to face readiness gaps. The lack of reliable infrastructure, insufficient training opportunities, and limited funding are persistent barriers that hinder smooth integration of AI into LMS.

Acceptance of AI technologies is more nuanced and often guided by psychological and behavioral models. Studies applying TAM and UTAUT confirm that perceived usefulness and perceived ease of use remain the dominant factors influencing whether lecturers and students are willing to adopt AI features. Trust in AI systems, particularly with respect to transparency in grading and ethical data use, is emerging as a critical determinant of acceptance. Without building trust, even the most advanced AI-enabled LMS may face resistance from end users.

Challenges such as ethics, privacy, cost, and fear of job replacement are repeatedly highlighted across studies. Ethical concerns about algorithmic bias and data privacy need to be addressed through clear governance policies. The high costs associated with infrastructure, especially in resource-constrained environments, pose additional difficulties. Yet, the literature also emphasizes significant opportunities. AI can deliver personalized learning pathways, intelligent tutoring, and data-driven insights that can greatly enhance learning outcomes. Gamification and adaptive learning powered by AI are already demonstrating positive effects on student motivation and performance.

For the Malaysian context, particularly in polytechnics and TVET institutions, readiness remains moderate. While acceptance levels among lecturers are encouraging, they are strongly dependent on institutional support, training, and infrastructure availability. This indicates that policy interventions, such as government funding and systematic lecturer training programs, are critical to realizing the full potential of AI in LMS.

5. Conclusion and Future Outlook

This systematic review concludes that AI integration into higher education LMS is progressing but uneven. Institutions with strong infrastructure, digital literacy, and supportive policies are leading adoption, while others remain constrained by cost and readiness gaps. Acceptance is consistently linked to perceived usefulness, ease of use, trust, and institutional support, reaffirming the importance of TAM and UTAUT frameworks in this domain.

Looking to the future, AI is expected to become increasingly embedded in LMS. In the next three to five years, widespread adoption of chatbots for student support and predictive analytics dashboards for lecturers is anticipated. Over the medium term (five to ten years), AI-driven adaptive learning pathways are likely to become standard features, allowing LMS platforms to deliver truly personalized education. At the same time, ethical governance frameworks addressing bias, privacy, and transparency will become central to educational policy.

For Malaysia and other developing contexts, including TVET institutions, the trajectory of AI adoption will depend on national strategies, investments in infrastructure, and capacity-building initiatives. If these conditions are met, AI in LMS has the potential not only to enhance learning effectiveness but also to support the broader digital transformation of higher education.

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