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Factors Influencing Perceptions of Learning Management System Effectiveness in Ghanaian Universities: A Systematic Review

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Abstract

This research systematically evaluates empirical studies about the determinants affecting perceptions of learning management system (LMS) efficiency among Ghanaian university students and teachers. The paper analyses LMS perspectives among students and teachers, addressing at least one of the following aspects, such as usability, institutional support, socio-cultural influence, or human factors. The research integrates literature regarding human, technological, socio-cultural, and institutional factors influencing LMS uptake and perceived utility, predominantly contextualised within the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The review encompassed empirical peer-reviewed research published from 2012 to 2024, mostly concentrating on Ghanaian higher education and similar developing countries. A total of 121 usable papers were retrieved, out of which 47 were relevant. The reviewed studies employed qualitative, quantitative, or hybrid methodologies. Exclusion criteria were based on non-empirical research, grey literature, conference abstracts without full text, and studies that did not explicitly examine views of LMS effectiveness. The review synthesises thematic and comparative studies to elucidate similarities and differences among user groups, methodological advantages and disadvantages, and practical ramifications for policy and pedagogy. The results show that perceived ease of use, self-efficacy, and technical support are important for adoption, but socio-cultural hurdles and problems with infrastructure remain insufficiently theorised and inconsistently measured across studies, representing a significant gap in literature. These findings carry significant implications for institutional policymakers, LMS administrators, and academic developers seeking to design contextually responsive and equitable digital learning environments in Ghanaian higher education.

Keywords: Learning Management Systems (LMSs), faculty and students' perception, higher education, Technology Acceptance Model, Unified Theory of Acceptance and Use of Technology

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Introduction

Research on the factors affecting perceptions of learning management system (LMS) effectiveness among Ghanaian university students and faculty has become a crucial area of study due to the increasing reliance on digital platforms for educational delivery, especially following the COVID-19 pandemic (Adu & Biljon, 2023; Agbaglo & Bonsu, 2022; Attiogbe et al., 2025). Consistent with this growing emphasis on digital education, the progression of LMS adoption in higher education has transitioned from basic use to extensive integration, with Ghanaian institutions increasingly adopting LMS to facilitate blended and online learning (Asabere et al., 2021; Tanye et al., 2019). This development has crucial social and practical repercussions because LMS platforms make it simpler to find educational resources, enhance teaching methods, and may contribute to better grades (Mutanga et al., 2023; Samson & Yango, 2023). Research shows that more than 80% of universities in Ghana use LMS, which shows how important the system is in modern education (Alumona & Akinseinde, 2023; Darko-Adjei & Ankrah, 2018). Despite these gains, challenges persist in understanding the specific factors that shape perceptions of LMS effectiveness among students and staff in Ghana (Antwi-Boampong, 2021; Asamoah & Oheneba-Sakyi, 2024).

Challenges like inadequate ICT skills, infrastructural deficiencies, and variable degrees of technical support had previously been identified (Chasubuta et al., 2024; Dlalisa & Govender, 2020; Qua-Enoo et al., 2021). Moreover, a knowledge gap persists about the interplay of human, technological, and institutional elements that influence these perceptions. Some studies have concentrated on usability and self-efficacy (Adu & Biljon, 2023; Fearnley & Amora, 2020), whereas others highlight cultural and motivational dimensions (Amankwah et al., 2024; Asunka, 2012). Differing perspectives emerge about the relative impact of perceived ease of use versus perceived utility on LMS adoption (Asamoah, Oheneba-Sakyi & Tagoe, 2024; Prakarsa et al., 2023). This gap has real-world repercussions because not knowing enough about LMS may make it difficult to utilise and limit the educational benefits it offers (Chasokela et al., 2024).

This review is grounded in a conceptual framework that integrates key constructs from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), including perceived usefulness, perceived ease of use, facilitating conditions, social influence, and self-efficacy (Adu & Biljon, 2023; Fearnley & Amora, 2020; Quiban, 2024). These constructs are interrelated and collectively shape attitudes and behavioural intentions regarding LMS utilisation, thereby influencing actual adoption and perceived effectiveness (Hussein et al., 2024; Osman & Yatam, 2024). While TAM and UTAUT provide a widely validated theoretical foundation, it is important to acknowledge their limitations when applied to sub-Saharan African contexts. Both models were developed and predominantly validated in Western, technology-rich settings, and their core constructs may not fully capture the socio-cultural dynamics, digital infrastructure inequalities, and relational learning norms characteristic of Ghanaian higher education (Tanye et al., 2019). Accordingly, this review supplements these frameworks with socio-cultural and institutional lenses to more comprehensively account for the contextual realities shaping LMS perceptions in Ghana.

Although Learning Management Systems are increasingly adopted in Ghanaian universities to support digital and blended learning, their effective implementation remains uneven. The success of these systems depends not only on technological availability but also on how students and faculty perceive their usefulness, usability, and relevance to teaching and learning. Despite growing research on LMS adoption in Ghana, existing studies are fragmented and focus on isolated institutional contexts, making it difficult to develop a comprehensive understanding of the factors that shape perceptions of LMS effectiveness. Moreover, most research on LMS effectiveness has been conducted in non-Ghanaian or broader international contexts, which may not adequately capture the technological infrastructure, pedagogical practices, and socio-cultural factors influencing LMS use within Ghanaian higher education. Consequently, policymakers, university administrators, and educators lack a consolidated evidence base to guide effective LMS implementation and improvement.

This gap highlights the need for a systematic synthesis of empirical studies that examine the factors influencing perceptions of LMS effectiveness among Ghanaian university students and faculty. Without such a comprehensive review, efforts to enhance LMS adoption and optimise digital learning outcomes in Ghanaian universities may remain inconsistent and inadequately informed. Therefore, this study seeks to systematically review the existing literature (2012–2024) to identify the key factors influencing the perceptions of LMS effectiveness in Ghanaian universities. While the primary focus is on Ghanaian higher education, the review deliberately incorporates empirical studies from comparable developing-country contexts (including Zimbabwe, Tanzania, South Africa, Sri Lanka, and Indonesia) where findings offer theoretical or contextual insights relevant to the Ghanaian situation. This comparative scope enriches the synthesis and is reflected in the study's inclusion criteria; however, conclusions are oriented towards implications for Ghanaian universities specifically. In doing this, the study will provide evidence-based recommendations for improving LMS implementation and utilisation in Ghanaian higher education. The specific objectives are to

- examine the technological factors influencing LMS effectiveness, including perceived usefulness, perceived ease of use, system quality, and technical support;
- evaluate the influence of human factors such as self-efficacy, digital literacy, training, and behavioural intention on LMS adoption and sustained use;
- analyse the institutional and infrastructural conditions affecting LMS implementation, including internet connectivity, institutional support, and organisational readiness;
- investigate the socio-cultural and pedagogical factors shaping students' and faculty perceptions of LMS effectiveness in higher education;
- synthesise the differences and similarities in students' and faculty experiences, attitudes, and perceptions regarding LMS usefulness and educational effectiveness;

The study employs a rigorous systematic review methodology following PRISMA guidelines, selecting peer-reviewed publications that examine LMS attitudes in Ghanaian higher education and certain underdeveloped nations. Inclusion standards underscore empirical research that investigates technical, human, and institutional dimensions, assessed using thematic and quantitative frameworks. The results are organised to show how LMS adoption has changed over time, what problems and benefits it has brought, and what it means for all the people involved, to guide future research and practice.

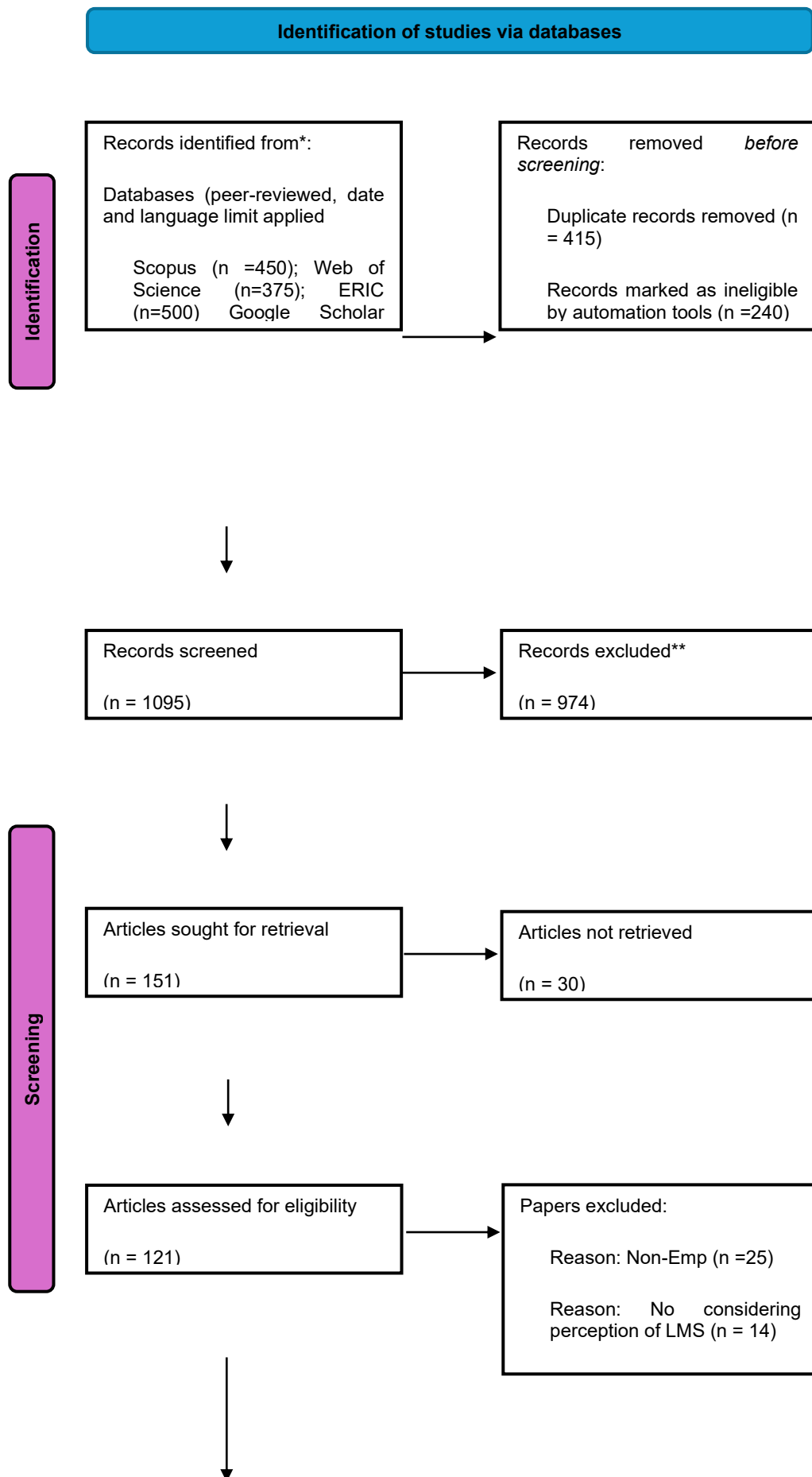
Research Design

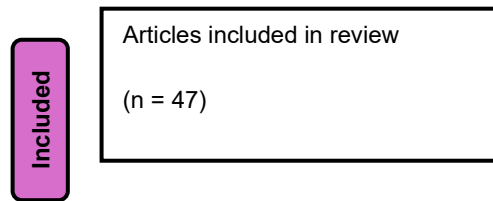
This study employed a systematic review methodology to investigate and evaluate the available literature concerning the perceptions of Ghanaian university students and teachers regarding the efficacy of Learning Management Systems (LMS). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach by Page et al. (2021), was selected because it provides a structured framework that enables researchers to present the review process in a clear and systematic manner, thereby enhancing the transparency, rigour, and credibility of the study.

Search plan

The database search comprised Google Scholar, Scopus, Web of Science, and ERIC. Search terms included both keywords and Boolean operators. For example, "Learning Management System" AND "Ghana" AND ("perception" OR "acceptance" OR "effectiveness"). The inclusion requirements mandated the examination of all empirical works published between 2012 to 2024, as this period spans the widespread adoption and integration of LMS in Ghanaian higher education, beginning with early institutional uptake and extending through the post-pandemic digital transformation. The studies needed to be peer-reviewed, focused on higher education in Ghana and other developing countries, and looked at how students and/or teachers felt about LMS. The software should explore at least one determinant, including usability, institutional support, socio-cultural influence, or human aspects, in accordance with the research objectives. Non-empirical research, grey literature, conference abstracts without full text, and studies that didn't explicitly look at how people thought LMS worked were excluded. The research used SciSpace software to create a relevance rating, which moved the most relevant studies to the top of the table.

Thus, using the PRISMA (Page et al., 2021) systematic review design, a total number of 1,750 records were identified from the databases (peer-reviewed, date and language limit applied). These were Scopus (n=450); Web of Science (n=375); ERIC (n=500) and Google Scholar (n=425). The search terms combined LMS, Ghana, perception, acceptance, and effectiveness. Out of 121 papers eligible, only 47 met the inclusion criteria. These were empirical, peer-reviewed studies published between 2012 and 2024, focusing on Ghanaian higher education (see Figure 1). Non-empirical papers, abstracts without full texts and grey literature were excluded.

Figure 1: THE PRISMA MODEL



Thematic analysis

The thematic analysis in this systematic review followed an inductive-deductive process grounded in the PRISMA framework. From 47 empirical studies, recurring patterns were identified across the literature and organised into 13 themes. Coding was driven primarily by the Technology Acceptance Model (TAM) and UTAUT, which guided initial deductive categories, while additional themes emerged inductively from the data. The dominant theme, *Perceived Usefulness and Ease of Use*, appeared in 32 of 47 papers, affirming TAM's centrality in LMS adoption discourse. Subsequent themes such as *Technical Support and Infrastructure* (29/47), *Human Factors* (27/47), and *Socio-Cultural and Institutional Influences* (23/47) were constructed by clustering conceptually related findings across studies. Lesser-frequency themes such as *COVID-19's Impact* and *Pedagogical Integration* captured contextual and emergent patterns not fully accounted for by existing frameworks. Comparative analysis across themes revealed tensions between student and faculty perceptions, underscoring the need for stakeholder-differentiated LMS strategies. This structured thematic synthesis enabled the identification of research gaps, particularly around socio-cultural variables and longitudinal outcomes, informing both theoretical and practical implications.

Results

Critical examination and integration of the literature

The literature on determinants of LMS effectiveness perceptions among Ghanaian university students and faculty reveals a multi-dimensional picture shaped by intersecting technological, human, and institutional forces. Usability and technical support consistently emerge as significant predictors of adoption and sustained use; however, their operationalisation and measurement vary considerably across studies, making cross-study comparisons difficult and limiting cumulative theoretical development. Socio-cultural factors are acknowledged as influential yet remain unevenly examined: some studies investigate their effects on faculty attitudes and resistance, while others treat them as peripheral variables. Methodologically, the review is dominated by quantitative survey designs employing TAM and UTAUT frameworks, which provide robust predictive models but tend to underrepresent the contextual and experiential dimensions of LMS engagement. Importantly, discrepancies between student and faculty perceptions are documented across studies, yet direct comparative analyses within the same institutional settings remain scarce. Significant gaps persist in addressing infrastructural constraints and the interplay between socio-cultural factors and technology adoption in the Ghanaian context. Table 1 below illustrates.

Table 1: Analysis of strengths and weaknesses in the studies reviewed

Aspect	Strengths	Weaknesses
Methodological Approaches	The employment of validated quantitative instruments and structural equation modelling (SEM) in various studies yields comprehensive statistical analysis and model testing, thereby augmenting the reliability of findings pertaining to LMS adoption and perceptions (Adu & Biljon, 2023; Asamoah, Oheneba-Sakyi & Tagoe, 2024; Fearnley & Amora, 2020). Some studies use mixed methods approaches to provide. This helps to better understand the experiences of staff and students (Antwi-Boampong, 2021; Brenya, 2024).	A predominant reliance on cross-sectional survey methodologies constrains the capacity to infer causality or to document longitudinal shifts in attitudes and usage patterns. Qualitative samples are frequently limited in size and scope (Antwi-Boampong, 2021; Asamoah & Oheneba-Sakyi, 2024). Moreover, certain studies exhibit insufficient reporting on sample methodologies and response rates, which may compromise representativeness (Akwene, 2024).
Support for Usability and Technology	Research consistently identifies perceived ease of use and technical assistance as critical determinants affecting LMS uptake and efficacy perceptions among both students and teachers (Adu & Biljon, 2023; Asamoah, Oheneba-Sakyi & Tagoe, 2024; Caratiquit & Caratiquit, 2022). Combining usability elements with technology acceptance models gives a more detailed picture of how system design affects user engagement (Revythi & Tselios, 2019).	Even though people know how important technical assistance is, there hasn't been much research into the quality and responsiveness of support services and how these differ from one institution to another. Some data indicate that the categories of usability and perceived usefulness conceptually overlap, hence complicating model interpretations (Adu & Biljon, 2023). In addition, infrastructural issues like internet connectivity are recognised but not consistently tackled (Brenya, 2024; Darko-Adjei & Ankrah, 2018).
Social and Cultural Influences	Research recognises social impact and cultural aspects as critical determinants of LMS adoption, especially among faculty, emphasising the significance of peer norms and institutional culture (Adu & Biljon, 2023; Asunka, 2012). Participatory action research methodologies yield significant insights into cultural impediments and tactics for surmounting opposition and resistance (Asunka, 2012).	The investigation of socio-cultural dynamics is still in its infancy, as there are limited studies utilising theoretical frameworks specifically designed for cultural contexts. People often think of social influence as a general idea without breaking it down into its parts or looking at how other parts of society affect how people use technology (Asamoah & Oheneba-Sakyi, 2024; Bayaga & du Plessis, 2024).

Perceptions of Faculty and Students	Comparative research indicates disparities in attitudes and adoption behaviours between staff and students, with faculty frequently demonstrating greater reluctance regarding pedagogical integration and workload (Asamoah & Oheneba-Sakyi, 2024; Lasanthika & Tennakoon, 2019; Tanye et al., 2019). Some studies show that teachers need ongoing training and incentive to use LMS more effectively (Asamoah, Oheneba-Sakyi & Tagoe, 2024; Tanye et al., 2019).	Few studies systematically analyse how faculty and students see things in the same institutional environment, which makes it hard to fully comprehend where they agree and where they disagree. Moreover, faculty apprehensions regarding pedagogical transformation and workload are occasionally lightly addressed without comprehensive qualitative investigation (Antwi-Boampong, 2021; Dlalisa & Govender, 2020).
Integration in teaching Effectiveness	Evidence indicates that the utilisation of LMS can promote pedagogical transformation and enhance educational outcomes when properly integrated, with faculty techno-pedagogical competencies being essential (Samson & Yango, 2023; Tanye et al., 2019). Research correlates the efficacy of LMS with student engagement and satisfaction, underscoring the significance of instructional design (Hussein et al., 2024; Toring et al., 2022).	Though there are promising signs, it is still not apparent how much LMS adoption really changes the way teachers teach. Numerous research emphasise perceptions over objective assessments of learning results. The congruence of LMS features with instructional objectives is insufficiently analysed, and obstacles in faculty adoption impede the complete actualisation of LMS potential (Mutanga et al., 2023; Tanye et al., 2019).
Infrastructural and Institutional Contexts	Research identified infrastructural challenges such as insufficient internet connection, inadequate hardware, and institutional support deficits as key hurdles to LMS implementation and efficacy in Ghanaian universities (Antwi-Boampong, 2021; Brenya, 2024; Darko-Adjei & Ankrah, 2018). Institutional accountability for delivering ICT infrastructure and training is underscored as crucial for effective LMS integration (Asamoah, Oheneba-Sakyi & Tagoe, 2024).	There is a deficiency of thorough, system-wide evaluations of infrastructural issues, as numerous research concentrates on singular factors. Institutional policies and resource allocation techniques are inadequately examined, and their effects on LMS sustainability and scalability remain insufficiently investigated (Antwi-Boampong, 2021; Brenya, 2024). Furthermore, the interaction between infrastructural constraints and socio-cultural elements is hardly examined comprehensively.
Theoretical Frameworks and Model Application	Utilising existing frameworks such as TAM, UTAUT, and Innovation Diffusion Theory provides a robust theoretical foundation for analysing LMS adoption, enabling comparability among research (Adu & Biljon, 2023; Asamoah, Oheneba-Sakyi & Tagoe, 2024;	Excessive dependence on these models may limit the investigation of context-specific elements exclusive to Ghanaian higher education. Some research indicates overlapping constructs and uneven operational definitions, potentially impacting construct validity. Moreover, the inadequate integration of

	Bayaga & du Plessis, 2024). Integrating factors such as self-efficacy and system quality into these models increases their explanatory value (Fearnley & Amora, 2020; Quiban, 2024).	socio-cultural theories hinders a thorough comprehension of LMS perspectives within the local environment (Adu & Biljon, 2023; Bayaga & du Plessis, 2024).
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Thematic Review of Literature

In Table 2, significant themes were identified in the literature that focused on technological usability, technical support, and socio-cultural and institutional effects. Research consistently highlighted the significance of perceived simplicity of use, perceived utility, and system quality as essential factors influencing LMS uptake and user satisfaction. Other emerging issues include pedagogical integration and cultural factors, which highlight the difficulty of getting people to use LMS in different educational and social settings. The effects of technological infrastructure, digital literacy, and training support are also spoken about in depth, pointing out the things that make LMS integration easier or harder.

Table 2: Themes constructed from the literature review

Theme	Shows up in	Description of the theme
How useful and easy it is to use (PU/PEOU)	32/47 Papers	Perceived usefulness and perceived ease of use regularly emerge as the principal factors driving LMS uptake among students and staff in Ghanaian universities. These constructs are fundamental to Technology Acceptance Model (TAM) studies, demonstrating substantial beneficial impacts on attitude, behavioural intention, and actual utilisation of LMS platforms (Adu & Biljon, 2023; Asamoah, Oheneba-Sakyi & Tagoe, 2024; Fearnley & Amora, 2020; Prakarsa et al., 2023; Quiban, 2024).
Technical Support and Infrastructure	29/47 Papers	The availability of technical assistance and the quality of ICT infrastructure have a considerable effect on how users view and use LMSs effectively. Studies show that problems like inconsistent internet, lack of training, and limited technical help make LMS less effective (Adu & Biljon, 2023; Agbaglo & Bonsu, 2022; Asamoah & Oheneba-Sakyi, 2024; Caratiquit & Caratiquit, 2022; Darko-Adjei & Ankrah, 2018). Facilitating conditions, such as continuous training and technical support, are underscored as essential for the enduring adoption of LMS (Asamoah, Oheneba-Sakyi & Tagoe, 2024; Caratiquit & Caratiquit, 2022; Fearnley & Amora, 2020).
Human Factors: Self-Efficacy, Digital Literacy, and Training	27/47 Papers	Individual competencies, including computer self-efficacy and digital literacy, significantly impact opinions of LMS usefulness and uptake. Research emphasises the significance of past ICT experience and training programs to promote staff and student proficiency with LMS utilisation (Adu & Biljon, 2023; Asamoah & Oheneba-Sakyi, 2024; Chasubuta et al., 2024; Quiban, 2024; Riyath & Rijah, 2022). Self-efficacy acts as a mediator between perceived usefulness and ease of use, underscoring the necessity for capacity-building activities (Bayaga & du Plessis, 2024; Fearnley & Amora, 2020; Riyath & Rijah, 2022).

Socio-Cultural and Institutional Influences	23/47 Papers	Cultural norms, social impact, and institutional policies shape LMS perceptions and usage habits. Research delineates cultural impediments and diminished motivation among faculty as obstacles to LMS adoption, whereas social facilitation and administrative assistance function as facilitators (Adu & Biljon, 2023; Amankwah et al., 2024; Asunka, 2012; Bayaga & du Plessis, 2024; Brenya, 2024). Management commitment, incentive structures, and organisational preparation are institutional elements that affect LMS uptake (Antwi-Boampong, 2021; Asunka, 2012; Riyath & Rijah, 2022).
Pedagogical Integration and Faculty Attitudes	18/47 Papers	The compatibility of LMS features with teaching methods has an impact on how faculty members embrace and use them. Research indicates that LMS features impact pedagogical strategies and student involvement, with alignment between LMS functionalities and educational objectives augmenting perceived utility (Asamaoah, Oheneba-Sakyi & Tagoe, 2024; Mutanga et al., 2023; Riyath & Rijah, 2022; Su & Chen, 2025; Tanye et al., 2019). Faculty opinions towards LMS are associated with pedagogical beliefs and the perceived ability to innovate instructional delivery (Su & Chen, 2025; Tanye et al., 2019).
Quality of the system and usability	16/47 Papers	The quality of a system, including how well it works, how easy it is to use, and how well it is designed, has a big impact on how satisfied users are and how likely they are to use LMSs. Research indicates that excellent system quality is associated with enhanced views of use and utility (Fearnley & Amora, 2020; Nurdin et al., 2023; Prakarsa et al., 2023; Sánchez et al., 2023). Usability assessments reveal that LMS platforms require ongoing improvements to fulfil user expectations and promote participation (Manasrah et al., 2024; Revyathi & Tselios, 2019).
Barriers to LMS Adoption	15/47 Papers	Some of the most common problems are: not having enough infrastructure, not wanting to change, not having enough digital skills, and having technical problems. These barriers diminish the willingness of both staff and students to include LMS into educational practices (Antwi-Boampong, 2021; Asamoah & Oheneba-Sakyi, 2024; Asunka, 2012; Darko-Adjei & Ankrah, 2018; Dlalisa & Govender, 2020). To get rid of these barriers, we need to come up with all-encompassing plans that focus on raising awareness, motivating people, and providing resources (Asamoah & Oheneba-Sakyi, 2024; Asunka, 2012).
Differences in how students and faculty see things	12/47 Papers	Comparative studies show that students and teachers have quite different ideas about the pros and cons of LMS. Faculty generally perceive LMS as more beneficial, although they also encounter greater difficulties with technical assistance and pedagogical adaption (Adu & Biljon, 2023; Alumona & Akinseinde, 2023; Lasanthika & Tennakoon, 2019). To make LMS implementation tactics work better, it's important to understand these differences.
Impact of COVID-19 on LMS Adoption and Digital Transformation	11/47 Papers	The COVID-19 epidemic sped up the use of LMS, showing both the good and bad sides of digital education. Research shows that there are big gaps in infrastructure, readiness, and digital skills as more and more people move to online and blended learning (Agbaglo & Bonsu, 2022; Attiogbe et al., 2024; Butakor, Kakutia, Shah & Hunt, 2022). The epidemic has made the need for good

		LMS integration and institutional support systems even greater (Osman & Yatam, 2024).
Behavioral Intention and Actual Use	10/47 Papers	Behavioural intention is a major predictor of actual LMS use, with attitudes towards technology and perceived usefulness acting as mediators. Studies using structural equation modelling show that having a good attitude towards LMS directly makes it more likely that people will embrace and keep using it (Fearnley & Amora, 2020; Caratiquit & Caratiquit, 2022; Quiban, 2024). This method shows how important it is to create positive attitudes in order to get people involved.
Personalized and Interactive Features	8/47 Papers	Personalisation and interaction in LMS design improve student motivation and academic performance. Research indicates that tailoring LMS settings to student requirements enhances engagement and perceived efficacy (Mutanga et al., 2023; Shaame et al., 2023). Nevertheless, infrastructural challenges frequently impede the complete actualisation of these advantages (Shaame et al., 2023).
Digital Development Curriculum	6/47 Papers	There is an increasing focus on integrating digital literacy and skills development into academic programs to enhance the effectiveness of Learning Management Systems (LMS). Evidence shows that there is a gap between digital initiatives and how well they are really used in disciplinary teaching (Armah & Westhuizen, 2020; Chasubuta et al., 2024). Improving digital skills is very important for getting the most out of LMS in higher education.
System Usability Scale and Extended Theoretical Models	5/47 Papers	Some studies employ expanded TAM frameworks that incorporate system usability scores to evaluate behavioural intention and acceptability more thoroughly. These models validate the influence of system access, self-efficacy, and social norms on LMS adoption (Caratiquit & Caratiquit, 2022; Revyathi & Tselios, 2019; Quiban, 2024). These methodological breakthroughs enhance comprehension of LMS acceptance dynamics.
Comparisons across cultural and regions	4/47 Papers	Comparative studies examining Ghana alongside other developing nations (e.g., South Africa, Sri Lanka, Malaysia) demonstrate contextual variances in factors influencing LMS adoption, including infrastructure gaps and cultural effects (Bayaga & du Plessis, 2024; Chasokela et al., 2024; Riyath & Rijah, 2022). These results underscore the imperative for regionally customised methods while leveraging global theoretical frameworks.

Comparison between studies

There is a broad consensus across the examined studies that human factors, self-efficacy, digital literacy, and attitudes significantly influence views of LMS effectiveness. Technological factors, particularly perceived ease of use and system quality, are equally important in encouraging use. There is a lot of disagreement about how important social and cultural factors are, such as support from peers and institutions. Some studies focus on cultural barriers, including hierarchical norms and aversion to change, while others ignore them. There are clear discrepancies between how faculty and students see things. Faculty frequently emphasise difficulties related to pedagogy and

infrastructure, whereas students concentrate on access, connectivity, and interface usability. These disparities could be due to changes in the design of the research, the characteristics of the sample, and the context of the institution. In the end, the adoption of LMS is influenced by a combination of human aptitude, system design, and the socio-cultural milieu. However, the importance of these elements varies based on the user's perspective.

Discussion

This systematic review synthesised previous evidence on the factors influencing perceptions of LMS effectiveness in Ghanaian higher education, revealing a multi-layered interplay between human, technological, institutional, and socio-cultural dimensions. The following findings are discussed based on the objectives.

Technological factors influencing LMS effectiveness

This review demonstrates that technological factors remain central to perceptions of Learning Management System (LMS) effectiveness in Ghanaian higher education. Across the reviewed studies, perceived usefulness, perceived ease of use, system quality, and technical support consistently emerged as major predictors of LMS adoption and sustained utilisation. These findings strongly support the assumptions of the Technology Acceptance Model (TAM), which posits that users are more likely to adopt technologies they perceive as useful and easy to use. Studies included in the review consistently reported that reliable platforms, user-friendly interfaces, and accessible LMS functionalities positively influenced user satisfaction and behavioural intention toward LMS use (Adu & Biljon, 2023; Revythi & Tselios, 2019; Quiban, 2024). However, the review also identified conceptual overlaps between usability and perceived usefulness, with some studies treating the constructs interchangeably, thereby weakening theoretical precision. Furthermore, infrastructural deficiencies such as unstable internet connectivity, low bandwidth, and inconsistent access to digital devices continue to undermine the practical effectiveness of LMS implementation in Ghanaian universities despite positive perceptions of usability.

Human factors and user readiness

The findings further indicate that human factors significantly shape perceptions of LMS effectiveness. Self-efficacy, digital literacy, prior ICT experience, and training opportunities emerged as important determinants of LMS acceptance and sustained engagement. Students and faculty with stronger digital competencies were more likely to perceive LMS platforms as useful, accessible, and beneficial to teaching and learning processes. These findings align with TAM and extended acceptance models that position self-efficacy as an important mediator between perceived ease of use and behavioural intention (Adu & Biljon, 2023; Fearnley & Amora, 2020). However, the review also reveals persistent disparities in digital competencies among users, particularly among faculty members who may have limited exposure to digital pedagogies. The evidence suggests that inadequate training and insufficient institutional support continue to constrain meaningful LMS utilisation. Consequently, digital readiness should not be viewed solely

as an individual characteristic but as a capacity shaped by institutional investment in continuous professional development and digital skills training.

Institutional and infrastructural conditions affecting LMS implementation

Institutional and infrastructural conditions emerged as major contextual determinants influencing LMS effectiveness in Ghanaian universities. The review identified inadequate internet connectivity, limited access to ICT infrastructure, insufficient technical support, and weak institutional policies as recurring barriers affecting both adoption and sustained LMS use which aligns with studies by Antwi-Boampong (2021) and Darko-Adjei and Ankrah (2018). While many institutions have adopted LMS platforms in response to increasing digitalisation and post-pandemic educational demands, implementation remains uneven due to disparities in institutional preparedness and resource allocation. The findings further suggest that facilitating conditions alone are insufficient unless accompanied by effective administrative commitment, sustainable funding, and institutional strategies that support long-term digital transformation. Importantly, the interaction between infrastructural limitations and user attitudes indicates that poor institutional environments can negatively affect confidence, motivation, and perceptions of system usefulness.

Socio-cultural and pedagogical influences on LMS perceptions

The review also demonstrates that socio-cultural and pedagogical factors significantly influence perceptions of LMS effectiveness, although these dimensions remain underexplored in many studies. This is consistent with some studies that highlight the impact of cultural norms, resistance to change, and hierarchical academic structures on faculty engagement with LMS platforms (Amankwah et al., 2024; Asunka, 2012;). Cultural norms, resistance to change, institutional culture, and traditional pedagogical practices affect both faculty and student engagement with LMS platforms. Faculty resistance to LMS adoption is often linked to concerns about increased workload, disruption of established teaching methods, and uncertainty regarding pedagogical effectiveness. Similarly, hierarchical educational structures and preferences for face-to-face interaction may limit willingness to integrate LMS tools into instructional practices. The findings further show that LMS platforms are more positively perceived when their functionalities align with instructional goals, student engagement strategies, and pedagogical needs. These findings suggest that LMS effectiveness is not solely dependent on technological functionality but also on the extent to which systems accommodate local educational cultures and teaching philosophies.

Differences between faculty and student perceptions

An important finding across the reviewed studies is the existence of significant differences between student and faculty perceptions regarding LMS usefulness and effectiveness. Students generally perceive LMS platforms positively due to their convenience, accessibility, flexibility, and ability to support independent learning (Attigbo et al., 2025). Their concerns primarily focus on usability, connectivity, and ease of access to learning materials. In contrast, faculty perceptions are more strongly influenced by pedagogical integration, workload management, institutional support, and technical reliability. While faculty often acknowledge the pedagogical potential of LMS platforms for improving engagement and instructional innovation, they simultaneously express concerns regarding digital adaptation, course redesign, and increased administrative responsibilities (Asamoah & Oheneba-Sakyi, 2024). These differences reflect the distinct roles

and expectations of each stakeholder group within higher education environments and suggest the need for differentiated implementation and support strategies.

Applicability of theoretical frameworks in the Ghanaian context

The review reaffirms the relevance of dominant theoretical models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) in explaining LMS adoption and perceived effectiveness. Constructs such as perceived usefulness, perceived ease of use, facilitating conditions, social influence, and self-efficacy consistently demonstrated explanatory value across many studies. However, the findings also reveal limitations in the applicability of these frameworks within Ghanaian higher education contexts. Many studies rely heavily on technologically deterministic models that insufficiently account for socio-cultural realities, institutional inequalities, and infrastructural constraints that shape LMS adoption in developing contexts (Adu & Biljon, 2023; Tanye et al., 2019). Furthermore, inconsistencies in construct operationalisation and overlapping variables reduce theoretical clarity across studies. The review, therefore, suggests the need for more context-sensitive theoretical frameworks that integrate technological, institutional, pedagogical, and socio-cultural dimensions in explaining LMS effectiveness in Ghanaian universities.

Theoretical Implications

This synthesis of findings reaffirms, and, in some respects, extends, the enduring relevance of dominant technology acceptance frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) in accounting for patterns of Learning Management System (LMS) adoption and perceived effectiveness within the Ghanaian higher education landscape. In various empirical settings, constructs such as perceived usefulness, perceived ease of use, and self-efficacy consistently serve as statistically significant predictors of user acceptance, highlighting the explanatory strength of these models in contexts characterised by varied institutional capacities and digital readiness (Adu & Biljon, 2023; Bayaga & du Plessis, 2024; Fearnley & Amora, 2020; Quiban, 2024). Nonetheless, the theoretical discourse becomes increasingly complex when analysing the subtle interactions between usability components and technology adoption theories. Although perceived usability and perceived usefulness exhibit a robust conceptual and empirical correlation, they must not be regarded as interchangeable. This conceptual distinction indicates the necessity for advanced acceptance models that explicitly incorporate usability effectiveness, not solely as a mediating factor, but as an equivalent dimension affecting adoption trajectories (Adu & Biljon, 2023).

The socio-cultural variables that influence adoption behaviours are equally significant. Social impact, cultural norms, and resistance stemming from established academic practices serve as significant factors influencing LMS perception and utilisation, hence challenging the adequacy of technologically deterministic models. Evidence from participatory action research demonstrates that cultural factors, such as hierarchical teaching cultures or a preference for face-to-face interaction, can significantly influence faculty participation with LMS platforms (Akwene, 2024; Asunka, 2012). The function of facilitating conditions within these frameworks is also dependent on the situation. Some studies identify infrastructure quality, institutional readiness, and technical support as direct facilitators of adoption, while others demonstrate inconsistent or statistically insignificant effects. This indicates that these enabling conditions may exert their theoretical

influence solely when integrated within a comprehensive ecosystem of organisational preparedness.

Additionally, the results highlight the significance of pedagogical alignment. The epistemological orientations and teaching philosophies of instructors significantly influence LMS integration patterns; platforms are most effectively embraced when their functionalities align with educators' chosen methods of information dissemination. This expands existing acceptance theories beyond their technological foundation, establishing pedagogical compatibility as an essential theoretical aspect (Mutanga et al., 2023; Su & Chen, 2025). The COVID-19 pandemic has ultimately tested existing theoretical frameworks by presenting an external shock that necessitated swift adoption in circumstances that were previously resistive. This crisis-driven uptake highlights the imperative to incorporate adaptability, resilience, and scalability into forthcoming iterations of technology acceptance models, transcending gradualist adoption trajectories to accommodate expedited digital transformation amid institutional and societal upheaval.

Conclusion

This study demonstrates that the perceptions of Ghanaian university students and professors on the efficacy of LMS are influenced by a combination of human, technological, social, institutional, and contextual factors. Users' confidence in technology, digital abilities, and attitudes have a big impact on whether or not they use LMSs effectively. Those who believe in their own abilities tend to find LMSs more useful and interesting. However, disparities in digital skills, especially among students, show that better training is needed. The quality of the technology is equally important. Systems that are reliable, easy to use, well-designed, and have useful features leads to satisfaction. Contrarily, systems that have bugs, slow connections, and complicated interfaces make users less satisfied. Similarly, simplicity of use is not equal to usefulness, as opinions of users depend on their level of experience. Social and cultural elements, such as peer support and institutional culture, also have an effect. Cultural opposition to changes in teaching can make it harder for teachers to adopt them, especially for faculty. But interactive and culturally sensitive methods can help. Institutional support, such as infrastructure, training, and clear policies, is very important. Lack of professional development and bad internet connectivity are still issues. Faculty frequently see enhanced pedagogical advantages yet encounter increased workloads and infrastructural obstacles, whilst students emphasise usability and accessibility concerns. TAM and UTAUT are two examples of current adoption models that are helpful; however, they often lack consideration of the unique circumstances in Ghana.

Recommendations

From a pragmatic perspective, the findings of this analysis have significant ramifications for policy, institutional strategy, and system design in Ghanaian higher education. First, universities must invest in ongoing, focused capacity-building programs to improve the digital literacy and self-efficacy of both faculty and students. Second, institutions must prioritise robust infrastructure investment, including reliable high-speed internet connectivity, adequate bandwidth, and responsive technical support services. Without such infrastructure assurance, users are likely to perceive the system as inaccessible and unreliable. Third, policy frameworks should clearly include socio-cultural factors in plans for deploying LMS. Fourth, LMS designs that are both pedagogically responsive and customisable should be at the top of the list for system developers and institutional procurement teams. Fifth, institutions should adopt a genuinely holistic approach to implementation that aligns technical ability with the preparedness of people and institutions.

The COVID-19 pandemic sped up the digital transformation, which taught us an important lesson: higher education systems need LMS solutions that are flexible and adaptable and can easily switch between face-to-face, blended, and fully remote modes. Such adaptability is fundamental to institutional resilience, guaranteeing educational continuity and equitable access during crises, while concurrently shaping long-term digital strategy.

Limitations

This systematic review provides important insights into LMS effectiveness in Ghanaian higher education; however, several limitations must be acknowledged. First, the inclusion of studies from non-Ghanaian contexts (including Zimbabwe, Tanzania, South Africa, Sri Lanka, and Indonesia) may reduce the local specificity of conclusions and warrants careful interpretation when drawing implications exclusively for Ghanaian institutions. Second, the review is limited to studies published in English, which may introduce language bias and exclude relevant scholarly contributions published in other languages. Third, the search was confined to four databases (Google Scholar, Scopus, Web of Science, and ERIC), and potentially relevant studies indexed in other repositories may have been omitted, introducing a degree of database selection bias. Fourth, the predominant focus on perceptions and attitudes rather than objectively measured learning outcomes limits the conclusions that can be drawn about the actual educational effectiveness of LMS platforms. Fifth, the reliance on SciSpace for relevance ranking, while pragmatically useful, introduces a degree of algorithmic subjectivity that was not independently validated through inter-rater reliability assessment. Future research should adopt longitudinal and mixed-methods designs to capture changes in LMS use and perceptions over time, providing deeper contextual insights. In addition, future work should employ dual-reviewer screening with inter-rater reliability coefficients. Studies that directly measure learning outcomes, rather than relying solely on self-reported perceptions, are particularly needed to assess the real educational impact of LMS adoption in Ghanaian higher education.

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