ORIGINAL ARTICLE

LEARNING MANAGEMENT SYSTEMS (LMS) IN MEDICAL EDUCATION: INSIGHTS FROM UNDERGRADUATE MEDICAL STUDENTS IN PESHAWAR

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ABSTRACT

Objectives: To determine students' perceptions regarding the usability and efficacy of the Learning Management System (LMS).

Materials & Methods: This Descriptive cross-sectional study was carried out in public and private sector medical colleges of Peshawar from October 2023 to February 2024. The data collected was analysed using SPSS ver.29 to determine students' perceptions of LMS usability and effectiveness.

Results: The average mean score for students' attitudes and experiences with the LMS's ease of use and overall user experience was 3.32, exceeding the criteria score of 3. Additionally, students' mean score for the LMS's effectiveness in supporting their learning was 3.48, also greater than the criterion score of 3. Furthermore, an independent samples t-test revealed that students from private medical colleges found the LMS to be significantly more user-friendly and effective ($p = 0.011$). However, there was no statistically significant difference in LMS perceptions between clinical and preclinical students ($p = 0.723$).

Conclusion: According to our research findings, both the students of public and private medical colleges perceive LMS as user-friendly and efficient. This implies that LMS has the potential to streamline medical education irrespective of the institutional variations, ensuring a cohesive learning environment for every student.

Keywords: Efficacy, Learning management system, Perception, Usability

This article may be cited as: Afridi SG, Zain K, Mahsood N, Noor N, Noori M, Kashif L. Learning Management Systems (LMS) In Medical Education: Insights From Undergraduate Medical Students In Peshawar . J Med Sci 2025 April - June;33(2):72-76

INTRODUCTION

Learning management systems (LMS) are online software systems that are operated to support miscellaneous instructional, learning, and assessment activities and are major constituents of many university course delivery techniques. [1] The learning management systems Blackboard, Canvas, e-College, Moodle, and Sakai are a few examples. An LMS can assist tutors and make students' lives easier by arranging an online classroom. The simplicity of use for students and tutors is one of their most substantial attributes. [2] A study performed in RUSSIA Learning Management Systems (LMS) has been ascertained to streamline active learning and foster a positive strategy for learning acquisition. The stakeholders' adoption and perception of this learning tool are the keys to its effective and successful utilization. [3]

According to the current 4th annual LMS data update, more than 90% of educational institutions in the US, Australia, Canada, and the UK are actively operating LMS. [4] Due to the global menace of the novel coronavirus, an unprecedented crisis prevailed throughout the country, which attracted the usage of LMS instruments for learning objectives. [5] With the evolution of the Internet and new technology, LMS has arisen as a feasible alternative for universities presently experiencing rapid modification. Since the end user's perspective towards the application of information technology is one of the critical standards for the flourishing expansion of academic programs, considering pupils' perceptions of LMS technologies is necessary for their expertise in the field. [6] In one of the studies performed in Pakistan, it was noted that during

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Date Received: 18/03/2025
Date Revised: 19/05/2025
Date Accepted: 24/06/2025

COVID-19 times, due to the closure of schools and colleges to restrain the spread of the virus, educational institutions quickly transitioned to remote learning, and many universities started their online education systems as per their feasibility for students and educators. [7] According to a Study performed in Indonesia, LMSs are now the most demanded instruments in the educational sector. Many universities utilize LMSs to sustain and improve learning and teaching methods. [8] A study carried out in Indonesia regarding information systems like LMS often combines human, hardware, communication network software, and data resources to gather, modify, and transmit information inside an organization to enable decision-making and control of organizations. [9] A study conducted in Saudi Arabia emphasized important cultural differences between students attending different types of higher education institutions, specifically, public institutions mainly rely on standalone personal computers in computing laboratories, with no internet access available at their place of study. [10]

The significance of Learning Management Systems (LMS) in academic contexts is universally recognised; nonetheless, their contextual efficacy and user experience might differ markedly among various educational institutions. Despite the growing adoption of LMS platforms by private and public medical institutions, empirical research regarding students' perceptions of their usability and effectiveness remains scarce. This study seeks to fill this vacuum by examining students' perceptions in private and public-sector medical institutions, thereby offering context-specific insights to guide the strategic integration and enhancement of LMS utilisation in analogous academic settings. The primary objective of this research is to explore students' perceptions of the usability and effectiveness of the Learning Management System (LMS) in supporting their education.

MATERIALS AND METHODS

This analytical cross-sectional study was conducted in public and private medical colleges of Peshawar. The duration of the study was 5 months. This sample size was computed using Open Epi based on a proportion of medical students utilizing LMS for their academic courses. Assuming a 50% prevalence, a sample size of 424 participants was calculated. A multistage sampling technique was used, and all students enrolled in public and private medical colleges from 1st to the final year of MBBS were included in the study. Participants who failed to complete the questionnaire were excluded.

After ethical approval from the institutional ethical board (approval #1625), data were collected from the students of the 1st to final-year MBBS in one public and two private medical colleges. The questionnaire used was taken from previously published literature[11] and is a validated tool, which was converted into a Google form for data collection. The students were selected in equal numbers from each academic year, ranging from first to final year MBBS, as illustrated in the flow chart. The responses were then analysed using SPSS version 29 to assess students' perceptions of LMS usability and effectiveness.

RESULTS

The mean analysis of the attitudes and experiences of private and public medical college students toward the ease of use, navigability, and overall user experience of the LMS is presented in Table 1. The average mean score is 3.32, which is greater than the criterion score of 3. This shows that LMS is perceived as highly usable by the students, with a higher degree of user satisfaction. The term "Accepted" indicates that the mean scores reflect general agreement or positive endorsement of the statements by the students, consistent with established threshold criteria in similar attitudinal studies.

The mean analysis of the students' views on the efficacy of LMS in supporting their learning is presented in Table 2. The average mean score is 3.48, which is greater than the criterion score of 3. This shows that LMS is perceived by students as highly efficient in supporting their learning. Additionally, no significant difference was observed in LMS perceptions between students from public and private medical colleges.

The comparison of students' perceptions of LMS efficacy between private and public medical colleges is presented in Table 3. The independent samples t-test revealed a statistically significant difference in students' perceptions of LMS efficacy between public and private medical colleges ($t = -4.44$, $p = 0.011$). The mean LMS efficacy score was 3.18 ($SD = 0.749$) for public medical college students and 3.47 for private medical college students, indicating that students from private institutions perceived the LMS as more effective in supporting their learning.

The comparison between the perception of LMS among clinical and preclinical years students in private and public medical colleges is presented in Table 4. The results indicate that the difference is not statistically significant ($p > 0.05$), leading to the retention of the null hypothesis. This suggests that there is no statistically significant difference in LMS perception between clinical and preclinical years.

DISCUSSION

The primary finding of this research highlights that students perceive the Learning Management System (LMS) as efficient and highly user-friendly, leading to a high level of satisfaction. They consider it a valuable platform for effortless communication and idea exchange with their peers. The perceived advantages of learning management systems were also brought to light by Alumona

Table No 1: Mean analysis of the students' attitudes and experiences towards the ease of use, navigability, and overall user experience of the LMS.

Statement	3.03	1.076	Remarks
I can easily connect and share data and information with my classmates using the LMS tools in class.	3.2	1.038	Accepted
I can efficiently and effortlessly move and access my contents and activities from one technological application to another application.	3.95	1.288	Accepted
I find it helpful that I can revisit online content (videos, texts, etc) whenever I find something hard to understand.	3.19	1.001	Accepted
I can easily control how fast or slow I go through the lesson in LMS.	3.26	1.069	Accepted
I found out that there is always more to a topic that I already know through the LMS.	3.4	0.962	Accepted
I am free to look up further on my own topic discussed in out-of-class activities.	3.51	0.912	Accepted
I find mid-assessments helpful because I will know if I need to revisit the first few parts before proceeding.	3.25	1.011	Accepted
I am properly given meaningful feedback to improve my performance in class.	3.38	1.001	Accepted
I can get a better idea of what works better and needs improvement with the scores given after every assessment.	3.36	1.019	Accepted
I can improve my own learning by using the immediate feedback given through LMS.	3.21	1.072	Accepted
I can effectively communicate and exchange ideas with my teacher and classmates on topics being discussed in and outside the classroom.	3.13	1.005	Accepted
I get to experience a learning session that encourages a group participation with the aid of the LMS.	3.13	1.005	Accepted
Average Mean Score = 3.32			
Criterion Mean = 3			

Table No 2: Mean analysis of the students 'views on the efficacy of LMS in supporting their learning.

Statement	Mean	SD	Remarks
I am able to access the appropriate videos, links, and other content that I need using LMS.	3.4	1.085	Accepted
I am well-guided by the well-stated instructions and requirements on LMS, so I can work confidently on my own.	3.13	1.098	Accepted
I find the activities given through LMS engaging.	3.18	1.085	Accepted
I find the content collected in the LMS relevant to me and possibly my other classmates.	3.43	0.94	Accepted
I learn better and faster because I communicate with my fellow learners when I am doing the activities/tasks given through LMS.	3.2	1.052	Accepted
I am able to save time in taking down notes because I have access to the slides, presentations, instructional videos and online textbooks used in class.	3.47	1.056	Accepted
I find my learning experience flexible because of the varied class activities in the LMS.	3.27	1.02	Accepted
I find the combined use of online and classroom resources effective in learning new concepts.	3.55	0.969	Accepted
Average Mean Score= 3.48			
Criterion Mean= 3			

Table No 3: T-test analysis of the difference between the perception of private and public sector medical colleges' students regarding LMS

Status	n	Mean	SD	P	t
Public	214	3.18	0.749	0.011	-4.44
Private	210	3.47	0.604		
α=0.05					

Table No 3: t-test analysis of the difference between the perception of private and public sector medical colleges' students regarding LMS

Year of Study	n	Mean	SD	P	t
Preclinical	233	3.41	0.675	0.723	2.831
Clinical	191	3.22	0.709		
α=0.05					

in his research. [12]

The other key aspect of LMS usability is the flexibility it provides in accessing learning materials. The ability to revisit online content, such as videos, texts, and other resources, was particularly beneficial for students. Similarly, a study by Simanullang and Rajagukguk found that Moodle enhances student learning by offering access to diverse learning materials. [13] Our findings also align with Sayfouri, who emphasized that LMS platforms provide a comprehensive set of features, such as interactive books, assignments, announcements, quizzes, discussion forums, chat options, labels, and external resource links. [14] LMS also facilitated group participation, enabling students to engage in collaborative learning experiences. This is consistent with the study conducted by Steven D. Lonn, which demonstrated that students found LMS useful to facilitate their groups' peer interaction and collaboration within the context of a course-related group project. [15] The findings of this study also suggest that LMS is perceived by students as highly efficient in supporting their learning.

One of the significant advantages of LMS perceived by students, was its time-saving capability. LMS allows students to engage with the material at their own pace. These findings are supported by Cao Thi, indicating that LMS helps students manage course content effectively and saves them time traveling between their homes and campus. [16] Students also found the combined use of online and classroom resources—an approach commonly referred to as blended learning the proven potential to enhance both the effectiveness and efficiency of meaningful learning experiences, as highlighted by Garrison and Kanuka. [17]

Private college students found it more user-friendly than public sector students, which is similar to a Pakistani study that concluded that student satisfaction in Pakistani educational institutions is contingent on a variety of factors, which highlights the need for targeted improvements in teaching methods, resource provision, and infrastructure development. [18]

Our results indicated no significant difference in how clinical and preclinical year students perceived the LMS. This finding is supported by previous research, which discovered that both preclinical and clinical students recognized the value of LMS integration in their curriculum, emphasizing its role in enhancing their overall learning experience. [19]

However, a key limitation of our study is the relatively small sample size, which may not fully represent the broader population of medical colleges. Future research with a larger and more diverse sample is recommended to strengthen the generalizability of these findings.

CONCLUSION

This study aims to offer context-specific insights on students' experiences with learning management systems (LMS) at both public and private medical colleges, despite the consensus on their advantages in medical education. The findings not only emphasise strengths, including usability and perceived efficiency, but also indicate opportunities for focused enhancement in implementation and assistance. This information will feed future initiatives for improving the integration of learning management systems across diverse institutional contexts.

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CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Afridi SG	✓	×	✓	×	✓	×
Zain K	✓	✓	×	✓	✓	×
Mahsood N	×	✓	×	×	✓	×
Noor N	✓	✓	✓	×	✓	✓
Noori M	×	✓	×	×	✓	×
Kashif L	✓	✓	✓	×	✓	✓

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Hayatabad Medical Complex, Peshawar. Vide No.1625. Dated: 09 10 2023