SOUTHEAST ASIAN JOURNAL OF SCIENCE AND TECHNOLOGY

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

Exploring Technology based Learning and Teaching through A Learning Management System

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Article Info :
Received: ***20 June 2025;*** *Revised:* ***27 Aug 2025;*** *Accepted:* ***22 Oct 2025;*** *Available Online:* ***15 Dec 2025***

Abstract - *This study explored technology-based learning and teaching through the use of a Learning Management System (LMS) in a higher education setting. Specifically, it examined the technological tools integrated within the LMS that support flexible teaching and learning, the influence of student interaction with LMS digital platforms on task performance, and the ways teachers implement and adapt their teaching strategies within the LMS environment. Employing a quantitative descriptive research design, the study involved twenty respondents composed of ten students and ten instructors from Cebu Technological University–Barili Campus, selected through purposive sampling. Data were collected using a structured survey questionnaire with a 5-point Likert scale and analyzed using frequency distribution, percentage, and weighted mean. Findings revealed that integrated LMS tools such as video-lecture hosting, auto-graded assessments, analytics dashboards, mobile-friendly interfaces, and collaborative workspaces strongly support flexible learning and teaching. Student interaction with LMS platforms was found to positively influence task performance, although technical glitches were identified as a significant barrier. Teachers demonstrated high levels of adaptation in organizing content, integrating multimedia resources, and fostering collaboration within the LMS, while institutional support for LMS implementation was perceived as moderate. Based on the findings, the study proposed an enhancement training and workshop plan aimed at improving LMS usability, strengthening pedagogical integration, and providing targeted technical and professional support. The study underscores the potential of LMS as an effective instructional platform while highlighting the need for sustained training and institutional support to maximize its impact on teaching and learning.*

Keywords - *Learning Management System, Technology-Based Learning, Flexible Learning, Teaching Strategy Adaptation, Student Interaction, Higher Education*

INTRODUCTION

This generation, driven by technology, nothing is impossible. With its fast-changing development, it provides additional opportunities for learners to explore and discover digital tools that can track their learning and training. Digital platforms, particularly learning management systems (LMS) is a web-based application capable of transforming face-to-face sessions by offering students a space for online learning (Wichadee, 2015). A tool for the learners and teachers to access flexible learning and t teaching. It is a software that delivers, creates, and organizes tasks and enables the students and teachers to manage their own time and pace in learning and teaching. Using an LMS is an effective way of delivering instruction to students by offering 24/7 access to course content, while enabling convenient course creation and management for teachers (Bousbahi & Alrazgan, 2015). The LMS allows teachers and learners to automate their task efficiency and enables them to do the task together with management and organization.

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

With the advent of technology, numerous digital tools are created and change the way students and teachers interact in their own tasks. Moreover, digital solutions offer better opportunities for the learners to interact proficiently in their specialized subjects. According to Bhuiyan (2025) learning Management Systems (LMS) have gained rapid popularity as a widely utilized method for teaching and learning in the blended learning environment of universities particularly using Google classroom during Covid- 19. It pertains that LMS has contributed to the learners and teachers' flexibility both in a challenging and normal education setting. Hence, Learning Management System (LMS) becomes resourceful and is needed by educators around the world. LMS is an open-source framework used for all kinds of e-learning for example blended learning, distance education and workplace training. LMS reinforces the learning process through collaborative-group learning, discussion, monitoring students' progress, assessment, and evaluation through online learning environment (Bradley, 2020). There are various types of LMS offered such as Edmodo, WebCT, Canvas, Moodle and Google Classroom.

The LMS, despite being a foundational tool for teaching and learning, often presents challenges that influence its efficiency towards its user, leading to poor experience for the learners and teachers. Many faculty members remain hesitant to adopt them as a teaching tool (Wichadee, 2015; Zanjani et al., 2016). Moreover, teachers tend to underutilize this educational technology despite its widespread availability in higher education settings (Fathema & Sutton, 2013; Bousbahi & Alrazgan, 2015). Another reason is that some LMS are designed with features that are considered outdated and use complex icons. Jump in Rope (n.d.), navigating these features is a challenge for some students and teachers, making it difficult for students to do their tasks and for teachers to upload their materials. Additionally, it also presented a major drawback in responsiveness and accessibility in mobile phones. Pages often don't work smoothly or correctly on smartphones or tablets, leading to students unable to fully achieve their potential if using it outside the desktop setting.

Many studies have supported the benefits of Learning Management Systems (LMS) for users; however, only a few have examined their efficacy in relation to learning outcomes. Most LMS research primarily relies on short-term surveys, and only a limited number of studies have explored how LMS use affects students' performance or whether it leads to improvement. Additionally, studies related to LMS are often conducted in urban universities and schools, with less emphasis on rural areas, resulting in insufficient data about how LMS functions in contexts with digital inequality. Furthermore, according to Zhang and Chen (2023), many studies focus on students' ability to utilize LMS platforms, while fewer investigate teachers' pedagogical application of LMS. These observations strongly suggest that LMS requires further examination because of the existing research gaps.

In connection to this, the researcher aims to determine how LMS can be effectively utilized inside the classroom, explore its impact on both students and teachers, and identify its gaps to better understand how it functions in the modern educational setting. This includes highlighting learners' flexibility in using the software and teachers' pedagogical adaptation to this digital platform.

This study aims to explore technology-based learning through a Learning Management System.

Specifically, it seeks to answer the following questions:

1. What technological tools integrated within the Learning Management System (LMS) support flexible teaching and learning in the classroom?

2. How does student interaction with LMS digital platforms influence their task performance?

3. How do teachers implement and adapt their teaching strategies within the LMS environment?

RESEARCH METHODOLOGY

This section narrates the quantitative research design, research respondents, research instrument, research environment, data gathering

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
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procedure, statistical treatment, and the ethical considerations that will be implemented in the study.

Research Design

The study utilizes quantitative research approach to gain and achieve a deeper understanding of LMS-based teaching and learning. A carefully designed survey questionnaire, featuring a 5-point Likert scale, will be distributed to respondents. This scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), will enable respondents to express their level of agreement with statements regarding their perceptions on LMS.

This methodology aims to strengthen the understanding of how LMS can be essentially used inside the classroom, exploring its impact on both students and teachers, and identifying its gaps. Moreover, this method explores the multifaceted aspects of LMS in a culturally diverse educational setting.

Flow of the Study

Figure 1 illustrates the flow of the study. Basically the different technological tools integrated within the LMS; how do teachers implement and adapt their teaching strategies within the LMS environment and how does the student's interaction with LMS digital platform influence their task performance. These data undergo a series of processes including descriptive survey design, questionnaire development, data processing, analysis and interpretation. Once the input processing is done meticulously, enhancement training and seminar will be proposed and implemented.

LMS environment

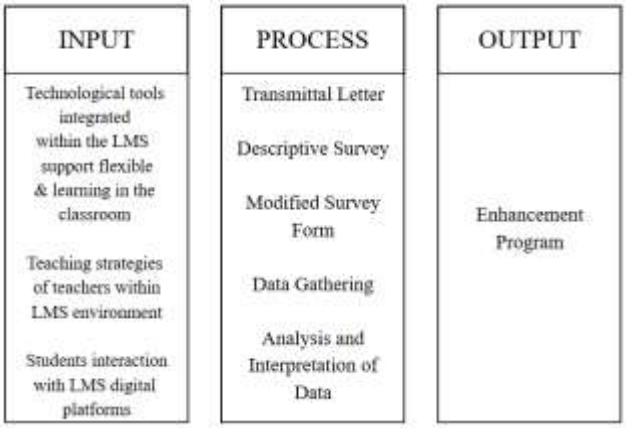

Figure 1. *Conceptual Framework of the Study*

Research Respondents

Two groups of participants will be involved in this study. First are the selected 10 students of CTU Barili Campus, particularly BSEd English 3, who engage with the LMS for class activities, tasks, and submissions. Second are the selected 10 instructors of CTU Barili Campus who design instruction, upload materials, and evaluate performance via LMS. These two groups will provide valuable insights into the effectiveness of the learning management system. A purposive sampling technique is used to select participants who have significant experience using the LMS.

Research Instrument

The research tool used in this study is a survey questionnaire to collect quantitative data. It will serve as an instrument in collecting and gathering data in order to achieve an honest result. The use of this method will provide a comprehensive understanding of the participants' perspectives.

Research Environment

This study is conducted at Cebu Technological University – Barili Campus, a satellite campus of CTU located in Barili, Cebu. The university is equipped with computer laboratories, Wi-Fi access, and digital learning facilities that support technology-based instruction. Both teachers and students on campus regularly use online platforms for classes, making CTU Barili an ideal setting for exploring the use of a Learning Management System in teaching and learning.

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P-ISSN: 2672-2984
E-ISSN: 2672-2992
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Data Gathering Procedures

To enable the researcher to officially administer the survey form to the respondents, a letter was addressed to the campus director of CTU Barili Campus to seek permission to distribute the survey form to the students and teachers. To ensure the accuracy of the information, the researcher conducted a brief discussion with the participants regarding the study. The participants were then given enough time to prepare and think about their thoughts regarding the research topic.

The study was conducted on November to December 2025. The survey questionnaire was distributed at the target time and date.

Statistical Treatment

To analyze the data, the following statistical treatment was applied.

Frequency Distribution/Simple Percentage was used to arrange the gathered data of the respondents in terms of their age and gender and for the teachers; age and no. of years in teaching.

Likert Scale Analysis was used to analyze respondents' perceptions on exploring technology based learning and teaching through a Learning Management System.

The weighted mean was employed to determine how the students interaction with LMS digital platforms influence their task performance. To interpret the weighted mean of the items, the following hypothetical mean ranges was set:

Scoring Procedure:

Mean Ranges	Interpretation
3.26-4.00	Strongly Agree
2.50-3.25	Agree
1.75- 2.49	Disagree
1.00-1.74	Strongly Disagree

Definition of Terms

To know about the study, the listed below are significant terms were defined conceptually:

1.Blended Learning: Blended learning is an instructional approach that combines face-to-face classroom interaction with online or technology-mediated learning experiences. It integrates physical and digital environments to create a more flexible, interactive, and student-centered learning process. In the context of an LMS, blended learning uses digital tools to supplement, extend, or enhance traditional teaching.

2.Digital Platforms: Digital platforms are online systems or applications that support communication, content delivery, collaboration, and educational transactions. In technology-based learning, digital platforms serve as virtual spaces where learners access resources, interact with teachers and peers, and participate in learning activities.

3. Flexible Learning: Flexible learning refers to an educational approach that provides students with choices in how, when, and where learning occurs. It accommodates diverse learning needs and contexts by using technology to offer varied modes of access, pacing, and instructional delivery. Within LMS-based environments, flexible learning enables asynchronous and synchronous participation.

4.Google Classroom: Google Classroom is a web-based learning platform developed by Google that facilitates the creation, distribution, and management of learning tasks. It supports communication, assignment tracking, and resource sharing, functioning as a lightweight LMS that enhances technology-based teaching and learning.

5. Learning Management System (LMS): A Learning Management System is a digital framework used to plan, deliver, monitor, and assess teaching and learning processes. It provides tools for content management, communication, evaluation, and tracking of learner progress. In technology-enhanced education, the LMS serves as the central

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
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environment through which learning experiences are organized and mediated.

6. Pedagogical Platform: A pedagogical platform is the instructional foundation or framework that guides how teaching and learning are designed, delivered, and supported. In technology-based contexts, it refers to the underlying pedagogical principles, strategies, and digital tools that shape the learning experience within an LMS or online environment.

7. Research Gaps: Research gaps are areas within the existing body of literature where knowledge is limited, insufficient, or under explored. Identifying research gaps helps justify the relevance of a study by showing what has not yet been adequately studied. In your research, gaps may appear in the understanding of how LMS-based teaching affects learning outcomes, teacher practices, or student engagement.

RESULTS AND DISCUSSION

A. Demographic Characteristics of the Respondents

The demographic characteristics of the respondents were examined, and the results are shown in Table 1.

B. *Research Question 1: What technological tools integrated within the Learning Management System (LMS) support flexible teaching and learning in the classroom?*

Research question one investigated the tools being integrated within the LMS that support flexible teaching and learning. In this study, weighted mean were calculated to determine the perceived tools integrated within LMS such that mean 1.00-1.74 indicated/perceived as strongly disagree, mean of 1.75-2.49 perceived as disagree, mean 2.50-3.25 perceived as agree and 3.26-4.00 indicated as strongly agree. The analysis of the results is shown in Table 2.

Table 1. Demographic Characteristics of Respondents

Variable	Sub-scale	Frequency	Percent
Sex	Male	4	
	Female	16	
	Total	20	100.0
Age	Under 20	8	
	20-29	3	
	30-39	7	
	40＋	2	
	Total	20	100.0
Teaching experience (years)	Below 5		
	5-9		
	10-14		
	15-19		
	20 & above		
	Total	10	

Table 2. Mean Analysis on Integrated LMS Tools for Flexible Teaching & Learning

Tool	Indicator	Weighted Mean	Verbal Interpretation
Video-lecture hosting / streaming	Having recorded lectures available 24/7 lets me study/teach whenever it suits my schedule.	3.75	Strongly Agree
Discussion boards & chats	Asynchronous forums enable meaningful interaction even when I cannot	3.65	Strongly Agree

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P-ISSN: 2672-2984
E-ISSN: 2672-2992
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	attend class in real time.		
Integrated video-conferencing	Live virtual meetings within the LMS support flexible delivery of lessons.	3.55	Strongly Agree
Auto-graded quizzes & assignment drop-boxes	Instant feedback from automated assessments helps me monitor progress on my own.	3.75	Strongly Agree
Analytics dashboards	Progress dashboards allow me to adjust my learning/teaching plan quickly.	3.70	Strongly Agree
Mobile-friendly interface/LMS app	I can access course materials effectively on my smartphone or tablet."	3.55	Strongly Agree
Collaborative workspace (wikis, shared docs)	Group-project tools foster teamwork without needing a physical classroom.	3.40	Strongly Agree
Gamification features (badges, leader-boards)	Game-like elements keep me motivated to complete learning tasks	3.07	Agree

Legend:
3.26 - 4.00 - Strongly Agree
2.50 - 3.25 - Agree
1.75 - 2.49 - Disagree
1.00 - 1.74 - Strongly Disagree

Table 2 shows the mean analysis on integrated LMS tools for flexible teaching and learning. Video-lecture hosting/streaming, auto-graded quizzes and assignments drop boxes got the highest weighted mean of 3.75 which was interpreted as strongly agree. In addition gamification features (badges, leader-boards) got the lowest weighted mean of 3.07 which was interpreted as agree. In analytics dashboards, discussion boards and charts, integrated videoconferencing, mobile-friendly interface and collaborative workspace (shared docs) got the weighted mean of 3.70, 3.65, 3.55, 3.55, and 3.40 respectively which were also interpreted as strongly agree. LMSs offer many tools such as online group chats, discussion threads, video conferencing, lecture materials, learning modules, grading and course evaluations, all of which may be customized to suit specific instructional needs (Fathema et al., 2015; Walker et al., 2016). These variety of online tools brings everyone to another dimension of learning.

Table 3. Student Interaction with LMS Digital Platforms and Task Performance

Indicator	Weighted Mean	Verbal Interpretation
1. Access to LMS resources (videos, readings) improves the quality of my assignments.	3.20	Agree
2. Participating in LMS discussions clarifies concepts and boosts my test scores.	3.50	Strongly Agree

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
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3. Technical glitches in the LMS hinder my ability to finish tasks.	3.75	Strongly Agree
4. The LMS interface is too complex, reducing my productivity.	2.40	Disagree
5. Additional LMS training would improve my task performance.	3.80	Strongly Agree

Table 3 presents the students interaction with LMS digital platforms. Statement number 5 got the highest weighted mean of 3.80 and perceived as strongly agree. For numbers 3, 2, and 1 got the weighted mean of 3.75, 3.50, and 3.20 which was interpreted as strongly agree. On the other hand only statement number 4 got the weighted mean of 2.40 which was perceived as disagree. Research points to the conclusion that having favorable attitudes towards LMS may result in more engagement, better grades, and increased satisfaction with the learning experience (Almaiah et al., 2020). Perceptions, of course, depend on a series of variables, such as usability and accessibility of the systems or how much LMS match students' learning preferences or cultures (Nguyen, 2019).

Table 4. Teaching Strategy Implementation and Adaptation in The LMS Environment

Indicator	Weighted Mean	Verbal Interpretation
1.I use the LMS to organize and deliver course content effectively.	3.65	Strongly Agree
2. I integrate multimedia resources (videos, presentations, links) into my LMS courses.	3.70	Strongly Agree
3. I use LMS tools (e.g., quizzes, assignments, forums) to support my teaching strategies.	3.80	Strongly Agree
4. I modify my teaching strategies to suit the LMS environment.	3.80	Strongly Agree
5. I adapt face-to-face teaching activities for online or blended learning in the LMS.	3.70	Strongly Agree
6.I adapt learning materials to accommodate different learning styles using LMS features.	3.65	Strongly Agree
7.I use discussion forums or interactive tools in the LMS to promote student participation.	3.75	Strongly Agree
8. I encourage collaboration among students using LMS features (e.g., group work, peer review).	3.75	Strongly Agree

Volume 10, Issue 1, 2025
P-ISSN: 2672-2984
E-ISSN: 2672-2992
www.sajst.org

9. Technical challenges limit my ability to use the LMS effectively for teaching.	3.65	Strongly Agree
10. I receive sufficient institutional support to adapt my teaching strategies within the LMS.	3.25	Agree

Table 4 presents the teaching strategy implementation and adaptation in the LMS environment. Among the 10 indicators, statement number 4 and 3 got the highest weighted mean of 3.80 which was interpreted as strongly agree. Statement number 7 and 8 got the same weighted mean of 3.75 which was interpreted as strongly agree. In addition statement number 2 and 5 got the same weighted mean of 3.70 as perceived as strongly agree. Statement number 1, 6, and 9 got the weighted mean of 3.65 which were also interpreted as strongly agree. On the other hand statement number 10 got the lowest weighted mean of 3.25 which was interpreted as agree. Teachers play an important role in carrying out any innovation in the classroom (Alharbi & Drew, 2014). This is why determining the variables that motivate teachers to provide a technology-supported learning environment to their students is essential (Teo et al., 2012).

Output of the Study

This section presents the proposed development plan for the teachers and students in Exploring Technology based Learning and Teaching through a Learning Management System. This proposal considers and identifies areas of concerns, its action or strategies of implementation and expected outcome.

Enhancement Training & Workshop Plan

Areas of Concerns	Actions/Strategies	Expected Impacts/ Outcomes
Tool Upgrade	• Redesign icons and navigation for simplicity. • Implement responsive mobile UI across all modules.	Improves perceived ease of use; for complex interface.
Targeted Training	• Quarterly workshops on analytics dashboards, auto-graded quizzes, and gamified features (high school student) endorsement. • Hands-on labs for creating video-lecture streams and collaborative workspace.	Boosts student task performance and teacher confidence
Pedagogical Coaching	•Mentor-pairing: experienced faculty guide peers in adapting face-to-face activities to LMS formats. • Provide templates for multimedia integration and discussion-forum design.	Raises teacher adoption scores and promotes consistent instructional quality.
Technical Support Hub	• 24/7 help-desk with live chat. • Quick-fix guides for common glitches	Reduces disruption, improves overall productivity.

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P-ISSN: 2672-2984
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CONCLUSION AND RECOMMENDATIONS

The study demonstrates that Learning Management Systems can effectively support flexible teaching and learning when their integrated tools—such as video-lecture streaming, auto-graded quizzes, analytics dashboards, mobile-friendly interfaces, and collaborative workspaces—receive strong student endorsement (Mean ≥ 3.55). Students who regularly access LMS resources and participate in discussions report higher task performance, while technical glitches and complex interfaces hinder productivity (Mean = 2.40). Teachers also show high adoption of LMS functions for organizing content, integrating multimedia, and fostering collaboration, though they perceive only moderate institutional support for adapting their strategies (Mean = 3.25). Persistent challenges include outdated features, poor mobile responsiveness, and limited faculty willingness to embrace the technology.

The study recommends upgrading the usability of Learning Management Systems by redesigning icons, streamlining navigation, and ensuring full mobile compatibility to reduce access barriers and improve user experience for both students and faculty. Expanding training programs is also essential, with a particular focus on enhancing users' proficiency in analytics dashboards and gamified features to boost engagement and improve learning and teaching performance. Furthermore, institutional support should be strengthened through the provision of sustained technical assistance, incentive mechanisms, and continuous professional development opportunities in order to increase users' perceived level of support and encourage effective LMS adoption. To address existing research gaps, the study also recommends conducting longitudinal, rural-focused investigations that examine how LMS adoption influences learning outcomes over time, particularly in contexts affected by digital inequality. Finally, the integration of adaptive learning tools, such as AI-driven feedback mechanisms, alongside the expansion of collaborative workspaces is encouraged to further personalize instruction and promote meaningful peer interaction within LMS environments.

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