Evaluation of Students' Perceptions of Learning Management Systems and Technologies

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***Abstract*—This research aimed to evaluate students' use of learning management systems and technologies. The research was carried out using the survey model, which is one of the quantitative research designs. The research study included a sample of 312 students from various universities across Kazakhstan. To gather research data, the researchers developed a learning management and technologies scale. The dataset was then analyzed using parametric tests. The independent sample t-test was used in the analysis of bivariate data, and one-way Analysis of Variance (ANOVA) was used in the analysis of data with more than two variables. As a result of the research, it was determined that university students had a very high attitude toward learning management and technology motivation, as well as a high level of self-efficacy. Their overall attitudes toward learning management and technologies were also found to be high. It was concluded that the attitudes of university students participating in the research towards learning management and technologies differ in favor of male students according to the gender variable. It was also concluded that the attitudes of university students towards the learning management and technologies scale do not make a significant difference according to the class and department students are studying.**

***Keywords*—learning management system, perception, technology, university students**

I. Introduction

Learning Management Systems (LMS) are software platforms designed to facilitate access to, interaction with, and management of educational content by students, instructors, and institutions. LMS platforms offer a broad spectrum of functionalities, including the organization of learning materials in online or blended education models, monitoring student progress, and administering assessments and examinations. These systems not only enable content dissemination but also foster interactive learning experiences [1]. Prominent examples, such as Moodle and Blackboard, empower educators and learners to manage educational processes effectively through user-friendly interfaces and customizable features [2].

In recent years, LMS platforms have emerged as pivotal components of contemporary education, significantly contributing to student-centered learning approaches within the broader context of digital transformation [3].

Educational technologies, in parallel, encompass a wide array of digital tools, software applications, and methodologies that aim to enhance the accessibility and efficacy of educational processes. These technologies enable instructors to enrich course content, engage with students dynamically, and tailor the learning process to individual needs [4]. For instance, video conferencing tools, Augmented Reality (AR) applications, and learning analytics can provide personalized and immersive learning experiences. Furthermore, instructional technologies are shown to improve academic outcomes by fostering collaborative and interactive learning environments [5].

Learning Management Systems and instructional technologies function synergistically as foundational elements of digital education. While an LMS offers a structured platform for managing, organizing, and monitoring educational activities, instructional technologies extend their capabilities by introducing innovative tools and pedagogical approaches. For example, the integration of instructional technologies such as video conferencing systems, virtual laboratories, or augmented reality applications within an LMS can create more engaging and tailored learning experiences [5].

Students' opinions of Learning Management Systems (LMS) and other instructional technologies are greatly influenced by their level of self-efficacy. According to Bandura [6] framework on self-efficacy, people's motivation and conduct are greatly influenced by their views about their capacity to do particular activities. Students with a high level of self-efficacy in educational technology are more likely to actively engage with digital tools and demonstrate confidence in their ability to succeed in an online learning environment. According to Prifti [7], who discovered a positive relationship between self-efficacy and student satisfaction in combined learning courses, students who believe they are capable are more likely to use Learning Management Systems (LMS) successfully and be satisfied with their educational endeavors. Furthermore, self-efficacy and the self-regulation dimension interact to further affect how students view LMS.

Self-regulated students who are capable of setting objectives, tracking their progress, and modifying their approach are more likely to use educational technology effectively. According to Balkaya, & Akkucuk [8], these self-management abilities enhance the entire learning experience by encouraging a positive attitude toward LMS. Students who possess high levels of self-efficacy and self-management skills are better able to use educational technologies, which leads to better learning outcomes.

Enhancing student learning is made possible by the interplay among self-efficacy, motivation, and acceptance. According to Delita *et al.* [9], fostering self-efficacy is linked

to the highest academic achievement and enhances engagement with educational technologies. Students typically put forth more effort and perseverance in situations where they are required to overcome obstacles, such as those provided by learning Management Systems (LMS). This helps to strengthen their self-efficacy beliefs as they accomplish predetermined objectives. As a result, this cycle of belief and performance can help create a more nuanced view of educational technologies, affecting how much students believe these platforms play a role in their academic achievement.

Furthermore, the collective dynamics of group learning in LMS are also affected by self-efficacy. Since students are more likely to take initiative and make valuable contributions when they feel confident in their skills, higher self-efficacy can enhance collaborative behaviors among coworkers. The positive feedback loop between group self-efficacy and interaction can increase the perceived value of Learning Management Systems (LMS), as cooperation is made easier by educational technologies. Self-efficacy in this context relates to more than just individual learning; it has a significant impact on the larger social dynamics of learning in digital contexts.

Lastly, students' opinions of learning management systems and instructional technologies appear to be greatly influenced by the relationship between self-efficacy and motivation. Self-efficacy, engagement, and competence all show positive connections, suggesting that interventions aimed at boosting students' self-efficacy may be essential to maximizing the benefits of instructional technology. While navigating the challenges of digital learning environments, educational stakeholders can promote the experiences and learning outcomes of improved students by encouraging self-regulation and trust. Students' perceptions and usage of educational technologies, especially in online learning environments, are also greatly influenced by their motivation. Several research shows that self-efficacy and motivation are important mediators of learning in online settings [10].

Since highly motivated students are more likely to use Learning Management Systems (LMS), there is a noticeable correlation between student motivation and LMS usage. According to Chang & Tsai [11], this enhanced engagement typically results in more active participation in learning activities, which favorably reflects the experience and overall learning outcomes.

Furthermore, it is impossible to overlook the importance of extrinsic motivators, such as the conduct of instructors and the caliber of the instructional materials offered in LMS. According to studies Amoozegar *et al.* [12], good teacher participation greatly raises student motivation levels [13], which in turn fosters a positive learning environment. The LMS structure's surrounding instructional tactics, prompt responses to student consultations and efficient use of feedback are all mentioned as important factors that affect students' motivation to use the accessible learning technology. Beyond only providing information, these behavioral elements also include support networks that foster an environment that encourages students to learn.

There are significant ramifications when motivational theories are incorporated into LMS design. By comprehending the elements that motivate students to use educational technologies, educators and developers can design more engaging and beneficial learning environments. According to Zhao *et al.* [14], the user experience can be greatly improved by including well-established motivational frameworks in LMS development, such as expectation-value theory and self-determination theory. In addition to meeting the psychological demands of students' autonomy, competence, and relationships, this strategy positions educational technologies as facilitators of deeper learning engagement rather than merely means for delivering knowledge.

The success of technological tools in enhancing student learning will depend on how well they connect with motivational structures as they develop further [15]. Students are more motivated to learn when they believe their learning management system is understanding and user-friendly. This impression is impacted by the LMS's user-friendly layout, interactive features, and resources that accommodate different learning preferences.

Taking into account the individual characteristics of students is a crucial component in illustrating the relationship between motivation and LMS use. For instance, compared to their less motivated peers, students who are more intrinsically motivated are probably going to be more persistent and resilient while using LMS resources to support their learning objectives. These differences highlight the necessity for LMS-facilitated differentiated teaching tactics that cater to various motivational profiles and self-efficacy levels.

Peer interactions, which are triggered by Learning Management Systems (LMS), also boost motivation when students work together on assignments, projects, and conversations. It has been demonstrated that this social component of education improves students' feelings of community and belonging, which in turn increases their motivation and engagement with the educational process. As a result, encouraging a collaborative learning environment in LMS boosts students' enthusiasm in addition to improving academic performance [16].

To put it briefly, educators and instructional designers must have a solid understanding of the dynamics of motivation and self-efficacy while using learning management systems. It is crucial to develop an integrated strategy that takes into account both environmental and psychological aspects to enhance the educational experience through technology. There is a complex and important relationship between self-efficacy, motivation, and how Learning Management Systems (LMS) are perceived. Self-efficacy, which is the belief in one's ability to carry out actions required to achieve particular performance outcomes [1], is a key factor in deciding how students approach their educational experiences. Since students are more likely to believe they can overcome the difficulties involved in using educational technology, high levels of self-efficacy can result in increased commitment to these systems [17]. Because they are more motivated to use the available technological tools, students who exhibit high self-efficacy can explore online materials more thoroughly, leading to better learning outcomes [18].

On the other side, motivation serves as a catalyst that nourishes students' dedication to their learning environments, which include learning management systems and educational

technology. The theory of self-determination states that a greater level of dedication and persistence in educational endeavors is correlated with intrinsic motivation, which stems from a natural desire to learn and develop [19]. According to Wang *et al.* [20], motivated students are more likely to experiment with different LMS features, which could result in a deeper understanding of the material and better academic achievement. Furthermore, students' degrees of involvement can also be influenced by extrinsic motivating factors, such as the perceived value of LMS tools in achieving academic success. Students can approach their education with a more positive outlook when they see the immediate advantages of using educational technology, which reinforces their views of these platforms as vital parts of their education [21].

The relationship between motivation and self-efficacy concerning LMS views has been the subject of numerous studies. For instance, Kim *et al.* [22] demonstrates that students who have higher levels of self-efficacy also typically have more favorable opinions of LMS, which in turn raises their motivation levels. Because of this reciprocal link, educational institutions should take into account both conceptions to maximize the creation and use of digital learning resources. Al-Adwan [23] provide additional confirmation, emphasizing that the motivating techniques integrated into Learning Management Systems (LMS) can enhance students' engagement and connection with educational technology, hence fostering a more profound learning experience.

Additionally, Dindar *et al.* [24] emphasizes how crucial it is to continuously assess LMS functionality and interfaces in light of motivation and self-efficacy. Institutions can make well-informed adjustments that cater to various student profiles by acknowledging the evolving needs of their students and encouraging an atmosphere that fosters self-efficacy. This raises the perceived value of instructional tools while also enhancing overall educational outcomes. Additionally, as Yu *et al.* [25] points out, gamification components and customized learning pathways inside LMS have demonstrated the ability to boost motivation and self-efficacy, further solidifying students' favorable opinions of these platforms.

Understanding the factors that affect motivation and self-efficacy is essential to optimize the performance of learning management systems as educational institutions increasingly use digital resources to support learning. To provide students with more stimulating, encouraging, and productive learning experiences, educators must continue to pay attention to these psychological aspects as educational technology continues to evolve. This requires multidisciplinary approaches that integrate pedagogy, educational technology, and psychological insights to improve and continuously develop the educational environment in the digital age.

In addition, new research findings are needed to obtain constantly up-to-date information in this direction and to better understand the evolving learning management technology. It can be said that there are research gaps in the field.

A. Purpose of Study

This research aimed to evaluate students' perceptions of learning management and technologies. Within the scope of this purpose, the research questions developed were used to investigate the level of learning management and technologies used by university students and whether there were any differences.

The research questions are given below.

1) What is the usage of learning management and technologies by university students?
2) Do university students' use of learning management and technologies differ according to gender?
3) Do university students' use of learning management and technologies differ according to the variable of the department they study?
4) Do university students' use of learning management and technologies differ according to the class variable they study in?

II. Materials and Methods

This section is the section where the research method, sample group, data collection tools, data collection process, and data evaluation stages are introduced.

A. Research Method

This research was carried out in the screening model, one of the quantitative research designs, to determine the views of university students on Learning Management and Technologies. Screening studies are carried out to reveal the beliefs, expectations, attitudes, characteristics, and similar situations of a certain group of individuals. The study aimed to objectively present the current state of the subject. Additionally, it utilized larger sample sizes compared to other research methods [26].

B. Participants

The study group consisted of 312 students studying at various universities across Kazakhstan. The study utilizes a participant of 312 university students, which satisfies the recommended participants size for achieving valid and reliable results in social science research. Tabachnick and Fidell [27] assert that in statistical methods such as factor analysis, the determination of participant size should be guided by the number of variables analyzed, with 300 or more participants generally deemed adequate. Similarly, Field [28] emphasizes that statistical techniques, including factor analysis and structural equation modeling, necessitate a participant size at least ten times larger than the number of variables analyzed. Moreover, Field [28] underscores that findings derived from studies with participant sizes of 300 or more participants are both reliable and generalizable. In light of these guidelines, the participant size of 312 utilized in the present study is deemed sufficient to ensure the validity and reliability of the analyses conducted.

The participants in the study were selected from students actively engaged in education during the Fall 2023–2024 academic year. The demographic characteristics of the students are given in Table 1.

In Table 1, the gender, class, and department information of the university students participating in the research are given. 52.9% of the students participating in the research were female, and 47.1% were male. Among the 312 university students who participated in the study, 53.9% were

first-year students, while 46.1% were in their second year. The distribution of students by field of study was as follows: 27.5% in history, 25.7% in economics, 23.7% in architecture, and 23.1% in law.

Table 1. Demographic information of students

Demographic Status	Variables	n	%
Gender	Female	165	52.9
	Male	147	47.1
	Total	312	100
Class	Class 1	168	53.9
	Class 2	144	46.1
	Total	312	100
Departments	History	86	27.5
	Economy	80	25.7
	Architecture	74	23.7
	Law	72	23.1
	Total	312	100

n = Sample size, %= Percentage value

C. Data Collection Tools

"The perception of learning management and technologies scale" was developed by researchers. In the phase of designing the trial form for the development of the scale, the scale items were created by scanning the literature. The total number of created items was 41. A linguist reviewed the 41 items to ensure their compliance with grammatical rules. Then, the opinions of four professors working in the field of educational technology, whose articles were published in journals indexed in Scopus or Web of Science. At this stage, the technique developed by Lawshe [29] was used. A path consisting of 6 steps was followed in this technique: a) Formation of a group of field experts; b) Preparation of the candidate form; c) Obtaining expert opinions; d) Obtaining content validity rates for the items; e) Obtaining content validity indexes for the form; f) Formation of the final form according to the content validity rates/index criteria. For each item, expert opinions were graded as "the item measures the targeted structure," "the item is related to the structure but needs to be improved," and "the item does not measure the targeted structure." Lawshe's [29] content validity rate calculation was used in obtaining the content validity rates of the items. The minimum Content Validity Criterion (CVC) for four experts is 0.99 [26].

$$CVR = \frac{Nu}{N/2} - 1 \qquad \text{or} \qquad CVR = \frac{Nu - N/2}{N/2}$$

In this formula, Nu represents the number of experts who stated that "the item measures the targeted structure," and N represents the total number of experts who provided an opinion on the question. Accordingly, the calculated Content Validity Ratios (CVR) were found to be 1.00 by selecting the items for which all experts stated that "the item measures the targeted structure" to ensure that the content validity criterion was above 0.99 over 41 items. Twenty-three items were included in this scope.

The experts selected the most appropriate items for the study's scope from a pool of 41 items. Based on the evaluations of four experts, 23 items deemed suitable for the study were incorporated into the scale. A pilot version of the scale was then developed using these 23 selected items. The draft form was graded on a 5-point Likert scale between "strongly agree" and "strongly disagree." Then, the draft scale application group was created. The application group comprised 296 university students enrolled at various universities in Kazakhstan during the 2023–2024 academic year. Of these, 120 were female and 176 were male. In scale development studies, sufficient sample size is important to ensure that the validity and reliability analyses of the scale produce reliable results. Comrey and Lee [30] state that a sample size of 250–300 is good, and a sample size of 100–200 is acceptable in scale development or factor analysis studies. Similarly, Kline [31] emphasizes that at least 200 people will be sufficient in complex statistical methods such as factor analysis, but a sample size closer to 300 will increase the reliability of the analysis results. In this context, the sample of 296 people studied in the scale development phase complies with the sufficient size range recommended in the literature.

The scale development application for the students was carried out online. After the application, the Barlett Sphericity test and Kaiser-Meyer test were used to evaluate the construct validity. Olkin (KMO) value was calculated. Calculations have shown that the KMO value is 0.877. The result of Bartlett's Sphericity test is 3,775,015 ($p < 0.05$) is out. These values indicated that the data set was suitable for factor analysis. Exploratory Factor Analysis (EFA) was performed with SPSS 25.0. At this stage, the discrimination power of the scale items was examined. The intra-item-total correlation was calculated. Pearson correlation coefficient was used for item-total correlation calculation. During the exploratory factor analysis, the ProMax rotation technique was used. Items with a factor load greater than 0.32 were included in the scale, while two items with a factor load below 0.32 were excluded from the scale. After item subtraction, the factor structure of the scale was re-examined.

The remaining 21 items were found to comply with the specified criteria. In the EFA stage of the learning management and technologies scale, the percentage of the total variance explained by the factors was examined to determine the number of factors. Two sub-dimensions with an eigenvalue greater than one were found. The total variance explained by these two factors was found to be 79.451%. According to the transformed component matrix obtained by rotating with the Promax rotation method, nine items were found in the first factor and 11 items in the second factor. Since an item loaded on more than one factor, it was removed from the scale. After the procedures, Confirmatory Factor Analysis (CFA) for the learning management and technologies scale consisting of 20 items was performed with the SPSS Amos program.

Statistics on the concordance of the CFA results of the learning management and technologies scale are given in Table 2.

In Table 2, the values of goodness of fit, good fit values, and acceptable fit values obtained as a result of the analyses of the Learning Management and Technologies Scale are given together. The values accepted for goodness of fit indices in the literature are consistent with the results obtained in the study. Tabachnick and Fidell [27] stated that the following values should be considered for goodness of fit indices: $X^2/df \leq 3$, GFI ≥ 0.90, CFI ≥ 0.95, and RMSEA ≤ 0.08 are considered acceptable fit limits. Similarly, Hu and

Bentler [32] emphasize that CFI ≥ 0.95 and RMSEA ≤ 0.06 are indicators of a good fit.

Table 2. The goodness of fit index of the learning management and technologies scale

Scale	X^2	df	X^2/ df	GFI	CFI	RMSEA
Scale	288.96	136	2.124	0.966	0.97	0.064
Good Fit Values			≤3	≥0.90	≥0.97	≤0.05
Acceptable Fit Value			≤ 4–5	0.89–0.85	≥0.90	0.06–0.08

X^2 = Chi Square; df = Degrees of Freedom; GFI = Good Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Errors of Approximation

In the literature, $X^2/df \leq 3$ is recommended for acceptable fit [24]. The X^2/df (2.124) value is below this limit and indicates a good fit. According to the literature, GFI ≥ 0.90 is acceptable, and GFI ≥ 0.95 indicates a good fit [32]. The value of 0.966 obtained from the analysis result indicates a good fit. In the literature, CFI ≥ 0.95 is accepted as a good fit [32]. The CFI value of 0.97 obtained from the data set exceeds this limit and indicates a good fit.

Finally, in the literature, RMSEA ≤ 0.06 is considered a good fit, and 0.06 ≤ RMSEA ≤ 0.08 is considered an acceptable fit [32]. The RMSEA value of 0.064 is in the acceptable fit category. These results show that the factor structure of a scale generally provides a good and reliable model. Meeting the good fit limits of indices such as X^2/df, GFI, and CFI emphasizes that a scale is a strong fit with the data and that the factor structure is valid. An acceptable RMSEA value may imply that a small amount of improvement can be made to the model, but this value is within the limits generally accepted in the literature. As a result, the construct validity of the scale is strong, and it can be said that it is an effective tool for assessing students' attitudes in the context of learning management and technologies.

The changes in the number of scale items after the necessary modifications were made are given in Table 3.

Table 3. Number of factor items after EFA and CFA

Factors	Number of Articles After EFA	Number of Items After CFA
Factor 1	9	9
Factor 2	11	10

Table 3 shows the number of items included in the factors of the scale after EFA and CFA. The data obtained after applying the final modifications show that there are nine items in the first factor (motivation) and 10 items in the 2nd factor (self-sufficiency). The Learning Management and Technologies Scale consisted of a total of 19 items.

Item total correlation and Cronbach Alpha values of the learning management and technologies scale items are given in Table 4.

Table 4. The perception of learning management and technologies scale item factor loadings

Factor	Item No	Expressions	Item Total Correlation	Cronbach's Alpha
Motivation	1	Accessing course materials through the Learning Management System motivates me.	0.681	0.865
	2	Using the Learning Management System increases my interest in learning.	0.669	
	3	I am more involved in classes through the Learning Management System.	0.689	
	4	Using the Learning Management System effectively contributes positively to my academic success.	0.705	
	5	The use of educational technologies and the Learning Management System increases my belief that I can achieve my learning goals.	0.653	
	6	Interactive content offered through the Learning Management System increases my desire to learn.	0.700	
	7	The easy accessibility of the Learning Management System strengthens my commitment to learning.	0.620	
	8	Using the Learning Management System in group projects helps me be more motivated in the learning process.	0.599	
	9	Using the Learning Management System makes me feel like my learning efforts are paying off.	0.639	
Self-sufficiency	10	I believe that I can easily find the materials I need in the Learning Management System.	0.735	0.809
	11	I can follow the lessons independently using the Learning Management System.	0.702	
	12	I am confident in using educational technologies and Learning Management Systems.	0.782	
	13	I can effectively use the tools provided in the Learning Management System in my learning process.	0.733	
	14	I have no trouble exploring the Learning Management System on my own.	0.720	
	15	Thanks to educational technologies and the Learning Management System, I can manage my time effectively.	0.710	
	16	I can improve my academic performance by using the features of the Learning Management System.	0.697	
	17	I can solve the problems I encounter while using educational technologies and Learning Management Systems on my own.	0.774	
	18	I can complete my homework and projects without any problems through the Learning Management System.	0.744	
	19	I think I can achieve my academic goals by using the Learning Management System effectively.	0.729	
Cronbach's Alpha for Total Scale				0.842

In Table 4, item-total correlations, Cronbach's Alpha coefficients related to learning management and technologies scale factors, and Cronbach's Alpha coefficient for the overall scale are given. The item-total correlations of the items in the "Motivation" factor range between 0.599 and 0.705. The item-total correlations of the items in the "self-efficacy" factor are between 0.697 and 0.782.

Reliability analysis included the calculation of Cronbach's Alpha, stratified Alpha construct reliability. In the reliability analysis of the two-factor structure of the scale, the

motivation sub-dimension Cronbach's Alpha value was found to be 0.865, and the self-efficacy sub-dimension Cronbach's Alpha value was 0.809. For the general learning management and technologies scale, Cronbach's Alpha value was found to be 0.842. Self-efficacy subscale Cronbach's Alpha value is 0.792; Cronbach's Alpha value of the optimism sub-dimension was found to be 0.833, and Cronbach's Alpha value of the individual learning sub-dimension was found to be 0.804. Cronbach's Alpha value for the overall scale was found to be 0.812. Following an analysis of the scale's data, it was concluded that the scale's internal consistency and sub-dimensions both showed adequate reliability.

The items in the developed scale were prepared according to a 5-point Likert-type rating scale. The score ranges were considered to be of equal intervals. Accordingly, a score between 1.00 and 1.80 was categorized as "strongly disagree," a range from 1.81 to 2.60 as "disagree," a range from 2.61 to 3.40 as "partially agree," a range from 3.41 to 4.20 as "agree," and a range from 4.21 to 5.00 as "strongly agree."

D. Data Collection Process

The learning management and technologies scale developed by the researchers was applied online to the university students who constituted the sample group of the research. The scale application, which was delivered to students via Google form, was completed in approximately 3 weeks. During the scale development process, it was determined that the application time of the scale was 10–15 minutes.

E. Compliance with Ethics

This research was designed and conducted by ethical rules. Before initiating the research, the study design, participant rights, and data security protocols were meticulously planned. Necessary permissions were obtained from the institutions where the research data were collected, specifically the universities in which the participating students were enrolled. In the universities in Kazakhstan where the study was conducted, voluntary participation was emphasized, ensuring that no coercion or pressure was applied during the process. Data collection was conducted via online platforms, and participants' identities were not recorded, thereby guaranteeing anonymity. At the outset of the research, participants were explicitly informed that the data they provided would be used solely for academic purposes and would not be shared with third parties. All data were securely stored and were accessible only to the research team. Participants were thoroughly informed about the purpose, scope, and anticipated contributions of the research before their involvement. Only data from individuals who provided explicit consent were included in the analysis. Additionally, participants were informed of their right to withdraw from the study at any stage without any consequences. During the online data collection process, tools and secure connections adhering to data protection standards were utilized to ensure the confidentiality and integrity of the data. All data obtained were analyzed anonymously because they did not contain personally identifiable information. During the data storage process, encrypted storage methods were used to prevent third parties from accessing participants' information. In this context, ethical rules were adhered to at every stage of the research process, and both the protection of participants' rights and the security of the obtained data were prioritized. The research was conducted in full compliance with international ethical standards and relevant guidelines.

F. Data Analysis

SPSS 25.0 program was used in data analysis. Kolmogorov-Smirnov test was applied to decide which tests to apply to the data set. As a result of the analysis, it was determined that the data set ($p < 0.05$) showed a normal distribution. In this regard, it was determined that parametric tests would be applied to the dataset obtained from the learning management and technologies scale. Independent samples t-test was used in the analysis of bivariate data, and one-way Analysis of Variance (ANOVA) was used in the analysis of data with more than two variables.

III. Results

To evaluate the perceptions of university students regarding learning management and technologies, the "Learning Management and Technologies Scale" was developed and applied to university students. In this section, the scores obtained by university students on the Learning Management and Technologies Scale are presented.

In Table 5, the weighted average and standard deviations of the learning management and technologies scale of the university students participating in the research are given.

Table 5. Weighted average and standard deviations of learning management and technologies scale

Scales	*M*	SD
Motivation	4.35	0.842
Self-sufficiency	3.88	0.693
Total scale	4.10	0.805

M = Mean, SD = Standard Deviation.

In Table 5, the learning management and technologies scale motivation sub-dimension ($M = 4.35$, SD = 0.842), self-efficacy sub-dimension ($M = 3.88$, SD = 0.693), and the overall scale ($M = 4.10$, SD = 0.805) weighted average and standard deviations are given. These findings show that students have very high attitudes toward learning management and technology motivation and high levels of self-efficacy. It was also determined that students had high attitudes towards learning management and technologies.

In Table 6, the t-test results of the independent variables of the attitudes of the university students participating in the research towards the learning management and technologies scale are given according to the gender variable.

Table 6. T-test results of independent variables according to gender variable

Gender	*n*	*M*	SD	*F*	*p*
Female	165	3.88	0.811	12.698	0.000
Male	147	4.35	0.665		

n = Sample size, *M* = Mean, SD = Standard deviation, *F* = Test of equality of variances, *p* = Null hypothesis

In Table 6, the independent variables t-test results ($F = 12.698$, $p < 0.5$) of the attitudes of the university students participating in the research towards the learning management and technologies scale according to the gender variable are given. This result reveals that there is a significant difference between male and female students. According to the results, male students' attitudes towards

learning management and technologies were found to be higher than female students.

In Table 7, the independent variables t-test results of the attitudes of the university students participating in the research towards the learning management and technologies scale according to the class variable they are studying are given.

Table 7. t-test results of independent variables according to the class of education

Class	*n*	*M*	SD	*F*	*p*
1. Class	168	4.07	0.651	4.754	0.880
2. Class	144	4.12	0.644		

n = Sample size, *M* = Mean, SD = Standard deviation, *F* = Test of equality of variances, *p* = Null hypothesis

In Table 7, the t-test results of the independent variables ($F = 4.754$, $p > 0.5$) of the attitudes of the university students participating in the research towards the learning management and technologies scale according to the class variable they are studying are given. This result reveals that the 1st and 2nd-grade students' attitudes toward learning management and technologies are similar.

In Table 8, the one-way analysis of variance ANOVA results of the attitudes of the university students participating in the research towards the learning management and technologies scale according to the variable of the department they studied are given.

Table 8. One-way analysis of variance ANOVA results according to the Department of Education

Departments	*n*	*M*	SD	*F*	*p*
History	86	4.04	0.683	6.565	0.620
Economy	80	4.17	0.441		
Architecture	74	4.07	0.436		
Law	72	4.13	0.699		

n = Sample size, *M* = Mean, SD = Standard deviation, *F* = Test of equality of variances, *p* = Null hypothesis

Table 8 shows the one-way analysis of variance ANOVA results ($F = 6.565$, $p > 0.5$) of the attitudes of the university students participating in the study towards the Learning Management and Technologies Scale according to the department variable in which they study. This result reveals that the students studying in the departments of history, economy, architecture, and law have similar attitudes towards learning management and technologies.

IV. Discussions

The university students participating in the research have a very high attitude toward learning management and technology motivation and a high degree of self-efficacy. The general attitudes of students towards learning management and technologies are found to be a high degree. Eom [33] investigated students' satisfaction with learning management systems in online learning. As a result of the research, it was determined that students' satisfaction with learning management systems was high, and the quality of information and readiness had an effect on student satisfaction. In addition, there are studies in the field that show that learning management systems have a positive effect on course success [34–36].

It is seen that the attitudes of the university students participating in the research towards the learning management and technologies scale differ according to the gender variable. It was determined that the significant difference was in favor of male students. This finding aligns with previous research indicating that male students tend to have a more positive attitude toward the use of Information and Communication Technologies (ICT). For example, a study by Al-Azawei [37] found that male students have a higher acceptance of Learning Management Systems (LMS) than female students. In contrast, other studies have reported different trends. A meta-analysis conducted by Campos and Scherer [38] revealed that female students demonstrate higher proficiency in digital skills compared to their male counterparts. The study suggests that this disparity may stem from differing perspectives: while male students exhibit a more positive attitude toward technology, female students possess greater competence in specific digital competencies. Contrary to this research, Chua and Montalbo [39], in their study aiming to determine the satisfaction of learners in learning environments, found that there was no significant difference between male and female students and that the satisfaction of all students was high.

These mixed findings suggest that gender differences in attitudes toward educational technologies are complex. Research conducted in disciplines such as history, economics, architecture, and law suggest that male students in these fields may exhibit more positive attitudes toward the use of Learning Management Systems (LMS). However, the inconsistencies observed across studies highlight the need for further investigation into how factors such as academic discipline, cultural context, and prior experience with technology influence these attitudes. Understanding these nuances is critical to developing targeted strategies to increase LMS participation in different student groups.

It was determined that the attitudes of university students towards the learning management and technologies scale did not differ significantly according to the grade variable. Nevertheless, 1st and 2nd-year students had similar attitudes. This finding is consistent with the study by Odekeye *et al.* [40], which found that students' satisfaction with learning management systems did not differ significantly according to their year of study. In contrast, a study by Alshorman and Bawaneh [41] found that students' attitudes toward using learning management systems differed according to the grade level they were studying in, with first-year students exhibiting more positive attitudes. These different results suggest that attitudes toward learning management systems may vary according to the grade level, but this effect may differ depending on the context and characteristics of the participants. The findings of the present study, which indicate that the attitudes of students in disciplines such as history, economics, architecture, and law did not vary according to grade level, suggest that students within these fields may share similar experiences and needs related to technology use.

Similarly, it was determined that the attitudes of the university students participating in the research towards the learning management and technologies scale did not make a significant difference according to the variable of the department they studied and the students studying in the departments of history, economics, architecture, and law had similar attitudes. This finding is consistent with the study by Öztürk *et al.* [42], which reported that most learners,

regardless of age, gender, or academic department, expressed satisfaction with the use of the Learning Management System.

Tabachnick & Fidell [27] evaluated student attitudes toward learning management systems and determined that their attitudes towards learning management systems were high, regardless of age and department variables.

Possible reasons for the similar results may include the similar perception of standardized and user-friendly interfaces offered by learning management systems by students in different departments. In addition, the widespread and consistent use of LMS in all departments of universities may contribute to students' attitudes towards these systems being similar regardless of department. Another possible reason for the similar results is that the basic functions that students need when using learning management systems (accessing course materials, uploading homework, participating in exams, among other things) are largely similar across departments. This may provide a user experience that does not differ across departments and shape student attitudes on a common level. In addition, general access to digital technologies and the increasing homogeneity of students' technological literacy levels may have a balancing effect on attitudes toward learning management systems. In particular, familiarity with technology and widespread daily use may create similarities in student perceptions regardless of department. However, these findings do not directly imply that learning management systems meet the needs of all departments equally. Future studies should examine the unique educational needs of different departments and how these systems respond to these needs in more detail. Thus, by going beyond the current use of learning management systems, more customized and department-based applications can be designed.

In conclusion, the lack of variation in attitudes toward Learning Management Systems (LMS) based on academic departments suggests that these systems generally provide a user-friendly and inclusive design. However, implementing department-specific enhancements to tailor these systems to the unique needs of different disciplines could further improve their effectiveness and responsiveness, thereby enhancing overall user satisfaction and success.

A review of the research conducted in the field revealed that numerous studies identified the necessity for learning management systems to incorporate features that facilitate ease of use for students [43–48].

V. Conclusion and Recommendations

Since technology and education were combined, there has been a constant renewal in educational content. Learning management systems also create positive effects in the education process of students with the integration of technology into education. Since learning management systems are student-oriented, they allow the active participation of students. For this reason, it is important to get students' opinions on learning management systems. From this point of view, this study is aimed at examining the students' learning management and use of technologies. The findings show that students' general attitudes toward learning management systems are high and that these systems are used effectively by students.

Significant differences were observed according to the gender variable within the scope of the research; it was determined that male students' attitudes towards learning management systems were more positive than female students. However, this finding contradicts some studies suggesting that women have higher digital competence levels. This situation reveals that attitudes towards technology and digital skills have a complex structure and that the effects of gender in these areas may vary depending on the context and participant profile. Criteria should be determined to ensure that the attitudes of university students towards learning management systems are at a similar level for male and female students, and experts' opinions should be consulted in this regard.

The research indicated that class level did not create a significant difference in attitudes toward learning management systems. This situation shows that students perceive and use learning management systems similarly regardless of their class level. Similarly, the department variable did not have a significant effect on attitudes. It was determined that students studying in different disciplines, such as history, economics, architecture, and law, exhibited similar attitudes toward learning management systems. This finding shows that the standardized and user-friendly structures offered by learning management systems can minimize the effect of differences between departments. Institutions should consider students' attitudes and expectations when choosing learning management systems.

As a result, students' positive attitudes towards learning management systems indicate that these systems generally meet user needs. However, to make the systems more effective and user-focused, detailed analyses based on gender, class, and department are important. This research emphasizes that learning management systems offer inclusive designs, but it also reveals that future studies should focus on how the systems can meet the unique needs of different user groups.

This study was conducted with 1st and 2nd-year university students on learning management systems. It is anticipated that replicating this study with larger sample sizes while considering current practices will further contribute to the field. It is recommended to expand the study to include students from different academic years and departments. Investigating such variations could lead to more tailored and effective solutions regarding the design and functionality of Learning Management Systems (LMS). Moreover, studies involving more diverse sample groups would offer a broader range of perspectives on LMS usage. Replicating studies in varied contexts may also provide insights into how cultural, socioeconomic, and educational differences influence attitudes toward LMS, thereby laying the groundwork for future research in this area.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

AMA Conceptualization, Investigation; AAM Project administration, Writing-review & editing; ZMZ Data curation, Formal analysis; MAE Methodology, Resources; LM Validation, Visualization. All authors had approved the final version.

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