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Study of Student Satisfaction in Using the Moodle E-Learning System: PLS-SEM Approach

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ABSTRACT

This research investigates the factors influencing student satisfaction in using the Moodle E-Learning system in a higher education environment. We apply the Structural Equation Modeling Partial Least Squares (SEM PLS) method to explore the relationship between relevant variables, such as Moodle system quality, service quality, learning quality, level of system use, and student perceptions of their satisfaction. This research uses data collected from a sample of students who use Moodle as an E-Learning platform. The results of the SEM PLS analysis will provide insight into the influence of each variable on student satisfaction and how these factors are interconnected. The results of this research will help higher education institutions increase the use of Moodle as an effective online learning tool. In addition, the findings of this research will provide a deeper understanding of the critical elements that influence student satisfaction in the E-Learning context.

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1. INTRODUCTION

In this digital era, higher education has experienced fundamental changes in the way learning and teaching are carried out. Information and communications technology has made distance education more affordable, allowing students to access learning resources from anywhere [1]. E-Learning System covers various platforms and applications and has become a significant component in technology-based education [2]. Wrongone's popular platform is Moodle, which is known for providing access to high-quality education via the Internet [3], [4]. However, to ensure its effectiveness, it is essential to understand how Moodle meets students' needs and elicits satisfaction in the online learning context. Studies on student satisfaction in using E-Learning platforms such as Moodle have an essential impact on the development of distance education and technology in education. Student satisfaction is one of the critical factors influencing retention, participation, and learning outcomes [5]. Therefore, a deeper understanding of the factors influencing student satisfaction in using Moodle will help decision-makers in higher education institutions improve online learning quality and meet student expectations. Although E-Learning platforms such as Moodle are widely used, several challenges arise in measuring and improving student satisfaction. Using Moodle involves various elements, including system

quality, service, learning, and level of use [6]. Understanding how these factors interact and contribute to student satisfaction is a challenge that needs to be addressed. Therefore, this research aims to fill this knowledge gap by applying the Structural Equation Modeling Partial Least Squares (SEM PLS) approach to analyze the relationships between relevant variables. The main objective of this research is to identify factors that influence student satisfaction in using Moodle as an E-Learning platform. Thus, this research will provide deeper insight into how higher education institutions can improve the quality of Moodle use in online education. In addition, the results of this research can provide better guidance for decision-makers in higher education institutions to strengthen E-Learning platforms and meet student expectations in the online learning process. This research will contribute to understanding the factors influencing student satisfaction using the e-learning platform. The results of this research can also provide practical guidance for the development and improvement of the Moodle platform as well as more appropriate pedagogical approaches for online learning. Thus, this research will benefit higher education institutions, students, and educational technology developers.

2. THE COMPREHENSIVE THEORETICAL BASIS

2.1. Platform E-Learning and Moodle

An E-Learning Platform is a system or software designed to facilitate electronic learning. By using information and communication technology, this platform allows interaction between teachers and students in a digital environment [7]. The advantage of using an E-Learning platform is its ability to provide flexible and structured access to learning content, allowing students to learn at a time and place that suits their needs. E-learning platforms have changed the educational paradigm, opening the door to distance learning and expanding the accessibility of higher education [8]. One of the E-Learning platforms that has received widespread recognition is Moodle. Moodle, a "Modular Object-Oriented Dynamic Learning Environment," is an open-source platform designed to support online learning. The uniqueness of Moodle lies in its ability to be customized and adapted to suit the needs and learning objectives of various educational institutions [9]. Moodle provides a comprehensive and interactive learning environment with features such as discussion rooms, online assignment submission, and an integrated assessment system. Since its first release in 2002, Moodle has become one of the most popular E-Learning platforms in the world, used by thousands of higher education institutions to provide quality online learning [10]. The use of Moodle brings various advantages to higher education institutions. In addition to enabling remote access to education, Moodle allows teachers to manage and monitor student progress effectively. Collaborative features like discussion forums and interactive quizzes allow for more dynamic interaction and evaluation between instructors and students [11]. However, some challenges need to be overcome in implementing Moodle. Commitment and training are required to maximize the potential of this platform, and efficient management of learning content is critical to successfully utilizing Moodle as a practical learning tool.

2.2. Student Satisfaction in Online Learning

Student satisfaction in online learning is a critical factor influencing retention, motivation, and learning outcomes. Previous research has identified various factors affecting student satisfaction with the online learning experience. One of the main factors is the quality of learning and teaching content, including clarity of material and relevance to learning objectives [12]. Therefore, effective interaction between students and teachers through E-Learning platforms also plays a vital role in shaping student perceptions and satisfaction. Technical factors such as platform reliability, ease of use, and accessibility influence student satisfaction with online learning [13]. Measuring student satisfaction is critical to improving the quality of online learning. This evaluation can provide valuable insight into the effectiveness of the E-Learning platform and the learning methods used. Previous studies have shown that student satisfaction with using E-Learning platforms is positively correlated with their level of participation and learning outcomes [14]. Therefore, understanding the factors that influence student satisfaction in the context of using Moodle is essential for developing and improving online education in higher education. By integrating an in-depth look at student satisfaction in this research, we can build a strong foundation for enhancing E-Learning platforms and providing students with a more satisfying learning experience.

2.3. The Influence of System Quality on User Satisfaction

System quality, including the technical and functional quality of the Moodle platform, plays a crucial role in shaping user satisfaction, especially for students. System quality includes platform stability, perfor-

mance, security, ease of use, and existing functionality [15], [16]. A positive user experience regarding these aspects can increase their satisfaction level. For example, users who do not experience significant technical problems are more likely to feel satisfied using the platform [17]. Therefore, it is essential to evaluate and understand the contribution of the quality of the Moodle system to student satisfaction in online learning. Several previous studies have investigated the relationship between system quality in the E-Learning context and student satisfaction. The results of this research have provided evidence that high system quality contributes positively to user satisfaction. Students who experience minimal technical glitches, find the platform easy to use, and feel that the system meets their learning needs tend to be more satisfied [18]. Thus, understanding and evaluating the quality of the Moodle system in the student experience will help increase the platform's effectiveness in providing high-quality distance education.

2.4. Service Quality and User Experience

The quality of service when using e-learning platforms, including Moodle, significantly influences the user experience, especially for students. Service quality includes interaction between teachers and students, technical support, and platform responsiveness to user needs [19]. In a learning context, where physical interaction is limited, quality service is one of the main ways to help students feel connected to the educational institution and supported in the learning process [20]. Therefore, understanding how service quality influences student satisfaction in using Moodle is essential. Previous research has shown that service quality in the E-Learning context positively impacts user satisfaction, including students. Students who feel supported, get quick responses to questions, and feel connected to their instructors tend to be more satisfied using the E-Learning platform. This creates a more positive and productive learning environment [21]. Therefore, this research will analyze how service quality factors in the Moodle context influence student satisfaction and user experience. Although service quality is essential, managing services in an online learning context also brings challenges. One of them is ensuring timely and efficient responses to student questions, especially in learning environments that can reach thousands of students. Appropriate planning, training, and technology are needed to meet student expectations [22]. Therefore, a deeper understanding of service quality in the context of Moodle will help higher education institutions overcome these challenges and provide optimal support to students in online learning.

3. RESEARCH METHODOLOGY

Within the framework of this research, we will apply a quantitative research methodology using the Structural Equation Modeling Partial Least Squares (SEM PLS) approach. The PLS-SEM method was chosen because it allows us to analyze complex relationships between variables in the context of student satisfaction using Moodle as an E-Learning platform.

Table 1. Research variable

Variable	Description
System Quality	Technical evaluation of platform functionality, including stability, performance, security, and ease of use.
Service quality	Factors influencing interaction between students and lecturers, technical support, and ease of access to information.
Quality of learning	Evaluation of the quality and ease of accessing learning materials.
System Usage Rate	Level of student participation and interaction in using the E-Learning platform.
Student Satisfaction	Overall level of student satisfaction in using the E-Learning platform.

The hypothesis in this research is based on an analysis that identifies factors that influence student satisfaction in using the Moodle E-Learning platform. Based on the findings and research framework, the following hypotheses are proposed:

Table 2. Hypothesis

Hypothesis	**Research variable**	Channel	Description
H1	System quality	KS → TP	System quality has a positive influence on the level of system use.
H2	Service quality	KP → KM	Service quality has a positive influence on student satisfaction.
H3	Quality of learning	KB → KM	Learning quality has a positive influence on student satisfaction.
H4	System Usage Rate	TP → KM	The level of system use has a positive influence on student satisfaction.
H5	System quality	KS → KP	System quality has a positive influence on service quality.
H6	System quality	KS → KB	System quality has a positive influence on learning quality.

The required data will be collected through a specially designed questionnaire survey. This questionnaire will include questions allowing us to measure the above variables and students' perceptions of their satisfaction with using Moodle. We will ensure that this questionnaire meets the standards of validity and reliability in measuring the variables involved.

The collected data will be analyzed using statistical software suitable for SEM PLS analysis. This method allows us to identify relationships between variables and the relative contribution of each variable to student satisfaction. Thus, this research method will allow us to answer previously posed research questions and achieve the objectives of this research with a high degree of accuracy.

4. RESULT AND DISCUSSION

The results of this research involve a series of data validation steps and SEM PLS analysis to test the hypotheses proposed in the research framework. The first step was testing the validity of the data using Cronbach's alpha, where we ensured the accuracy and reliability of the data collected through a questionnaire survey. Cronbach's alpha is used to measure the internal reliability of the measuring instruments used in the study.

Table 3. Data Validity Test

Variable	**Cronbach Alpha**	rho_a	rho_c	AVE
KB	0.837	0.841	0.891	0.671
KM	0.749	0.779	0.840	0.572
KP	0.849	0.852	0.899	0.690
KS	0.860	0.866	0.905	0.705
City	0.848	0.852	0.897	0.686

The results of data validity trials show that the data used in this research has a high level of reliability, with a significant Cronbach's alpha value. This indicates that the measuring instruments used to measure the variables in the study have good consistency and are reliable.

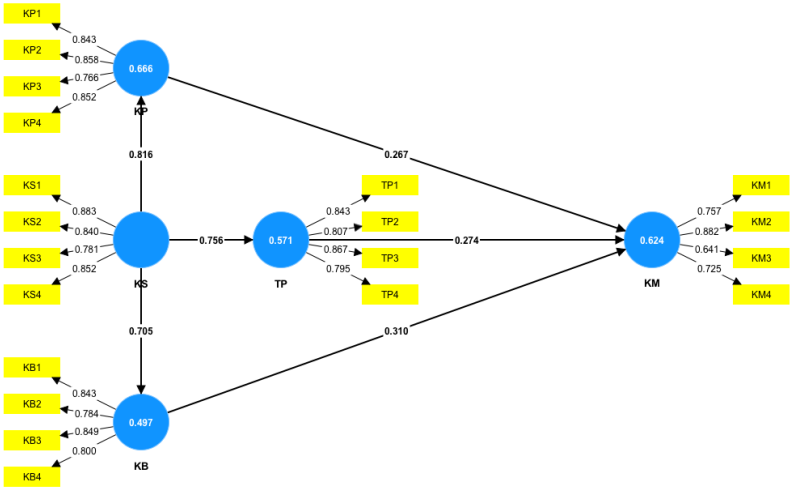

Figure 1. SmartPLS Analysis

Next, we conducted SEM PLS analysis to test the relationships between the variables in the model. The results of this analysis confirm the relationship between variables by the hypothesis proposed in the research. The path coefficient results for each hypothesis are as follows.

- Hypothesis H1 found that Moodle System Quality (KS) positively and significantly affects System Usage Level (TP) with a path coefficient of 0.756.
- Hypothesis H2 was also proven that Service Quality (KP) positively and significantly affects Student Satisfaction (KM) with a path coefficient of 0.267.
- Hypothesis H3 supports that Learning Quality (KB) positively and significantly affects Student Satisfaction (KM) with a path coefficient of 0.310.
- Hypothesis H4 was also proven correct, showing that the Level of System Use (TP) positively and significantly affects Student Satisfaction (KM) with a path coefficient of 0.274.
- Apart from that, the analysis results also confirm hypotheses H5 and H6, which show that Moodle System Quality (KS) has a positive effect on Service Quality (KP) and Learning Quality (KB) with path coefficients of 0.816 and 0.705.

These results support the hypothesis proposed in this research and indicate that system quality, service quality, learning quality, and level of system use positively influence student satisfaction in using Moodle as an E-Learning platform. These findings have important implications for higher education institutions and the development of E-Learning platforms to improve the quality of online learning and student satisfaction.

4.1. Problem

The research problem in this study is related to the need to understand the factors influencing student satisfaction in using the Moodle E-Learning platform in higher education. Although E-Learning platforms have grown, many challenges still need to be overcome, especially in ensuring that the online learning experience meets students' expectations [23], [24]. The main problem is how system quality, service quality, learning quality, and level of system use are interconnected and influence student satisfaction. Apart from that, this problem also includes how higher education institutions can increase the effectiveness of using Moodle as an effective online learning tool, meet student expectations, and support the development of better distance education. Therefore, this research aims to identify and answer this problem using the Structural Equation Modeling Partial Least Squares (SEM PLS) approach to analyze the relationship and impact of relevant variables.

5. CONCLUSION

This research investigates the factors influencing student satisfaction using the PLS SEM-based Moodle E-Learning platform. The analysis results confirm that system quality, service quality, learning quality, and level of system use significantly influence student satisfaction. This shows that improving the quality and use of E-Learning platforms can contribute directly to student satisfaction with their use. This research has important implications for higher education institutions and E-Learning platform developers. Improving system quality, providing responsive services, improving the quality of learning, and encouraging higher usage levels can be effective strategies for increasing student satisfaction and supporting more effective online learning. In an ever-evolving digital era, efforts to improve the quality and use of E-Learning platforms are becoming increasingly relevant, and this research makes an essential contribution to that understanding.

5.1. Suggestion

We hope that the findings from this research will provide significant value for the development of industry, society and the academic community. We hope this research results can provide a solid basis for policy improvements, best practices, or even deeper follow-up research in this area. An integrative model can be developed for further research by combining factors influencing student satisfaction with other relevant variables, such as academic achievement, participation and student retention. Comparative research that compares student satisfaction in using Moodle with other E-Learning platforms will also provide valuable insight in determining the relative advantages and disadvantages of various platforms. A deeper analysis of aspects of service quality, such as response time, accessibility, and technical support, can identify the elements that most influence student satisfaction. Additionally, using case studies and qualitative approaches to gain deeper insight into students' experiences of using Moodle could be a valuable contribution.

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