



USER ADOPTION READINESS OF AN ARTIFICIAL INTELLIGENCE-BASED LEARNING MANAGEMENT SYSTEM (LMS) IN HIGHER EDUCATION: A CASE STUDY AT TELKOM UNIVERSITY

KESIAPAN ADOPSI PENGGUNA TERHADAP SISTEM MANAJEMEN PEMBELAJARAN (LMS) BERBASIS KECERDASAN BUATAN DI PERGURUAN TINGGI: STUDI KASUS DI UNIVERSITAS TELKOM

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Abstract

The development of Artificial Intelligence (AI)-based Learning Management Systems (LMS) offers significant potential to enhance the effectiveness of higher education through learning personalization, learning analytics, and the automation of academic processes. However, the successful implementation of AI-based LMS is not solely determined by technological sophistication, but also by users' readiness to adopt the technology. This study aims to analyze the *user adoption readiness* of students and lecturers toward AI-based LMS and to examine the effects of *perceived usefulness*, *perceived ease of use*, and *trust in AI* on such readiness. This study employs a mixed-method approach with a sequential explanatory design. The quantitative phase was conducted through a survey of students and lecturers in higher education institutions using a Likert-scale questionnaire, and the data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). Subsequently, the qualitative phase involved in-depth interviews to further explain and enrich the quantitative findings, which were analyzed using thematic analysis. This study hypothesizes that *perceived usefulness*, *perceived ease of use*, and *trust in AI* have a positive influence on *user adoption readiness* in the use of Artificial Intelligence-based Learning Management Systems (LMS). This study is expected to contribute theoretically to the literature on AI-based educational technology adoption and practically to higher education institutions in developing more effective AI-based LMS implementation strategies that are aligned with users' readiness.

Keywords : AI-Based LMS, User Adoption Readiness, Perceived Usefulness, Perceived Ease of Use, Trust in AI, Higher Education.



Abstrak

Pengembangan Learning Management System (LMS) berbasis Kecerdasan Buatan (Artificial Intelligence/AI) menawarkan potensi signifikan untuk meningkatkan efektivitas pendidikan tinggi melalui personalisasi pembelajaran, analitik pembelajaran, dan otomatisasi proses akademik. Namun, keberhasilan penerapan LMS berbasis AI tidak hanya ditentukan oleh kecanggihan teknologi, tetapi juga oleh kesiapan pengguna dalam mengadopsi teknologi tersebut. Penelitian ini bertujuan untuk menganalisis kesiapan mahasiswa dan dosen dalam mengadopsi LMS berbasis AI, serta mengkaji pengaruh persepsi kegunaan, persepsi kemudahan penggunaan, dan kepercayaan terhadap AI terhadap kesiapan tersebut. Studi ini menggunakan pendekatan metode campuran (mixed-method) dengan desain eksplanatori sekuensial. Tahap kuantitatif dilakukan melalui survei terhadap mahasiswa dan dosen di perguruan tinggi menggunakan kuesioner berskala Likert, dengan data yang dianalisis menggunakan Structural Equation Modeling–Partial Least Squares (SEM-PLS). Selanjutnya, tahap kualitatif melibatkan wawancara mendalam untuk menjelaskan lebih lanjut dan memperkaya temuan kuantitatif, yang kemudian dianalisis menggunakan analisis tematik. Penelitian ini berhipotesis bahwa persepsi kegunaan, persepsi kemudahan penggunaan, dan kepercayaan terhadap AI memiliki pengaruh positif terhadap kesiapan pengguna dalam mengadopsi LMS berbasis AI. Studi ini diharapkan dapat memberikan kontribusi secara teoretis terhadap literatur mengenai adopsi teknologi pendidikan berbasis AI, serta secara praktis bagi perguruan tinggi dalam mengembangkan strategi penerapan LMS berbasis AI yang lebih efektif dan selaras dengan kesiapan pengguna.

Kata Kunci : LMS Berbasis AI, Kesiapan Adopsi Pengguna, Persepsi Kegunaan, Persepsi Kemudahan Penggunaan, Kepercayaan terhadap AI, Pendidikan Tinggi.

1. INTRODUCTION

The rapid advancement of digital technology has brought significant changes to various aspects of human life, including higher education. Higher education institutions are required to adapt to technological developments in order to improve the quality of learning, enhance the effectiveness of academic management, and strengthen institutional competitiveness. One of the key forms of this adaptation is the implementation of a Learning Management System (LMS) as the primary platform for supporting online and hybrid learning.

Along with the rapid development of Artificial Intelligence (AI), LMSs no longer function merely as platforms for distributing learning materials but have evolved into intelligent systems capable of providing personalized learning experiences, learning analytics, and data-driven decision support. AI-based LMSs offer substantial opportunities to enhance students' learning experiences while improving teaching efficiency for instructors. However, the successful implementation of such technologies depends not only on the readiness of the technological infrastructure and system capabilities but also on the readiness of users to adopt and utilize them effectively.

Within the context of higher education, students and lecturers are the primary users of AI-based LMSs, each having distinct roles and needs. Students interact with the system as learners, whereas lecturers serve as learning facilitators and course managers. These differing roles may influence their perceptions, trust, and readiness to adopt AI-based technologies. Therefore, understanding users' adoption readiness is an essential prerequisite before AI-based LMSs can be implemented on a broader scale.

Previous studies have shown that the adoption of educational technologies is largely influenced by users' perceptions of usefulness and ease of use (Venkatesh & Davis, 2000). However, in the context of AI technologies, which are characterized by greater complexity and autonomy, trust in AI systems has emerged as a critical determinant of technology adoption. Without sufficient trust, users



may hesitate or even refuse to use AI technologies, despite the significant benefits these systems can offer (Rai et al., 2019).

Numerous studies have also indicated that although Learning Management Systems have been widely implemented in higher education institutions, their adoption and utilization remain suboptimal. Al-Busaidi and Al-Shihi (2012) found that many LMS users primarily utilize basic features, such as uploading learning materials, while interactive and collaborative functionalities are rarely employed. This finding suggests a gap between the technological capabilities of LMSs and their actual use in educational practice. Similarly, Sun et al. (2008) identified that perceived usefulness and perceived ease of use alone are insufficient to maximize LMS utilization, particularly when users encounter technical difficulties or inadequate system support. More recently, Zawacki-Richter et al. (2019) emphasized that despite the continuous advancement of educational technologies, including the integration of Artificial Intelligence, users still exhibit resistance and uncertainty, particularly due to the complexity of AI technologies and limited understanding of their functionalities. Furthermore, Dhawan (2020) demonstrated that the accelerated adoption of LMSs during the COVID-19 pandemic was not always accompanied by adequate user readiness, resulting in significant challenges for higher education institutions in ensuring effective and sustainable system utilization.

These findings highlight an empirical gap between the availability and sophistication of LMS technologies and the actual readiness and acceptance of their users. Consequently, further research is necessary to better understand the factors influencing user adoption readiness, particularly in the context of AI-based Learning Management Systems.

Based on these circumstances, research on user adoption readiness toward AI-based Learning Management Systems is both relevant and necessary. This study aims not only to identify the level of adoption readiness among students and lecturers but also to investigate the factors influencing such readiness. The findings are expected to provide valuable insights for higher education institutions in designing effective, sustainable, and user-centered implementation strategies for AI-based Learning Management Systems.

2. RESEARCH METHOD

This study employs an explanatory research design, aiming to examine and explain the relationships and effects of perceived usefulness, perceived ease of use, and trust in artificial intelligence on user adoption readiness in the adoption of an Artificial Intelligence (AI)-based Learning Management System (LMS) in higher education. Explanatory research is appropriate when researchers seek to test causal relationships among variables based on well-established theoretical frameworks. According to Sugiyono (2019), explanatory research aims to explain the positions of the variables under investigation and the relationships among those variables.

Based on its methodological approach, this study adopts a mixed-methods approach using a sequential explanatory design, in which quantitative data are collected and analyzed first, followed by qualitative data collection and analysis to provide a deeper explanation and interpretation of the quantitative findings. This approach was selected because it provides a more comprehensive understanding of the research phenomenon than the use of a single method alone. Creswell (2014) explains that the sequential explanatory design is particularly appropriate when quantitative statistical results require further interpretation through qualitative data.

In terms of data type, this study utilizes both quantitative and qualitative data. Quantitative data are collected through a survey using a Likert-scale questionnaire administered to students and lecturers and are subsequently analyzed using Structural Equation Modeling–Partial Least Squares (PLS-SEM). PLS-SEM is chosen because it is prediction-oriented, does not require normally distributed data, and is suitable for relatively simple research models. According to Hair et al. (2017), PLS-SEM is particularly appropriate for exploratory and predictive research involving small to medium sample sizes.



Subsequently, qualitative data are collected through semi-structured in-depth interviews with selected students and lecturers using purposive sampling. The qualitative data are analyzed using thematic analysis to identify patterns and themes that explain users' perceptions of the AI-based LMS. Miles et al. (2014) argue that thematic analysis enables researchers to gain an in-depth understanding of the meanings and experiences of research participants.

From a temporal perspective, this study adopts a cross-sectional research design, as data are collected at a single point in time. Consequently, the findings reflect users' adoption readiness during the period in which the study was conducted. The unit of analysis is the individual, specifically students and lecturers as the primary users of the AI-based LMS. This study is conducted within the context of higher education in Indonesia, using CeLOE at Telkom University as the case study. Therefore, the findings are expected to provide empirical evidence regarding user adoption readiness for AI-based Learning Management Systems in higher education institutions.

3. RESULT AND DISCUSSION

The structural model evaluation demonstrated that the proposed PLS-SEM model met the required quality criteria. The multicollinearity assessment showed that all Variance Inflation Factor (VIF) values were below the recommended threshold of 5, indicating the absence of multicollinearity among the independent variables. The model also exhibited strong explanatory and predictive capabilities, with an R^2 value of 0.715, suggesting that 71.5% of the variance in User Adoption Readiness was explained by Perceived Usefulness, Perceived Ease of Use, and Trust in Artificial Intelligence. Furthermore, the Q^2 value of 0.532 confirmed the model's predictive relevance, while the goodness-of-fit indices (SRMR = 0.058 and NFI = 0.845) indicated that the structural model provided an acceptable fit to the observed data.

The hypothesis testing results revealed that all proposed relationships were statistically significant. Perceived Usefulness had the strongest positive influence on User Adoption Readiness ($\beta = 0.646, p < 0.001$), indicating that users who perceived greater benefits from the AI-based Learning Management System (LMS) were more prepared to adopt the technology. Perceived Ease of Use also exerted a positive and significant effect ($\beta = 0.150, p = 0.034$), suggesting that systems that are easy to understand and operate encourage greater adoption readiness. Similarly, Trust in Artificial Intelligence significantly influenced User Adoption Readiness ($\beta = 0.129, p = 0.005$), demonstrating that confidence in the reliability, accuracy, and security of AI technology contributes to users' willingness to adopt AI-supported LMS platforms.

To further examine differences between user groups, a Partial Least Squares Multi-Group Analysis (PLS-MGA) was conducted to compare students and lecturers. The analysis revealed significant differences in the effects of Perceived Usefulness ($p = 0.017$) and Trust in Artificial Intelligence ($p = 0.032$) on User Adoption Readiness, indicating that these two factors influence students and lecturers differently. In contrast, the effect of Perceived Ease of Use did not differ significantly between the two groups ($p = 0.195$), suggesting that both students and lecturers share similar perceptions regarding the importance of system usability in adopting an AI-based LMS.

Overall, the findings indicate that Perceived Usefulness is the most influential determinant of users' readiness to adopt an AI-based Learning Management System, followed by Perceived Ease of Use and Trust in Artificial Intelligence. While ease of use is perceived similarly by both students and lecturers, differences in perceived usefulness and trust in AI highlight the importance of considering user characteristics when designing and implementing AI-enabled learning technologies. These findings provide empirical evidence that successful adoption of AI-based LMS platforms in higher education depends not only on technological functionality but also on users' perceptions of value and trust in artificial intelligence.

The qualitative data analysis in this study was conducted using NVivo software to support the processes of organizing, coding, and interpreting interview data. The data were collected through semi-structured interviews with 11 informants, consisting of 6 students and 5 lecturers. The analysis



followed several stages, including transcription of interviews, case classification based on participant groups, coding into main thematic categories, and comparative analysis using matrix coding queries. The main themes were developed based on the research constructs, namely AI Governance & Policy, Perceived Ease of Use, Perceived Usefulness, Trust in AI, and User Adoption Readiness. Overall, this process was used to identify patterns, similarities, and differences in perceptions between students and lecturers regarding the adoption of Artificial Intelligence (AI) in Learning Management Systems (LMS).

The matrix coding results show that students most frequently discussed Perceived Ease of Use, while lecturers most frequently focused on Trust in AI. This indicates that students tend to emphasize usability and ease of interaction with AI systems, whereas lecturers are more concerned with issues of accuracy, reliability, and security. Meanwhile, User Adoption Readiness showed an equal number of references between both groups, suggesting a relatively similar level of readiness to adopt AI in LMS despite differences in perspective.

Overall, Perceived Usefulness emerged as one of the most dominant themes, with both groups generally holding positive views about the benefits of AI in LMS. However, lecturers primarily emphasized AI's role in analytics, evaluation, and decision-making support, such as grading and performance monitoring. In contrast, students focused more on practical benefits such as learning efficiency, access to learning materials, and task management. This reflects how perceived usefulness is shaped by user roles within the educational environment.

For Perceived Ease of Use, both students and lecturers generally perceived AI as easy to use, largely due to increasing familiarity with AI technologies and intuitive system design. Students highlighted their prior experience with generative AI tools, while lecturers noted that digital literacy and system interface design significantly influence ease of use. Nevertheless, both groups acknowledged the importance of training, guidance, and clear system design to ensure effective adoption.

Regarding Trust in AI, both groups showed positive but conditional trust. AI was generally seen as useful but still requiring human verification due to concerns about accuracy, limitations, dependency risks, and data privacy. Lecturers tended to adopt a more cautious stance, emphasizing validation and academic integrity, while students viewed AI as helpful but not fully reliable for independent use.

In terms of User Adoption Readiness, both students and lecturers demonstrated a high level of readiness to adopt AI in LMS. This readiness was influenced by familiarity with AI, perceived usefulness, and awareness of technological development in education. However, readiness was also conditional, depending on how effectively AI is implemented and whether it provides meaningful benefits in practice.

Finally, the comparative analysis between students and lecturers revealed that differences in adoption readiness are influenced not only by role but also by factors such as digital literacy, experience with AI, and individual attitudes. Students tend to be more adaptive and focused on practical benefits, while lecturers are more critical and governance-oriented, emphasizing validation, control, and responsible use of AI in educational settings.

4. CONCLUSION

This study aims to analyze the effect of Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Trust in AI on User Adoption Readiness (UAR) in the implementation of Artificial Intelligence (AI) within Learning Management Systems (LMS) in higher education institutions. In addition to testing the relationships among variables quantitatively using Structural Equation Modeling–Partial Least Squares (SEM-PLS), this study also employs a qualitative approach through semi-structured interviews analyzed using NVivo to gain a deeper understanding of the factors influencing users' readiness to adopt AI. The integration of both approaches produces meta-inferences



that explain not only the statistical relationships among variables but also the underlying reasons behind those relationships.

Overall, the findings indicate that the research model effectively explains user readiness to adopt AI in LMS environments. The quantitative results show that Perceived Usefulness, Perceived Ease of Use, and Trust in AI all have a positive and significant effect on User Adoption Readiness. This indicates that users' readiness to adopt AI is shaped by their perceptions of its benefits, the ease of using the system, and their level of trust in AI's ability to support academic activities. Among these variables, Perceived Usefulness has the strongest influence on adoption readiness, followed by Perceived Ease of Use and Trust in AI. This suggests that the perceived practical benefits of AI are the primary driver of its acceptance in higher education settings.

The quantitative findings are supported by qualitative analysis. Interviews with eleven informants, consisting of six students and five lecturers, reveal that most respondents view AI as a technology that enhances learning effectiveness, accelerates task completion, supports academic management, and improves assessment processes. NVivo analysis shows that Perceived Usefulness generated 39 coding references, Perceived Ease of Use 33 references, Trust in AI 40 references, and User Adoption Readiness was relatively balanced between students and lecturers. These results indicate that the main constructs identified in the quantitative model also emerge prominently in users' perceptions, thereby reinforcing the statistical findings.

Regarding the first research objective, the results show that Perceived Usefulness has a positive and significant effect on User Adoption Readiness with a path coefficient of 0.646, making it the most influential variable in the model. This indicates that the more users perceive AI as beneficial, the higher their readiness to adopt it in academic activities. The qualitative findings further explain that students and lecturers perceive AI benefits differently. Students emphasize AI's role in supporting learning activities such as summarizing materials, academic chatbots, reference search, task reminders, and learning efficiency. In contrast, lecturers focus on AI as a tool for assessment and evaluation, including automatic grading, similarity checking, student performance analysis, and data-driven learning recommendations. Despite these differences in orientation, both groups agree that AI can improve learning quality when implemented appropriately.

For the second objective, the results show that Perceived Ease of Use has a positive and significant effect on User Adoption Readiness with a path coefficient of 0.150. Although weaker than Perceived Usefulness, this finding confirms that ease of use remains an important factor in shaping adoption readiness. Users are more willing to adopt AI when it is easy to understand, operate, and requires minimal effort. Qualitative findings support this result, showing that most informants consider AI relatively easy to use due to their familiarity with generative AI tools. Ease of use is also influenced by intuitive interface design, simple navigation, and system integration within LMS platforms. However, effective implementation still requires training, clear user guidance, and improved interface design. Some challenges, such as prompt formulation, response speed, and output quality, also affect users' perceived ease of use.

The third objective examines the effect of Trust in AI on User Adoption Readiness. The results show a positive and significant effect with a path coefficient of 0.129. This indicates that higher trust in AI leads to greater readiness to adopt the technology. The qualitative findings reveal that trust in AI is one of the most frequently discussed themes among informants. Although AI is generally considered useful, this trust is conditional rather than absolute. Users emphasize the need to verify AI outputs before using them in academic decision-making. Trust is shaped by four key dimensions: accuracy and verification, system limitations and risks, contextual or conditional trust, and privacy and data security concerns. This indicates that trust in AI in higher education is better described as conditional trust rather than full trust, as it always involves human oversight and validation.

In addition to testing direct relationships, the study also examines group differences between students and lecturers using PLS-MGA. The results show significant differences in the effects of Perceived Usefulness and Trust in AI on User Adoption Readiness, while no significant difference is



found for Perceived Ease of Use. The qualitative findings explain that these differences arise from variations in user orientation. Students focus on practical benefits that directly support learning activities, whereas lecturers emphasize evaluation quality, performance analysis, and data-driven decision-making. Differences in trust are influenced by varying levels of caution, with lecturers showing greater concern for accuracy, academic validity, ethical use, and data security. In contrast, students are generally more open due to greater exposure to generative AI tools. However, both groups still emphasize the importance of verifying AI-generated outputs. The absence of differences in perceived ease of use suggests that both groups share similar levels of familiarity with AI and perceive it as easy to use when supported by intuitive design.

The integration of quantitative and qualitative findings leads to the meta-inference that successful AI implementation in Learning Management Systems is not determined solely by technological sophistication, but primarily by perceived usefulness, ease of use, and user trust. Among these factors, Perceived Usefulness is the dominant driver of adoption readiness, while Perceived Ease of Use and Trust in AI function as supporting factors that strengthen acceptance. The study also highlights that user characteristics shape how AI benefits and risks are interpreted. Students tend to focus on efficiency and learning support, while lecturers emphasize evaluation, governance, academic validity, and data security. Therefore, AI implementation in LMS should be tailored to the needs of different user groups to maximize adoption readiness.

Overall, this study concludes that AI implementation in Learning Management Systems has strong potential to support digital transformation in higher education. However, successful adoption requires more than technological advancement. It also demands strategies that enhance perceived benefits, ensure ease of use, build trust through transparent governance, and accommodate the differing needs of students and lecturers. With such an approach, AI can serve not only as a technological innovation but also as a strategic tool for improving learning quality, teaching effectiveness, and institutional competitiveness in the era of digital transformation.

5. REFERENCES

- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.)*. Sage Publications.
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Ellis, R. K. (2009). *Field guide to learning management systems*. ASTD Learning Circuits.
- Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.2307/30036519>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook (3rd ed.)*. Sage Publications.
- Parasuraman, A. (2000). Technology Readiness Index (Tri): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies. *Journal of Service Research*, 2(4), 307–320. <https://doi.org/10.1177/109467050024001>
- Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO. <https://doi.org/10.54675/PCSP7350>
- Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators?



International Journal of Educational Technology in Higher Education, 16(1), 39.
<https://doi.org/10.1186/s41239-019-0171-0>