

LEARNING MANAGEMENT SYSTEMS ADOPTION BASED ON TECHNOLOGY ACCEPTANCE MODEL: A STUDY OF A MINING COMPANY

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ABSTRACT

Background: A digital learning system is one of several solutions for PT Riung Mitra Lestari (RML) to develop its employees, but the participation of its learning management system (LMS) remains low. For a mining company with remote project locations, distance learning plays a crucial role in employee knowledge development. Therefore, low LMS usage is a critical problem.

Purpose: This study aims to analyze the factors influencing LMS adoption at RML and propose recommendations to enhance the adoption of the LMS.

Design/methodology/approach: A quantitative analysis was conducted using the Technology Acceptance Model (TAM), a framework that examines how users come to accept and use technology. The Partial Least Squares – Structural Equation Modelling (PLS-SEM), which is used to test complex relationships between variables, was used to analyse the data. The study involved a survey of 361 respondents, followed by 39 participants in Focus Group Discussions (FGD), which are group interviews used to collect in-depth feedback.

Findings/Results: The results of PLS-SEM show that perceived ease of use influences both perceived usefulness and attitude toward the LMS adoption. The FGD revealed key challenges based on the findings, including LMS navigation difficulties and limited internet connectivity, and was treated as a basis for recommendations.

Conclusion: Companies with remote branches must recognize that limited supporting infrastructure and LMS usability present significant obstacles to effective LMS adoption. To drive meaningful improvement, management should proactively invest in reliable devices and robust LMS systems that are user-friendly and tailored to field employees' needs. Emphasising user-oriented design and overcoming connectivity challenges are critical for ensuring successful, widespread e-learning adoption and continued organizational growth.

Originality/value (state of the art): The limited research on LMS use in mining companies prompted this study to fill that gap.

Keywords: e-learning, employee training, mining industry, technology acceptance model, technology adoption

How to Cite:

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INTRODUCTION

In a world with rapid digital transformation, the use of information technology has become a strategic aspect in various sectors. One of the prominent technologies is e-learning, which is an electronic-based learning system that utilizes digital media to transfer knowledge flexibly, cost-effectively, and can be accessed at any time (Budianti & Lubis, 2022). In the context of human resource (HR) development, e-learning contributes significantly to improving employee competencies and building a sustainable learning culture. Data from the Indonesian Internet Service Providers Association (APJII) in 2024 shows that more than 77% of companies in Indonesia have adopted digital technology in operational and HR management (Wulandari et al. 2024). This trend is driven by the need for a flexible training system, especially in response to changing work patterns due to the pandemic. A study by Rijal and Sholihah (2022) confirmed that e-learning has a positive impact on job satisfaction, commitment, and employee performance. Moreover, according to Cranston (2024), the success of e-learning programs relies heavily on a continuous evaluation process to improve the quality of materials and delivery methods. This technology enables faster collaboration and communication as well as more inclusive learning through various formats, such as text, video, and interactive media (Galih et al. 2024).

Previous studies have focused on the education sector and city-based companies that have adequate digital infrastructure (Rijal & Sholihah, 2022; Rosidi & Mujiasih, 2022). Studies on employee knowledge development systems in companies with many branches in remote areas are very limited. This study fills the research gap by analyzing the adoption of learning management systems at the mining company operating in a remote area of Kalimantan, PT Riung Mitra Lestari (RML). RML runs various mining projects spread across several regions of Kalimantan, as shown in Figure 1. There are some projects located in Kalimantan, including the Riung Mandiri Inti Perkasa (RMIP) project in Sesayap, North Kalimantan, the Riung Multi Tambang Utama (RMTU) project in South Barito, the Riung Marunda Graha Mineral (RMGM) project in Muara Larung, the Riung Energi Batu Hitam (REBH) project in Melak, East Kalimantan, and the Riung Harapan Mitra Lestari (RHML) project in Rantau, South Kalimantan. The main challenge faced is the limited access to conventional training due to the scattered locations in the Kalimantan region, which results in high training operational costs. In this context, e-learning was chosen as a strategic alternative to overcome geographical and operational barriers and support training efficiency. The work environment in mining areas, especially for field employees who work in a rotational system and face limited access to technology and digital infrastructure, has unique characteristics that differ from other business environments.

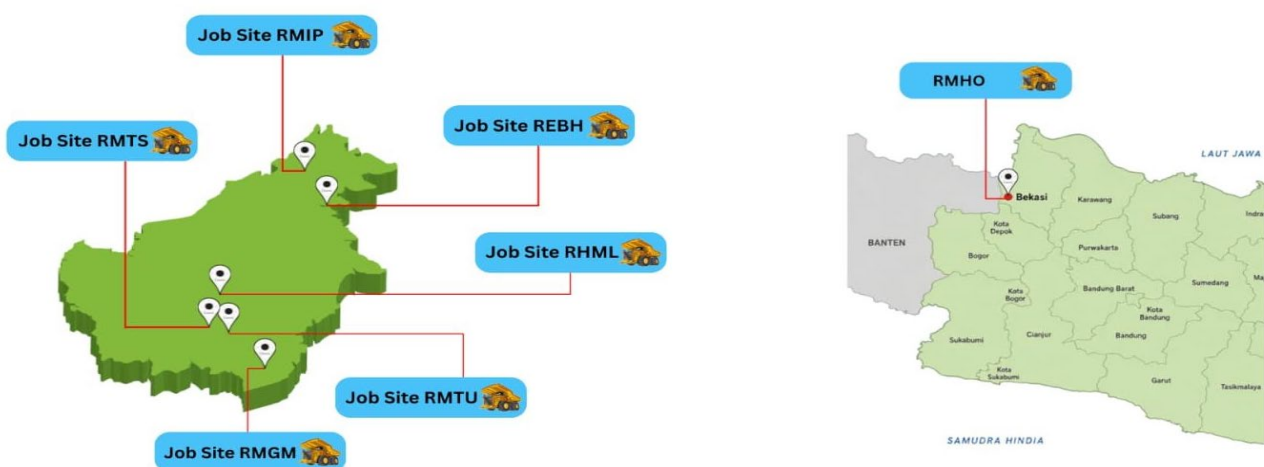


Figure 1. Location of the mine

Most of the RML employees are millennials and Gen Z (71.53% of the total 3,664 employees), who generally have a high level of digital literacy. This is an important asset in the implementation of e-learning, especially since this system enables self-directed learning that is aligned with the principle of continuous improvement. Training is no longer limited to time and space, so the company's operations continue without being disrupted by the need for employees to leave the work location. Nevertheless, the implementation of e-learning in the mining work environment in RML is challenging. Limited technological devices, low digital literacy of some employees, and uneven quality of internet connection become barriers to adoption. These barriers create a gap between management expectations and realization in the field.

Previous studies have examined the adoption of digital technology in a learning context. A study by Bond et al (2020) investigated the use of educational technology among undergraduate students by analyzing the influence of behavioral engagement and adoption factors. Research on the use of e-learning systems during the COVID-19 pandemic was conducted by Almaiah et al (2020), involving 30 students from six universities in Jordan and Saudi Arabia. The study identified the key success factors for the use of learning management systems by examining external variables within the Technology Acceptance Model (TAM). Another study by Barz et al (2024) examined the adoption of e-learning technology among university students using the TAM approach. The findings indicate that students' attitudes significantly influence their behavioral intention to use e-learning systems.

METHODS

This research uses a quantitative approach, analyzing the factors of learning adoption through surveys, followed by a qualitative approach by conducting focus group discussions (FGD) to obtain the perspectives of employees to improve the e-learning adoption level in RML. The research population was all 3,664 employees of RML. Based on the Slovin formula with a 5% margin of error, a minimum of 361 respondents were required. The study used a stratified random sampling method based on work location to ensure proportional representation. The population distribution is presented in Table 1.

The method of Partial Least Squares - Structural Equation Modeling (PLS-SEM) was used in this study because it is able to accommodate sample limitations and is suitable for complex and exploratory structural models (Anwar & Hamid, 2019). The analysis includes: descriptive statistics for respondent characteristics, outer model for construct validity and reliability through loading factor, AVE, cross-loading, Cronbach's Alpha, and Composite Reliability, and inner model for the relationship between variables with R^2 , Q^2 , and path significance through bootstrapping.

The FGDs were conducted in the South Barito RMTU job site, involving four sessions: three initial sessions of 10 participants each (5 mechanics and 5 operators), and one final session with 9 participants (7 staff and 2 non-staff), making a total of 39 participants. The study was conducted from February to July 2025. The FGD was attended by representatives from RMHO, RMIP, RHML, RMGM, RMTU, and REBH sites, ensuring representation for each area. The number of participants per area was not determined, given the limited mobility of participants from remote areas.

Table 1. Population stratified random sampling in RML Projects

	RMHO	RMIP	RHML	RMGM	RMTU	REBH
Population	596	688	595	595	595	595
Percentage	16.27%	18.78%	16.24%	16.24%	16.24%	16.24%
Respondents	59	68	59	59	59	59

Note: Riung Mitra Lestari Head Office (RMHO); Riung Mandiri Inti Perkasa (RMIP); Riung Multi Tambang Utama (RMTU); Riung Marunda Graha Mineral (RMGM); Riung Energi Batu Hitam (REBH); Riung Harapan Mitra Lestari (RHML)

Overall, most previous studies have employed the TAM framework to investigate technology adoption among students. However, studies applying TAM to the context of corporate training remain limited, particularly within the mining industry. Therefore, this study fulfills the research gap and aims to analyze the key factors that influence the acceptance of e-learning systems by RML employees using the TAM approach, developed by Davis (1989), and to design strategies that can improve the effectiveness, adoption, and sustainability of e-learning programs in RML. Based on the TAM approach, variables and indicators developed in this study are shown in Table 2.

Consistent with the problems and research gaps that have been identified, this article focuses on analyzing the factors that influence the acceptance and use of e-learning systems in the mining industry. Based on the Technology Acceptance Model (TAM) approach, the main factors analyzed include Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Toward Using (ATU), Behavioral Intention to Use (BIU), and

Actual System Use (ASU). Each construct is measured through indicators that have been adapted to the context of field users who work in remote locations and have limited access to digital infrastructure.

The following six hypotheses are formulated based on the relationship between variables in the conceptual model, illustrated in Figure 2:

- H1: Perceived Ease of Use (PEOU) correlates with Perceived Usefulness (PU)
- H2: Perceived Usefulness (PU) correlates with Attitude Toward Using (ATU)
- H3: Perceived Ease of Use (PEOU) correlates with Attitude Toward Using (ATU)
- H4: Attitude Toward Using (ATU) correlates with Behavioral Intention to Use (BIU)
- H5: Perceived Usefulness (PU) correlates with Behavioral Intention to Use (BIU)
- H6: Behavioral Intention to Use (BIU) correlates with Actual System Use (ASU)

Table 2. Identification of variables and indicators

Variables	Indicators	References
Perceived Usefulness (PU)	Learning facility	Padalia et al. (2023)
	Learning effectivity	
	Productivity	
	Learning cost efficiency	
	Quality of work	
Perceived Ease of Use (PEOU)	Ease of accessibility	Padalia et al. (2023)
	Ease of operation	
	Ease of learning	Qomariah (2022)
	Flexibility	
	Simplicity and ease of mastery	
Attitude Toward Using (ATU)	Comfort in interaction	Padalia et al. (2023)
	Enjoyment in usage	
	Unbounded user experience	
	Pleasure in usage	
	Acceptance of learning media	
Behavior Intention to Use (BIU)	Usefulness of available features	Padalia et al. (2023)
	Consistency in usage patterns	
	Sustainability in media utilization	
	Addition of supporting software to media	
Actual System Use (ASU)	Consistency in frequency of media use	Padalia et al. (2023)
	Utilization of technology/media in practice	
	Consistency in duration of media use	Muntianah et al. (2012)
	Integrity of technology/media use	
	Satisfaction with media us	

RESULTS

This study began with validity and reliability tests on 30 respondents. Overall, the instrument has met the quality standards to analyze the adoption of e-learning at PT Riung Mitra Lestari, especially related to the influence of PU and PEOU as described in the TAM framework. Then the second data collection was carried out through distributing questionnaires to all respondents of RML employees as noted in Table 1. The data processing process with PLS SEM produces output as illustrated in Figure 3.

Validity Test

According to Anwar & Hamid (2019), the requirement for convergent validity is the loading factor value > 0.7 and the Average Variance Extracted (AVE) > 0.5 . The results in Figure 3 show that all indicators have a loading factor > 0.7 . This indicates that each construct,

such as PU, PEOU, ATU, BIU, and ASU, has been well measured and validated in explaining the variable in question. This finding confirms that the instruments used in the study have met the requirements of convergent validity.

Based on the results of the convergent validity test in Table 3, which show that all indicators have Average Variance Extracted (AVE) values exceeding 0.5, it can be concluded that this research instrument has proven to be convergently valid. This means that each indicator is able to represent the measured construct consistently and accurately, so that the constructs in the model can be trusted to be used in further analysis. The results of testing discriminant validity using the Fornell-Larcker approach are presented in Table 3, where discriminant validity is achieved if the AVE square root value of a construct is higher than the correlation value between other constructs. Therefore, each construct is discriminative and suitable for structural analysis.

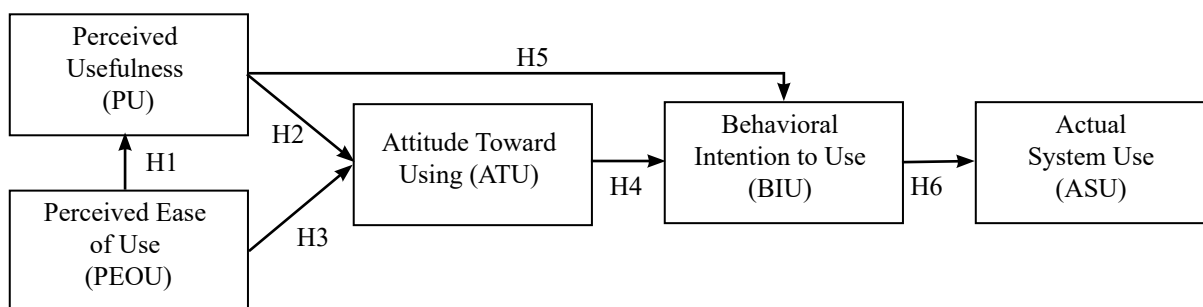


Figure 2 Conceptual Model (Davis, 1989)

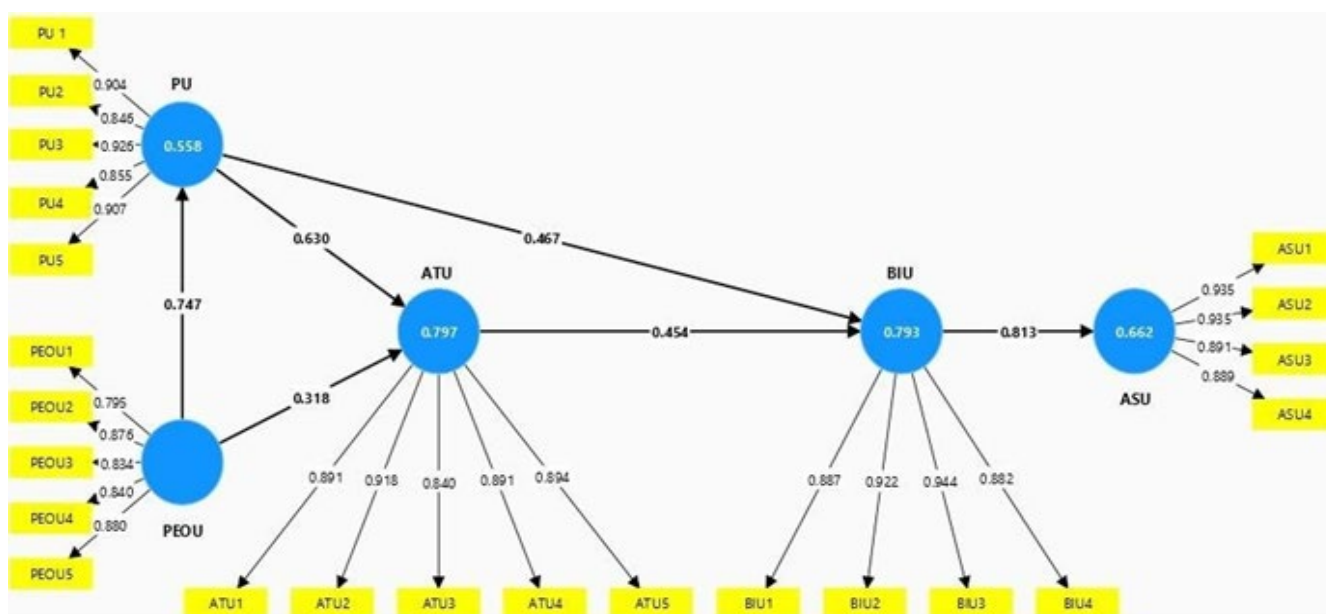


Figure 3. PLS SEM Model

Table 3. Data test results

Variabel	Cronbach's Alpha	Composite reliability (rho_c)	Average Variance Extracted (AVE)	Fornell-Larcker
Actual System Use (ASU)	0.933	0.952	0.913	0.913
Attitude Toward Using (ATU)	0.932	0.949	0.887	0.887
Behavior Intention to Use (BIU)	0.930	0.950	0.909	0.909
Perceived Ease of Use (PEOU)	0.901	0.926	0.846	0.846
Perceived Usefulness (PU)	0.933	0.949	0.888	0.888

Reliability Test

Several rules of thumb are used to assess construct reliability to ensure instruments consistently measure latent variables. Anwar & Hamid (2019) state that the ideal Composite Reliability (CR) value above 0.70 indicates high internal consistency of indicators in the construct. The reliability test results in Table 3 show that the Composite Reliability value of all variables is > 0.70 and Cronbach's Alpha of all variables > 0.60. So that this research instrument is expected to be reliable.

Structural Model Evaluation

Based on the R-square results in Table 4, the model shows strong predictive ability, especially for ATU(0.797) and BIU (0.793), with about 79% of variance explained. ASUals shows good prediction (0.662), while PU has the lowest (0.558). The small gap between R-square and adjusted R-square (0.004–0.005) across all constructs indicates model stability and appropriate predictor use.

Based on the structural model evaluation in Table 5 using three main indicators: Standardized Root Mean Square Residual (SRMR), Chi-square, and Normed Fit Index (NFI) the model is categorized as fit. An SRMR value below 0.10 indicates good model-data fit (Henseler et al. 2016), a Chi-square above 0.50 suggests acceptable model complexity (Hair et al. 2019), and an NFI below 0.95 confirms the model avoids overfitting (Gefen et al. 2000). These indicators collectively support the model's feasibility in explaining variable relationships in the context of e-learning adoption at PT Riung Mitra Lestari.

Hypothesis 1: Perceived Ease of Use (PEOU) correlates with Perceived Usefulness (PU)

Based on Table 6, it is obtained that perceived ease of use has a positive and significant effect on perceived usefulness(PU) with a p-value of 0.000 <0.05,so that

hypothesis H1 is accepted. That is, the easier the learning system is used by employees, the higher their perception of the usefulness and benefits of the system. These results also support the research of Mailizar et al. (2021) which confirmed the important role of ease of use in shaping the perceived usefulness of e-learning systems during the COVID-19 pandemic. In the context of RML, a user-friendly system is crucial given the remote geographical characteristics of the work and the digital infrastructure challenges faced by employees.

Hypothesis 2 : Perceived Usefulness (PU) correlates with Attitude Toward Using (ATU)

The analysis results in Table 6 show that Perceived Usefulness (PU) has a positive and significant effect on Attitude Toward Using (ATU) with a p-value of 0.000 <0.05, so hypothesis H2 is accepted. This means that employees who feel the e-learning system is useful will form a more positive attitude towards its use. This finding is in line with recent research which shows that perceived usefulness ($\beta = 0.38, p < 0.01$) plays a significant role in shaping continuance intention on learning platforms. Research by Hosseini et al. (2025) also confirmed that attitude toward using reflects individuals' positive or negative feelings about using the system. In the practical context at RML, direct benefits such as flexibility of learning time and training efficiency are highly appreciated by mining employees who work in a rotation system. A study by Tawafak et al (2023) about the analysis of e-learning system adoption in university in Oman supports this hypothesis, that shows that perceived usefulness and ease of use significantly impact the students' intentions to use e-learning systems.

Hypothesis 3: Perceived Ease of Use (PEOU) correlates with Attitude Toward Using (ATU)

Based on the data processing results in Table 6, it is evident that Perceived Ease of Use (PEOU) has a positive and significant influence on Attitude

Toward Using (ATU), with a p-value of $0.000 < 0.05$. Therefore, Hypothesis H3 is accepted, although the relationship is not as strong as the one between $PU \rightarrow ATU$. This finding is supported by the study conducted by Abubakar et al. (2024), which showed that perceptions of ease of use significantly contribute to students' intention and positive attitudes toward the use of Learning Management Systems (LMS) at several universities in Saudi Arabia. Additionally, research at the Kalimantan Institute of Technology (Amalia et al. 2024) also found that Perceived Ease of Use (PEOU) significantly and positively affects Attitude Toward Using (ATU) in the context of LMS adoption. These results affirm that ease of use remains an important factor in shaping a positive attitude toward a system, even though Perceived Usefulness (PU) demonstrates a more dominant influence in the context of this study.

Hypothesis 4: Attitude Toward Using (ATU) correlates with Behavioral Intention to Use (BIU)

The data analysis in Table 6 indicates that Attitude Toward Using (ATU) has a positive and significant effect on Behavioral Intention to Use (BIU), with a p-value of $0.001 < 0.05$. Therefore, Hypothesis H4 is accepted. Mailizar et al. (2021) confirmed the significant relationship between attitude and behavioral intention in the context of e-learning during the pandemic. In the context of RML as a mining company, the convenience of using the system without disrupting daily operational tasks becomes a significant added value for employees.

Table 4. R-Square (R^2) test results

	R-square	R-square adjusted
Actual System Use (ASU)	0.662	0.658
Attitude Toward Using (ATU)	0.797	0.793
Behavior Intention to Use (BIU)	0.793	0.789
Perceived Usefulness (PU)	0.558	0.553

Table 5. Model fit test results

	Saturated model	Estimated model
SRMR	0.056	0.076
d_ ULS	0.851	1.583
d_ G	0.967	1.045
Chi-square	480.195	502.823
NFI	0.823	0.814

Table 6. Direct effect test results

	Original sample (O)	Sample-mean (M)	Standard deviation (STDEV)	T statistics ($ O/STDEV $)	P Values	Notes
$ATU \rightarrow BIU$	0.454	0.455	0.132	3.449	0.001	Supported
$BIU \rightarrow ASU$	0.813	0.814	0.036	22.417	0.000	Supported
$PEOU \rightarrow ATU$	0.318	0.320	0.076	4.216	0.000	Supported
$PEOU \rightarrow PU$	0.747	0.748	0.062	11.992	0.000	Supported
$PU \rightarrow ATU$	0.630	0.629	0.073	8.670	0.000	Supported
$PU \rightarrow BIU$	0.467	0.467	0.123	3.805	0.000	Supported

Note: Actual System Use (ASU);Attitude Toward Using (ATU); Behavior Intention to Use (BIU);Perceived Ease of Use (PEOU); Perceived Usefulness (PU)

Hypothesis 5: Perceived Usefulness (PU) correlates with Behavioral Intention to Use (BIU)

Based on Table 6, Perceived Usefulness (PU) is proven to have a positive and significant effect on Behavioral Intention to Use (BIU) with a p-value of $0.000 < 0.05$, so hypothesis H5 is accepted. These results are in line with the research of Raihan & Habib (2022), who developed a research model based on several technology acceptance models to predict factors that influence students' behavioral intentions to use e-learning systems. This study also shows the impact of knowledge quality and technology suitability on behavioral intention. These results indicate that employees who find e-learning systems useful will show a high intention to use them in the long term.

Hypothesis 6: Behavioral Intention to Use (BIU) correlates with Actual System Use (ASU)

The findings in Table 6 show that Behavioral Intention to Use (BIU) has a very strong and significant influence on Actual System Use (ASU), with a p-value of $0.000 < 0.05$ and the highest coefficient value of 0.813. Thus, Hypothesis H6 is accepted. This result aligns with the findings of Aliazas and Panergayo (2021), who stated that within the foundational framework of the Technology Acceptance Model (TAM), behavioral intention is the primary predictor of actual system usage. In RML LMS, it is essential to ensure the reliability of features that affect the comfort of the learning process, considering the characteristics of work on mining sites.

Strategy Recommendations

Based on the focus group discussion results, six strategy recommendations were formulated to enhance the e-learning adoption at RML. Based on the study result, the Perceived Ease of Use significantly affects Perceived Usefulness (PU) and Attitude Toward Using (ATU). A study by Al-Fraihat et al. (2022) supports this finding by stating that "perceived ease of use had a positive and significant effect on perceived usefulness". One of the FGD participants mentioned, "I still think LMS navigation could be improved, because some functions remain unclear for us." (Bangun, Session 1). In this context, the RML LMS requires a user-friendly interface, equipped with access guidelines and subtitles to provide clear guidance for navigation.

The training materials should be tailored to technical field requirements, in response to the significant influence of PU on ATU and Behavioral Intention to Use (BIU). This is supported by a study by Tran et al. (2025), which noted that the hands-on experience and skills application in a real work environment are fulfilled by on-the-job training for employees. Participants in RML FGD also have the same perceptions. Bangun (Session 1) said: "I am interested in field operational and safety training". The other participant mentioned: "I need training on manual SOPs and equipment operation techniques" (Andri, Session 1). In summary, the topics of RML e-learning contents are suggested to be relevant to their fieldwork requirements to be practical and easy to implement.

The learning schedules are required to be flexible to accommodate the demanding and uncertain characteristics of mining work. Participants in FGD mentioned that the best time to study is during non-operational hours. He stated: "The best time to study is when it rains, because field activities stop" (Bangun, Session 1). This opinion responds to the relationship between Behavioral Intention to Use (BIU) and Actual System Use (ASU) as a result of quantitative data processing. Therefore, RML must implement a training mechanism through LMS with flexible time, so that every employee on site can have the opportunity to participate in training according to their free time.

Managerial support is one of the driving factors in the adoption of e-learning. Wallo et al. (2021) stated, "learning-oriented leadership refers to managers' activities that are intended to promote employees' learning in daily work." In line with this study, one of the FGD participants stated: "I hope my supervisor gives recognition and appreciation for our learning efforts" (Dicky, Session 2). Management support is not only related to financial incentives, but can also include the form of certificates and performance assessment.

The next recommendation is the availability of facilities and infrastructure to overcome technical barriers in mining areas. The existence of internet connection difficulties causes employees to be reluctant to participate in e-learning. One FGD participant stated: "I suggest having an offline mode so materials can be accessed without relying on signal" (Bayu, session 2). A study by Chuenyindee et al. (2022) revealed that Filipino students have low regard for

the system usability of LMS in online learning due to poor connectivity. Therefore, it is necessary to design modules that can be downloaded from the LMS so that employees can study them offline, thereby reducing dependence on an internet connection.

Nikolopoulou et al. (2021) stated that monitoring and evaluation of e-learning usage encourages continuous improvement of the system, so that ultimately users feel that the LMS is easy to use, useful, fun, and engaging. This was supported by Danial (Session 3), who said: “*I don't know how the system can tell if I've studied. A clearer tracking system is needed.*” A progress tracking system and performance analytics are required in RML LMS to encourage active learner engagement.

Based on the study results, six strategy recommendations can be the basis for developing a relevant and sustainable e-learning improvement strategy in the mining companies, which have challenging work environments. In addition to practical contributions to the mining industry, this research also contributes theoretically to the use of the TAM approach in corporate training in the mining industry.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study fulfills the lacking of e-learning technology adoption research in industries, including the mining industry. Most studies have been conducted in educational institutions, undergraduate and graduate programs, and universities (Barz et al, 2024; Sasongko et al, 2024; Alamiah et al, 2020; Bond et al, 2020) with respondents both young and adult students. Employee behavior in companies that have a work system in remote locations, such as mining companies, is analyzed in this study, and produces recommendations that are a practical contribution of this study to the mining industry or similar industries.

Based on the study results, six recommendation strategies were formulated to enhance e-learning adoption: (1) improving LMS usability with more user-friendly features; (2) developing contextual and applicable learning materials aligned with field-specific technical needs; (3) establishing flexible yet structured learning schedules; (4) strengthening managerial support through validation, incentives, and

recognition; (5) providing supporting infrastructure, including devices and offline access; and (6) enhancing evaluation and progress tracking systems to ensure transparency and sustainability in the learning process.

Recommendations

However, this study has several limitations. First, the research was limited to a single mining company, which restricts the generalizability of its findings to other sectors or organizations. Second, data were collected cross-sectionally, preventing analysis of behavioral changes over time. Third, the study focused predominantly on user perceptions, without a deep technical evaluation of the LMS system itself. Fourth, the number of FGD participants was limited, which may not fully reflect the diversity of user experiences across departments. Lastly, external factors such as corporate policies, technological developments, or socioeconomic conditions were not included in the analytical model, although they may significantly influence e-learning adoption.

Future research is recommended to conduct multiple case studies across different mining companies to improve generalizability and to adopt a longitudinal approach to capture changes in adoption patterns over time. The study recommendations are beneficial for the human resources managers in mining companies to be used as guidelines in enhancing the adoption of LMS systems.

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