JKTP: Jurnal Kajian Teknologi Pendidikan
Vol. 8, No. 4, November 2025: 349-358
e-ISSN: 2615-8787
DOI: 10.17977/um038v8i42025p349-358
https://journal-fip.um.ac.id/index.php/jktp

INTEGRATION OF TECHNOLOGY READINESS AND ACCEPTANCE MODEL TO ANALYZE THE USE OF E-LEARNING IN INDONESIA

Kevin Praditya Dewantara, Siti Rahayu, Adhika Putra Wicaksono
Program Studi Manajemen Fakultas Bisnis dan Ekonomika, Universitas Surabaya
s_rahayu@staff.ubaya.ac.id

Article History
Received: 24 October 2025, Accepted: 09 November 2025, ***Published: 15 November 2025***

Abstrak
Penelitian ini bertujuan untuk menganalisis tingkat penerimaan dan penggunaan e-learning di Indonesia dengan mengintegrasikan konsep Technology Readiness dan Technology Acceptance Model (TRAM). Penelitian ini dilakukan untuk memahami sejauh mana kesiapan teknologi dan sikap pengguna memengaruhi adopsi sistem pembelajaran daring di lingkungan perguruan tinggi. Metode yang digunakan adalah pendekatan kuantitatif melalui penyebaran kuesioner kepada mahasiswa dari berbagai universitas di Indonesia. Data yang terkumpul kemudian diolah menggunakan Partial Least Squares Structural Equation Modeling (PLS-SEM) dengan menggunakan aplikasi program SmartPLS 4 untuk menguji hubungan antar konstruk dalam model. Hasil penelitian menunjukkan bahwa penerimaan e-learning di Indonesia dipengaruhi oleh kesiapan teknologi dan persepsi positif terhadap manfaat serta kemudahan penggunaan sistem. Faktor ketidaknyamanan dan rasa tidak aman tidak memiliki pengaruh yang signifikan, yang berarti hambatan psikologis bukan faktor utama dalam penerapan e-learning. Temuan ini menegaskan pentingnya peningkatan literasi digital, dukungan institusional, serta pengembangan sistem e-learning yang lebih adaptif agar proses pembelajaran daring dapat berjalan lebih efektif dan diterima secara luas oleh mahasiswa di Indonesia.

Kata Kunci: e-learning; penerimaan teknologi; kesiapan teknologi; Indonesia

Abstract
This research seeks to analyse the level of e-learning acceptance and use in Indonesia by integrating the concepts of Technology Readiness and the Technology Acceptance Model (TRAM). The research seeks to understand how technological preparedness and user attitudes influence the use of online learning systems in higher education. A quantitative approach was employed by distributing questionnaires to students representing multiple universities in Indonesia. Data gathered in this study were analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 to analyse the connections among constructs within the model. The findings indicate that e-learning acceptance in Indonesia is shaped by technological readiness and positive perceptions of system usefulness and ease of use. In contrast, discomfort and insecurity show no significant effect, suggesting that psychological barriers are not the main obstacles to adoption. These results highlight the importance of improving digital literacy, providing institutional support, and developing more adaptive e-learning systems to enhance the effectiveness and acceptance of online learning among Indonesian students.

Keywords*: e-learning; technology acceptance; technology readiness; Indonesia*

To cite this article:
Dewantara, K. P., Rahayu, S., & Wicaksono, A. P. (2025). Integration of technology readiness and acceptance model to analyze the use of e-learning in Indonesia. *JKTP: Jurnal Kajian Teknologi Pendidikan, 8*(4), 349–358. doi: 10.17977/um038v8i42025p349-358

INTRODUCTION

The rapid progress of globalization has profoundly affected multiple aspects of human life, including education (Kampa, 2023). Advances in information and communication technology have enabled learning processes that are no longer limited by space and time, allowing instruction to be conducted online through e-learning platforms. Globally, e-learning has become one of the primary approaches to improving educational access by offering flexibility, interactivity, and sustainability (Huang & Chiu 2015). According to Buyle et al. (2018), the integration of technology in education is a strategic step toward creating adaptive and future-oriented learning. The increased use of e-learning is also evident in Indonesia, where the implementation of virtual classrooms and web-based learning platforms has become increasingly common (Amri et al., 2022). Higher education institutions in Indonesia have begun integrating Learning Management Systems (LMS) as the main medium for delivering materials, assignments, and interactions between lecturers and students (APJIII, 2023). Halimah et al. (2024) further emphasize that LMS-based learning plays an important role in supporting the digital transformation of Indonesian universities.

The growing adoption of e-learning in Indonesia reflects a shift toward technology-oriented learning models. However, this implementation still faces challenges related to users' readiness and their perceptions of the system's usefulness and ease of use. Although the availability of internet infrastructure and digital devices has improved significantly, the high rate of e-learning adoption does not necessarily align with user acceptance and overall effectiveness (Rahayu & Wirza, 2020). Several studies have shown that the adoption of educational technology is influenced not only on technical aspects as well as on psychological readiness and user attitudes toward technology, as described in the Technology Acceptance Model (Davis, 1989) and the Technology Readiness Index (Parasuraman, 2000), both of which continue to be widely applied in contemporary research. Kurnia (2020) notes that in Indonesia, some studies have applied the UTAUT2 model, where perceived ease of use and perceived usefulness significantly influence the intention to use e-learning. Therefore, understanding the factors that shape e-learning acceptance is an essential step toward improving the effectiveness of digital learning systems in Indonesia.

Research on technology acceptance frequently refers to the Technology Acceptance Model (TAM) (Andriani et al., 2024; Aripradono, 2021; Mufidah et al., 2022). This model comprises two key constructs perceived ease of use and perceived usefulness both of which influence users' attitudes and behavioural intentions toward using technology. TAM has been applied in various educational studies (Abdullah & Ward, 2016; Maryani & Puspitasari, 2024). Meanwhile, Parasuraman & Colby (2015) explain that the Technology Readiness Index (TRI) measures an individual's psychological preparedness to adopt new technologies through four dimensions: optimism, innovativeness, discomfort, and insecurity. These two frameworks were later integrated by (Lin et al., 2007) into the Technology Readiness and Acceptance Model (TRAM) to provide a more comprehensive understanding of users' behaviour toward educational technology (Kampa, 2023; Nafia et al., 2023).

A study conducted by Kampa (2023) in India used TRAM to analyse students' acceptance of mobile learning. The findings indicate that positive dimensions, such as optimism, significantly influence perceived ease of use and perceived usefulness, while innovativeness only affects perceived ease of use but not perceived usefulness. Conversely, negative dimensions, such as discomfort, significantly affect perceived ease of use, whereas insecurity shows no significant impact on either perception. The study also demonstrated that perceived usefulness and ease of use play an essential role in shaping students' attitudes and behavioural intentions toward using mobile learning. A similar study in Indonesia by Larasati (2017) also employed the TRAM framework,

confirming that optimism and innovativeness contribute to shaping users' perceptions of new technology. Thus, TRAM has proven effective in explaining technology acceptance behaviour within online learning environments.

Based on the integration of technology readiness (TRI) and technology acceptance (TAM), this study develops several hypotheses that define the relationships among variables within the TRAM framework. Optimism and innovativeness are assumed to positively influence perceived ease of use and perceived usefulness, as individuals with positive and open attitudes toward technology tend to perceive digital systems as more useful and easier to operate (Parasuraman & Colby, 2015). Conversely, discomfort and insecurity are expected to have negative effects on both perceptions, as feelings of unease and insecurity can inhibit users from exploring new technologies (Parasuraman & Colby, 2015). Furthermore, perceived ease of use is expected to positively influence perceived usefulness, as the easier a system is to use, the more useful it is perceived to be (Kampa, 2023). Both perceived ease of use and perceived usefulness are also predicted to have positive effects on users' attitudes and behavioural intentions toward e-learning (Kampa, 2023)

Although e-learning has been widely implemented in Indonesia, the level of user acceptance remains varied (Rahayu & Wirza, 2020). Krull & Duart (2017) found that e-learning implementation in developing countries is often hindered by a gap between technological readiness and users' ability to operate digital systems. Factors such as trust in digital systems and data security play a decisive role in successful adoption. Similar findings from previous studies also suggest that the success of technology implementation depends not only on system design but also on users' beliefs and attitudes (Buyle et al., 2018; Kim & Chiu, 2019).

This study aims to analyse the effect of technology readiness on e-learning acceptance in Indonesia by integrating the TRAM model. Specifically, the study aims to examine the relationships between technology readiness factors (optimism, innovativeness, discomfort, insecurity) and user perceptions (perceived ease of use, perceived usefulness, behavioural intention, and attitude). The results are expected to extend the comprehension of technology acceptance models in education. From a practical standpoint, the results can serve as a foundation for educational institutions to enhance e-learning adoption through digital literacy training, improved system design, and adaptive learning policies that meet students' needs in the digital era

METHOD

A quantitative approach with an explanatory research design was applied in this study. The aim was to explain the relationship between technology readiness and e-learning acceptance using TRAM framework. This approach was chosen because it allows the researcher to analyse the influence among latent variables that reflect users' psychological readiness and behavioural responses toward learning technologies.

The participants of this study were undergraduate students from various higher education institutions in Indonesia who had used e-learning platforms for at least one academic semester. Respondents were selected using a purposive sampling technique, considering their experience and level of engagement in online learning. Data were gathered online using a Google Form questionnaire distributed to students from multiple regions across Indonesia. A total of 237 reliable responses were gathered which was considered sufficient for analysis using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) method with the version 4.0 of SmartPLS. The sample size meets the minimum criteria recommended by Hair et al. (2021) for models with multiple constructs.

The study used a closed-ended questionnaire with a five-point Likert scale, where responses ranged from 1 (strongly disagree) to 5 (strongly agree). The questionnaire items were developed based on the constructs within the TRAM model. The technology readiness constructs were adapted from the Technology Readiness Index (Parasuraman & Colby, 2015), which comprises four main dimensions: optimism, innovativeness, discomfort, and insecurity. Meanwhile, the technology acceptance constructs referred to the Technology Acceptance Model (Davis & Granić, 2024), which includes perceived ease of use, perceived usefulness, attitude toward use, and behavioural intention. All measurement items were adapted from Kampa (2023). Prior to data collection, the questionnaire was validated and pilot-tested to ensure linguistic clarity and indicator suitability, as summarized in Table 1.

Table 1. Research Construct Indicators

Construct	Number of Items	Operational Definition
Optimism	4	Belief that technology improves learning efficiency.
Innovativeness	4	The tendency to try new technologies in learning.
Discomfort	4	Feeling uncomfortable when using a technology system.
Insecurity	5	Concerns about the reliability and security of technology.
Perceived Ease of Use	5	Perception of ease in operating e-learning
Perceived Usefulness	5	Perception of the benefits and effectiveness of e-learning.
Attitude	4	Positive attitude towards the use of e-learning
Behavioral Intention	4	Motivation and intention to continue engaging with e-learning.

The data analysis process included both outer model and inner model evaluations. The outer model analysis was conducted to assess construct validity and reliability through Average Variance Extracted (AVE) and Composite Reliability (CR) values. The inner model analysis assessed the relationships between latent variables through path coefficients, t-statistics, and p-values obtained from bootstrapping procedures. Additionally, R-square and F-square values were used to evaluate the model's predictive power and overall fit. The analysis followed the guidelines of Hair et al. (2021), in which indicators were considered valid if their factor loadings exceeded 0.70 and AVE values were above 0.50. Constructs were deemed reliable if both CR and Cronbach's Alpha exceeded 0.70. In the inner model assessment, relationships among variables were considered significant when p-value < 0.05, while R-square values were interpreted as strong, moderate, or weak according to the standard criteria in PLS-SEM

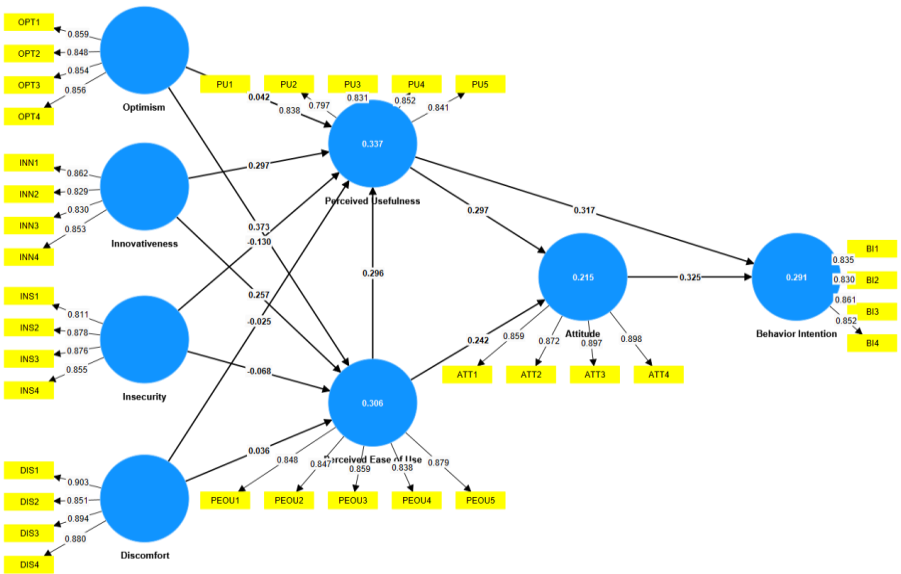

Figure 1. SmartPLS 4 Output

RESULT

This section reports the findings from the data analysis based on TRAM used in this study. The analysis investigates the associations between latent constructs representing technology readiness and user acceptance of e-learning in Indonesia. Data were collected from 237 university students who had used e-learning platforms as part of their coursework. The data were analysed using PLS-SEM method through the SmartPLS version 4.0 software. The analysis process began with the evaluation of the outer model to assess construct validity and reliability, followed by the inner model evaluation to test the hypothesized relationships among variables. The results are presented in tables and supported by interpretations to illustrate how the factors within the TRAM model influence e-learning acceptance among Indonesian students.

The first stage involved testing the reliability and validity of the constructs. According to Hair et al. (2021), a construct is considered reliable if the values of Cronbach's Alpha (CA) and Composite Reliability (CR) exceed 0.70, while convergent validity is confirmed when the Average Variance Extracted (AVE) value is greater than 0.50. Additionally, individual indicators are deemed valid if their factor loadings are above 0.70 (Hair et al., 2019).

Table 2. Construct Validity and Reliability

Construct	CA	CR	AVE
Attitude	0.905	0.933	0.778
Behavioural Intention	0.866	0.909	0.713
Discomfort	0.906	0.933	0.778
Innovativeness	0.865	0.908	0.711
Insecurity	0.879	0.916	0.732
Optimism	0.877	0.915	0.73
Perceived Ease of Use	0.908	0.931	0.73
Perceived Usefulness	0.889	0.918	0.692

The results of the reliability and validity assessments showed that all constructs met these criteria. The CA values varied between 0.865 to 0.908, CR values varied between from 0.908 to 0.933, and AVE values ranged from 0.692 to 0.778, indicating strong reliability and validity. At the initial stage, one indicator from the *Insecurity* variable (INS5) was identified as invalid because its loading factor was below 0.70; therefore, it was removed to improve the model's validity. After this adjustment, all constructs satisfied the thresholds recommended by Hair et al. (2021), suggesting the dataset demonstrated high internal consistency and the analysis results are reliable.

Table 3. Discriminant Validity Test Results (Fornell-Larcker Criteria)

	ATT	BI	DIS	INN	INS	OPT	PEOU	PU
Attitude	0.882							
Behavior Intention	0.455	0.845						
Discomfort	-0.146	-0.161	0.882					
Innovativeness	0.37	0.503	-0.159	0.843				
Insecurity	-0.189	-0.199	0.465	-0.247	0.856			
Optimism	0.379	0.353	-0.117	0.432	-0.228	0.854		
Perceived Ease of Use	0.382	0.471	-0.08	0.429	-0.2	0.495	0.854	
Perceived Usefulness	0.412	0.451	-0.162	0.478	-0.284	0.349	0.472	0.832

Discriminant validity was evaluated based on the Fornell–Larcker approach, where the square root value of each construct's Average Variance Extracted (AVE) must exceed its correlations with all other constructs (Fornell & Larcker, 1981; Henseler et al., 2015). The results of discriminant validity were found to be fulfilled.

Table 4. Hypothesis Test Results

Hypothesis	Path	Mean	SD	T statistics	Results
H1	Optimism -> PEOU	0.369	0.061	6.079	Supported
H2	Optimism -> PU	0.039	0.071	0.586	Not Supported
H3	Innovativeness -> PEOU	0.253	0.062	4.111	Supported
H4	Innovativeness -> PU	0.294	0.063	4.725	Supported
H5	Discomfort -> PEOU	0.039	0.07	0.521	Not Supported
H6	Discomfort -> PU	-0.027	0.064	0.393	Not Supported
H7	Insecurity -> PEOU	-0.07	0.067	1.021	Not Supported
H8	Insecurity -> PU	-0.131	0.061	2.15	Supported
H9	PU -> Attitude	0.294	0.071	4.212	Supported
H10	PU -> Behaviour Intention	0.315	0.059	5.408	Supported
H11	PEOU -> PU	0.292	0.067	4.447	Supported
H12	PEOU -> Attitude	0.243	0.069	3.518	Supported
H13	Attitude -> Behaviour Intention	0.321	0.058	5.611	Supported

DISCUSSION

The structural analysis results revealed variations in the effects among constructs within the TRAM model. Some hypotheses showed significant relationships that reinforce previous findings, while others presented differing results, indicating a unique contextual influence in the implementation of e-learning in Indonesia.

The results for H1 indicate that optimism has a significant effect on perceived ease of use ($t = 6.079$, $p < 0.001$). This finding suggests that the more confident individuals are in technology's ability to make their lives easier, the greater their perception of e-learning's ease of use. This supports the studies of Afiana et al. (2022) and Kampa (2023), who stated that optimism is one of the key positive factors enhancing users' confidence in operating new technologies. For H2, the relationship between optimism and perceived usefulness was found to be insignificant ($t = 0.586$). This aligns with Mufidah et al. (2022), suggesting that context and users' technological maturity may explain the difference. Indonesian e-learning users may hold positive attitudes toward technology but may not yet perceive its tangible benefits. This implies that optimism alone is insufficient to shape perceived usefulness without direct experiential engagement with the system.

For H3, innovativeness had a significant effect on perceived ease of use ($t = 4.111$, $p < 0.001$), meaning that individuals with higher innovative tendencies more easily discover effective ways to utilize learning technologies. This finding aligns with Afiana et al. (2022) and Kampa (2023), who noted that innovative individuals tend to have greater curiosity and adaptability toward new technologies, leading them to perceive systems as easier to use. H4 also revealed a significant influence of innovativeness on perceived usefulness ($t = 4.725$, $p < 0.001$), supporting Mufidah et al. (2022). In the Indonesian context, this indicates that innovative individuals not only adapt quickly but also evaluate the usefulness of technology more objectively. This may be due to the growing digital acceptance among Indonesian students, encouraging them to appreciate the efficiency and flexibility of e-learning.

For H5, discomfort was found to have an insignificant effect on perceived ease of use ($t = 0.521$), differing from Kampa (2023) and Afiana et al. (2022), who found a significant negative relationship. This suggests that user discomfort with technology is no longer a major barrier to perceiving ease of use, as Indonesian e-learning users are increasingly familiar with various digital platforms. Enhanced digital literacy and prior experience with technology may have mitigated the negative impact of discomfort. Similarly, H6, which tested the effect of discomfort on perceived usefulness, also yielded an insignificant result ($t = 0.393$), consistent with Kampa (2023) and

Larasati (2017). This implies that discomfort in using technology does not directly reduce perceived usefulness if users still recognize its practical value. In this context, functional benefits such as time flexibility and accessibility remain the primary drivers of e-learning adoption.

H7 examined the influence of insecurity on perceived ease of use and found it insignificant ($t = 1.021$), consistent with Kampa (2023), Larasati (2017), and Afiana et al. (2022), whose findings also indicated no significant connection. This implies that users' concerns about system security or reliability do not directly affect their perceptions of ease of use. Users may have become accustomed to digital systems, so security concerns no longer hinder their ease-of-use evaluations. However, H8, which tested the influence of insecurity on perceived usefulness, showed a significant effect ($t = 2.15$, $p < 0.05$), differing from Kampa (2023), who found no such relationship. This result indicates that in the Indonesian context, users who perceive e-learning systems as more secure are more likely to view them as useful. Security thus becomes a key element of perceived usefulness, as users tend to value systems they trust and consider reliable for long-term use.

H9 demonstrated that perceived usefulness significantly influences attitude ($t = 4.212$, $p < 0.001$), reinforcing the TAM framework proposed by Davis & Granić (2024), which identifies perceived usefulness as a major determinant of positive attitudes toward technology. This finding is consistent with Kampa (2023), indicating that e-learning users who recognize practical advantages, like saving time and convenient access, are more likely to form positive attitudes toward the system.

H10, which examined the connection between perceived usefulness and behavioural intention, also revealed a significant influence ($t = 5.408$, $p < 0.001$). This indicates that perceived usefulness not only fosters positive attitudes but also directly affects users' willingness to keep using e-learning. The finding aligns with Larasati (2017), and Nigatu et al. (2024), who confirmed that perceived usefulness exerts a direct effect on the willingness to adopt educational technologies.

H11 indicated that perceived ease of use has a significant impact on perceived usefulness ($t = 4.447$, $p < 0.001$). This supports the core premise of TAM, which posits that systems perceived as easy to use are also perceived as more useful. This relationship also aligns with Kampa (2023), emphasizing that positive user experiences in the context of ease of use strongly reinforce the perceived value of technology.

H12 showed that perceived ease of use significantly affects attitude ($t = 3.518$, $p < 0.001$). This suggests that when a system is easier to navigate, the more positive the user's attitude toward e-learning will be. This finding is in line with Kampa (2023), who noted that perceived ease of use enhances learning experiences and increases technology acceptance.

Finally, H13 revealed that attitude significantly influences behavioural intention ($t = 5.611$, $p < 0.001$). This confirms that a positive attitude toward e-learning plays a key role in of the intention to use the system continuously. The result is consistent with Kampa (2023), further emphasizing attitude as a key indicator within technology acceptance models.

Overall, the findings demonstrate that both technology readiness and acceptance factors play vital roles in determining the level of e-learning adoption in Indonesia. However, the interaction patterns among variables differ from previous studies, particularly in psychological dimensions such as innovativeness and discomfort. This suggests that e-learning acceptance in Indonesia is shaped not only by individual readiness but also by the social and cultural learning context. For instance, students often use online learning platforms due to institutional requirements rather than

intrinsic motivation to explore new technologies. This condition aligns with Afiana et al. (2022), who noted that technology implementation in Indonesian education tends to follow a top-down approach, where users adapt to institutional policies rather than being driven by personal motivation.

CONCLUSION

This study integrated the Technology Readiness and Technology Acceptance Model (TRAM) to analyse e-learning acceptance in Indonesia. The results show that technology readiness factors, particularly optimism and innovativeness, have a stronger and more significant influence on perceptions of ease of use and usefulness in e-learning adoption, while discomfort and insecurity exhibited varying effects, suggesting that psychological barriers are not always the primary determinants of technology acceptance. The construct of perceived ease of use significantly influenced perceived usefulness, and both directly affected attitude and behavioural intention toward e-learning usage. These findings highlight that technology acceptance in Indonesia is shaped not only by individual psychological factors but also by social, cultural, and institutional contexts that influence users' experiences, motivation, and learning engagement. This study reinforces the relevance of the TRAM framework in educational settings and emphasizes the need for adapting its constructs to better align with the characteristics and digital readiness of Indonesian users. Moreover, the study provides empirical evidence that integrating psychological readiness with technological acceptance provides deeper understanding into user behaviour within the digital learning settings. Future research is encouraged to broaden the scope by incorporating external variables such as digital literacy, technical support, and educational policy factors to deepen understanding of e-learning acceptance behaviour and its long-term sustainability in higher education.

REFERENCES

APJII. (2023). *Internet Survey Report Indonesia 2023*. Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). https://apjii.or.id/survei2023

Abdullah, F., & Ward, R. (2016). Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, *56*, 238–256. https://doi.org/10.1016/j.chb.2015.11.036

Afiana, F. N., Karomatunnisa, H., & Ayuningtyas, S. (2022). Integrasi Technology Readiness dan Technology Acceptance Model untuk Analisis Kesiapan Pengguna Terhadap Penerimaan Aplikasi Parenting. *Edu Komputika Journal*, *9*(2), 122–133. https://doi.org/10.15294/edukomputika.v9i2.61537

Amri, M., Setyosari, P., & Ulfa, S. (2022). Pengembangan Virtual Classroom Berbasis Web Learning Pada Mata Pelajaran Bahasa Inggris Untuk Siswa Kelas VII. *JKTP: Jurnal Kajian Teknologi Pendidikan*, *5*(2), 142–150. https://doi.org/10.17977/um038v5i22022p142

Andriani, R., Pertiwi, J., & Nisaa, A. (2024). Technology Readiness and Acceptance Model (TRAM) Pada Pengguna Rekam Medis Elektronik. *J-REMI : Jurnal Rekam Medik Dan Informasi Kesehatan*, *5*(4), 363–372. https://doi.org/10.25047/j-remi.v5i4.4795

Aripradono, H. W. (2021). Analisis Technology Readiness and Acceptance Model (TRAM) Pada Penggunaan Sport Wearable Technology. *Teknika*, *10*(1), 68–77. https://doi.org/10.34148/teknika.v10i1.330

Buyle, R., Van Compernolle, M., Vlassenroot, E., Vanlishout, Z., Mechant, P., & Mannens, E. (2018). "Technology Readiness and Acceptance Model" as a Predictor for the Use Intention of Data Standards in Smart Cities. *Media and Communication*, *6*(4), 127–139. https://doi.org/10.17645/mac.v6i4.1679

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

Davis, F. D., & Granić, A. (2024). *The Technology Acceptance Model*. Springer International Publishing. https://doi.org/10.1007/978-3-030-45274-2

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). SAGE Publications.

Halimah, N., Degeng, M. D. K., & Soepriyanto, Y. (2024). Peranan Tingkat Penerimaan Learning Management System Terhadap Kemampuan Self-Regulated Learning. *JKTP: Jurnal Kajian Teknologi Pendidikan*, *7*(3), 118. https://doi.org/10.17977/um038v7i32024p118

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Huang, Y., & Chiu, P. (2015). The effectiveness of a meaningful learning-based evaluation model for context-aware mobile learning. *British Journal of Educational Technology*, *46*(2), 437–447. https://doi.org/10.1111/bjet.12147

Kampa, R. K. (2023). Combining technology readiness and acceptance model for investigating the acceptance of m-learning in higher education in India. *Asian Association of Open Universities Journal*, *18*(2), 105–120. https://doi.org/10.1108/AAOUJ-10-2022-0149

Kim, T., & Chiu, W. (2019). Consumer acceptance of sports wearable technology: the role of technology readiness. *International Journal of Sports Marketing and Sponsorship*, *20*(1), 109–126. https://doi.org/10.1108/IJSMS-06-2017-0050

Krull, G., & Duart, J. M. (2017). Research Trends in Mobile Learning in Higher Education: A Systematic Review of Articles (2011 – 2015). *The International Review of Research in Open and Distributed Learning*, *18*(7). https://doi.org/10.19173/irrodl.v18i7.2893

Kurnia, D. (2020). Penerimaan dan Penggunaan E-Learning pada Masa Pandemi Covid-19: Aplikasi Model UTAUT2. *JKTP: Jurnal Kajian Teknologi Pendidikan*, *3*(4), 435–447. https://doi.org/10.17977/um038v3i42020p435

Larasati, N. (2017). Technology Readiness and Technology Acceptance Model in New Technology Implementation Process in Low Technology SMEs. *International Journal of Innovation, Management and Technology*, 113–117. https://doi.org/10.18178/ijimt.2017.8.2.713

Lin, C., Shih, H., & Sher, P. J. (2007). Integrating technology readiness into technology acceptance: The TRAM model. *Psychology & Marketing*, *24*(7), 641–657. https://doi.org/10.1002/mar.20177

Maryani, I., & Puspitasari, Y. M. (2024). The Impact of Technology Readiness on Undergraduate Students' Acceptance of Learning Management System. *Journal of Education Technology*, *8*(1), 22–30. https://doi.org/10.23887/jet.v8i1.51989

Mufidah, I., Husaini, L. R., & Caesaron, D. (2022). Improving Online Learning through the Use of Learning Management System Platform: A Technology Acceptance Model-Technology Readiness Index Combination Model Approach. *Jurnal Teknik Industri*, *24*(1), 61–72. https://doi.org/10.9744/jti.24.1.61-72

Nafia, Z. I., Hidayati, D., & Sulisworo, D. (2023). The Application of the Technology Readiness Acceptance Model on Education. *Journal of Novel Engineering Science and Technology*, *2*(01), 9–15. https://doi.org/10.56741/jnest.v2i01.265

Nigatu, A. M., Yilma, T. M., Gezie, L. D., Gebrewold, Y., Gullslett, M. K., Mengiste, S. A., & Tilahun, B. (2024). Health professionals' technology readiness on the acceptance of teleradiology in the Amhara regional state public hospitals, northwest Ethiopia: Using technology readiness acceptance model (TRAM). *PLOS ONE*, *19*(3), e0301021. https://doi.org/10.1371/journal.pone.0301021

Parasuraman, A. (2000). Technology Readiness Index (Tri). *Journal of Service Research*, *2*(4), 307–320. https://doi.org/10.1177/109467050024001

Parasuraman, A., & Colby, C. L. (2015). An Updated and Streamlined Technology Readiness Index. *Journal of Service Research*, *18*(1), 59–74. https://doi.org/10.1177/1094670514539730

Rahayu, R. P., & Wirza, Y. (2020). Teachers' Perception of Online Learning during Pandemic Covid-19. *Jurnal Penelitian Pendidikan*, *20*(3), 392–406. https://doi.org/10.17509/jpp.v20i3.29226