

## Quizlet-Assisted Microlearning Approach: Impact on Digital Literacy and Student Learning Motivation

Paijan Rambe<sup>1</sup>, Nini Aryani<sup>1</sup>, Emilda Sulasmi<sup>2</sup>, Setya Wardana Putri<sup>1</sup>

paijanrambe@stkipaisyiahriau.ac.id, nini.aryani@gmail.com, emilda@umsu.ac.id, setyawp@gmail.com

<sup>1</sup>Economic Education, Institut Pendidikan dan Teknologi 'Aisyiyah Riau, Pekanbaru, Indonesia

<sup>2</sup>Faculty of Islamic Studies, Universitas Muhammadiyah Sumatera Utara, Medan, Indonesia

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### ABSTRACT

This study aims to examine the effect of Quizlet-assisted microlearning on digital literacy and learning motivation and investigate the mediating role of digital literacy, as well as to provide an overview of the contribution of technology-based learning media to learning competencies in the digital era. This research is motivated by the demands of education in the digital era which emphasizes the importance of digital literacy and student learning motivation. The research method uses a quantitative approach with an ex post facto design. The research sample amounted to 85 students who were selected through purposive sampling techniques. Data collection was carried out using a Likert scale questionnaire, then analyzed with Structural Equation Modeling based on Partial Least Square (SEM-PLS). The results of the study show that digital literacy has a positive and significant influence on learning motivation. In addition, Quizlet-assisted microlearning also has a significant effect on digital literacy and student learning motivation. Other findings reveal that digital literacy plays a partial mediator in the relationship between microlearning and learning motivation. This shows that increasing digital literacy is able to strengthen the influence of microlearning on student learning motivation. Thus, the integration of microlearning-based learning technology is an effective strategy to increase digital literacy and learning motivation, so that educators are expected to optimize the use of interactive digital media in the learning process.

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### Corresponding Author:

Paijan Rambe

Institut Pendidikan dan Teknologi 'Aisyiyah Riau

Email: paijanrambe@stkipaisyiahriau.ac.id

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## Introduction

The 21st century digital era emphasizes digital literacy and learning motivation as two essential competencies for students that determine the quality of learning in higher education. Digital literacy includes not only technical skills, but also the ability to access, evaluate, produce, and utilize digital information effectively, ethically, and in accordance

with academic and professional needs. The digital literacy of the Indonesian people is part of President Prabowo's *Asta Cita* Program, which is the development of human resources through improving the quality of education, health, and access to technology (Chuang et al., 2025; Dong et al., 2026; Sonni et al., 2025). This is implemented in the Ministry of Higher Education, Science and Technology Program through the Transformative Campus strengthening program and digital literacy-based education programs. This program emphasizes the development of in-depth understanding, critical analysis, and the application of knowledge in solving real problems that are realized through a student-centered learning environment by emphasizing active participation in learning (Brojonegoro et al., 2025).

The Ministry of Communication and Digital program also supports the program with the program for the equitable distribution of basic digital literacy of Indonesian people, one of which is in the world of Education (Sari et al., 2025). Meanwhile, learning motivation in the digital era plays an important role in encouraging student active involvement, perseverance in dealing with complex material, and consistency in undergoing the learning process (Rambe, 2022). The process of preparing students according to those who have digital literacy and good learning motivation is not an instant process, but must be formed from learning approach programs that utilize digital technology productively, one of which is the microlearning approach. This approach emphasizes learning to follow modern learning patterns with shorter attention spans and utilizing digital technology (Samala et al., 2023). In the context of digital learning, this approach is increasingly relevant because technology allows students to access learning resources and develop good digital literacy (Le, 2019; Suvandy et al., 2024).

Various studies on the microlearning approach have been proven to be effective in improving teachers' digital literacy through the presentation of compact, flexible, and accessible materials, as well as being able to increase learning motivation (Tobing et al., 2023). The microlearning approach also supports the development of digital literacy and adaptive learning for students with positive results in learning activities (Balasundaram et al., 2024; Javorcik & Polasek, 2019). The same study also concluded that microlearning increases retention and is able to support the mastery of literacy skills if it is well designed instructionally (Nissen et al., 2024). The results of the study also suggest that microlearning applications improve feedback skills in learning related to academic literacy and reflective abilities (Gorham et al., 2025). The results of the study also suggest that multimedia microlearning helps improve digital reading skills (Pinandhita & Mohd Yasin, 2025).

From the perspective of learning motivation, it is seen from the Microlearning Approach. The results show that microlearning approaches can match or surpass eLearning in student engagement & motivation, depending on the learning design (Javorcik & Polasek, 2019). Research also says that microlearning affects students' critical thinking skills and increases motivation to learn in the digital age (Farhan M et al., 2024; Monib et al., 2025). The results of the study also stated that microlearning can increase learning motivation and support independent learning & flexible access (Rof et al., 2024). The findings are in line with research that states that microlearning combined with flipped classroom also increases motivation and effectiveness of learning in the context of higher education (Fidan, 2023). The microlearning approach by utilizing technology in the digital era is very relevant to be application-based in the mobile learning era, where students can use smart devices such as smartphones and tablets to access materials anytime and anywhere. Microlearning applications are usually equipped with interactive features, multimedia, and short evaluations so that they not only help improve knowledge retention, but also motivate participants to continue learning.

The results of the study suggest that mobile-based microlearning fosters motivation and learning outcomes in secondary students (Corbeil et al., 2023). The findings are supported by the results of the study which states that the implementation of microlearning through applications for engineering/software courses shows an increase in participants' learning motivation (Gasca-Hurtado et al., 2024). This is in line with research that says game-based microlearning prototypes report increased student motivation and engagement (Jannah et al., 2025). One of the application media that supports in the era of digital technology is the Quizlet application. Quizlet is an Interactive learning model App that provides Quizlet interactive flashcards, personalized practice tests, and engaging learning games (Amrullah, 2024). The results of the study stated that there was an increase in learning performance and learning motivation of students who used the Quizlet game (Li & Phongsatha, 2025). These results are in line with the results of a study that says that Quizlet helps with vocabulary acquisition; Its multimodal & accessibility features support engagement and motivation. The results also stated that Quizlet is easy to use, interactive, effective in vocabulary retention, motivating, flexible (Tanjung & Rafida, 2025). These findings are in line with research that there has been a significant improvement in understanding collocation and retention and that students have a positive attitude towards Quizlet (Tiang-uan, 2023).

Digital literacy is closely associated with students' learning motivation. Empirical findings indicate that digital literacy significantly contributes to enhancing learning motivation. The results of the study reveal that digital literacy accounts for approximately 46.8% of the variance in students' learning motivation, suggesting a substantial and meaningful influence (Lestari et al., 2024). These findings are corroborated by prior studies, which indicate that digital literacy exerts a positive contribution to both learning motivation and online learning outcomes (Arsyad et al., 2023). Research in the sample of students (n large), digital literacy and self-regulated learning both have a significant effect on learning motivation (Lingga et al., 2024; Akhsana et al., 2024). Research with student objects shows that digital literacy significantly affects learning motivation (Azizah et al., 2024). Although previous studies have separately examined the influence of microlearning on digital literacy and learning motivation, empirical evidence investigating the mediating role of digital literacy in the relationship between Quizlet-assisted microlearning and learning motivation remains limited, particularly within Indonesian higher education contexts. Therefore, this study contributes to the literature by proposing and testing a mediation model that explains how digital literacy serves as a mechanism through which Quizlet-assisted microlearning enhances student learning motivation.

## Method

This study was conducted at the Institute Pendidikan dan Teknologi 'Aisyiyah Riau and UIN Suska Riau by involving 85 students of the Economics Education Study Program as respondents. The sample size employed in this study satisfies the minimum requirement based on the 10-times rule and exceeds the recommended threshold for Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair Jr et al., 2021; Hair et al., 2011). This research method, which is *ex post facto*, is a method used to analyze cause-and-effect relationships based on events that have occurred without manipulating variables (Sugiyono, 2021). This method is based on scientific characteristics that include rationality, empirical, and systematic. The use of this method is because it observes cause-and-effect relationships based on existing data.

The type of data used in this study is primary data. The data source was obtained from respondents' answers related to digital literacy variables and student learning motivation

through questionnaire instruments that have been compiled by researchers. The instrument uses a closed question form with a Likert scale. The population in this study is all active students of the Economics Education Study Program at the Institute of Education and Technology 'Aisyiyah Riau and UIN Suska Riau, while the sampling technique uses purposive sampling, taking into account the level of suitability of respondent characteristics so that the data obtained is more representative in describing students' digital literacy. The respondent criteria are students who have used quizlets in learning.

Operationally, the Quizlet-assisted microlearning approach is conceptualized as a learning strategy aligned with contemporary learning patterns characterized by shorter attention spans, supported by digital technology. This approach leverages Quizlet features such as interactive flashcards, personalized practice tests, and engaging learning games to enhance the learning experience. Digital literacy, in this study, is defined as an individual's ability to access, evaluate, select, and effectively utilize information through digital technologies in everyday contexts. Meanwhile, learning motivation in the digital era is considered a crucial factor that fosters students' active engagement, persistence in addressing complex materials, and consistency throughout the learning process. The data analysis procedure in this study comprises two main stages: descriptive and inferential analysis. Descriptive analysis is conducted to collect, organize, and present data in a manner that facilitates understanding, and it is used to describe the conditions, patterns, or phenomena observed within the studied group without making broad generalization.

Furthermore, inferential analysis is employed to test the proposed hypotheses and to develop an appropriate and well-fitting research model. This study adopts a variance-based Structural Equation Modeling (SEM) approach, specifically the Partial Least Squares (PLS) method. Within the PLS framework, the relationships among latent variables in the structural model are referred to as the inner model, whereas the measurement model comprising both reflective and formative constructs is known as the outer model (Hair Jr et al., 2021; Hair et al., 2011; Jogiyanto & Abdillah, 2009). In contrast, conventional SEM typically refers to the integrated framework as the overall model, which combines the structural relationships among latent variables with the measurement model through Confirmatory Factor Analysis (CFA).

The analytical procedures in this study involve two main stages: (a) the development of a theory-driven structural model (inner model), constructed based on a conceptual framework to examine the relationships between exogenous and endogenous variables; and (b) the construction of a path diagram, serving as a visual representation of the theoretical model that illustrates the relationships among the variables under investigation. This study involves three variables: Quizlet-assisted microlearning, digital literacy, and learning motivation. Specifically, Quizlet-assisted microlearning and digital literacy are conceptualized as exogenous predictors driving learning motivation as the primary endogenous outcome, providing a robust structural framework for empirical hypothesis testing via Partial Least Squares Structural Equation Modeling (PLS-SEM).

Quizlet-assisted microlearning refers to the use of Quizlet as a technology-based microlearning platform characterized by usefulness, ease of use, accessibility, flexibility, interactivity, engagement, and learning effectiveness, grounded in the Technology Acceptance Model (Al-Nuaimi & Al-Emran, 2021; Rosli et al., 2022). Digital literacy is defined as students' ability to access, evaluate, create, and utilize digital information effectively, measured through the DigComp 2.2 dimensions: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving (Vuorikari et al., 2022). Learning motivation refers to students' internal drive to engage in

learning activities, reflected in autonomy, competence, relatedness, engagement, and persistence, based on Self-Determination Theory (Ryan & Deci, 2020).

## Results and Discussion

This section presents the results of the data analysis and discusses the findings in relation to the proposed research model and relevant theoretical perspectives. The analysis was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with SmartPLS software. The evaluation process consisted of two main stages: assessment of the measurement model (outer model) and assessment of the structural model (inner model). The measurement model evaluation aimed to ensure that the constructs and indicators used in the study were valid and reliable, while the structural model evaluation examined the relationships among the latent variables and tested the proposed hypotheses.

### Fit Model Evaluation

The assessment of the measurement (outer) model was conducted using the SmartPLS approach, employing three main criteria: convergent validity, discriminant validity, and composite reliability. Convergent validity in reflective measurement models is evaluated based on the correlation between item scores and their respective construct scores. According to prior literature, factor loadings in the range of 0.50 to 0.60 are considered acceptable, particularly in the early stages of research. Accordingly, this study adopts a minimum loading factor threshold of 0.50. The results of the PLS analysis, as presented in **Table 1**, indicate that the outer model meets the criteria for convergent validity, as all indicator loadings exceed the established threshold of 0.50, demonstrating adequate correlations between the observed variables and their corresponding constructs.

**Table 1.** Model Value of Outer Loading Indicator

|              | Digital Literacy | Quizlet-Assisted Microlearning | Learning Motivation | Critical Value |
|--------------|------------------|--------------------------------|---------------------|----------------|
| LD_1 - LD_15 | 0.816 - 0.903    |                                |                     | 0.5            |
| MB_1 - MB_14 |                  |                                | 0.876 - 0.945       | 0.5            |
| ML_1 - ML_10 |                  | 0.833 - 0.899                  |                     | 0.5            |

This data presents the All indicators achieved loading factors ranging from 0.818 to 0.945, exceeding the minimum threshold of 0.50. Moreover, according to the Fornell–Larcker criterion, as cited in prior studies, constructs with an AVE value below 0.50 may still be considered acceptable provided that their composite reliability exceeds 0.60. Collectively, these psychometric parameters substantiate robust indicator reliability and adequate convergent validity, thereby establishing a sound measurement model suitable for subsequent structural path evaluation. Consequently, this rigorous methodological foundation minimizes measurement error and ensures the empirical stability required for testing the hypothesized relationships.

**Table 2.** Average Variance Extracted

| Variable                       | Composite Reliability | Average Variance Extracted (AVE) |
|--------------------------------|-----------------------|----------------------------------|
| Digital Literacy               | 0.977                 | 0.736                            |
| Quizlet-Assisted Microlearning | 0.968                 | 0.755                            |
| Learning Motivation            | 0.987                 | 0.847                            |

Based on **Table 2**, convergent validity can be assessed through the Average Variance Extracted (AVE) values. The results indicate that all latent variables exhibit AVE values greater than 0.50, confirming that all constructs meet the required validity criteria. This finding suggests that the indicators used to measure each latent construct demonstrate adequate convergent validity, as reflected by their AVE values. Specifically, an AVE

exceeding 0.50 confirms that each latent construct accounts for more than half of the variance in its manifest indicators, thereby effectively minimizing measurement error. Consequently, this high level of item convergence establishes a solid empirical foundation for evaluating discriminant validity and proceeding to structural path analysis.

### Structural Model Testing

Structural model evaluation was conducted to examine the relationships among variables, as well as to assess the significance levels and the coefficient of determination ( $R^2$ ) of the proposed research model. The evaluation of the structural model was performed by analyzing the  $R^2$  values of the endogenous variables and the significance of the structural path coefficients using t-statistics. The following section presents an overview of the structural model employed in this study.

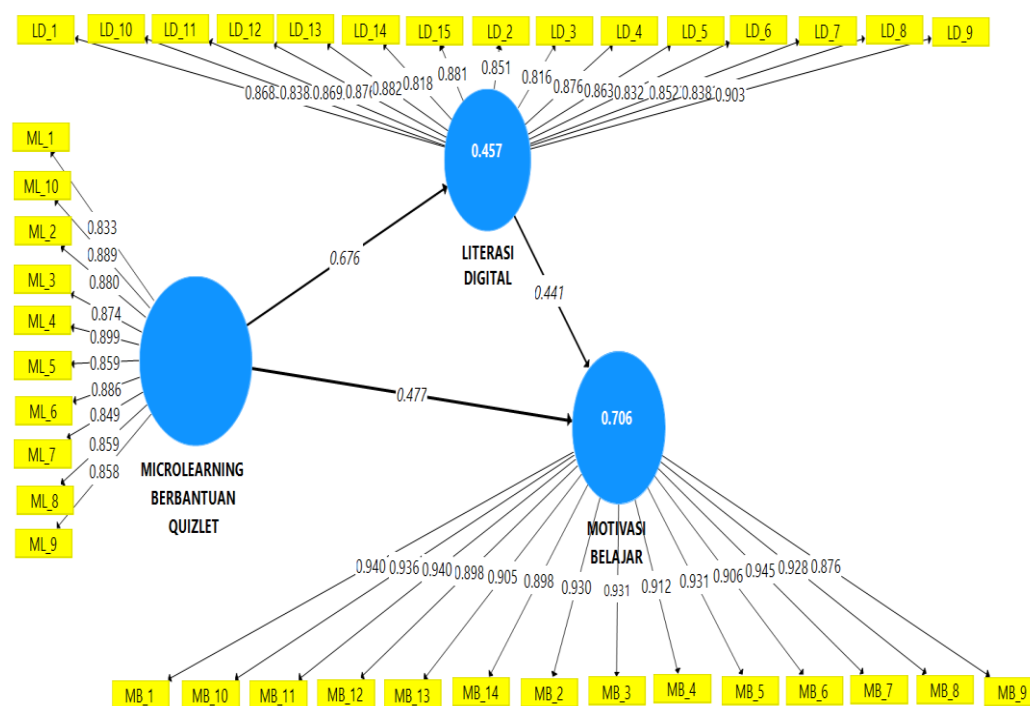


Figure 1. Digital Literacy Structure Model and Learning Motivation

Based on **Figure 1**, the measurement model shows that the covariance between indicators is explained by the underlying latent construct, so the variation in the indicator is a reflection of changes in the latent construct. Thus, this model assumes that any change in the latent variable will have a direct impact on the change in the value of its indicators. In the structural model shown, there is one exogenous variable, namely Quizlet-assisted microlearning, and two endogenous variables, namely digital literacy and learning motivation. The evaluation of the model using the PLS approach began by analyzing the R Square ( $R^2$ ) value of each endogenous latent variable. The R Square value is used to determine how much able the exogenous variable is to explain the endogenous variable, as well as to assess the strength of substantive influences in the model.

The results of the analysis indicate that the  $R^2$  value for the digital literacy variable is 0.457, suggesting that 45.7% of the variance in digital literacy is explained by the Quizlet-assisted microlearning approach, while the remaining 54.3% is attributed to other factors beyond the scope of this model. Meanwhile, the  $R^2$  value for the learning motivation variable is 0.706, indicating that 70.6% of its variance can be jointly explained by Quizlet-assisted microlearning and digital literacy, with the remaining 29.4% influenced by variables not

included in the model. These findings demonstrate that the proposed model exhibits substantial explanatory power, particularly for the learning motivation construct, and highlight the significant role of digital literacy in mediating the effect of microlearning on the enhancement of learning motivation.

### Hypothesis Test

The significance of the estimated parameters provides critical insights into the relationships among the variables examined in this study. Hypothesis testing is based on the values obtained from the inner model estimates, particularly the path coefficients (inner weights). The following table presents the results of the direct structural model assessment.

**Table 3.** Results of T-calculated Coefficient Values

|                                                           | Original<br>Sample (O) | Mean<br>(M) | Standard<br>Deviation<br>(STDEV) | T-<br>Values | P<br>Values |
|-----------------------------------------------------------|------------------------|-------------|----------------------------------|--------------|-------------|
| Quizlet-Assisted Microlearning -<br>> Digital Literacy    | 0.676                  | 0.677       | 0.054                            | 12.449       | 0.000       |
| Quizlet-Assisted Microlearning -<br>> Learning Motivation | 0.477                  | 0.478       | 0.076                            | 6.302        | 0.000       |
| Digital Literacy -> Learning<br>Motivation                | 0.441                  | 0.439       | 0.073                            | 6.067        | 0.000       |

As detailed in **Table 3**, all direct path coefficients are statistically significant at  $p < 0.001$  ( $t > 1.96$ ). Specifically, Quizlet-assisted microlearning exerts a strong positive influence on digital literacy ( $\beta = 0.676$ ,  $t = 12.449$ ,  $p = 0.000$ ). Furthermore, Quizlet-assisted microlearning demonstrates a significant direct effect on learning motivation ( $\beta = 0.477$ ,  $t = 6.302$ ,  $p = 0.000$ ). Similarly, digital literacy significantly predicts learning motivation ( $\beta = 0.441$ ,  $t = 6.067$ ,  $p = 0.000$ ). Collectively, these empirical findings confirm that all proposed direct hypotheses are supported, demonstrating that Quizlet-assisted microlearning directly boosts student motivation while simultaneously enhancing digital literacy as a vital co-predictor.

### *The Influence of Quizlet-Assisted Microlearning on Digital Literacy*

The value of the path coefficient was 0.676 with statistical  $t = 12.449$  and  $p$  value = 0.000. Since  $t$  count (12.449)  $>$   $t$  table (1.97) and  $p$  value  $<$  0.05, the hypothesis is accepted. This means that Quizlet-Assisted Microlearning has a positive and significant effect on Digital Literacy. The coefficient of 0.676 shows a strong influence, so the better the implementation of microlearning assisted by Quizlet, the higher the digital literacy of students. The positive effect of Quizlet-assisted microlearning on digital literacy can be explained through the Technology Acceptance Model (TAM), which remains one of the most widely adopted frameworks for understanding educational technology acceptance. According to TAM, students are more likely to utilize digital technologies when they perceive them as useful and easy to use. Quizlet provides an accessible and interactive learning environment through digital flashcards, gamified assessments, and personalized learning features (Al-Nuaimi & Al-Emran, 2021; Rosli et al., 2022).

These characteristics enhance students' perceptions of usefulness and ease of use, leading to more frequent interaction with digital resources and ultimately strengthening their digital literacy competencies. The effectiveness of microlearning can also be explained by cognitive load theory, which suggests that learning is more effective when instructional materials reduce unnecessary cognitive burden. By presenting information in short and focused segments, Quizlet-assisted microlearning minimizes extraneous cognitive load and allows students to process information more efficiently. As a result, students can allocate more cognitive resources to understanding, evaluating, and applying digital information,

which ultimately contributes to the enhancement of digital literacy skills (Sweller et al., 2019).

Microlearning as a short content-based learning approach has proven to be effective in improving students' digital literacy. This is due to its flexible, technology-based characteristics, and encourages active interaction with digital media. Various studies show that technology-based learning improves students' critical thinking skills and digital literacy (Vaszkun & Szakács, 2025). Other research also shows that the use of technologies such as AI and digital platforms drives an increase in students' digital literacy (Osipova, 2026; Chan & Sung, 2026; Eunike et al., 2024). Studies also show that microlearning improves the skills to use technology practically in academic life (Jamil et al., 2025). In addition, other research shows that technology-based learning strategies are able to increase the digital literacy of generation Z (Mukhlisa et al., 2025). Other research shows that digital learning increases students' adaptability to the technological environment (Samsi et al., 2025).

Drawing on a range of supporting empirical studies, this research concludes that microlearning represents an effective instructional approach for enhancing students' digital literacy. Its effectiveness is attributed to its inherent characteristics, including flexibility, technology integration, and its capacity to foster active engagement with digital media. The implementation of microlearning not only strengthens students' technical proficiency in utilizing digital tools but also promotes higher-order thinking skills, adaptability to digital environments, and practical competencies in applying technology within academic contexts (Astuti et al., 2026; Abidin, 2025). Therefore, microlearning plays a significant role in developing students' digital literacy competencies, particularly in the digital era, which necessitates adaptive and innovative capabilities.

### ***The Influence of Quizlet-Assisted Microlearning on Learning Motivation***

The path coefficient value was 0.477 with statistical  $t = 6.302$  and  $p$  value = 0.000. Since  $t$  is calculated ( $6.302 > t$  table (1.97) and  $p$  value  $< 0.05$ , the hypothesis is accepted. This means that Quizlet-assisted microlearning has a positive and significant effect on learning motivation. A coefficient of 0.477 shows that increasing microlearning directly increases learning motivation by 47.7%. Microlearning has been proven to have a significant influence on student learning motivation because of its interactive, flexible, and accessible nature. Microlearning-based learning allows students to learn in a short but effective time, increasing learning engagement. From a motivational perspective, the findings can be interpreted through Self-Determination Theory (SDT), SDT posits that learning motivation increases when learners experience autonomy, competence, and relatedness.

Quizlet-assisted microlearning allows students to learn independently at their own pace, choose learning schedules flexibly, and receive immediate feedback through interactive exercises. These features strengthen students' sense of competence and autonomy, thereby enhancing intrinsic motivation (Ryan & Deci, 2020). The gamification elements embedded within Quizlet further support motivational engagement by creating enjoyable and goal-oriented learning experiences. Therefore, the significant influence of microlearning on learning motivation observed in this study is theoretically consistent with the principles of Self-Determination Theory. Ultimately, this alignment demonstrates that microlearning interventions do not merely deliver bite-sized content, but actively construct a self-regulated learning environment where technology-mediated need satisfaction translates into sustained academic drive.

The results show that digital learning has a greater influence on motivation than conventional methods (Lin et al., 2017). The results of the study show that microlearning is effective in improving learning motivation, time efficiency, and short-term memory, especially when it is designed interactively and according to the needs of learners (Alam et

al., 2025). The study also suggests that students who learn using microlearning also show increased motivation and interest in learning, which is reflected in the high level of participation during the learning process (Suparman & Hadi, 2024). The results of the training on the use of Microlearning showed a significant increase in teachers' technological competence, which had implications for students' motivation to learn and understand (Dariyadi et al., 2024). The findings show that microlearning significantly increases student engagement, especially in concept comprehension, ease of remembering material, and learning motivation (Dariyadi et al., 2024).

Drawing on a range of supporting empirical studies, this research concludes that the microlearning approach is an effective instructional strategy for enhancing students' learning motivation. Its effectiveness is primarily attributed to its interactive, flexible, and accessible nature, which facilitates increased engagement, interest, and active participation in the learning process. Furthermore, microlearning contributes to greater learning efficiency by optimizing time utilization, improving memory retention, and enhancing comprehension of instructional materials (Magfira et al., 2026; Alias & Razak, 2025). Therefore, the implementation of microlearning not only strengthens students' learning motivation but also improves the overall effectiveness and quality of the learning process.

### ***The Influence of Digital Literacy on Learning Motivation***

The value of the path coefficient (Original Sample/O) was 0.441 with a statistical t-value = 6.067 and p value = 0.000. Since  $t$  is calculated  $(6.067) > t$  table  $(1.97)$  and  $p$  value  $< 0.05$ , the hypothesis is accepted. This means that Digital Literacy has a positive and significant effect on Learning Motivation. The coefficient of 0.441 shows that every increase in digital literacy will increase student Learning Motivation by 44.1%. The relationship between digital literacy and learning motivation can be further understood through self-determination theory. Students who possess higher levels of digital literacy tend to experience greater confidence and self-efficacy when interacting with digital learning environments. This confidence supports the fulfillment of competence needs, which is a central component of SDT. As students become more capable of locating, evaluating, and utilizing digital information effectively, they encounter fewer learning barriers and experience greater learning success. These positive learning experiences strengthen intrinsic motivation and encourage sustained engagement in academic activities (Ryan & Deci, 2020).

The findings of this study indicate that digital literacy has a positive effect on students' learning motivation. These results are consistent with prior research, which demonstrates that the ability to effectively access, evaluate, and utilize digital information enhances students' engagement and intrinsic motivation in the learning process. Furthermore, the study reveals that digital literacy exerts a significant influence on both motivation and learning outcomes within online learning environments (Amin et al., 2025). Another study found that digital literacy contributes directly to learning effectiveness and correlates with students' motivation and learning habits in a digital environment (Lingga et al., 2024; Nurhasanah et al., 2025; Vaszkun & Szakács, 2025).

In addition, recent research in the context of nursing education shows that digital literacy is able to increase academic motivation through technology-based interactive learning environments (Amin et al., 2025). Additional studies show that digital literacy plays a role in increasing self-efficacy, learning independence, and positive attitudes towards digital learning (Wahyuni et al., 2023). Similar findings are also strengthened by research on the integration of digital technology which shows that digital literacy has a significant contribution to increased learning motivation (Salim & Lubis, 2025). In addition, the development of digital literacy modules has also been proven to be able to significantly increase learning motivation (Sudarjat et al., 2025).

Drawing upon a body of supporting empirical evidence, this study concludes that digital literacy exerts a positive and significant influence on students' learning motivation. The ability to effectively access, evaluate, and utilize digital information enhances student engagement, intrinsic motivation, and productive learning behaviors within digital learning environments. Furthermore, digital literacy contributes to the development of self-efficacy, learning autonomy, and more positive attitudes toward the learning process (BinJwair & Al-Jasser, 2026; Zarshenas et al., 2022). The integration of technology and the implementation of structured digital literacy modules further reinforce improvements in learning motivation. Therefore, digital literacy represents a critical factor in fostering students' motivation and overall learning success in the digital era.

### Indirect Testing

**Table 4.** Results of T-calculated Coefficient Values

|                                                                                 | Original<br>Sample (O) | Mean<br>(M) | Standard<br>Deviation<br>(STDEV) | T-<br>Values | P<br>Values |
|---------------------------------------------------------------------------------|------------------------|-------------|----------------------------------|--------------|-------------|
| Quizlet-Assisted Microlearning -><br>Digital Literacy -><br>Learning Motivation | 0.298                  | 0.297       | 0.055                            | 5.403        | 0.000       |

### *The Influence of Quizlet-Assisted Microlearning on Learning Motivation Through Digital Literacy*

Based on the calculation results (Table 4), an indirect influence value of 0.298 was obtained which is the result of multiplying the coefficient of the Quizlet-assisted microlearning pathway to Digital Literacy (0.676) and digital literacy to learning motivation (0.441). This value shows that the improvement of Quizlet-assisted microlearning is indirectly able to increase learning motivation through the improvement of digital literacy. Given that both the direct and indirect effects are statistically significant, digital literacy can be characterized as a partial mediating variable in the relationship between Quizlet-assisted microlearning and learning motivation. Furthermore, the Variance Accounted For (VAF) value was calculated at 38.45% ( $0.298 / [0.298 + 0.477]$ ).

This result indicates partial mediation. Since both the direct and indirect effects are positive and significant, the mediation can be classified as complementary partial mediation (Hair Jr et al., 2021). The results of the study show that digital literacy mediates the relationship between technological ability and student learning outcomes (Fidan, 2023; Zhang, 2025). The results of the study show that digital literacy mediates the relationship between technological ability and student learning outcomes (Arsyad et al., 2023). Other research has also found that digital literacy is a connecting factor between technology and learning engagement (Amin et al., 2025). Other research has also found that digital literacy is a connecting factor between technology and learning engagement (Gasca-Hurtado et al., 2024; Vaszkun & Szakács, 2025). Other research also shows that digital literacy plays a role in increasing self-efficacy which has an impact on motivation (Sari et al., 2025).

Based on various research findings that are consistent with the present study, it can be concluded that digital literacy serves as an important mediating variable in the relationship between technology utilization, digital learning, and student learning outcomes. Digital literacy not only strengthens the relationship between technology use and learning motivation but also functions as a critical mechanism that enhances student engagement and overall learning effectiveness. Moreover, digital literacy contributes to the development of self-efficacy, which subsequently encourages higher levels of learning motivation (BinJwair & Al-Jasser, 2026; Alias & Razak, 2025). Therefore, digital literacy plays a strategic role in facilitating the integration of technology and improving the quality and outcomes of learning

in the digital era. The findings of this study provide important theoretical and practical implications. From a theoretical perspective, the results enrich the literature on technology-enhanced learning by confirming the mediating role of digital literacy in explaining how Quizlet-assisted microlearning influences students' learning motivation.

This finding extends previous studies that primarily examined the direct effects of microlearning and digital literacy by demonstrating the underlying mechanism through which technology-based learning strategies contribute to motivational outcomes. From a practical perspective, the findings suggest that educators should not only focus on integrating digital learning technologies into instructional practices but also prioritize the development of students' digital literacy competencies. Higher education institutions are encouraged to design learning environments and policies that support the effective use of digital platforms such as Quizlet, as improvements in digital literacy may amplify the positive impact of technology-assisted learning on student motivation and learning success.

## Conclusion

Based on the findings of this study, it can be concluded that digital literacy exerts a positive and significant influence on students' learning motivation. Students' ability to access, comprehend, and effectively utilize digital technologies has been shown to enhance their engagement, interest, and intrinsic motivation in the learning process. Furthermore, the implementation of microlearning supported by digital platforms also demonstrates a positive contribution to the improvement of students' digital literacy. The inherent characteristics of microlearning namely its flexibility, interactivity, and concise content delivery enable students to develop their technological competencies more effectively. Furthermore, microlearning has been empirically demonstrated to exert a positive and significant effect on students' learning motivation, both directly and indirectly. The mediating role of digital literacy indicates that the enhancement of learning motivation is not solely driven by the implementation of microlearning, but also occurs through the improvement of students' digital literacy competencies. Therefore, the integration of microlearning within a digital technology-based framework represents an effective instructional strategy for simultaneously enhancing digital literacy and learning motivation, while also promoting more adaptive and relevant learning practices in the digital era. Future studies are encouraged to involve larger and more diverse samples across different regions and educational levels. Experimental and longitudinal designs are also recommended to provide stronger evidence regarding the causal relationship among Quizlet-assisted microlearning, digital literacy, and learning motivation.

## Author Contributions

Conceptualization was contributed by PR, NA, ES, and SWP; methodology by PR and NA; and formal analysis by PR, ES, and SWP. Investigation was conducted by PR and SWP, with the original draft written by PR and NA. Review and editing were performed by PR, ES, and SWP.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Use of Artificial Intelligence

The authors used ChatGPT 5.6 solely for language editing and grammar improvement. The authors reviewed and verified all AI-assisted revisions and take full responsibility for the final content of the manuscript.

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