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Research Article

# Analysis of Influencing Factors of the Use of E-Comic on Learning Platforms Digital Using Technology Acceptance Model (TAM)

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**Abstract:** This study examines factors influencing the acceptance of e-comic use on digital learning platforms using an extended Technology Acceptance Model (TAM). A quantitative survey was conducted involving 118 elementary school students, and the data were analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The results indicate that perceived usefulness significantly influences attitude and behavioral intention to use e-comics. Perceived ease of use does not directly affect attitude or behavioral intention but significantly influences perceived usefulness. Accessibility and student support also play important roles in increasing technology acceptance. The structural model explains 52.2% of the variance in behavioral intention ($R^2 = 0.522$), indicating moderate explanatory power. These findings strengthen the application of TAM in the context of digital learning media and highlight the importance of perceived usefulness, accessibility, and system support in supporting the adoption of e-comics in primary education.

**Keywords:** e-comic, digital learning platform, technology acceptance model.

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## INTRODUCTION

The use of technology has a significant impact on the daily activities of most individuals and drives transformations across various academic and administrative processes in the global education sector (Ranjbaran et al., 2023). One of these is the use of online learning, often called e-learning or distance learning. Online learning is the process of delivering learning materials and activities through digital platforms that enable students and educators to access learning resources and interact actively online (Bao, 2020). This learning model utilizes a variety of technologies to support the learning process that is not limited to conventional classrooms. These characteristics enable online education to go beyond the limitations of traditional learning and expand access to educational resources for students and educators (Coman et al., 2020). E-comics are one of the cutting-edge media that online learning platforms incorporate into their development as auxiliary elements intended to enhance student literacy by presenting more engaging, contextual, and comprehensible content.

The development of digital technology and the demands of 21st-century learning have driven the integration of digital media such as e-comics into online learning platforms to improve student engagement and learning outcomes. Therefore, studies analyzing the factors influencing user acceptance of these media are particularly relevant. This approach not only considers the technical aspects of the medium but also measures individuals' perceptions of ease of use, perceived benefits, and behavioral intentions in adopting new learning media such as e-comics, which is an important focus of this study (Safitri et al., 2021). Visual-based digital learning media, including e-comics, can improve cognitive engagement and learning outcomes when users perceive the technology as easy to use and as supporting learning goals (Huang, 2025). Interactive visual-based learning media has been shown to positively affect students' motivation and cognitive engagement because it can present material in an engaging, easy-to-understand manner (Chang et al., 2019).

External factors, such as system quality, information quality, and support for the digital learning environment, also affect users' perceptions of the use of e-comics in technology-based learning platforms (Al-Emran et al., 2022). The quality of the system and the quality of learning content have been shown to increase perceptions of usefulness and ease of use, thereby strengthening positive attitudes towards the adoption of digital learning media (Aparicio-flores et al., 2025). The integration of e-comics, supported by these factors, has the potential to enhance learning effectiveness while strengthening the acceptance of technology in the modern digital education ecosystem (Bergdahl et al., 2024).

The Technology Acceptance Model (TAM) is positioned as a theoretical framework that is able to comprehensively explain the factors that influence the behavioral intentions of individuals in using technology, as well as serve as an analytical basis for examining the decision-making process in the adoption of new technologies in the context of education. This framework is widely used in online education research because it provides a systematic explanation of the mechanisms underlying users' technology acceptance. TAM-based research offers an empirical understanding of how students' and educational institutions' desire to adopt technology-based learning innovations is influenced by their perceptions of technology readiness, utility, and ease of use (Jiang et al., 2025). Bibliometric studies show that TAM is widely used to research various online learning environments, including MOOCs, LMS, and flipped learning, to understand the factors that influence the adoption of technology by learners and teachers (Abuhassna et al., 2023).

Studies that explicitly incorporate the use of e-comics in online learning platforms remain relatively limited, although several studies have demonstrated the effectiveness of e-comic learning media in improving students' engagement and learning outcomes (Damayanti et al., 2024; Khairunnisak et al., 2024). Previous research has primarily focused on the development and implementation of e-comic-based learning media rather than examining the factors influencing users' acceptance of such media within technology-based learning environments. In addition, many studies on technology acceptance tend to examine factors such as perceived usefulness and perceived ease of use separately without simultaneously exploring their relationships within a comprehensive theoretical framework. This indicates a gap in the literature regarding a comprehensive understanding of the factors influencing students' acceptance and intention to use e-comics as a digital learning medium in online learning platforms. Therefore, this study aims to analyze the influence of Technology Acceptance Model (TAM) factors on the acceptance of e-comics on learning platforms and to examine the causal relationships among the constructs involved.

## THEORETICAL FRAMEWORK

Digital comics are digital-based story media that present a series of static images combined with narrative text and are used as a supporting means in the teaching and learning process (Akcanca, 2020). Various studies have shown that the use of digital comics as a learning medium can improve the quality of the teaching and learning process, especially in the education of elementary school children (Phoon et al., 2020). Digital comics help students understand complex, abstract material, making learning easier, more effective, and more meaningful (Sagri et al., 2018).

The use of digital comics as a learning tool has also been reported to improve students' translation skills, cultural awareness, and motivation to learn (Al-abdullatif, 2022). Research on children aged 6-8 years shows that digital comics are preferred over printed books (Syarah et al., 2019), while another study found that comics positively contribute to preschoolers' oral text production abilities and improve their learning performance (Al-abdullatif, 2022). Digital comics can encourage creativity and develop writing skills among elementary school students (Istiq'faroh & Mustadi, 2020). This condition underscores the importance of educators' and education stakeholders' attention to optimizing the use of digital comics as a learning medium aligned with students' developmental characteristics (Al-abdullatif, 2022).

The Technology Acceptance Model (TAM) is one of the relevant and widely used models in analyzing technology acceptance. The model developed by Davis is widely recognized as the primary conceptual framework for explaining how individuals receive and adopt technology in a variety of contexts (Davis et al., 1989). TAM is often used as an analytical construct in research to examine user experience and the level of acceptance of technology on digital platforms (Mailizar et al., 2021). Numerous studies demonstrate that TAM can offer a thorough grasp of the elements influencing user attitudes and behaviors when using e-learning platforms (Herodotou et al., 2019). This model focuses on two core constructs, namely perceived ease of use (PEOU) and perceived usefulness (PU), as the main determinants of technology acceptance (Kemp et al., 2019). The development of TAM is also based on Behavioral Adoption Theory (BAT), which includes the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB), with an emphasis on the role of individual intentions and behaviors in adopting new technologies through usability, ease of use, social influence, and previous experience with similar technologies (Wang & Shin, 2022).

Digitization of education offers significant opportunities to develop students' academic abilities through innovative learning technologies (Alsaleh, 2020). The implementation of Digitalization still faces a number of challenges, especially related to the low level of acceptance and optimal use of technology by students (S. A. Salloum et al., 2019). The Technology Acceptance Model (TAM)-based approach is considered relevant for addressing these problems because it explains the factors that affect the acceptance and use of technology in the context of education (Raffaghelli et al., 2022). The application of TAM to digital comic media enables a more systematic analysis of the extent to which learning platforms support the process of understanding information and adapt to students' learning needs.

This approach is expected to strengthen the role of digital literacy in education, making a real contribution to improving students' abilities and skills by fostering better acceptance of technology. The presence of e-comics on the learning platform is also expected to help assess students' attitudes and intentions toward technology use, an important aspect in evaluating the effectiveness of information absorption and increasing reading interest. The urgency of this research lies in the strategic role of acceptance and attitude toward technology as indicators of the success of digital learning in supporting the development of students' abilities and skills through e-comic media.

This study adopts the Technology Acceptance Model as a theoretical foundation to formulate a conceptual framework that examines the factors affecting students' acceptance and sustainability of e-comics as a learning medium on digital learning platforms. This model confirms that the adoption of learning technology is determined by users' evaluation of the level of usefulness of the technology in supporting learning activities and their perception of ease of use during interaction with the system (Davis, 1989). This study proposes eleven hypotheses related to the proposed model construction, as shown in **figure 1**.

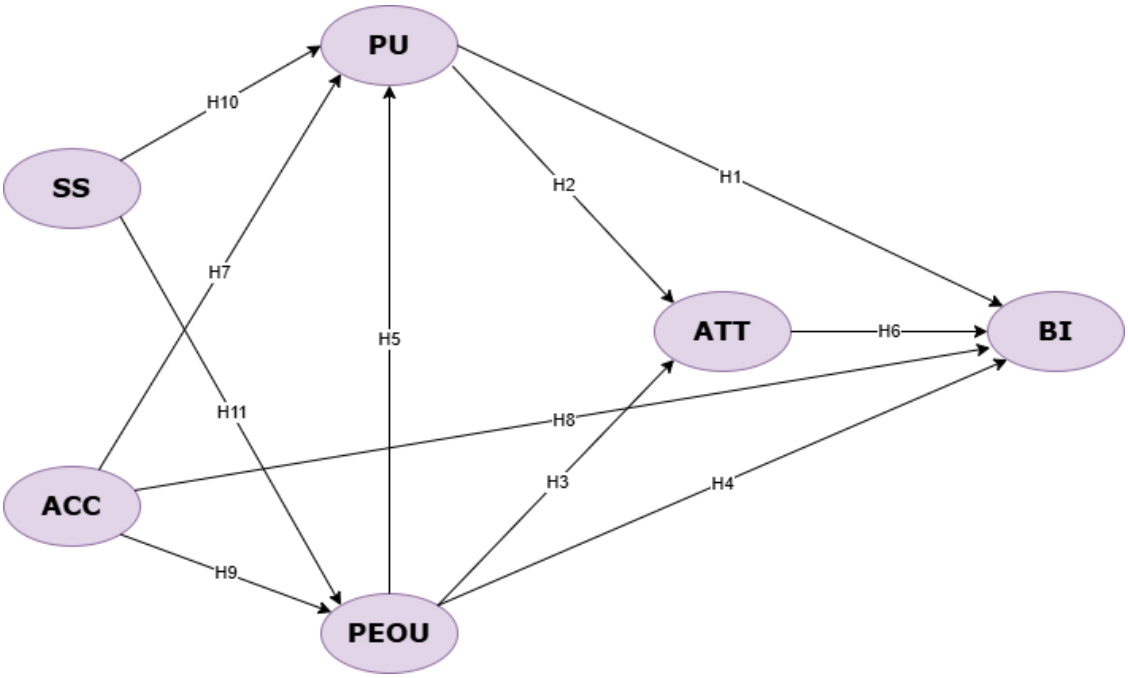


**Figure 1.** Research Model (Original Model Drawing using PLS-SEM Program for This Study)

**H1:** Perceived Usefulness (PU) has a positive effect on Behavioral Intention (BI).
The perception of usefulness reflects an individual's belief that learning technology can to improve academic effectiveness and performance. Users are more likely to stick with the technology when they can experience its advantages firsthand. The relationship between perceived usefulness and behavioral intent has been consistently confirmed in contemporary educational technology adoption studies (Matemba et al., 2020).

**H2**: Perceived Usefulness (PU) has a positive effect on Attitude Toward Using (ATT).
The perception of technology's benefits plays an important role in shaping users' affective attitudes. Technology that is considered to be able to improve material understanding and learning efficiency tends to result in more positive attitude evaluations. Recent findings show that perceived usefulness remains a key determinant of attitudes in the context of digital learning (Granić, 2022).

**H3**: Perceived Ease of Use (PEOU) has a positive effect on Attitude Toward Using (ATT).
The ease of use of technology influences user attitudes through a simple interaction experience and minimal technical barriers. The easy-to-operate system allows users to focus on learning objectives, thus fostering a positive attitude towards technology. This relationship has been strengthened by empirical studies of the modern digital learning environment (Al-Emran et al., 2020).

**H4**: Perceived Ease of Use (PEOU) has a positive effect on Behavioral Intention (BI).
*Perceived Ease of Use (PEOU) positively affects Behavioral Intention (BI).* The perception of ease of use drives users' intention to adopt technology because it lowers cognitive and technical effort. Users tend to intend to reuse systems that are considered uncomplicated and easy to learn. Recent research on e-learning and mobile learning supports the direct influence of ease of use on behavioral intent (Yakubu et al., 2025).

**H5**: Perceived Ease of Use (PEOU) has a positive effect on Perceived Usefulness (PU).
Ease of use contributes to the perception of usefulness because an easy-to-use system enables optimal use of features. Users are better equipped to enjoy the benefits of available learning when technology does not pose challenges. This relationship remains relevant in the development of TAM in the context of the latest digital education (Mailizar et al., 2021).

**H6**: Attitude Toward Using (ATT) has a positive effect on Behavioral Intention (BI).
A positive attitude towards technology reflects an affective acceptance that encourages the formation of the intention to use. Users with a positive attitude toward learning technology tend to be committed to continuing to use it. Recent studies show that attitudes remain an important mediator between perception and behavioral intent (Su & Chao, 2022).

**H7**: Accessibility (ACC) has a positive effect on Perceived Usefulness (PU).
Technological accessibility affects the perception of usefulness through device availability and ease of connectivity. Easily accessible technology enables more intensive and flexible use, so that the benefits of learning are felt more significantly. Recent research confirms the role of access as an important external factor in the adoption of educational technology (Raza et al., 2021).

**H8**: Accessibility (ACC) has a positive effect on Behavioral Intention (BI).
Ease of access to learning technology increases the chances of repeat use because users do not face significant infrastructure constraints. Adequate access conditions reinforce the

individual's intention to integrate technology in learning activities. This relationship is widely found in post-pandemic online learning studies (Almaiah et al., 2020).

**H9**: Accessibility (ACC) has a positive effect on Perceived Ease of Use (PEOU).
Access to stable devices and networks reinforces the perception that technology is easy to use. Adequate infrastructure reduces technical barriers, leading users to rate the system as more user-friendly and simple. The latest empirical findings place accessibility as a key prerequisite for the ease of use of learning technologies (S. Salloum et al., 2023).

**H10**: Student Support (SS) has a positive effect on Perceived Usefulness (PU).
Adequate learning support increases the perception that technology has a useful value in supporting the learning process. The guidance and assistance available help users maximize the system's functionality, so the benefits of learning are felt more effectively. Recent studies confirm the importance of user support in increasing perceived usefulness (Bervell et al., 2022).

**H11**: Student Support (SS) has a positive effect on Perceived Ease of Use (PEOU)
Technical and pedagogical support helps users understand how technology works and reduces the difficulty of use. The presence of responsive assistance increases the user's confidence in operating the system independently. Recent research shows that user support contributes significantly to the perception of ease of use of learning technology (Almorgen & Aljammaz, 2022).

## METHODS

### *Design, Participants, and Data Collection Procedure*

This study employed a quantitative explanatory research design to examine the causal relationships among the variables using the Technology Acceptance Model (TAM) as the theoretical framework. A quantitative approach was applied to test the proposed relationships through survey data collection (Zhang et al., 2007). The target school was selected using purposive sampling based on criteria including representativeness of the research context, accessibility for researchers, relevance to local educational issues, and feasibility of data collection. The survey was distributed to sixth-grade students who were available during the data collection period using a convenience sampling approach.

The population of this study consisted of 118 sixth-grade students, and all students participated in the survey. The total number of respondents was therefore 118 students. Participant characteristics show that 63% of the respondents were female and 37% were male. The students were 11-12 years old, which corresponds to the typical age range of sixth-grade students in Indonesian elementary schools. Data were collected using a structured questionnaire administered to students during school hours with assistance from the classroom teacher. Before completing the questionnaire, students were given access to e-comic learning materials through a digital learning platform so that they could experience the use of the media in the learning process.

The questionnaire consists of statements designed to measure users' perceptions of the usability and ease of use of technology. The data from this questionnaire are expected to illustrate the level of technology acceptance using TAM indicators and to understand the extent to which technology is accepted by users based on student responses. The survey used 18 items distributed among the TAM constructs. Each construct was measured using a

5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The TAM questionnaire instrument contains the following constructs: Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Toward Use (ATT), Behavioral Intention (BI), System Satisfaction (SS), and Actual Use (ACC). The TAM questionnaire was adapted from Lin & Yu (2023) whose instrument has been previously tested and reported acceptable validity and reliability. Reliability testing was also conducted in the present study to confirm the internal consistency of the instrument with the current participants.

**Table 1.** TAM Questionnaire

| No | Aspect | Indicators | Question Number | | Quantity |
|---|---|---|---|---|---|
| | | | Positive | Negatives | |
| 1 | *Perceived Ease of Use* (PEOU) | Feature complexity | | 1 | 3 |
| | | Clarity of instructions | 2 | | |
| | | User independence | 3 | | |
| 2 | *Perceived Usefulness* (PU) | Understanding of the material | 4 | 5 | 6 |
| | | Digital literacy | 6 | | |
| | | Learning efficiency | 7 | 8 | |
| | | Improved learning outcomes | 9 | | |
| 3 | *Attitude towards using Technology* (ATT) | Interest in learning | 10 | | 2 |
| | | Usage interests | 11 | | |
| 4 | *Behavioral Intention to use* (BI) | Reuse intention | 12 | | 2 |
| | | Usage preferences | 13 | | |
| 5 | *Self-Satisfaction* | Quality satisfaction | 14 | | 3 |
| | | Expectations fit | 15 | | |
| | | Emotional satisfaction | 16 | | |
| 6 | *Accessibility* | Device availability | 17 | | 2 |
| | | Ease of access | 18 | | |
| | | Quantity | | | 18 |

## *Data Analysis*

This study uses a research methodology that combines factor analysis with TAM and path analysis with PLS-SEM to test the relationships among technology use factors, such as technology use, user experience, ease of use, and other factors. The survey data were analyzed using the Partial Least Squares–Structural Equation Modeling (PLS-SEM) approach to test the relationships among constructs derived from the Technology Acceptance Model. The PLS-SEM approach was chosen for its ability to evaluate the simultaneous relationships between dependent and independent latent variables, accommodate complex research models, and remain reliable at small to medium sample sizes.

The analysis stage involved data preparation, including checks for completeness, consistency of responses, and outlier detection. The measurement model was evaluated by assessing construct reliability and validity using Cronbach's alpha, composite reliability, average variance extracted, and factor loadings to ensure that each indicator adequately represented the construct. For convergent validity, outer-loading values are generally required to exceed 0.70, as recommended by Gozali and Latan (2015), however, in this study, outer-loading values between 0.50 and 0.60 were considered sufficiently valid, in line with the criteria

established by Chin.(Choi & Lee, 2022). As for measuring reliability, *Composite Reliability* (CR), which shows the extent to which a construct is reliable. A CR value of > 0.7 is generally considered acceptable (Bagozzi & Yi, 1988). In addition, AVE is used to evaluate the amount of variance captured by a construct relative to measurement error, as a measure of discriminant validity. An AVE value that is> 0.5 indicates good reliability (Fornell & Larcker, 1981).

The assessment of the structural model was carried out by analyzing path coefficients to test the research hypothesis, while statistical significance was determined using the PLS Algorithm, Bootstrapping and Blindfolding procedures to ensure the accuracy of the estimation and the significance of the relationships between variables. The criteria used, namely the Inflation Factor (VIF), are used to assess multicollinearity among variables in the research model, with a limit of 5 to avoid excessive correlation among independent variables. The p-value tests the statistical significance of the relationship between variables by comparing it to the significance level α = 0.05; a p-value smaller than α indicates a significant relationship, while a p-value greater than α indicates an insignificant relationship. The $f^2$ test measures the magnitude of exogenous variables' influence on endogenous variables by assessing changes in the determination coefficient; values above 0.02, 0.25, and 0.35 indicate small, medium, and large effects, respectively.

**Table 2.** Result of Validity and Reliability

| Cronbach's alpha | Cronbach's alpha based on standardized items | Number of items |
|---|---|---|
| .648 | .807 | 18 |

**Table 3.** Descriptive mean and standard deviation statistics

| Item | Sample mean (M) | Standard deviation (STDEV) | P values |
|---|---|---|---|
| P1 ← PEOU | 0.503 | 0.192 | 0.008 |
| P2 ← PEOU | 0.906 | 0.069 | 0.000 |
| P3 ← PEOU | 0.556 | 0.167 | 0.001 |
| P4 ← PU | 0.613 | 0.120 | 0.000 |
| P5 ← PU | 0.678 | 0.083 | 0.000 |
| P6 ← PU | 0.672 | 0.072 | 0.000 |
| P7 ← PU | 0.753 | 0.055 | 0.000 |
| P8 ← PU | 0.586 | 0.099 | 0.000 |
| P9 ← PU | 0.696 | 0.083 | 0.000 |
| P10 ← ATT | 0.853 | 0.046 | 0.000 |
| P11 ← ATT | 0.760 | 0.084 | 0.000 |
| P12 ← BI | 0.852 | 0.041 | 0.000 |
| P13 ← BI | 0.820 | 0.057 | 0.000 |
| P14 ← SS | 0.813 | 0.043 | 0.000 |
| P15 ← SS | 0.830 | 0.041 | 0.000 |
| P16 ← SS | 0.793 | 0.054 | 0.000 |
| P17 ← ACC | 0.876 | 0.029 | 0.000 |
| P18 ← ACC | 0.767 | 0.077 | 0.000 |

The entire analysis process was carried out using SmartPLS software version 4.0, which supports measurement and structural model testing as well as visualization of relationships between latent variables.

## RESULT

The design of the inner and outer models is informed by the proposed research hypothesis, with relationships among constructs such as PEOU, PU, ATT, B, SS, and ACC measured by specific indicators. In the outer model, indicators are reflective, so the measurement model's arrows extend from the construct to the indicators. Table 2 demonstrates that the research instrument possesses sufficient reliability for further analysis. A Cronbach's alpha of 0.648 indicates acceptable internal consistency for predictive PLS-SEM-based research, while a standardized Cronbach's alpha of 0.807 demonstrates good internal consistency after accounting for scale similarity among indicators with 18 items representing the main constructs in the Technology Acceptance Model (TAM), these findings suggest that the instrument reliably measures perceptions, attitudes, and intentions to use learning technology, making it appropriate for testing relationships among constructs in the research model.

Table 3 shows that all construct indicators have positive and significant average values, indicating that respondents generally rate e-comics on learning platforms as relatively easy to use, useful, and valuable, and as a technology to be accepted in the context of learning. The average score of items in the perceived ease of use construct showed that respondents tended to feel the ease of interaction with the interface (e.g., P2 and P3) and perceived the system to be not cognitively burdensome, while the perceived usefulness construct had a consistently high score, indicating respondents' confidence that e-comic supports the achievement of their learning objectives. The constructs of attitude toward use, behavioral intention, self-satisfaction, and accessibility also showed higher averages and relatively low standard deviations, indicating a positive attitude toward use, a strong intention to use, and a high level of satisfaction and access.

These findings are in line with previous research that reported that the perception of ease of use and the perception of benefits are closely related to users' intentions and attitudes towards the adoption of digital learning systems in the context of e-learning and educational technology (Sasongko et al., 2025). For example, an empirical study integrating TAM factors in the context of online learning reports that the perception of convenience and usability are important determinants that influence students' acceptance and use of e-learning through the analysis of the TAM model (Sasongko et al., 2025).

**Table 4.** Construct Reliability and Validity

| Constructs | Item | Outer Loading | Cronbach's alpha | CR | AVE |
|---|---|---|---|---|---|
| PEOU | P1 | 0.512 | 0.492 | 0.724 | 0.484 |
| | P2 | 0.925 | | | |
| | P3 | 0.579 | | | |
| PU | P4 | 0.624 | 0.759 | 0,833 | 0,455 |
| | P5 | 0.686 | | | |
| | P6 | 0.670 | | | |
| | P7 | 0.753 | | | |
| | P8 | 0.595 | | | |

| | | | | | |
|---|---|---|---|---|---|
| | P9 | 0.706 | | | |
| ATT | P10 | 0.854 | 0.483 | 0,793 | 0,657 |
| | P11 | 0.765 | | | |
| BI | P12 | 0.854 | 0.576 | 0,825 | 0,702 |
| | P13 | 0.820 | | | |
| SS | P14 | 0.814 | 0.747 | 0,855 | 0,663 |
| | P15 | 0.831 | | | |
| | P16 | 0.798 | | | |
| ACC | P17 | 0.872 | 0.544 | 0,812 | 0,684 |
| | P18 | 0.779 | | | |

Based on the results presented in the table, the Cronbach's alpha value for the PEOU construct is 0.492, which is below the recommended threshold of 0.7 in PLS-SEM studies (Hair et al., 2020). The PU construct shows a higher Cronbach's alpha value of 0.759, indicating better internal consistency. Most constructs demonstrate reliability values that approach or exceed the recommended threshold, suggesting that the measurement model generally exhibits acceptable internal consistency. Composite reliability (CR) values for all constructs exceed the recommended threshold of 0.7.

The SS construct shows the highest value (0.855), indicating good reliability. The Average Variance Extracted (AVE) values for most constructs, such as ATT (0.657) and BI (0.702), meet the criteria for convergent validity because they exceed the recommended threshold of 0.5. The PEOU construct has an AVE value of 0.484, which is slightly below the recommended threshold. Most constructs meet the recommended reliability and validity criteria, indicating that the measurement model is generally adequate for further analysis. Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT) based on the same methodological guidelines.

**Table 5.** Heterotrait-Monotrait Ratio Matrix

| | ACC | ATT | BI | PEOU | PU | SS |
|---|---|---|---|---|---|---|
| ACC | | | | | | |
| ATT | 1.216 | | | | | |
| BI | 1.180 | 0.962 | | | | |
| PEOU | 0.586 | 0.758 | 0.731 | | | |
| PU | 0.708 | 1.078 | 0.810 | 0.834 | | |
| SS | 0.478 | 0.871 | 0.643 | 0.903 | 0.961 | |

Table 5 presents the results of the discriminant validity test using the Heterotrait–Monotrait ratio (HTMT) criterion. Several construct pairs show HTMT values below the commonly suggested threshold of 0.90, indicating acceptable discriminant validity among those constructs. Some construct pairs display HTMT values that exceed the recommended threshold, particularly between ATT and ACC as well as BI and ACC. These higher values indicate a strong relationship among constructs that represent closely related dimensions in the Technology Acceptance Model.

The proximity among constructs such as attitudes, behavioral intentions, and actual use reflects the theoretical relationships proposed in TAM, where attitudes toward technology

are closely associated with behavioral intentions and subsequent usage behavior. Such patterns are commonly observed in technology acceptance studies in educational contexts. The HTMT criterion has been widely used to evaluate discriminant validity in PLS-SEM analyses, with a threshold of 0.90 often considered acceptable in applied research settings (Henseler et al., 2015).

**Table 6.** $R^2$ results

| | R-square | R-square adjusted |
|---|---|---|
| ATT | 0.457 | 0.447 |
| BI | 0.522 | 0.505 |
| PEOU | 0.353 | 0.342 |
| PU | 0.645 | 0.636 |

Table 6. presents the results of the determination coefficient ($R^2$) on endogenous constructs in the Technology Acceptance Model model which shows the ability of predictive variables to explain the variance of dependent constructs. An $R^2$ value in PU of 0.645 indicates strong explanatory power, suggesting that the perceived usefulness can be substantially explained by the predecessor construct in the model. The $R^2$ value in BI of 0.522 indicates a moderate to high level of explanation of behavioral intention to use technology, while the ATT's $R^2$ of 0.457 indicates a moderate level of explanation of the user's attitude. The PEOU construct has an $R^2$ of 0.353, indicating medium explanatory ability. The proximity of the R-square-adjusted value to the R-square across the entire construct indicates good model stability. These results are in line with recent PLS-SEM research, which indicates that $R^2$ values of 0.25, 0.50, and 0.75 correspond to weak, moderate, and strong explanatory levels in TAM-based models and predictive analyses, respectively (Sarstedt et al., 2024).

**Table 7.** Hypotheses remarks

| H | Relationship | Factor | B | p | F2 | Q2 | VIF | Remarks |
|---|---|---|---|---|---|---|---|---|
| H1 | PU → ATT | PU | 0.713 | 0.000 | 0.626 | 0.231 | 1.496 | Supported |
| H2 | PU → BI | | 0.258 | 0.041 | 0.056 | | 2.495 | Supported |
| H3 | PEOU → ATT | PEOU | -0.069 | 0.569 | 0.006 | 0.083 | 1.496 | Not supported |
| H4 | PEOU → BI | | 0.087 | 0.462 | 0.010 | | 1.532 | Not supported |
| H5 | PEOU → PU | | 0.221 | 0.009 | 0.089 | | 1.546 | Supported |
| H6 | ATT → BI | ATT | -0.048 | 0.714 | 0.002 | 0.064 | 2.336 | Not supported |
| H7 | ACC → PU | ACC | 0.307 | 0.000 | 0.246 | 0.122 | 1.081 | Supported |
| H8 | ACC → BI | | 0.563 | 0.000 | 0.390 | | 1.697 | Supported |
| H9 | ACC → PEOU | | 0.006 | 0.960 | 0.000 | | 1.080 | Not supported |
| H10 | SS → PU | SS | 0.509 | 0.000 | 0.450 | 0.320 | 1.623 | Supported |
| H11 | SS → PEOU | | 0.593 | 0.000 | 0.502 | | 1.080 | Supported |

Based on table 7, the results of the structural model test indicate that the TAM model, extended with ACC and SS variables, provides adequate empirical support for explaining the acceptance of e-comics on learning platforms. Based on the path coefficients and the previous $R^2$ value, endogenous constructs such as ATT, BI, PU, and PEOU have meaningful explanatory power, so the model is feasible for analyzing causal relationships among constructs. A VIF value below the threshold of 5 indicates the absence of multicollinearity problems in the model.

Path analysis showed that PU had a positive and significant effect on ATT (B = 0.713, p < 0.001, $f^2$ = 0.626), supporting H1. These findings confirm that perceptions of e-comics' usefulness foster positive user attitudes in the context of digital learning. PU also had a significant effect on BI (B = 0.258, p = 0.041, $f^2$ = 0.056), so H2 was accepted, albeit with a small effect size. In contrast, PEOU did not show a significant effect on ATT (B = -0.069, p = 0.569) or BI (B = 0.087, p = 0.462), so H3 and H4 were not supported. This indicates that the ease of use of e-comics does not directly shape attitudes and intentions; rather, it shapes them indirectly.

PEOU was shown to have a positive and significant effect on PU (B = 0.221, p = 0.009, $f^2$ = 0.089), so H5 was supported, which is in line with the TAM core assumption that an easy-to-use system would be perceived as more beneficial. However, ATT had no significant effect on BI (B = -0.048, p = 0.714), so H6 was rejected, suggesting that a positive attitude towards e-comics does not necessarily translate into intention to use.

External variables show a strong role in the model. ACC had a significant effect on PU (B = 0.307, p < 0.001, $f^2$ = 0.246) and BI (B = 0.563, p < 0.001, $f^2$ = 0.390), thereby supporting H7 and H8. In contrast, the influence of ACC on PEOU was not significant (B = 0.006, p = 0.960), so H9 was rejected. Furthermore, SS was a strong predictor of PU (B = 0.509, p < 0.001, $f^2$ = 0.450) and PEOU (B = 0.593, p < 0.001, $f^2$ = 0.502), supporting H10 and H11. These findings show that support for digital learning systems and environments strongly influences perceptions of the ease and usefulness of e-comics.
Overall, the results of this study confirm that acceptance of e-comics on learning platforms is more influenced by perceptions of usability, accessibility, and system support than by ease of use alone. These findings reinforce the relevance of the extended TAM model in explaining the adoption of visual-based digital learning media and show that PEOU serves as a mediating construct through PU rather than as a direct predictor of attitudes and intentions to use.

## DISCUSSION

### *Perceived Usefulness and Attitudes Toward E-Comic*

Perceived Usefulness had a positive and significant effect on users' attitudes towards e-comics (B = 0.713; p < 0.001). These findings show that students form positive attitudes when e-comics are perceived as capable of enhancing the effectiveness and quality of learning. These results are consistent with TAM development in the context of interactive digital learning media (Tick, 2019). PU has a significant effect on the intention to use e-comics, with the perception of pedagogical benefits as the main determinant of sustainable use. This aligns with TAM-based e-comic research, which found that cognitive benefits and learning efficiency drive the adoption of digital visual media (Al-abdullatif, 2022).

### *Perceived Ease of Use and Perceived Usefulness*

Ease of use has no significant effect on attitudes towards e-comics. These findings indicate that, in the context of modern learning platforms, technical ease is considered a basic prerequisite and no longer the main driver of attitudes. These results align with studies that show that digital-native students value content quality more than operational aspects (Kolikant, 2010). PEOU does not directly affect the intention to use e-comics. These findings reinforce the argument that ease of use is indirect and works through PU. This pattern is widely found in contemporary TAM research on digital learning media (Alkhawaja et al., 2022). PEOU has a significant effect on PU, indicating that e-comics that are easy to use are perceived as more useful for supporting independent learning. These findings are consistent with research on interactive visual media design (Tyng et al., 2023).

### Attitudes and Behavioral Intention

A positive attitude alone does not necessarily lead to the intention to use e-comics. This finding highlights a gap between affective evaluation and behavioral decision-making in digital learning media, particularly within institutionally integrated learning systems (Songkram et al., 2023). It suggests that while learners may perceive e-comics positively, other factors such as perceived usefulness, ease of use, or contextual support play a crucial role in translating attitude into actual behavioral intention. Understanding this gap is essential for designing effective digital learning interventions that not only engage learners affectively but also motivate actual usage.

### Accessibility and Behavioral Intention

Accessibility significantly affects the perception of e-comic usability. Cross-device availability and ease of access increase the functional value of digital comic-based learning media (Cohen et al., 2022). ACC has a strong influence on the intention to use e-comics. These findings confirm that ease of access is a key factor in the adoption of visual-based digital learning media (Songkram et al., 2023). Accessibility had no significant effect on the perception of e-comic ease of use, suggesting that ease of use is more determined by interface design than accessibility (Shi et al., 2021).

### System Support and Technology Acceptance

System support has a significant impact on PU, confirming that platform stability and technical support enhance the benefits of e-comics in digital learning (Abu-taieh et al., 2022). SS has a significant impact on PEOU, indicating that technical support enhances the ease of use of e-comics on learning platforms (Revythi & Tselios, 2019). The use of E-Comic on learning platforms is understood as a visual-narrative digital medium designed to increase students' cognitive and affective engagement in an online learning environment (Wijayanti et al., 2024).

The Technology Acceptance Model framework is used to explain how user perceptions shape attitudes towards the adoption of multimedia-based educational technologies (Dwiasih & Agung, 2021). The use of e-comic on learning platforms is understood as a visual-narrative digital medium designed to increase students' cognitive and affective engagement in an online learning environment (Ramadana & Widayati, 2025). The integration of e-comic into online platforms reveals the relationship between the quality of media design and the sustainability of learners' technology use (Wijayanti et al., 2024). This perspective expands the analysis beyond mere instructional effectiveness to an understanding of the psychological dynamics of acceptance of the digital learning system.

Perception of usefulness refers to the belief that e-comic can improve conceptual understanding through contextual visualization and structured storylines (Safitri et al., 2021). Research shows that multimedia contributes to increased motivation and retention of learning compared to static texts in online learning (D. Liu, 2024). The presentation of narratives in e-comic helps students relate academic material to everyday experiences, thus strengthening the process of constructing meaning (Yunita et al., 2025). The relationship between perceived benefits and user attitudes reinforces the relevance of TAM assumptions in the context of technology-based education (Mastour et al., 2025). This dimension places content quality and pedagogical suitability as strategic factors in the formation of sustainable use intentions.

The perception of ease of use is related to the user's convenience in accessing and navigating the e-comic through various devices and learning management systems. Responsive and consistent interface design reduces cognitive load during the digital learning process (Skulmowski & Xu, 2022). These technical factors play an important role in shaping a positive learning experience and reducing resistance to new technologies (Granić, 2022). Ease of cross-platform access supports the flexibility of independent and collaborative learning outside of formal classrooms (Alghazzawi et al., 2021). This relationship confirms that the success of e-comic adoption is greatly influenced by the integration of technology design with users' pedagogical needs.

Users' attitudes towards e-comic are shaped by the interaction between perceptions of usefulness and ease of use in the social context of education. Institutional support and teacher technology training strengthen users' trust in the quality of digital learning systems (Nawaz & Khan, 2012). The school environment and organizational culture also affect the collective readiness to adopt technology-based media (J. Liu et al., 2025). Positive attitudes contribute to greater use of e-comic as part of regular learning practices (Rasmet et al., 2025). This perspective shows that the acceptance of technology is not only individual but also influenced by structural factors and educational policies.

The expansion of the TAM concept in the e-comic study allows the integration of pedagogical variables such as learning engagement, user satisfaction, and interaction quality as mediators of technology acceptance. This approach enriches the analysis with a broader affective and social dimension in evaluating the impact of digital media (Schneider et al., 2022). The extended model provides a framework for assessing the sustainability of e-comic use based on learners' actual learning experiences (Rasmet et al., 2025). The integration of user behavior data supports the improvement of media design and evidence-based decision-making in the development of learning platforms (Leila et al., 2017). This perspective emphasizes that the acceptance of technology in education is a dynamic process that evolves alongside changing learning needs and technological innovation.

## CONCLUSION

Acceptance of e-comics on learning platforms is influenced by perceptions of usefulness, accessibility, and system support, while ease of use plays an indirect role through perceived usefulness. Students tend to develop positive attitudes and intentions to use e-comics when the media is considered pedagogically relevant, accessible, and supported by an adequate learning system. The extended TAM model demonstrates strong explanatory power for understanding the acceptance of visual-based digital learning media at the elementary school level. This study has several limitations. The sample involved 118 elementary school students from a specific educational context, which may limit the generalizability of the findings. Data were obtained through self-reported questionnaires that reflect students' perceptions rather than actual usage behavior. Future research can expand the sample and explore additional mediating or moderating variables such as learning engagement, digital literacy, or user characteristics to strengthen the development of technology acceptance models in education.

## REFERENCES

Abu-taieh, E. M., Alhadid, I., Alkhawaldeh, R. S., Khwaldeh, S., Masa'deh, R., Alrowwad, A., & Al-Eidie, R. (2022). An empirical study of Factors influencing the perceived usefulness and effectiveness of integrating e-learning systems during the COVID-19 pandemic using

SEM and ML : A case study in Jordan. *Sustainability*, *14*(20), 1–27. https://doi.org/10.3390/su142013432

Abuhassna, H., Yahaya, N., Aman, M., Megat, Z., Zaid, N. M., Samah, N. A., Awae, F., Nee, C. K., & Alsharif, A. H. (2023). Trends on using the Technology Acceptance Model ( TAM ) for online learning : A bibliometric and content analysis. *International Journal of Information and Education Technology*, *13*(1), 131–142. https://doi.org/10.18178/ijiet.2023.13.1.1788

Akcanca, N. (2020). An alternative teaching tool in science education: Educational comics. *International Online Journal of Education and Teaching (IOJET)*, *7*(4), 1550–1570. http://iojet.org/index.php/IOJET/article/view/1063

Al-abdullatif, A. M. (2022). Towards digitalization in early childhood education : pre-service teachers ' acceptance of using digital storytelling , comics , and infographics in Saudi Arabia. *Education Sciences Article*, *12*(702), 1–22. https://doi.org/10.3390/educsci12100702

Al-Emran, M., Al-Nuaimi, M. N., Arpaci, I., Al-Sharafi, M. A., & Jnr, B. A. (2022). Towards a wearable education : Understanding the determinants affecting students ' adoption of wearable technologies using machine learning algorithms. *Education and Information Technologies*, *28*(3), 2727–2746. https://doi.org/10.1007/s10639-022-11294-z

Al-Emran, Mostafa, Arpaci, I., & Salloum, S. A. (2020). An empirical examination of continuous intention to use m-learning: An integrated model. *Education and Information Technologies*, *25*(4), 2899–2918. https://doi.org/10.1007/s10639-019-10094-2

Alghazzawi, D. M., Hasan, S. H., Aldabbagh, G., Alhaddad, M., Malibari, A., Asghar, M. Z., & Aljuaid, H. (2021). Development of platform independent mobile learning tool in Saudi Universities. *Sustainability*, *13*, 1–22. https://doi.org/10.3390/su13105691

Alkhawaja, M. I., Halim, M. S. A., Abumandil, M. S. S., & Al-adwan, A. S. (2022). System quality and student ' s acceptance of the e-learning system : The eerial mediation of perceived usefulness and intention to use. *CONTEMPORARY EDUCATIONAL TECHNOLOGY*, *14*(2), 1–15. https://doi.org/10.30935/cedtech/11525

Almaiah, M. A., Al-khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, *25*(May), 5261–5280. https://doi.org/10.1007/s10639-020-10219-y

Almorgen, A. S., & Aljammaz, N. A. (2022). The integrated social cognitive theory with the TAM model : The impact of M-learning in King Saud University art education. *Frontiers in Psychology*, *13*(November), 1–19. https://doi.org/10.3389/fpsyg.2022.1050532

Alsaleh, N. J. (2020). Teaching critical thinking skills : Literature review. *TOJET: The Turkish Online Journal of Educational Technology –*, *19*(1), 21–39. https://eric.ed.gov/?id=EJ1239945

Aparicio-flores, M. P., Esteve-faubel, R. P., Fernández-Sogorb, A., & Gonzalves, C. (2025). Spanish validation perceived ease of ICT among future early childhood education and primary school teachers. *Education and Information Technologies (2025)*, *30*(4), 5133–5148. https://doi.org/10.1007/s10639-024-12983-7

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. In *In Journal of the Academy of Marketing Science* (Vol. 16, pp. 074–094). https://doi.org/10.1007/BF02723327

Bao, W. (2020). COVID-19 and online teaching in higher education : A case study of Peking University. *Human Behavior and Emerging Technologies*, *2*(2), 113–115. https://doi.org/10.1002/hbe2.191

Bergdahl, N., Bond, M., Sjöberg, J., Dougherty, M., & Oxley, E. (2024). Unpacking student engagement in higher education learning analytics : a systematic review. *International*

*Journal of Educational Technology in Higher Education*, *21*(63), 1–33. https://doi.org/10.1186/s41239-024-00493-y

Bervell, B., Kumar, J. A., Arkorful, V., Agyapong, E. M., & Osman, S. (2022). Remodelling the role of facilitating conditions for Google Classroom acceptance : A revision of UTAUT2. *Australasian Journal of Educational Technology*, *38*(1), 115–135. https://doi.org/10.14742/ajet.7178

Chang, K., Zhang, J., Huang, Y., Liu, T., & Sung, Y. (2019). Applying augmented reality in physical education on motor skills learning. *Interactive Learning Environments*, *0*(0), 1–13. https://doi.org/10.1080/10494820.2019.1636073

Choi, Y., & Lee, H. (2022). Psychometric properties for multidimensional cognitive load scale in an e-learning environment. *International Journal of Environmental Research and Public Health*, *19*(10), 1–12. https://doi.org/10.3390/ijerph191058222

Cohen, A., Soffer, T., & Henderson, M. (2022). Students ' use of technology and their perceptions of its usefulness in higher education : International comparison. *Journal of Computer Assisted Learning*, *38*(5), 1321–1331. https://doi.org/10.1111/jcal.12678

Coman, C., Tiru, L. G., Mesesan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic : students ' perspective. *Sustainability Article*, *12*(24), 1–24. https://doi.org/10.3390/su122410367

Damayanti, L., Wulandari, D., Busyairi, A., Wadiyo, W., Raharjo, T. J., & Sumartiningsih, S. (2024). The effectiveness of e-comic media based on scientific literacy for teaching single and mixed substance materials. Unnes Science Education Journal, 13(3), 205-214. https://doi.org/10.15294/usej.v13i3.7423

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

Dwiasih, A. A. I., & Agung, A. A. G. (2021). The development of fabel e-comic in Bahasa Indonesia lesson for grade II of elementary school. *Advances in Social Science, Education and Humanities Research*, *540*(April), 499–508. https://doi.org/10.2991/assehr.k.210407.284

Fornell, C., & Larcker, D. . (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research This*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Granić, A. (2022). Educational technology adoption : A systematic review. *Education and Information Technologies*, *27*, 9725–9744. https://doi.org/10.1007/s10639-022-10951-7

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

Herodotou, C., Rienties, B., Boroowa, A., Zdrahal, Z., & Hlosta, M. (2019). A large - scale implementation of predictive learning analytics in higher education : the teachers ' role and perspective. In *Educational Technology Research and Development* (Vol. 67, Issue 5). Springer US. https://doi.org/10.1007/s11423-019-09685-0

Huang, D. (2025). Innovative interactive instruction to enhance learning behaviors. *Journal of Innovation & Knowledge*, *10*(1), 1–9. https://doi.org/10.1016/j.jik.2024.100641

Istiq'faroh, N., & Mustadi, A. (2020). Improving elementary school students ' creativity and writing skills through digital comics. *Ilkogretim Online - Elementary Education Online*, *19*(2), 426–435. https://doi.org/10.17051/ilkonline.2020.689661

Jiang, S., Li, H., & Gan, D. (2025). Technology acceptance model for online education : identifying interdisciplinary topics and their evolution based on BERTopic model. *Social*

*Sciences & Humanities Open*, *12*(July), 1–17. https://doi.org/10.1016/j.ssaho.2025.101831

Khairunnisak, K., Sumanti, S., & Muharramsyah, R. (2024). Development and validation of e-comic-based interactive learning media for elementary education. International Journal of Educational Dynamics, 7(1), 59-68. https://doi.org/10.24036/ijeds.v7i1.513

Kemp, Andrew, Palmer, Edward, & Strelan, P. (2019). A taxonomy of factors affecting attitudes and intentions to use educational technologies : a theoretical revision and recommended minimum scope of educational technology acceptance models Andrew Kemp , Edward Palmer and Peter Strelan. *British Journal OfEducational Technology*, *50*(5), 2394–2413. https://doi.org/10.1111/bjet.12833

Kolikant, Y. B. (2010). Computers in Human Behavior Digital natives , better learners ? Students ' beliefs about how the Internet influenced their ability to learn. *Computers in Human Behavior*, *26*(6), 1–8. https://doi.org/10.1016/j.chb.2010.04.012

Leila, S., Safadari, R., & Jimma, W. (2017). Knowledge management implementation and the tools utilized in healthcare for evidence-based decision making : A systematic review. *Ethiopian Journal of Health Sciences*, *27*(5), 541–558. http://dx.doi.org/10.4314/ejhs.v27i5.13

Lin, Y., & Yu, Z. (2023). Extending Technology Acceptance Model to higher - education students ' use of digital academic reading tools on computers. *International Journal of Educational Technology in Higher Education*, *20*(1), 1–24. https://doi.org/10.1186/s41239-023-00403-8

Liu, D. (2024). The effects of segmentation on cognitive load , vocabulary learning and retention , and reading comprehension in a multimedia learning environment. *BMC Psychology*, *12*(4), 1–12. https://doi.org/10.1186/s40359-023-01489-5

Liu, J., Nana, E., Ofori, K., & Aziku, M. (2025). Relationship between digital preparedness and digital integration : mediation evidence on the role of school climate. *Journal of New Approaches in Educational Research*, *14*(18), 1–24. https://doi.org/10.1007/s44322-025-00040-1

Mailizar, M., Burg, D., & Maulina, S. (2021). Examining university students' behavioural intention to use e-learning during the COVID-19 pandemic: An extended TAM model. *Education and Information Technologies*, *26*(April), 7057–7077. https://doi.org/10.1007/s10639-021-10557-5

Mastour, H., Yousefi, R., & Niroumand, S. (2025). Exploring the acceptance of e-learning in health professions education in Iran based on the technology acceptance model (TAM). *Scientific Reports* |, *15*, 1–14. https://doi.org/10.1038/s41598-025-90742-5

Matemba, E. D., Guoxin Li, I. C., Gogan, W., & Maiseli, B. J. (2020). Technology acceptance model: recent developments, future directions, and proposal for hypothetical extensions. *International Journal of Technology Intelligence and Planning*, *12*(4), 315–348. https://doi.org/10.1504/IJTIP.2020.109769

Nawaz, D. A., & Khan, M. Z. (2012). Issues of technical support for e-learning systems in higher education institutions. *I.J.Modern Education and Computer Science*, *2*(March), 38–44. https://doi.org/10.5815/ijmecs.2012.02.06

Phoon, H., Roslan, R., Shahrill, M., & Said, H. M. (2020). The role of comics in elementary school science education. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *10*(2), 67–76. http://dx.doi.org/10.30998/formatif.v10i2.6257

Raffaghelli, J. E., Rodríguez, M. E., & Baneres, D. (2022). Applying the UTAUT model to explain the students ' acceptance of an early warning system in Higher Education. *Computers & Education Journal*, *182*, 1–14. https://doi.org/10.1016/j.compedu.2022.104468

Ramadana, N., & Widayati, A. (2025). Development of e-comic based learning media to increase student learning motivation on journal material adjusted by service companies for class XII high school students. *International Journal of Educational Development*, *2*(1),

25–38. https://doi.org/10.61132/ijed.v2i1.169

Ranjbaran, F., Al-Abri, A., & Al-Hashmi, S. (2023). *Exploring ELT teachers' behavioral intention to continue using technology in the post-covid-19 era: A case study of Oman . In D. Tafazoli, & M. Picard (Eds.)*. https://doi.org/10.1007/978-981-99-0514-0

Rasmet, R. R., Shaafi, N. F., Sharif, S., Nasir, S., Salleh, M. F. M., & Ellianawati, E. (2025). The impacts of comic-based learning on student engagement in primary education : A systematic literature review. *Citra Journal of Innovative Education Practices*, *1*(1), 26–39. https://doi.org/10.37934/cjiep.1.1.2639

Raza, S. A., Qazi, W., Khan, K. A., & Salam, J. (2021). Social isolation and acceptance of the Learning Management System ( LMS ) in the time of COVID-19 pandemic : An expansion of the UTAUT model. *Journal of Educational Computing Research*, *59*(2), 183–208. https://doi.org/10.1177/0735633120960421

Revythi, A., & Tselios, N. (2019). Extension of technology acceptance model by using system usability scale to assess behavioral intention to use e- learning. *Education and Information Technologies*, *24*(February), 1–5. https://doi.org/10.1007/s10639-019-09869-4

Safitri, Y., Mailizar, & Johar, R. (2021). Students' perceptions of using e-comics as a media in mathematics learning. *Journal of Mathematics Education*, *10*(2), 319–330. https://doi.org/10.22460/infinity.v10i2.p319-330

Sagri, M., Sofos, F., & Mouzaki, D. (2018). Digital Storytelling , comics and new technologies in education : review , research and perspectives. *The International Education Journal: Comparative Perspectives Vol.*, *17*(4), 97–112. http://orcid.org/0000-0001-5036-2120

Salloum, S. A., Alhamad, A. Q. M., Al-Emran, M., Monem, A. A., & Shaalan, K. (2019). *Exploring Students' Acceptance of E-Learning Through the Development of a Comprehensive Technology Acceptance Model. IEEE Access*. *7*, 128445–128462.

Salloum, S., Marzouqi, A. Al, Alderbashi, K. Y., Shwedeh, F., Aburayya, A., Rasol, M., Saidat, A., & Al-maroof, R. S. (2023). Sustainability model for the continuous intention to use metaverse technology in higher education : A case study from Oman. *Sustainability*, *15*(6), 1–19. https://doi.org/10.3390/su15065257

Sarstedt, M., Richter, N. F., Hauff, S., & Ringle, C. M. (2024). Combined importance – performance map analysis ( cIPMA ) in partial least squares structural equation modeling ( PLS – SEM ): a SmartPLS 4 tutorial. *Journal of Marketing Analytics*, *12*, 746–760. https://doi.org/10.1057/s41270-024-00325-y

Sasongko, A. T., Ekhsan, M., & Fatchan, M. (2025). Dataset on technology acceptance in E-learning : A PLS-SEM analysis using extended TAM among undergraduate students in Indonesia. *Telematics and Informatics Reports*, *18*(March), 1–13. https://doi.org/10.1016/j.teler.2025.100192

Schneider, S., Beege, M., Nebel, S., Schnaubert, L., & Rey, G. D. (2022). The cognitive-affective-social theory of learning in digital environments (CASTLE). *Educational Psychology Review*, *34*, 1–38. https://doi.org/10.1007/s10648-021-09626-5

Shi, A., Huo, F., & Han, D. (2021). Role of interface design : A comparison of different online learning system designs. *Frontiers in Psychology*, *12*(August), 1–9. https://doi.org/10.3389/fpsyg.2021.681756

Skulmowski, A., & Xu, K. M. (2022). Understanding cognitive load in digital and online learning : A new perspective on extraneous cognitive load. *Educational Psychology Review*, *34*, 171–196. https://doi.org/10.1007/s10648-021-09624-7

Songkram, N., Chootongchai, S., Osuwan, H., Chuppunnarat, Y., & Songkram, N. (2023). Students ' adoption towards behavioral intention of digital learning platform. *Education and Information Technologies*, *28*(February), 11655–11677. https://doi.org/10.1007/s10639-023-11637-4

Su, C., & Chao, C. (2022). Investigating factors influencing nurses ' behavioral intention to use mobile learning : Using a modified unified Theory of Acceptance and Use of Technology Model. *Frontiers in Psychology*, *13*(May), 1–10. https://doi.org/10.3389/fpsyg.2022.673350

Syarah, E. ., Yetti, E., Yufiarti, Hapidin, & Pupala, B. (2019). Electronic comics in elementary school science learning for marine conservation. *Jurnal Pendidikan IPA Indonesia*, *8*(4), 500–511. https://doi.org/10.15294/jpii.v8i4.19377

Tick, A. (2019). An Extended TAM Model , for evaluating e-learning acceptance , digital learning and smart tool usage. *Acta Polytechnica Hungarica*, *16*(9), 213–233. https://h7.cl/1nUdJ

Tyng, K. S., Zaman, H. B., Mohamad, U. H., & Ahmad, A. (2023). Perceived ease of use on visual learning application for mathematics using holography display for the topic on shape and space. *F1000Research*, *12*(632), 1–21. https://doi.org/10.12688/f1000research.133177.1

Wang, G., & Shin, C. (2022). Influencing factors of usage intention of metaverse education application platform : Empirical evidence based on PPM and TAM models. *Sustainability*, *14*(24), 1–21. https://doi.org/10.3390/ su142417037

Wijayanti, F. Y., Handoyo, B., Uuriintuya, & Dembereldor. (2024). Contextual e-comics in geography: A modern pedagogical tool for volcanic hazard mitigation awareness. *Future Space: Studies in Geo-Education*, *1*(1), 20–29. https://doi.org/10.69877/fssge.v1i1.6

Yakubu, M. N., David, N., & Abubakar, N. H. (2025). Students ' behavioural intention to use content generative AI for learning and research : A UTAUT theoretical perspective. *Education and Information Technologies*, *30*(March), 17969–17994. https://doi.org/10.1007/s10639-025-13441-8

Yunita, N., Bachtiar, A. M., & Nurrohmah, O. (2025). The effectivenes of e-comic as a learning tool on short story writing among elementary school students. *Jurnal Teknologi Pendidikan*, *27*(2), 432–444. https://doi.org/10.21009/jtp.v27i2.54781

Zhang, N., Guo, X. H., & Chen, G. Q. (2007). Extended information technology initial acceptance model and its empirical test. *Systems Engineering - Theory & Practice*, *27*(9), 123–130. https://doi.org/10.1016/s1874-8651(08)60057-5