

The Influence of Digital Based Learning Media and Financial Literacy on Economic Learning Outcomes Through Learning Activities

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Abstract. This study aims to analyze the influence of digital learning media and financial literacy on the economic learning outcomes of SMA Negeri 1 Maron students by considering the mediating role of learning activities. The research uses a quantitative approach with ex post facto and causal associative methods. The research sample totaled 80 students which was determined through the Slovin formula. The research instrument consisted of questionnaires for digital learning media variables, financial literacy, and learning activities, while learning outcome variables were measured through even semester report cards for the 2024/2025 school year. Data analysis was carried out with the help of WarpPLS software using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The analysis stages include an outer model test, an inner model test, and a significance test with a bootstrapping technique. The results of the study show that digital learning media and financial literacy have a significant effect on students' economic learning outcomes, both directly and indirectly through learning activities as a mediation variable. These findings affirm the importance of effective use of digital learning media and strengthening financial literacy to improve learning activities and outcomes. Further research is suggested to further explore the clarity of feedback through digital media, the relationship between students' financial readiness such as emergency fund ownership and their psychological stability, as well as the impact of saving habits on students' consumptive behavior and academic achievement in economics subjects.

Keywords: Digital-Based Learning Media, Economic Learning Outcomes, Financial Literacy, Learning Activities.

1 Introduction

The development of digital technology has brought great transformations in the world of education, including in economic learning at the high school level. Digital-based learning media such as interactive videos, online quizzes, and platforms such as Google Classroom and Quizizz have opened up new opportunities in the delivery of teaching materials that are more varied and interesting [1], [2], [3], [4]. Digital media allows

teachers to present material visually, interactively, and contextually, so it is expected to facilitate more active and meaningful learning [5], [6], [7]. However, in reality, at SMAN 1 Maron, the use of digital media is still limited only as a one-way presentation tool by teachers, not as an interactive means that arouses students' active participation. This condition is in line with the opinion Rafsanjani et al. [8] and Sariwedani et al. [9] that digital media will only be effective if it is able to transform students from passive recipients to active actors in learning.

The impact of this suboptimal use of media can be seen from the achievement of students' economic learning outcomes. Based on the initial data of the study, of the 80 students studied, around 55% obtained a score equivalent to the Minimum Completeness Criteria (KKTP), which is 78 As the data is in Appendix 1. This shows that learning has not fully reached the expected learning outcome target. In fact, according to Sudjana [10], learning outcomes are important indicators that reflect changes in students' cognitive, affective, and psychomotor behavior as a result of the learning process. If the media used is not able to encourage intensive learning activities, then students' understanding of economic concepts will be shallow [11]. Research by Fairuzzabad et al. [12] and Konc [13] emphasized that digital innovations that are truly interactive and applicable have been proven to be able to improve economic learning outcomes at various levels of education.

Apart from the learning media side, financial literacy is also a serious problem that contributes to low student learning outcomes. In today's digital era and global economy, financial literacy is not only essential for personal life, but it is also part of the 21st century competencies that every student must possess [14]. However, at SMAN 1 Maron, students' financial literacy skills are still relatively low. Many students are not able to make a personal budget, prioritize expenses, let alone understand basic financial instruments such as savings and investments. Financial literacy does not only function as additional knowledge, but is able to influence economic learning outcomes directly or indirectly.

Good financial literacy can strengthen students' critical thinking skills in making economic decisions relevant to daily life [15], [16]. However, this literacy has not been systematically integrated in learning activities, especially in economics subjects which should be a means to instill financial skills from an early age [17], [18]. This barrier indicates that economic learning is not yet fully contextual and applicative. This was also agreed by Cerya et al. [19], Hasan et al. [20], and Sari et al. [21] which states that financial literacy must be instilled as a life skill through digital learning media that suits the character of today's students.

Another problem that contributes to worsening the condition is the low learning activity of students. Many students are less engaged in discussions, don't actively ask questions, or simply take notes without deep understanding. Villalta-Cerdas [22] which states that financial literacy must be instilled as a life skill through digital learning media that suits the character of today's students. Another problem that contributes to worsening the condition is the low learning activity of students. Many students are less engaged in discussions, don't actively ask questions, or simply take notes without deep understanding [23], [24], [25].

The theory of constructivism provides a theoretical basis that students should be active subjects in building their understanding through meaningful experiences and interactions [26]. In this context, digital media and financial literacy should not only be additional content, but developed in activities that allow for contextual exploration, collaboration, and problem-solving [27], [28]. Involving constructivist-based designed learning activities, students are expected to connect economic theory with the realities of their financial lives.

Empirical studies show that there is still limited research that comprehensively examines the relationship between digital learning media, financial literacy, learning activities, and student learning outcomes simultaneously, especially in the context of high school. Therefore, this research has an urgency to be carried out. The findings of this study are expected to answer the need for an economic learning strategy that not only targets academic achievement, but also strengthens students' financial competence and active participation in the learning process. Therefore, this study aims to analyze the influence of digital learning media and financial literacy on students' economic learning outcomes at SMAN 1 Maron, by considering the mediating role of learning activities.

2 Method

This study uses a quantitative approach with ex post facto and causal associative methods. The data analysis in this study uses a quantitative approach with the help of Warp-PLS software. WarpPLS is one of the software used in the analysis of Partial Least Squares Structural Equation Modeling (PLS-SEM), which is a multivariate statistical technique that allows researchers to test relationships between latent variables simultaneously [29].

The location of this study is at SMA Negeri 1 Maron with a population of 103 students from class XI. The sampling technique used in this study is a probability sampling technique with a simple random sampling method. The researcher set an error rate of 5% (0.05) in order to obtain a representative sample but still be efficient in the implementation of the research using the Slovin formula. Based on the results of this calculation, the number of samples used in this study was rounded to 80 students. This sample will then be selected using the proportional random sampling technique, so that each student from grade XI has the same opportunity to become a respondent, but still considers the proportion of the number of students in each class [30].

The variables of learning activities in this study were adapted from Sardiman [31] who divided them into six indicators, namely visual activity, oral activity, writing activity, social activity, psychomotor activity, and reflective activity. The variable of digital-based learning media refers to Paling et al. [32] which emphasizes three main aspects including technical aspects, pedagogical aspects, and psychological aspects. The variables of financial literacy are formulated based on indicators from Atkinson & Messy [33] which include financial knowledge, financial behavior, and financial attitudes. The learning outcome variables in this study refer to student academic achievement as measured through even semester report cards for the 2024/2025 school year. The framework of the research hypothesis can be seen in figure 1.

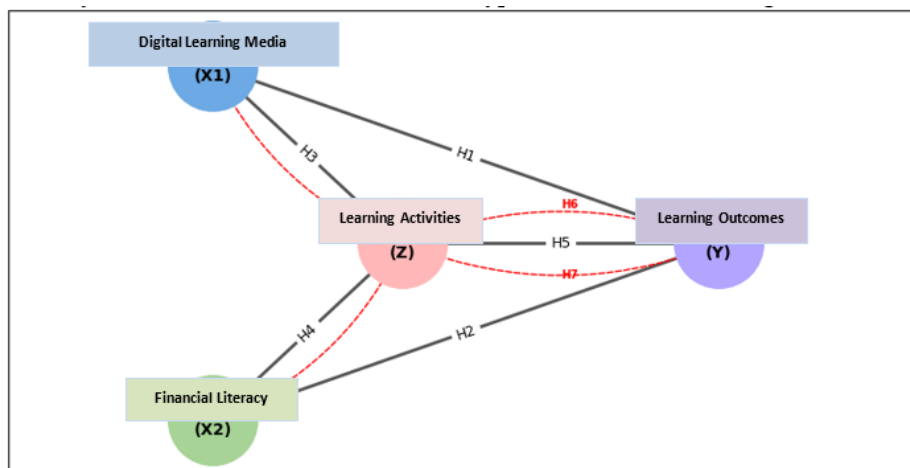


Fig. 1. The framework of the research hypothesis.

In general, the analysis stages using WarpPLS in this study include measurement model tests (outer models), structural model tests (inner models), and significance tests through bootstrapping. The measurement model test aims to determine the validity and reliability of the construct used, with indicators such as convergent validity measured through the value of the loading factor and Average Variance Extracted (AVE), where the loading value > 0.5 and $AVE > 0.5$ indicate good validity; discriminant validity determined by comparing AVE to the correlation between constructs; as well as composite reliability and Cronbach's alpha to assess internal consistency of indicators [29].

Furthermore, structural model tests were used to test the relationship between latent variables (hypotheses) by paying attention to the path coefficient and significance of p-value (< 0.05), R-square (R^2) to measure the contribution of independent variables to dependents, Q-square (Q^2) to test the predictability of the model, and effect size (f^2) to assess the magnitude of the influence of each construct [29]. Finally, significance testing is performed through bootstrapping which allows testing of relationships between constructs with more accurate standard estimates of errors and p-values [34].

3 Result

Based on the results of the data recapitulation, an evaluation of the measurement model as shown in figure 1 was carried out. Furthermore, an analysis stage was carried out to test the indicators used by examining the outer loading as the basis for convergent validity testing. The test results show that all indicators in the research variables are valid because the outer loading value is more than 0.7 each. In addition, the results of the discriminant validity test showed that the loading value of each question item was greater than the cross-loading value of other indicators in the research model, so that all question items had good discriminant validity. Furthermore, the composite

reliability test showed that the value was above 0.7. This value confirms that all constructs in this research model have good reliability and are suitable for use for the next stage of testing.

Then a corrected determination coefficient test (adjusted R-squared) was used in this study to assess the role of exogenous variables on endogenous variables, to avoid bias due to the number of predictors included in the model. The results of the adjusted R-squared calculation in the research model are shown in table 1.

Table 1. R-squared test results

Influences	Adjusted R- Squared
Digital Learning Media & Financial Literacy for learning activities	0.598
Digital Learning Media & Financial Literacy on learning outcomes mediated by learning activities	0.037
Average Adjusted R-Square (AARS)	0.318

Based on the Table 1, the corrected determination coefficient of 0.318 shows that Learning Outcomes can be explained by the variables of Digital Learning Media and Financial Literacy mediated by Learning Activities of 31.8%, while the remaining 68.2% is influenced by other variables outside the study. Next, the Goodness of Fit test is carried out as shown in table 2.

Table 2. Goodness of fit test results

No	Criterion	Value	Decision
1	ARS	0.336	Acceptable
2	AARS	0.318	Acceptable
3	AVIF	1.644	Ideally
4	AFVIF	1.569	Ideally
5	TGoF	0.435	Large
6	SPR	0.800	Acceptable
7	SSR	0.800	Acceptable

Based on Table 2, all goodness of fit criteria have met the cut-off, so that the structural model is declared good (fit) and can be used in future research. Direct effect testing was carried out by looking at the significance of the path coefficient in PLS. The results of the path coefficient test in the structural model are presented in table 3.

Table 3. Path coefficient test results

Tested Influences	Path Coefficient	P-Values	Decision
Digital Learning Media - Learning Activities	0.300	<0.001	Significant
Financial Literacy - Learning Activities	0.561	<0.001	Significant
Learning Activities - Learning Outcomes	0.176	0.034	Significant
Digital Learning Media - Learning Outcomes	0.192	0.023	Significant
Digital literacy - Learning Outcomes	0.175	0.034	Significant

The test results showed that the entire direct influence between exogenous variables on endogenous variables was significant at the level of $\alpha = 0.05$. Digital Learning Media and Digital Literacy have a positive and significant effect on Learning Activities, while Learning Activities also have a significant effect on Learning Outcomes. In addition, both Digital Learning Media and Digital Literacy directly improve Learning Outcomes. Indirect influence testing was carried out by multiplying the coefficient of the independent variable path to mediation by the coefficient of the mediation path to dependent, and its significance was tested through the Sobel test. The test results are shown in table 4.

Table 4. Sobel test results

Tested Influences	Path Coefficient	P-Values	Decision
Digital Learning Media on Learning Outcomes through Learning Activities	0.053	<0.001	Significant
Digital Financial Literacy on Learning Outcomes through Learning Activities	0.099	<0.001	Significant

The coefficient and p-value show that the indirect influence of Digital Learning Media and Digital Financial Literacy on Learning Outcomes through Learning Activities is significant, so that Learning Activities play a role as an effective mediator in this research model.

4 Discussion

4.1 The Influence of Digital Learning Media on Learning Activities

The development of digital learning media has been proven to have a positive impact on learning activities because it is able to provide an interactive, contextual, and learning atmosphere that is in accordance with the characteristics of the millennial generation and Gen Z. According to Parekh [35], Clark & Mayer [36] and Çeken & Taşkın [37] explains that the integration of text, images, sound, and animation will help students process information better, thus encouraging active engagement. Fuadi & Aulia [38] and Abildinova et al. [39] emphasized that the effectiveness of digital media in online learning is influenced by teacher teaching models that can integrate technology with active learning methods. Meanwhile, Amalia & Supriyadi [40] prove that the use of smartphones as a means of digital literacy encourages motivation as well as student learning activities in economics classes. Similar research by David & Weinstein [41] and Wibowo et al. [42] states that technology-based media makes learning more practical, fun, and increases active participation. Through digital learning media innovation, it has been successfully shown that digital media is able to significantly increase students' motivation and learning activities [43], [44] These findings are in line with the research Fitrianto & Hidayat [45], Singha [46] and Bean & Melzer [47] which affirms that the integration of digital media in economic learning encourages students to be more active in discussion, exploration, and reflection.

4.2 The Influence of Digital Literacy on Learning Activities

Financial literacy not only serves as practical knowledge, but also influences students' learning activities in economics subjects. Students with high financial literacy tend to be more disciplined, structured, and motivated to be active in learning [48], [49]. According to Bean & Melzer [50] financial literacy is closely related to students' job readiness and academic participation. A significant increase in family-based financial literacy scores, which indirectly encourages student involvement in economic learning activities [51] [52] [53] [54]. The use of financial literacy educational games is able to increase student engagement in discussions and simulations [55] [56]. Financial literacy is a life skill that has implications for more independent and participatory learning activities [57]. Based on the global context, it shows that financial literacy not only has an impact on financial management, but also increases student involvement in the practice-based learning process [58], [59], [60].

4.3 The Effect of Learning Activities on Learning Outcomes

Learning activities are an important variable that bridges the learning process and learning outcomes. Constructivism theory emphasizes that meaningful learning is only achieved if students are actively involved in building knowledge [61], [62], [63]. Exploratory activities in Problem-Based Learning (PBL) can improve the understanding of accounting students [64]. The effectiveness of PBL in encouraging learning activities that have an impact on improving learning outcomes [65] [66]. Learning activities have a significant influence on economic learning outcomes [67] and [68]. In line, high learning activity is directly proportional to academic achievement, because active involvement strengthens students' memory, concept understanding, and critical thinking skills [69].

4.4 The Influence of Learning Media on Economic Learning Outcomes

Digital learning media has been proven to have a direct influence on improving economic learning outcomes. Interactive digital media can increase students' understanding as well as motivation [70] [71]. The effectiveness of digital media will be more optimal if it is in accordance with the learning context [72] [73]. The use of learning media is not only feasible to use, but also has a significant effect on increasing interest and economic learning outcomes [74], [75], [76], [77]. Electronic learning media has a positive effect on business economics learning outcomes [78]. The use of digital technology in learning consistently contributes positively to academic achievement at various levels [79], [80].

4.5 The Effect of Financial Literacy on Economics Learning Outcomes

Financial literacy is an important skill that supports the achievement of economic learning outcomes because it determines the extent to which students are able to access, understand, and integrate information from various digital sources [81], [82], [83], [84]. Financial literacy is not only a technical skill, but also includes the ability to think critically in managing digital information for academic purposes [85] [86]. Financial literacy is a life skill that is closely related to student learning outcomes [87]. The use of android-based interactive media not only improves financial literacy, but also learning outcomes in economics subjects [88] [89]. Financial literacy encourages the

effectiveness of e-learning and has an impact on improving academic achievement [90]. This finding is strengthened by research Brata et al. [91] which proves that financial literacy through smartphones has a significant effect on students' motivation, activities, and learning outcomes. Financial literacy is also an important predictor of academic achievement in various analytical-based subjects, including economics [92], [93], [94], [95]

4.6 Indirect Influence of Digital Learning Media Through Learning Activities on Economic Learning Outcomes

Digital learning media not only has a direct impact on learning outcomes, but also has an indirect effect through increasing student learning activities. The Cognitive Theory of Multimedia Learning explains that the integration of various multimedia elements will stimulate students' attention and involvement, thereby encouraging them to be more active in the learning process [96], [97]. This learning activity then becomes a bridge in achieving optimal learning outcomes. Exploratory activities facilitated by learning media improve accounting students' understanding [98] [99].

The success of digital media in improving economic learning outcomes is inseparable from increasing student activity in using and exploring materials [100] [101]. Similar results were obtained by Hidayat & Suryadi [102] who showed that digital learning media is able to encourage more intense learning activities, which ultimately improves learning outcomes. Conceptually, students' active involvement is an important mediating factor that connects learning inputs (such as digital media) with outputs in the form of academic achievements [103], [104].

4.7 Indirect Influence of Digital Financial Literacy Through Learning Activities on Economic Learning Outcomes

Digital financial literacy also has an indirect effect on economic learning outcomes through learning activities. Students with good digital financial literacy have skills in accessing, understanding, and managing technology-based financial information, which then encourages them to be more active in participating in learning [105], [106], [107], [108]. This increased learning activity contributes significantly to the achievement of economic learning outcomes [109], [110]. High financial literacy has implications for student engagement in more disciplined and productive academic activities [111] and [112]. Financial literacy education games encourage intensive learning activities through simulations and discussions, thereby having an impact on improving understanding of economic concepts [113].

Through the LF2OH program, it is also emphasized that family-based financial literacy is able to increase student involvement in learning, which in turn strengthens learning outcomes [114]. This is supported that financial literacy is not only important for life skills, but also impacts students' motivation and engagement in learning activities, which then affects academic outcomes [115] [116] [117]. Through social constructivism theory, it is emphasized that learning activities are the main mechanism that connects students' initial competencies (including digital financial literacy) with the achievement of learning outcomes [118].

5 Conclusion

Based on the results of research at SMAN 1 Maron, digital-based learning media and financial literacy have a significant effect on students' economic learning outcomes, both directly and indirectly through learning activities. Digital media improves students' understanding of the material and engagement, while financial literacy encourages more active learning attitudes and behaviors. Learning activities have also proven to play an important role in improving learning outcomes, becoming a mediator that strengthens the influence of digital media and financial literacy on students' academic achievement.

Further research can be directed to explore more deeply the reasons why students feel that the feedback provided through digital media is not clear, so that factors that affect the perception and effectiveness of digital communication in learning can be found. Furthermore, follow-up studies can examine the relationship between students' financial readiness, such as the ownership of emergency funds, and their psychological stability in the learning process, as well as examine how saving habits affect students' consumptive behavior and academic achievement in economics subjects.

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