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The Synergistic Contribution of Pedagogical Competence and Digital Media to Elementary Students' Learning Interest: A TPACK Perspective

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ABSTRACT

Students' learning interest is an important factor in supporting engagement and achieving optimal learning outcomes in elementary education. In response to the increasing integration of digital technology in educational practices, teachers are expected to possess strong pedagogical competence and effectively utilize digital learning media. This study aimed to analyze the contribution of teacher pedagogical competence and digital learning media to the learning interest of fifth-grade students at SD Al Islam 2 Jamsaren Surakarta, both partially and simultaneously, from a TPACK perspective. This study employed a quantitative correlational design involving 86 students selected from a population of 110 through simple random sampling based on the Isaac and Michael sampling formula. Data were collected using closed-ended questionnaires with a Likert scale and analyzed through multiple linear regression after classical assumption testing. The results showed that teacher pedagogical competence and digital learning media significantly contributed to students' learning interest, both partially and simultaneously ($p < 0.05$), with pedagogical competence demonstrating a stronger contribution. The regression model explained 52.9% of the variance in students' learning interest ($R^2 = 0.529$). These findings indicate that strengthening pedagogical competence accompanied by the meaningful use of digital learning media can support the development of students' learning interest and improve instructional quality in elementary education.

INTRODUCTION

Interest plays a crucial role in teaching and learning activities. In educational psychology, interest is commonly defined as a psychological state characterized by focused attention, increased cognitive engagement, and positive emotional responses toward particular objects or activities (Hidi, 2006). Within the learning context, interest functions as an intrinsic motivational force that encourages students to engage more

deeply with instructional materials, sustain their attention during the learning process, and persist in the face of challenges. In line with this perspective, Ainly (2012) defined learning interest as a strong inclination or desire toward a particular subject or activity, which manifests in students' tendency to allocate greater cognitive attention to that subject. Thus, understanding interest as a malleable psychological state has important implications for educators seeking to design learning environments that foster student engagement and motivation (Renninger & Hidi, 2020).

Students' interest in learning is influenced by various factors. These include internal factors within the students themselves, such as attitudes, motivation, talents, and hobbies, as well as external factors originating from the surrounding environment, including family support, learning environments, and teachers' instructional practices (Rahmawati, 2024). Among these external factors, the role of teachers is particularly important because teachers are directly involved in designing and implementing learning activities in the classroom. To increase students' interest in learning, teachers are expected to create an engaging and creative learning environment that supports the achievement of educational goals (Hasriadi, 2022; Irmadurisa et al., 2022).

Teacher pedagogical competence is a foundational concept in educational literature. According to Wijaya (2023), this competence encompasses knowledge of learning and teaching, the ability to implement effective learning strategies, and the capacity to facilitate student understanding of subject matter. Rusmiyasih (2020) further elaborates that pedagogical competence involves the systematic planning, implementation, and assessment of learning through measurable competency mastery demonstrated in teachers' professional performance. The quality of teaching is largely determined by the teacher's ability to plan, implement, and evaluate learning activities, as well as their understanding of students' characteristics and potential (Azizah et al., 2024; Sultan et al., 2023; Stefany, 2022).

The conceptualization of teacher pedagogical competence has evolved significantly in response to contemporary educational challenges, particularly regarding digital integration. Recent scholarship emphasizes that pedagogical competence in the post-pandemic era extends beyond traditional classroom management to encompass the ability to integrate digital technology meaningfully into instructional design and create

student-centered learning environments that respond to the demands of Society 5.0 (Aisyah & Ningsih, 2025; Pratama, 2025). Atmojo et al. (2025) demonstrate that contemporary pedagogical competence includes designing deep and joyful learning experiences that integrate technology effectively, with their training program for elementary teachers showing a 45% increase in competency through the implementation of deep learning approaches that leverage digital tools. These recent studies confirm that pedagogical competence remains a dynamic and foundational skill that enables teachers to navigate the complexities of technology-enhanced classrooms.

In the context of digital learning, teachers are required not only to possess strong pedagogical competence but also to effectively integrate technology into the learning process. One framework that explains this integration is the Technological Pedagogical Content Knowledge (TPACK), which emphasizes the balance between technological knowledge, pedagogical knowledge, and content knowledge in designing effective learning experiences (Silvester et al., 2024). Technological developments have enabled more dynamic and interactive learning processes in the 21st century, shifting away from traditional rote memorization toward more engaging learning activities through the use of digital learning media (Hanik et al., 2022). Through the TPACK framework, teachers can combine appropriate teaching strategies with digital technologies to support meaningful and interactive learning.

Within the TPACK framework, digital learning media play a crucial role in translating pedagogical strategies into engaging classroom experiences. Digital learning media support current educational developments through their ability to engage students' focus. According to Hafizah (2023), digital learning media is a modern type of learning tool, in line with current developments, aimed at increasing efficiency and up-to-date learning processes. According to Rosmana et al. (2024), digital learning media is sophisticated and innovative because it can present stories or knowledge in the form of text, graphics, animation, audio, and video. The selection and use of appropriate learning media is closely related to teachers' pedagogical competence, as effective integration of learning media can create a more interactive and meaningful learning experience that encourages student engagement and interest.

A growing body of research underscores the positive role of technology in education. Studies have shown that appropriate technology integration can enhance the appeal of learning materials and strengthen students' interest (Siregar et al., 2025). Furthermore, technology facilitates deeper understanding through interactive visualizations and supports teachers in delivering content more engagingly (Nugroho et al., 2024; Sulistyanto et al., 2024). While these findings confirm the potential of digital media, they often examine its contribution in isolation from the pedagogical competencies of the teacher.

Studies like Sari et al. (2025) demonstrate the potential of digital media to support learning, yet they often examine its contribution in isolation from the pedagogical competencies of the teacher. This fragmented approach leaves a critical gap in understanding how digital media and pedagogical practices work together to foster student learning interest. Empirical evidence demonstrates the significant influence of teacher pedagogical competence on student learning interest. Afifah & Nurachadijat (2023) found that the quality of the learning process was strongly influenced by teachers' pedagogical skills in designing meaningful learning experiences. Similar findings were reported by Choliyatun (2019), who found that high pedagogical competence tended to successfully create a learning environment that fostered student learning interest. These results are corroborated by Cahyanti et al. (2024), who underscored the essential role of pedagogical competence in fostering both student achievement and motivation. Complementing these findings, studies focusing specifically on digital media have also demonstrated positive effects on student interest.

From the perspective of digital media, Sari et al. (2025) found that argumentative reality and virtual reality media successfully created engaging, interactive, and enjoyable learning experiences, ultimately triggering increased student learning interest. A similar study by Mekalungi et al. (2025) found that digital learning media in the form of digital comics can foster active student engagement and increase their interest in the learning process. Digital learning media is evident in their ability to capture student attention, spark curiosity, and foster active involvement in learning (Fithriyah et al., 2025). These contextual findings reinforce that pedagogical competence and digital learning media

should not be viewed as isolated instructional components, but rather as interconnected elements within a comprehensive teaching framework.

The novelty of this research resides in its empirical examination of an integrated model that concurrently assesses the contribution of teacher pedagogical competence and digital learning media to student learning interest from a TPACK perspective. This research does not merely combine two variables; rather, it conceptualizes their interdependent relationship, arguing that digital media effectiveness is contingent upon teachers' pedagogical competence. By positioning pedagogical competence as a critical determinant of how digital media function in practice, this study extends existing theoretical models and offers deeper insight into instructional quality in elementary education.

Therefore, the present study seeks to empirically investigate the contribution of teachers' pedagogical competence and digital learning media to elementary school students' learning interest, examining both their simultaneous and partial effects. Specifically, this study aims to: (1) examine the contribution of teachers' pedagogical competence to students' learning interest, (2) analyze the contribution of digital learning media to students' learning interest, and (3) investigate the simultaneous contribution of both variables to learning interest among elementary school students.

METHOD

This investigation employed a quantitative approach utilizing a correlational research design. As defined by Sudaryono (2018) this design serves to ascertain both the existence and the magnitude of relationships between variables. In the context of the present study, teachers' pedagogical competence (X_1) and digital learning media (X_2) were positioned as independent variables, with students' learning interest (Y) designated as the dependent variable at SD Al Islam 2 Jamsaren Surakarta.

The investigation population comprised 110 students from the fifth grade. The determination of an appropriate sample size in this research was guided by the Isaac and Michael formula, as recommended by Sugiyono (2020), This formula provides calculated sample sizes corresponding to three distinct margin of error thresholds: 1%, 5%, and 10%. The error level or sampling error applied in this study was 5%. Using that error rate, the

sample size for this study was 86 respondents. A diagram of Isaac and Michael's formula can be seen in the following section.

Based on the formula calculation above, the sample size for data collection was 86 students. A probability sampling approach was employed, specifically simple random sampling. This procedure guarantees that every individual within the target population possesses an equal probability of selection and inclusion as a respondent in the study (Sutama, 2019). To acquire the necessary data, this investigation utilized a variety of data collection instruments, including interview guidelines, documentary analysis, and questionnaires. Questionnaires employing a Likert scale were administered to measure the attitudes, opinions, and perceptions expressed by individuals or groups in response to specific social phenomena (Sugiyono, 2020).

The instrument employed in this research consisted of a questionnaire designed to measure three variables: pedagogical competence, digital learning media, and learning interest. Pedagogical competence (X_1) was measured using indicators adapted from the framework proposed by Febriana (2019) which was selected because it comprehensively represents the core dimensions of teachers' pedagogical competence within the Indonesian educational context. These indicators include understanding of educational foundations, understanding of learners, curriculum development capability, proficiency in learning design, implementation of interactive and dialogical learning, integration of learning technology, competence in assessment and evaluation of learning outcomes, and attention to student development.

Digital Learning Media (X_2) was measured using indicators adapted from Hasan et al. (2021), which were selected because they describe key characteristics of effective digital learning media in supporting interactive and technology-based learning processes. These indicators include conformity with learning material, interactive and multimedia elements, fostering motivation and learning interest, enhancing ability to utilize digital learning media, and improving understanding of learning material.

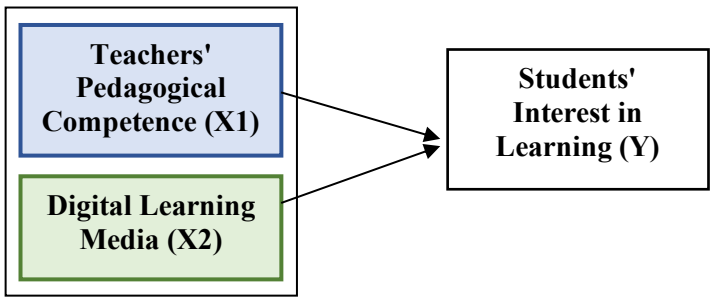
Learning Interest (Y) was measured using indicators based on Rahmawati (2024), whose framework was adopted because it represents the core dimensions of students' learning interest in educational settings. These indicators include feelings of pleasure, attraction, student involvement, and student attention.

The questionnaire was pilot tested on 30 students SD Darussalam Surakarta, outside the sample, to test its validity and reliability. In this study, content validity was the method applied to validate the research instrument. The purpose of this procedure was to verify that every test item appropriately aligned with its targeted construct, namely the participants' conceptual understanding (Sugiyono, 2020). Validity was tested by calculating the correlation coefficient (r) for each item, and an item was considered valid if the significance value (Sig.) was below 0.05. The validity test results showed that of the 20 items measuring teacher pedagogical competence, 18 items were valid and 2 items were invalid. For the digital learning media variable, 19 items were valid and 1 item was invalid. For the learning interest variable, 18 items were valid and 2 items were invalid. The invalid items were removed from the questionnaire. Following their removal, a content validity review was conducted to ensure that the remaining items continued to adequately represent all key indicators for each construct. This review confirmed that the essential dimensions of pedagogical competence, digital learning media, and learning interest were still comprehensively covered by the retained items, thereby preserving the instrument's content validity.

Reliability was tested using Cronbach's Alpha, which yielded values of 0.783 for teacher pedagogical competence, 0.827 for digital learning media, and 0.869 for learning interest, indicating that the questions were reliable. These three values are well above the minimum threshold of 0.7 (Nunnally & Bernstein, 1994; Zahriyah et al., 2021), which indicates that the instrument reliably measures the same construct when used repeatedly. Therefore, the research instrument is considered to have excellent validity and reliability.

Data analysis was performed using multiple linear regression to investigate the influence of pedagogical competence (X_1) and digital learning media (X_2) on student interest in learning (Y_1). To assess the individual impact of each independent variable, a t-test was employed, while an F-test was used to evaluate their combined effect. In addition, the coefficient of determination (R^2) was calculated to measure the extent to which variance in learning interest could be attributed to the combination of pedagogical competence and digital learning media.

Figure 1
Research Design



Prior to conducting multiple linear regression analysis, a series of classical assumption tests were performed to ensure the validity of the regression model. Normality of residuals was assessed using the Kolmogorov-Smirnov test, which yielded a significance value of 0.200 (Asymp. Sig. 2-tailed, $p > 0.05$), indicating that the residuals were normally distributed. The linearity test using the deviation from linearity approach showed that both variables had a linear relationship with student learning interest, with significance values of 0.795 for teacher pedagogical competence and 0.268 for digital learning media ($p > 0.05$). Multicollinearity was examined through Variance Inflation Factor (VIF) and tolerance values. The analysis yielded a VIF value of 1.290 for both independent variables, which is well below the maximum threshold of 10.00, and a tolerance value of 0.775, exceeding the minimum limit of 0.10. These results indicate that no multicollinearity issues were present. Heteroscedasticity was tested using Glejser's test, which regresses the absolute residuals on the independent variables. The results showed significance values of 0.074 for teacher pedagogical competence and 0.966 for digital learning media (both > 0.05), indicating that heteroscedasticity was not present. All classical assumption tests were satisfied, confirming that the data were appropriate for multiple linear regression analysis.

RESULT AND DISCUSSION

Results

Before analysis, classical assumption tests were undertaken to ensure the data were suitable for parametric procedures. The Kolmogorov-Smirnov test was applied to the regression residuals, yielding a significance value of 0.200 (Asymp. Sig. 2-tailed), which is greater than the 0.05 significance level. These findings demonstrate that the

residuals corresponding to the student learning interest variable follow a normal distribution, thus meeting the essential precondition for linear regression analysis.

Second, a multicollinearity assessment was conducted to investigate the presence of substantial correlation between the independent variables within the model, specifically teacher pedagogical competence and digital learning media. The test results showed no indication of multicollinearity, with a Variance Inflation Factor (VIF) value of 1.595, < 10, and a Tolerance value of 0.627, > 0.1, for both variables. These findings confirm that each independent variable makes a unique and independent contribution to the dependent variable (Creswell & Creswell, 2020). Third, the heteroscedasticity test yielded significance values above the 0.05 for all independent variables. This indicates the absence of heteroscedasticity, or in other words, the residual variance of the model is homogeneous.

Since all classical assumptions of multiple linear regression were met, the regression model is considered appropriate and reliable for subsequent analysis. Therefore, the accuracy of the regression analysis results is guaranteed and has a high level of confidence in examining the contribution of teacher pedagogical competence and digital learning media to the learning interests. Based on the regression analysis results, Table 1 provides the following:

Table 1
Results of Multiple Linear Regression Analysis

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*p*
	B	***Std. Error***	***β***		
(Constant)	10.592	4.405		2.405	.018
Teacher pedagogical competence	.509	.075	.578	6.749	.001
Digital learning media	.181	.063	.246	2.869	.005

Note. *B* = unstandardized regression coefficient; *β* (Beta) = standardized regression coefficient; *t* = *t*-value; *p* = significance level. Dependent variable: Student learning interest.

1. The regression analysis yielded a constant (*B* =10.592), this value mathematically represents the predicted value of student learning interest when both pedagogical competence and digital learning media are zero. However, this interpretation is not practically meaningful in the context of this study, as scores on these variables cannot realistically be zero on the measurement scale employed.

2. The regression coefficient for the Teacher's Pedagogical Competence variable is (*B* =0.509), indicating that for every one unit increase in teacher pedagogical competence, student learning interest increases by 0.509 units, assuming digital learning media is held constant. A positive coefficient signifies a unidirectional relationship wherein an increase in teacher pedagogical competence corresponds to an increase in student learning interest.
3. The regression coefficient for Digital Learning Media is (*B* =0.181), suggesting that each one-unit increment in digital learning media corresponds to a 0.181 unit increase in student learning interest, assuming pedagogical competence is held constant. This positive coefficient indicates a unidirectional relationship wherein digital learning media corresponds directly to student learning interest. Consequently, increased implementation of digital learning media exerts a positive influence on student learning interest.

The t-test results showed that teacher pedagogical competence made a significant partial contribution to student learning interest (t (83) = 6.749, p<0.001). Similarly, digital learning media also made a significant partial contribution (t (83) = 2.869 and p= 0.005). When comparing the relative strength of the predictors using the standardized coefficients (β), teacher pedagogical competence (β = 0.578) demonstrated a substantially stronger influence on student learning interest than digital learning media (β = 0.246). The magnitude of the beta coefficient for pedagogical competence is more than twice that of digital learning media, indicating that a one-standard-deviation increase in pedagogical competence produces a 0.578 standard deviation increase in learning interest, whereas the same increase in digital learning media yields only a 0.246 standard deviation increase. This finding suggests that teacher pedagogical competence is more influential than digital learning media in shaping students' learning interest.

Table 2
Analysis of Variance (ANOVA) for the Regression Model

Source	*SS*	*df*	*MS*	*F*	*p*
Regression	829.453	2	414.727	46.544	.001
Residual	739.568	83	8.910		
Total	1569.021	85			

Note: *SS* = Sum of Squares; *df* = degrees of freedom; *MS* = Mean Square; *p* = significance level. Dependent variable: Student learning interest. Predictors: (constant), Digital learning media, Teacher pedagogical competence. N = 86.

As illustrated in Table 2, the ANOVA analysis produced an *F*-value (*F* (2,83) = 46.544, accompanied by a significance value of 0.001 ($p < 0.050$). The results substantiate that teacher pedagogical competence and digital learning media have a significant simultaneous influence on the learning interest of students.

Table 3
Model Summary

Model Summary			
R	***R²***	***Adjusted R²***	***SE* Estimate**
.727	.529	.517	2.985

Note. Predictors: (constant), Digital Learning Media, Teacher Pedagogical Competence. Dependent variable: Student Learning Interest. N = 86. $R^2 = 0.529$ indicates that 52.9% of the variance in student learning interest is explained by the two predictor variables

As presented in Table 3, the multiple correlation coefficient (R) of 0.727 indicates a strong positive relationship between the combination of teacher pedagogical competence and digital learning media with student learning interest. The coefficient of determination (R^2) was calculated at 0.529 (adjusted $R^2 = 0.517$), indicating that pedagogical competence and digital learning media together explained 52.9% of the variance in student learning interest, while the remaining 47.1% was due to other variables not examined in this study. The adjusted R^2 value of 0.517 provides a more conservative estimate considering the number of predictors in the model and the sample size (N = 86). The minimal difference between R^2 and adjusted R^2 of 0.012 indicates that the model is parsimonious and not affected by overfitting, thus increasing confidence in the generalizability of these findings to a broader population of elementary school students.

Discussion

The Contribution of Teachers' Pedagogical Competence to the Learning Interest of Students

The finding that teacher pedagogical competence significantly contributes to students' learning interest reinforces the central role of teachers in creating engaging learning environments. Pedagogical competence refers to the teacher's ability to effectively manage the learning process, including understanding student characteristics, designing instructional strategies, implementing learning activities, and evaluating learning outcomes. As explained by Mustafa (2024), pedagogical competence functions

as a fundamental skill that shapes the quality of teacher-student interactions in educational settings. Meanwhile, learning interest does not arise spontaneously but develops through meaningful and engaging learning experiences. (Fadhilah et al., 2025).

From a theoretical standpoint, this relationship can be understood through Self-Determination Theory, which proposes that students' motivation and interest are enhanced when the learning environment supports the fulfillment of their basic psychological needs for autonomy, competence, and relatedness. Teachers who possess strong pedagogical competence are more capable of designing learning experiences that offer appropriate guidance, constructive feedback, and meaningful interactions, thereby strengthening students' sense of competence and promoting active engagement in the learning process (Ryan & Deci, 2017). Furthermore, the cultivation of learning interest can be fostered through instructional strategies that connect academic content to students' personal experiences and encourage their active participation (Renninger & Hidi, 2020).

The results of this study are also consistent with the findings of Afifah & Nurachadijat (2023), which found that teacher pedagogical competence significantly influences student learning interest. Similarly, Cahyanti et al. (2024) found that pedagogical competence plays an important role in increasing students' interest and academic achievement. These findings emphasize that teachers do not merely transmit knowledge but also function as facilitators who can stimulate students' learning interest through effective pedagogical strategies.

The Contribution of Digital Learning Media to the Learning Interest of Students

The significant contribution of digital learning media to students' learning interest ($\beta = 0.246$, $p < 0.05$) confirms the potential of technology to support the transformation of elementary education. This finding is consistent with previous studies highlighting that digital learning media can enhance the learning process through visual, interactive, and varied forms of content delivery (Nugroho et al., 2024; Sulistyanto et al., 2024). In addition, digital learning media can present learning content in engaging forms such as text, graphics, animation, audio, and video, which may stimulate students' curiosity and increase their engagement in learning activities (Zunidar & Suwandi, 2025). Furthermore, the use of digital media can help students understand learning materials more easily and enjoy the learning process (Yeni et al., 2023).

However, the relatively weaker contribution of digital media compared to pedagogical competence (β = 0.578) invites further critical reflection. This finding suggests that, within the context of elementary education, digital media alone may not be sufficient to foster students' learning interest. Rather, the effectiveness of digital media appears to depend largely on the pedagogical competence of teachers who design and implement its use in the classroom. This interpretation aligns with previous research indicating that digital learning media can create more stimulating learning experiences, promote active student participation, and make learning more enjoyable when integrated with appropriate teaching strategies (Dai et al., 2025; Mekalungi et al., 2025). Another study by Husnah (2024) found that the variety and attractiveness of learning media act as key external factors that can stimulate and enhance learning interest, which is an internal factor in students.

The Contribution of Teachers' Pedagogical Competence and Digital Learning Media to the Learning Interest of Students

The finding that teacher pedagogical competence and digital learning media simultaneously contribute to student learning interest underscores the complementary nature of these two factors. This indicates that efforts to enhance student learning interest will be more optimal when improvements in pedagogical competence are accompanied by the effective use of digital learning media. Rather than functioning independently, these two variables work synergistically to create engaging and meaningful learning experiences that meet the developmental needs of elementary school students.

Teachers with strong pedagogical competence are able to select and use digital media appropriately, aligned with learning objectives and student characteristics. According to Verawati et al. (2024), effective learning occurs when teachers successfully combine instructional strategies with suitable media, thereby fostering an active and meaningful educational environment. This synergy between pedagogical skills and digital tools is particularly crucial at the elementary level, where students benefit from varied, interactive approaches that capture their attention and sustain engagement.

The finding that both variables contribute significantly reinforces the importance of integrating TPACK (Technological Pedagogical Content Knowledge) into learning practices. As stated by Hendra et al. (2023) appropriate technology integration can

increase the appeal of the material and strengthen students' learning interest. Teachers who possess strong pedagogical competence and can optimally utilize digital media will be more successful in creating effective learning in the digital age. This research supports the theory that, in the context of 21st century education, learning approaches need to integrate pedagogical and technological aspects in a balanced manner (Fitria & Nuroh, 2025; Ganendra et al., 2025).

The coefficient of determination (R^2 = 0.529) indicates that pedagogical competence and digital learning media together account for 52.9% of the variance in students' learning interest. While this represents a substantial contribution, it also reveals that 47.1% of the variance is attributable to other factors not examined in this study. These may include individual student characteristics such as intrinsic motivation and prior knowledge, family support, peer influence, classroom climate, or school leadership all of which warrant further investigation in future research.

Beyond the statistical contribution, the role of digital media in enhancing learning outcomes has been widely documented. The results of several studies also reinforce the finding that digital media can improve student attention, learning interest, learning outcomes, and active participation (Fithriyah et al., 2025; Khasanah & Wulandari, 2024; Mekalungi et al., 2025). The use of digital learning media without adequate pedagogical competence will not produce optimal results. Conversely, strong pedagogical competence will have a stronger impact when supported by engaging and interactive digital learning media.

Despite the contributions of this study, several limitations should be acknowledged. First, the research was conducted in a single elementary school, with a relatively small sample of fifth-grade students, which may limit the generalizability of the findings to other educational contexts or grade levels. Second, the study employed a cross-sectional design, capturing data at one point in time therefore, causal relationships between the independent variables and learning interest cannot be conclusively established. Third, the data were collected using self-report questionnaires, which may be subject to response bias.

When pedagogical competence is strengthened and complemented by the effective use of digital media, classroom learning is expected to become more

meaningful, engaging, and capable of promoting optimal student involvement. These findings carry significant practical implications, highlighting the importance of developing teachers' pedagogical competence and their capacity to integrate digital learning media.

Given that pedagogical competence exhibited a substantially stronger contribution ($\beta = 0.578$) to student learning interest compared to digital learning media ($\beta = 0.246$), professional development initiatives should prioritize the enhancement of core pedagogical skills as the foundation for effective technology integration. Rather than offering technology training in isolation, schools and policymakers should design programs that first strengthen teachers' competencies in learner understanding, curriculum development, and instructional design, and then demonstrate how digital tools can amplify these pedagogical practices.

This approach ensures that technology serves as a pedagogical amplifier rather than a substitute for sound teaching. Furthermore, training should move beyond one-time workshops toward sustained, practice embedded professional learning communities where teachers can collaboratively design, implement, and reflect on lessons that synergistically integrate pedagogical competence with digital media. Implementing these initiatives is expected to enhance instructional quality, optimally nurture student learning interest, and foster the development of a learning ecosystem that remains responsive to advancements in educational technology.

Future research should address these limitations by employing longitudinal or experimental designs to establish causality, alongside multi-site replication across diverse educational contexts including public schools, different grade levels, and varied socio-economic backgrounds.

Additionally, future studies should incorporate other potential variables influencing learning interest such as student motivation, family support, peer influence, or socioeconomic factors and employ mixed methods combining surveys with classroom observations, teacher interviews, and student focus groups to capture richer insights into how pedagogical competence and digital media interact in practice. Finally, given the Islamic school context of the present study, further research could productively explore

how religious values and Islamic pedagogical traditions intersect with digital media integration to shape student learning outcomes.

CONCLUSION

Based on the data analysis, the alternative hypothesis was accepted, confirming that teacher pedagogical competence and digital learning media together contribute significantly to student learning interest. The multiple regression test results demonstrated that both independent variables exert a statistically significant simultaneous influence on the dependent variable, indicating that the regression model applied in this study is appropriate for explaining the relationships among the variables.

Moreover, the derived coefficient of determination *(R^2)* of 0.529 demonstrates that 52.9% of the variability in student learning interest is attributable to the collective impact of teacher pedagogical competence and digital learning media. Conversely, 47.1% of the variance is accounted for by factors outside the current research framework, including intrinsic student motivation, contextual learning conditions, familial support systems, or other extraneous variables.

Therefore, the stronger a teacher's pedagogical competence in planning and delivering instruction combined with the effective use of interactive digital learning media suited to students' needs the higher the potential for enhancing student learning interest. These findings underscore the significance of integrating pedagogical expertise with educational technology as a strategy for improving the quality of learning in elementary schools.

This research confirms the importance of an integrative approach to improving learning quality through the strengthening of teacher pedagogical competence alongside the use of digital learning media. These findings support the TPACK framework by illustrating that pedagogical competence and technological knowledge, reflected in the use of digital learning media, must be integrated within instructional practices to effectively enhance students' learning interest in elementary education.

This study may serve as a reference for future researchers interested in examining the relationship between teacher pedagogical competence, digital learning media, and students' learning interest. Considering that 47.1% of the variance in students' learning

interest was not explained by the variables in this study, future research could explore additional factors that may influence learning interest, such as student motivation, classroom climate, or learning engagement as potential mediating or moderating variables. In addition, further studies may employ qualitative or mixed method approaches to gain deeper insights into how teachers practically integrate pedagogical competence with digital learning media in classroom settings. Such investigations are expected to provide a more comprehensive understanding of instructional practices that effectively foster students' learning interest in the digital era.

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