

THE TEACHERS' TEACHING STYLES ON STUDENT MOTIVATION AND ENGAGEMENT: THE MEDIATING ROLE OF STUDENT DIGITAL MEDIA SELF-EFFICACY (ELEMENTARY SCHOOL TEACHERS' PERSPECTIVES)

¹Eni Trisnawati, ²Indriyani, ³Muhammad Sofwan, ⁴Robi Hendra

^{1,2,3,4}Universitas Jambi

¹enitrisnawati00@gmail.com, ²indryani@unja.ac.id, ³muhammad.sofwan@unja.ac.id,

⁴robi.hendra@unja.ac.id

ABSTRACT

The advancement of digital technology has transformed instructional practices in elementary schools; however, improvements in student motivation and engagement remain inconsistent, as prior studies have largely examined these relationships in isolation without addressing underlying psychological mechanisms. This study investigates the influence of teachers' teaching styles on learning motivation and student engagement, with student digital media self-efficacy as a mediating variable. Using a quantitative survey of 313 elementary school teachers selected through quota sampling, data were collected via questionnaires and analysed using Partial Least Squares–Structural Equation Modelling (PLS-SEM), with student-related variables assessed through teachers' perceptions. The findings reveal that teaching styles significantly influence digital self-efficacy ($\beta = 0.598$; $p < 0.001$) and learning motivation ($\beta = 0.359$; $p < 0.001$). Digital self-efficacy significantly affects student engagement ($\beta = 0.596$; $p < 0.001$) and learning motivation ($\beta = 0.406$; $p < 0.001$), while learning motivation also contributes to student engagement ($\beta = 0.186$; $p = 0.008$). These results confirm that digital self-efficacy functions as a central psychological mechanism linking pedagogical practices to student engagement. This study contributes theoretically by advancing a comprehensive mediation model that integrates pedagogical and psychological dimensions in digital learning, and practically by highlighting the need for adaptive, technology-integrated teaching strategies to strengthen students' digital self-efficacy and sustain their motivation and engagement.

Keywords: Teaching Styles, Self-Efficacy, Learning Motivation, Student Engagement, Digital Learning.

INTRODUCTION

The advancement of digital technology has had a significant impact on the learning process in elementary education. The integration of digital media in schools not only affects how students access information but also shapes interaction patterns, motivation to learn, and student engagement in the learning process (Wu, 2024). This shift indicates that learning is no longer one-directional but has become more interactive and student-centered. In the context of public elementary schools in Kumpeh Ulu District, the use of digital media has become increasingly important in line with the growing demands of 21st-century competencies, which emphasize digital literacy, creativity, communication, and collaboration. Therefore, the use of digital media in learning must be supported by appropriate pedagogical strategies to enhance the quality of the learning process and students' motivation and engagement.

One of the key factors determining the successful utilization of digital media in learning is teachers' teaching styles. Teaching styles are not only related to instructional delivery

techniques but also encompass how teachers build interactions, manage classrooms, and integrate technology into the learning process. Teachers who apply varied and adaptive teaching styles are more likely to create a conducive learning environment and encourage active student participation.

Several studies have shown that teachers' teaching styles are significantly related to students' motivation to learn (Susilawati et al., 2023; Rahmat & Jannatin, 2018). Susilawati et al. (2023) found that teachers who combine various teaching styles—classical, technological, personal, and interactive—enhance students' comfort in learning, thereby increasing their motivation. Similarly, Rahmat and Jannatin (2018) demonstrated that teaching styles play an important role in shaping enjoyable and motivating learning experiences, particularly at the elementary school level.

On the other hand, the development of digital technology requires students to adapt and possess confidence in using digital media. Students' belief in their ability to use digital media is referred to as student digital media self-efficacy. Digital self-efficacy plays a crucial role in how students approach challenges in technology-based learning, complete digital tasks, and use technology as an independent learning resource. Hammer et al. (2021) emphasize that digital self-efficacy is influenced by the quality of students' learning experiences, including how teachers facilitate digital-based learning. Although their study focuses on the role of parents, its implications suggest that teachers have a strategic role in shaping students' confidence in using digital media through the learning experiences they provide.

Furthermore, digital self-efficacy is closely associated with students' motivation and engagement in learning. According to Linnenbrink and Pintrich (2003), students with high self-efficacy tend to be more active and persistent and to demonstrate higher levels of engagement in the learning process. In digital learning environments, students who are confident in their digital abilities are more adaptable, more willing to take initiative, and more engaged in learning activities. This indicates that digital self-efficacy has strong potential as a mechanism linking teachers' teaching styles with students' motivation and engagement.

Previous studies have shown that student engagement can be enhanced through the effective use of digital media, particularly when supported by adequate digital literacy and access to learning facilities, such as computers and the internet (Fakhrudin & H., 2023). However, the effectiveness of digital media use does not depend solely on the availability of technology; rather, it is largely determined by how teachers design learning experiences that optimally engage students. In line with this, Wu (2024) emphasizes that the use of digital media can enhance student interaction and engagement when supported by effective instructional strategies and

proper classroom management. Nevertheless, most existing studies still examine the relationships among these variables only in part and have not extensively explored the underlying psychological mechanisms, particularly the mediating role of student digital media self-efficacy, within a comprehensive structural model in the context of elementary education.

On the other hand, although the use of digital technology in learning has developed rapidly, improvements in student motivation and engagement have not always been optimal. This condition indicates a gap between the potential of technology in education and the empirical realities in the field. Technology is available and widely used; however, it has not fully succeeded in promoting active student engagement. This suggests that the success of digital learning is determined not solely by technological factors but also by students' pedagogical and psychological factors. In this regard, teachers' teaching styles and students' digital self-efficacy emerge as key factors to consider when explaining the dynamics of student engagement in learning.

Several studies have examined the relationships among teachers' teaching styles, self-efficacy, learning motivation, and student engagement; however, most of them still position these variables separately or limit their analysis to direct or simple intervening relationships (Asuke et al., 2023; Anwar et al., 2020; Chaw & Tang, 2024; Meilinda et al., 2025; Wulandari et al., 2025). As a result, our understanding of how pedagogical and psychological factors interact to shape student engagement in digital learning remains incomplete.

Based on this gap, this study aims to analyze the influence of teachers' teaching styles on learning motivation and student engagement, with the mediating role of student digital media self-efficacy. The novelty of this study lies in integrating teachers' teaching styles, students' digital media self-efficacy, learning motivation, and student engagement into a comprehensive mediation model in the context of elementary education. This approach provides a more holistic understanding of the psychological mechanisms that bridge pedagogical practices and student engagement in digital learning.

LITERATURE REVIEW

Teachers' teaching styles, student digital media self-efficacy, learning motivation, and student engagement are interrelated variables that determine the quality of the learning process. Theoretically, student engagement and motivation are closely linked to self-belief in learning, as explained in social cognitive theory, which emphasizes the role of self-efficacy in directing individual behavior and effort (Linnenbrink & Pintrich, 2003). Furthermore, the development of technology-based learning indicates that the appropriate use of digital media can enhance student engagement in the learning process

(Meilinda et al., 2025). In this context, teachers' teaching styles are a crucial factor linking pedagogical aspects to students' psychological dimensions of learning.

Teachers' teaching styles are pedagogical approaches that reflect how they deliver content, facilitate interactions, and manage the learning process. Effective teaching styles do not merely focus on content delivery but also on creating a conducive learning environment and encouraging active student engagement. Studies have shown that teachers' teaching styles significantly influence students' learning activities and motivation (Asuke et al., 2023; Susilawati et al., 2023; Rahmat & Jannatin, 2018). Teachers who adopt interactive, varied, and adaptive teaching styles tend to enhance student participation in learning. In addition, teachers' teaching styles have been found to affect students' learning outcomes and academic achievement (Anwar et al., 2020; Anggelina et al., 2023). These findings indicate that teachers' teaching styles function as an initial factor influencing both cognitive and affective aspects of students.

Beyond their direct impact on motivation to learn, teachers' teaching styles can also shape students' confidence in using digital technology. In this regard, student digital media self-efficacy becomes a key factor in technology-based learning. Digital self-efficacy refers to students' beliefs in their ability to use digital media to accomplish learning tasks. Hammer et al. (2021) state that digital self-efficacy is influenced by students' learning experiences, including how teachers facilitate the use of technology in learning. Teachers who effectively integrate technology provide positive learning experiences, thereby enhancing students' confidence in using digital media.

Digital self-efficacy not only plays a role in students' ability to use technology but is also closely associated with their motivation and engagement in learning. Students with high levels of self-efficacy tend to be more active and persistent, and to demonstrate greater interest in learning (Linnenbrink & Pintrich, 2003). In digital learning environments, confidence in one's abilities becomes a crucial factor that encourages students to take initiative, persevere in the face of challenges, and engage more deeply in learning activities. This suggests that digital self-efficacy serves as a psychological mechanism linking pedagogical factors to students' motivation to learn and engagement.

Learning motivation is a crucial factor in determining student engagement in the learning process. It can be understood as internal and external drives that direct students' learning behaviors. Studies have shown that learning motivation plays a significant role in improving learning outcomes and student engagement (Agrifina et al., 2024; Lathifa et al., 2024; Nurfadilah et al., 2025). In addition, innovations in learning, including the use of digital media and varied instructional strategies, have been proven to enhance students' motivation (Adilah et al., 2025;

Haniffah et al., 2025; Susanti, 2025). Thus, learning motivation is influenced not only by internal student factors but also by teachers' roles and the instructional strategies implemented.

Student engagement is an important indicator in assessing the quality of learning. It encompasses cognitive, emotional, and behavioral aspects of the learning process. Research indicates that the use of digital technology and appropriate instructional strategies can enhance student engagement (Meilinda et al., 2025; Ar-Rasyid et al., 2025). Furthermore, project-based learning approaches and student-centered learning have been shown to improve both student engagement and critical thinking skills (Wati & Sugesti, 2025; Gessa & Martha, 2025). Environmental factors, such as family support and school climate, also contribute to increasing student engagement (Muhibbin & Yusri, 2025). These findings suggest that student engagement results from the interaction of pedagogical, psychological, and environmental factors.

Based on the theoretical review and previous studies, it can be understood that teachers' teaching styles function as an initial factor influencing student digital media self-efficacy, which in turn affects students' motivation and engagement in learning. Therefore, the relationships among variables in this study form a model explaining that teachers' teaching styles have a direct effect on student motivation and engagement and an indirect effect through student digital media self-efficacy as a mediating variable. Accordingly, the research hypotheses are formulated to test these relationships empirically:

H1: Teachers' teaching styles have a positive and significant effect on students' learning motivation.

H2: Teachers' teaching styles have a positive and significant effect on student digital media self-efficacy.

H3: Student digital media self-efficacy has a positive and significant effect on student engagement.

H4: Student digital media self-efficacy has a positive and significant effect on students' learning motivation.

H5: Students' learning motivation has a positive and significant effect on student engagement.

METHODOLOGY

This study employed a quantitative survey approach to analyze the relationships among teachers' teaching styles, students' digital media self-efficacy, learning motivation, and student engagement at the elementary school level. The research was conducted in public elementary schools in Kumpeh Ulu District, Jambi Province, Indonesia. The survey approach was selected because it enables systematic data collection through structured questionnaires to measure respondents' perceptions of the research variables in the context of digital learning implemented in classrooms.

The population of this study consisted of all public elementary school teachers in Kumpeh Ulu District. The sampling technique used was quota sampling to ensure the

representation of respondent characteristics, such as gender and educational background. Although this technique falls under non-probability sampling, it was chosen to ensure proportional representation of teacher characteristics within the field research context. The sample size was determined using G*Power software with a significance level and statistical power of 0.95, resulting in a minimum requirement of 210 respondents. In practice, this study involved 313 teachers who met the criteria, indicating that the sample size was sufficient for structural model-based analysis.

Data were collected using a structured questionnaire developed from a theoretical framework and adapted from relevant prior studies. The research instrument included four main constructs: teachers' teaching styles, student digital media self-efficacy, learning motivation, and student engagement, all measured using a five-point Likert scale. In this study, student-related variables were measured based on teachers' perceptions of students' conditions and behaviors during the learning process. This approach was used as a proxy measure to reflect classroom realities, given that teachers have direct experience observing students' interactions, motivation, and engagement during instructional activities.

To ensure instrument quality, content validation was conducted through expert judgment by five experts, as well as through Focus Group Discussions (FGDs) with elementary school teachers who shared characteristics similar to those of the study respondents. The results of the validity test indicated that all items had a Content Validity Index (CVI) above 0.80, confirming that the instrument was valid and appropriate for use. In addition, the instrument adaptation process also considered linguistic appropriateness to ensure clarity and comprehensibility within the elementary education context.

Data analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS version 3.3.3. PLS-SEM was selected due to its suitability for predictive and exploratory research, as well as its ability to accommodate complex latent constructs with relatively limited sample sizes. The analysis was carried out in two stages: evaluation of the measurement and structural models. The measurement model was assessed using reliability (Cronbach's alpha and composite reliability), convergent validity (outer loadings and Average Variance Extracted [AVE]), and discriminant validity (HTMT). Subsequently, the structural model was evaluated using path coefficients and bootstrapping to assess the significance of relationships among variables. In contrast, the coefficient of determination (R^2) was used to assess the model's explanatory power for the endogenous variables.

RESULT AND DISCUSSION

The measurement model was evaluated to ensure that each construct had adequate validity and reliability prior to testing the structural model. The analysis included assessments of convergent validity, internal consistency reliability, and indicator evaluation through outer loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). The results indicate that all indicators have outer loadings above 0.700, AVEs above 0.500, and CRs above 0.700. These findings demonstrate that all constructs meet the recommended criteria for validity and reliability in PLS-SEM analysis.

Table 1: Mean, CR, AVE, Loading, and VIF

Variable	Item	CR	AVE	Mean	VIF	Load
Teaching Style	TC 1	0.980	0.832	4,649	3,254	0,842
	TC 2			4,562	2,485	0,911
	TC 3			4,581	2,034	0,875
	TC 4			4,553	2,049	0,941
	TC 5			4,613	2,553	0,909
	TC 6			4,620	2,877	0,919
	TC 7			4,572	2,441	0,946
	TC 8			4,629	2,137	0,930
	TC 9			4,543	2,465	0,941
	TC 10			4,594	2,582	0,901
Student Digital Media Self-Efficacy	SDC 1	0.949	0.825	3,920	3,080	0,896
	SDC 2			3,990	4,226	0,924
	SDC 3			3,923	3,642	0,905
	SDC 4			3,885	3,273	0,907
Student Learning Motivation	SLM 1	0.981	0.878	3,971	2,107	0,916
	SLM 2			3,971	2,490	0,938
	SLM 3			3,981	2,450	0,953
	SLM 4			3,990	2,919	0,960
	SLM 5			3,990	2,132	0,953
	SLM 6			3,978	1,596	0,906
	SLM 7			4,019	1,433	0,933
Student Engagement	SE 1	0.969	0.862	3,840	1,289	0,932
	SE 2			3,853	1,112	0,941
	SE 3			3,847	1,504	0,936
	SE 4			3,776	4,011	0,907
	SE 5			3,850	4,831	0,927

Discriminant validity testing was conducted to ensure that each construct is empirically distinct and does not overlap with other constructs. The assessment was performed using the Heterotrait–Monotrait Ratio (HTMT). Based on the results presented in Table 2, all HTMT values among constructs range from 0.498 to 0.752, which are below the threshold of 0.900. This indicates that each construct demonstrates good discriminant validity.

In detail, the HTMT values are 0.573 between student engagement and learning motivation, 0.752 between student engagement and student digital media self-efficacy, and 0.498 to 0.625 between teachers' teaching styles and other constructs. These values confirm that each construct is clearly distinguishable from the others. Therefore, the measurement model in this

study has met the criteria for discriminant validity and is appropriate for subsequent structural model analysis.

Table 2. HTMT

	Student Engagement	Student Learning Motivation	Student Digital Media Self-Efficacy	Teaching Style
Student Engagement				
Student Learning Motivation	0,573			
Student Digital Media Self-Efficacy	0,752	0,651		
Teaching Style	0,498	0,614	0,625	

The structural model was evaluated to ensure it demonstrated an adequate fit prior to testing the relationships among variables. Based on Table 3, the Standardized Root Mean Square Residual (SRMR) values of 0.034 for both the saturated and estimated models are below the 0.080 threshold, indicating an excellent model fit. In addition, the Normed Fit Index (NFI) value of 0.877 indicates an acceptable fit.

The d_ULS and d_G values indicate minimal differences between the empirical data and the estimated model, further confirming the model's good quality. Overall, these results demonstrate that the structural model is appropriate for examining the relationships among the variables: teachers' teaching styles, students' digital media self-efficacy, learning motivation, and student engagement.

Table 3. Model Fit

Criteria	Saturated model	Estimated model
SRMR	0,034	0,034
d_ULS	0,401	0,410
d_G	0,878	0,878
Chi-square	1488,015	1488,249
NFI	0,877	0,877

The results of the structural model testing presented in Table 4 indicate that all hypotheses in this study are supported. Students' learning motivation has a positive and significant effect on student engagement ($\beta = 0.186$; $p = 0.008$), suggesting that increased motivation enhances students' involvement in the learning process. In addition, student digital media self-efficacy has a strong and significant effect on student engagement ($\beta = 0.596$; $p = 0.000$) and also positively influences learning motivation ($\beta = 0.406$; $p = 0.000$).

Teachers' teaching styles are also found to have significant effects on both learning motivation ($\beta = 0.359$; $p = 0.000$) and student digital media self-efficacy ($\beta = 0.598$; $p = 0.000$), indicating that instructional strategies play a crucial role in shaping students' confidence in using digital media and enhancing their motivation to learn. Overall, these findings confirm that

teachers' teaching styles and students' digital media self-efficacy are key factors in improving students' motivation and engagement in learning.

Furthermore, the results of the indirect effect analysis reveal that student digital media self-efficacy significantly mediates the relationship between teachers' teaching styles and students' learning motivation, as well as student engagement through learning motivation.

Table 4. Structural Model: Path Coefficients (β), p-values, and Significance

H	Path	B (original)	p-value	Sig.
H1	Student Learning Motivation -> Student Engagement	0,186	0,008	Yes
H2	Student Digital Media Self-Efficacy-> Student Engagement	0,596	0,000	Yes
H3	Student Digital Media Self-Efficacy-> Student Learning Motivation	0,406	0,000	Yes
H4	Teaching Style -> Student Learning Motivation	0,359	0,000	Yes
H5	Teaching Style -> Student Digital Media Self-Efficacy	0,598	0,000	Yes

The evaluation of the structural model indicates that the model demonstrates good predictive capability, as reflected in the values of R^2 , f^2 , and Q^2 for the endogenous variables. These results suggest that teachers' teaching styles and student digital media self-efficacy explain a substantial proportion of the variance in learning motivation and student engagement. In addition, the f^2 values indicate that the effects of student digital media self-efficacy on student engagement and of teachers' teaching styles on student digital media self-efficacy fall within the substantial category. This finding underscores that pedagogical and psychological factors simultaneously shape the quality of digital learning.

The findings reveal that teachers' teaching styles significantly influence both students' learning motivation and students' digital media self-efficacy, indicating that the quality of pedagogical practices not only directly affects students' affective outcomes but also shapes their confidence in using technology as part of the learning process. This suggests that teachers' teaching styles function as a determinant factor that not only influences learning outcomes directly but also activates psychological mechanisms that enhance student engagement in digital learning. These findings extend previous studies (Susilawati et al., 2023; Rahmat & Jannatin, 2018; Anwar et al., 2020) by demonstrating that the influence of teaching styles extends beyond motivation and operates through a psychological pathway: digital self-efficacy.

Furthermore, the analysis confirms that student digital media self-efficacy serves as a significant mediator in the relationship between teachers' teaching styles and both learning motivation and student engagement. This finding indicates that the success of digital learning is determined not only by the instructional strategies employed but also by the extent to which these strategies foster students' confidence in using technology. Therefore, digital self-efficacy can be understood as a key mechanism that bridges pedagogical practices and student engagement, while simultaneously enhancing the effectiveness of technology-based learning.

From a theoretical perspective, these findings can be explained through social cognitive theory and the concept of instructional leadership, which emphasize that effective teaching practices influence learning outcomes through psychological mechanisms such as self-efficacy (Liu & Hallinger, 2018). In this context, teachers' teaching styles can be positioned as a form of micro-level instructional leadership that directly shapes students' expectations, learning experiences, and self-beliefs. This reinforces the notion that successful learning is determined not solely by content delivery but also by teachers' ability to create meaningful learning experiences.

The strong relationship between teachers' teaching styles and student digital media self-efficacy indicates that students' confidence in using technology is highly influenced by the quality of learning experiences facilitated by teachers. Teachers who effectively integrate technology and provide supportive learning environments are more likely to foster students' confidence in digital learning. This finding is consistent with studies by Hammer et al. (2021) and Skaalvik (2020), which emphasize that self-efficacy develops through meaningful learning experiences and supportive environments.

In the context of elementary education, these findings are particularly important, as students are in the early stages of developing both academic and digital self-confidence. Therefore, adaptive and supportive teaching styles not only enhance students' skills but also help build the psychological foundation necessary for engaging in technology-based learning. In this regard, student digital media self-efficacy can be viewed as a primary mechanism linking instructional quality with sustained improvements in student motivation and engagement.

Overall, this study contributes theoretically by integrating pedagogical and psychological factors into a comprehensive model and by clarifying the mediating role of digital self-efficacy in technology-based learning. However, this study has several limitations, particularly the use of teacher-perceived data, which may introduce subjective bias, and the use of quota sampling, which limits the generalizability of the findings. Therefore, future research is recommended to use direct student data and employ probability sampling techniques to enhance the external validity of the results.

CONCLUSION

Based on the results of Partial Least Squares–Structural Equation Modeling (PLS-SEM) analysis, this study demonstrates that teachers' teaching styles play a significant role in enhancing students' learning motivation and engagement, both directly and indirectly through student digital media self-efficacy as a mediating variable. These findings confirm that digital self-

efficacy is a key psychological mechanism that bridges teachers' pedagogical practices and student engagement in technology-based learning.

From a theoretical perspective, this study contributes by integrating pedagogical and psychological factors into a comprehensive model, thereby providing a more holistic understanding of the dynamics of digital learning in elementary education. From a practical standpoint, the findings imply that teachers need to develop adaptive, interactive, and technology-integrated teaching styles not only to improve students' content understanding but also to strengthen their digital self-confidence as a foundation for sustained learning engagement.

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