



RECONSTRUCTING A DIGITAL PEDAGOGY-BASED LEARNING MODEL TO ENHANCE ELEMENTARY SCHOOL STUDENTS' MOTIVATION AND LITERACY ENGAGEMENT

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ABSTRACT

The integration of digital technology in elementary education plays a crucial role in fostering students' motivation and literacy engagement. Despite this importance, classroom practices often remain dominated by traditional instructional approaches that limit students' active participation and meaningful interaction with learning content. This study aimed to reconstruct a digital pedagogy-based learning model to enhance elementary students' learning motivation and literacy engagement. The research employed a Design-Based Research approach involving elementary school students as participants. Data were collected through validated and reliable motivation questionnaires, literacy engagement instruments, and classroom observations. Statistical analyses were conducted using SPSS, including tests of normality, paired sample comparison, and effect size analysis to determine the magnitude of the intervention's impact. The findings revealed a significant improvement in students' learning motivation and literacy engagement following the implementation of the reconstructed model. The statistical results confirmed that the differences between pretest and posttest scores were significant, and the effect size analysis indicated a strong practical impact. These results demonstrate that integrating digital pedagogy through a systematically designed instructional model can create a more engaging and meaningful learning environment. The study concludes that digital pedagogy-based instructional reconstruction is effective in enhancing motivation and literacy engagement in elementary classrooms.

Keywords: Digital Pedagogy; Motivation; Literacy Engagement; Instructional Model Reconstruction

1. Introduction

Reconstructing a Digital Pedagogy-Based Learning Model to Enhance Elementary School Students' Motivation and Literacy Engagement represents a systematic effort to transform traditional instructional practices into a more dynamic, student-centered, and technology-integrated learning framework (Rahma & Haviz, 2022). This reconstruction is grounded in the principles of digital pedagogy, which emphasize meaningful interaction between pedagogy, content, and technology rather than the mere use of digital tools (Jusmawati et al., 2021). The proposed model seeks to redesign classroom learning by integrating interactive digital media, multimodal texts, and collaborative learning activities that foster intrinsic motivation (Juliani & Zunidar, 2025). By shifting from teacher-dominated instruction to participatory learning experiences, the model encourages students to become active constructors of knowledge while engaging critically and creatively with literacy content.

The model further aims to strengthen students' literacy engagement by incorporating digital environments that support reading, writing, speaking, and critical interpretation in multimodal formats. Through carefully designed digital

tasks, such as interactive storytelling, multimedia projects, and inquiry-based activities, students are expected to demonstrate higher levels of cognitive involvement and sustained learning interest (Noviana et al., 2025). This reconstruction not only addresses the motivational challenges often found in conventional classrooms but also aligns with the demands of 21st-century education, where digital competence and literacy proficiency are essential (Biney & Adade, 2024). Ultimately, the study aspires to produce an empirically validated instructional model that enhances both learning motivation and meaningful literacy engagement among elementary school students.

Instructional practices in elementary schools are still largely dominated by traditional teacher-centered approaches, with technology use remaining instrumental and not yet pedagogically integrated (K. P. C. Putri et al., 2023). The use of digital devices in classrooms is often limited to presentation tools or video playback, without the design of activities that promote cognitive engagement and deep literacy development (Mardiana, 2023) (Khaled & Alghfeli, 2025) (Mahmudi et al., 2024). This condition contributes to low levels of students' intrinsic motivation and suboptimal literacy engagement, particularly in critical reading, reflective writing, and the comprehension of multimodal texts (Aslan & Shiong, 2023).

The challenges become more complex as twenty-first-century education demands digital literacy competence and critical thinking skills, while classroom practices continue to focus primarily on content delivery and short-term academic achievement (Apriyani et al., 2025). Conceptually and empirically, a research gap exists between studies that concentrate on the use of educational technology and those that examine learning motivation or literacy separately (Saputra et al., 2024). Most previous research has evaluated the effectiveness of digital media in improving cognitive learning outcomes, yet few have comprehensively reconstructed an instructional model grounded in digital pedagogy that integrates both motivation and literacy engagement within a unified conceptual framework (Sekarwangi et al., 2021). Moreover, studies that specifically develop and validate a digital pedagogy-based learning model in the context of elementary education remain limited (Sahputra & Ivana, 2022). This gap highlights the urgency of designing, implementing, and empirically testing a digital pedagogy-based instructional model capable of sustainably enhancing both students' motivation and literacy engagement.

Previous studies have shown that the integration of technology in instruction contributes to increased student motivation and engagement when it is pedagogically designed. (Sarki & Reinita, 2024), through Self-Determination Theory, argue that intrinsic motivation develops when the needs for autonomy, competence, and relatedness are fulfilled. The TPACK framework introduced by (Meisella et al., 2025) emphasizes the importance of balancing technology, pedagogy, and content in digital learning environments. The concept of student engagement proposed by (Agustin et al., 2025) explains that engagement encompasses behavioral, emotional, and cognitive dimensions that should be facilitated through active learning strategies. In the context of digital literacy, (Rustam et al., 2022) highlights that literacy involves the ability to understand and critically evaluate digital information. The multiliteracies perspective developed by (Fadli, 2025), along with the theory of

multimodality proposed by (Silaban et al., 2024), broadens the understanding of literacy within digital and visual text environments. Although these studies provide strong conceptual foundations, most of them examine technology, motivation, and literacy separately. Consequently, there remains limited research that reconstructs a digital pedagogy-based learning model in an integrative manner to enhance both motivation and literacy engagement among elementary school students.

The novelty of this study lies in the reconstruction of a digital pedagogy-based learning model that simultaneously integrates the dimensions of learning motivation and literacy engagement within a unified conceptual framework and implementation design in the context of elementary education (Kurniawan & Kurnia, 2025). This research does not merely adopt technology as a supplementary instructional tool; rather, it repositions technology as an integral component of pedagogical transformation grounded in theories of motivation, student engagement, and multimodal literacy (Muhammad, 2025). Unlike previous studies that tend to examine the effectiveness of digital media on cognitive learning outcomes in a partial manner, this study designs, develops, and validates an instructional model that combines the principles of student-centered learning, digital literacy, and strategies for enhancing intrinsic motivation within a design-based research approach (Yang et al., 2025). Therefore, the original contribution of this research lies in the development of a digital learning model that is not only technologically innovative but also pedagogically robust and empirically validated in improving elementary students' motivation and literacy engagement.

The needs analysis conducted at SD Negeri 2 Wameo revealed that classroom instruction is still largely dominated by conventional teacher-centered approaches, with limited and pedagogically unintegrated use of digital media. Initial observations indicated that students tend to be passive in literacy activities, show low enthusiasm in reading and writing tasks, and demonstrate fluctuating levels of learning motivation. Although technological facilities such as projectors and digital devices are available, their use is primarily limited to presenting instructional materials rather than creating interactive and collaborative learning experiences. Teachers also expressed the need for a more innovative and structured instructional model that effectively integrates technology to enhance students' literacy engagement. This condition highlights a gap between the school's technological potential and its actual classroom practices, underscoring the necessity to reconstruct a digital pedagogy-based learning model that aligns with the characteristics and needs of students at SD Negeri 2 Wameo.

The solution proposed in this study is the development and reconstruction of a digital pedagogy-based learning model that is systematically designed to integrate technology, pedagogical strategies, and literacy enhancement within a student-centered learning framework. The model incorporates multimodal literacy activities, collaborative project-based digital tasks, and strategies that foster intrinsic motivation through the provision of autonomy, meaningful feedback, and active student engagement. This approach is expected to address the persistent challenges of low motivation and limited literacy engagement commonly found in traditional instructional practices. This research is particularly significant because it lies at the strategic intersection of digital transformation in education, foundational literacy

development, and the enhancement of learning motivation – three critical issues in twenty-first-century education. Furthermore, the study offers both conceptual novelty and practical urgency, as it has the potential to produce an instructional model that is applicable, empirically validated, and aligned with educational policies promoting meaningful technology integration in elementary schools.

2. Research Methods

This study employed a Design-Based Research (DBR) approach aimed at systematically designing, developing, implementing, and refining a digital pedagogy-based learning model within an authentic classroom context. This approach was selected because it allows the researcher to reconstruct the instructional model through iterative stages, including needs analysis, prototype design, limited trials, evaluation, and continuous revision until a valid and effective model is achieved (Kurniawati et al., 2023). DBR contributes both theoretically and practically, as it not only produces an instructional product in the form of a learning model but also generates design principles that can be replicated in similar educational contexts.

The study involved a primary independent variable, namely the digital pedagogy-based learning model, and two dependent variables: students' learning motivation and literacy engagement. Learning motivation was measured through indicators of intrinsic motivation, interest in learning, and persistence in completing tasks (Azis & Ahmad, 2022). Literacy engagement encompassed cognitive, emotional, and behavioral dimensions reflected in reading, writing, and interpreting multimodal texts (Nurhayati et al., 2025). The relationships among these variables were analyzed to determine the extent to which the reconstructed model significantly enhanced students' motivation and literacy engagement.

This study was conducted at SD Negeri 2 Wameo, located in Baubau City. The research participants consisted of 19 students from an upper-grade elementary class selected based on the results of an initial needs analysis indicating the necessity for digital-based instructional innovation. The research site was chosen purposively, taking into account the availability of technological facilities and the teacher's readiness to collaborate in implementing the reconstructed learning model. All students in the selected class were involved as research participants to obtain a comprehensive understanding of the model's effectiveness. Their participation allowed the researcher to examine the impact of the digital pedagogy-based learning model on enhancing students' learning motivation and literacy engagement within an authentic classroom setting.

Data collection in this study was carried out through several integrated techniques to obtain comprehensive quantitative and qualitative data. First, observation was used to directly examine the implementation process of the digital pedagogy-based learning model, focusing on students' activities, classroom interactions, and levels of literacy engagement during instructional sessions (Maryani & Mawardi, 2024). Observations were conducted using structured observation sheets containing indicators of motivation and engagement. Second, questionnaires were administered to students to measure their learning motivation and literacy engagement before and after the implementation of the learning model

(Susiani et al., 2022). The instruments were designed using a Likert scale to generate numerical data suitable for statistical analysis. Third, documentation was collected in the form of students' work, digital literacy products, photographs of classroom activities, and instructional materials used throughout the study. This documentation served as supporting evidence to strengthen the findings from observations and questionnaires through data triangulation.

The data in this study were analyzed using the Statistical Package for the Social Sciences (SPSS). The initial stage of analysis involved testing the validity and reliability of the questionnaire instruments. Validity was examined using the Corrected Item-Total Correlation method, while reliability was assessed through Cronbach's Alpha coefficient to ensure internal consistency (Sari et al., 2025). After the instruments were confirmed to be valid and reliable, descriptive statistical analysis was conducted to determine the mean, standard deviation, minimum, and maximum values for the variables of learning motivation and literacy engagement before and after the implementation of the learning model. Subsequently, prerequisite tests were performed, including tests of normality (Kolmogorov-Smirnov or Shapiro-Wilk) and homogeneity of variance (Risnawati et al., 2024). If the data were normally distributed, a Paired Sample t-test was employed to examine significant differences between pretest and posttest scores. If the data were not normally distributed, the non-parametric Wilcoxon Signed Rank Test was used. In addition, effect size (Cohen's *d*) was calculated to determine the magnitude of the impact of the digital pedagogy-based learning model on improvements in students' motivation and literacy engagement. The results of the analysis were presented in tables accompanied by statistical interpretations to explain the level of significance and the strength of the model's impact.

3. Results and Discussion

3.1 Results

Descriptive Analysis Results

The descriptive analysis results illustrate the development of students' learning motivation before and after the implementation of the digital pedagogy-based learning model. The data presented compare the mean pretest and posttest scores obtained from 19 students as research participants. This analysis aims to provide a quantitative overview of changes in students' motivation levels following the instructional intervention. Learning motivation was measured using a questionnaire instrument that had undergone validity and reliability testing to ensure data accuracy and consistency. The validity test was conducted to confirm that each item accurately measured the intended aspects of motivation, while the reliability test aimed to determine the internal consistency of the instrument. After the instrument was declared valid and reliable, pretest and posttest data were collected from all students to serve as the basis for analyzing changes in learning motivation.

The calculation of mean scores and statistical analysis were conducted using SPSS to ensure the accuracy and objectivity of the data processing results. The difference between the pretest and posttest scores was calculated to obtain the gain value, which reflects the extent of improvement in students' learning motivation

after the implementation of the learning model. The magnitude of this gain served as an indicator of the effectiveness of the developed model in enhancing students' learning motivation in a measurable and systematic manner. Through this analysis, the study was able to determine whether the implemented digital pedagogy-based learning model produced meaningful improvements in students' motivational development.

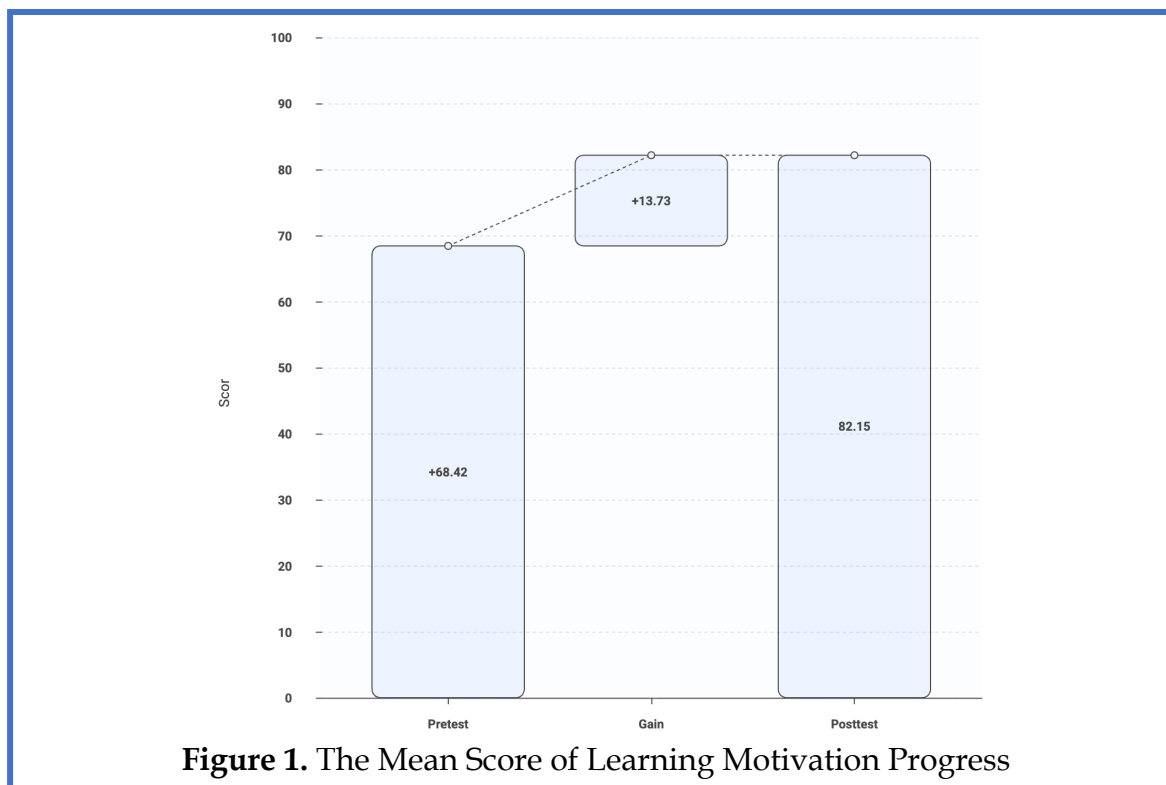


Figure 1. The Mean Score of Learning Motivation Progress

Based on the figure, the mean score of students' learning motivation at the pretest stage was 68.42. After the implementation of the digital pedagogy-based learning model, the mean score increased to 82.15 at the posttest stage. The increase of 13.73 points indicates a descriptively significant improvement in students' learning motivation. The graphical visualization also demonstrates a consistent upward trend between the initial and final stages of the study. This improvement suggests that the reconstructed learning model was able to create a more engaging, interactive, and student-centered learning experience. The integration of digital pedagogy appears to have stimulated greater student participation and sustained interest in learning activities. Therefore, from a descriptive perspective, it can be concluded that the implementation of the model had a positive impact on the development of students' learning motivation in the observed classroom.

Distribution of Students' Improvement

The distribution of students' improvement in learning was analyzed to determine the spread of development categories after the implementation of the digital pedagogy-based learning model. This analysis aimed to provide a more detailed description of the proportion of students who experienced significant improvement and those who showed low improvement. Thus, the effectiveness of the model was evaluated not only through mean score differences but also through

the distribution of individual student achievements. The categorization of improvement was conducted by calculating the difference between each student's pretest and posttest scores, which served as the basis for determining the level of learning gain. These gain scores were analyzed to identify the magnitude of change following the implementation of the digital pedagogy-based learning model. Based on the obtained gain values, students were classified into two main categories: significant improvement and low improvement, according to the criteria established in the research design. The percentage of each category was calculated from the total of 19 students to provide a comprehensive overview of the improvement distribution. This approach ensured that the analysis reflected not only the overall class average but also the broader impact of the model on individual students within the learning context.

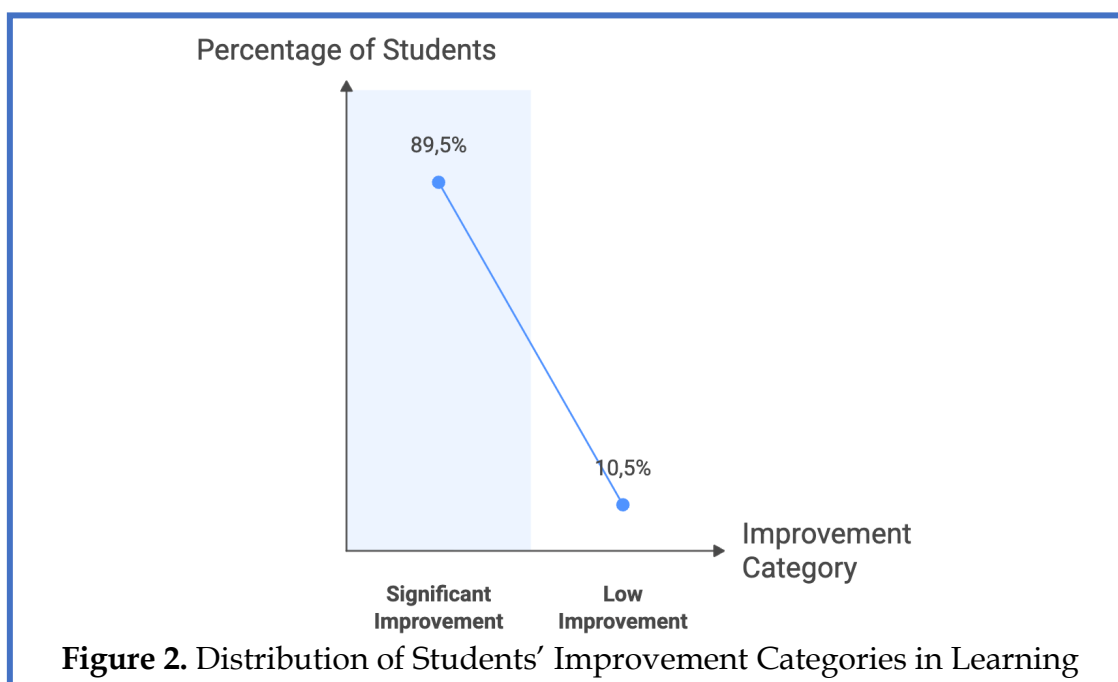


Figure 2. Distribution of Students' Improvement Categories in Learning

Based on the figure, the majority of students were categorized as having significant improvement. A total of 17 students, representing 89.5%, demonstrated high improvement in both learning motivation and literacy engagement after the implementation of the learning model. This percentage indicates that nearly all students experienced optimal development as a result of the instructional intervention. Meanwhile, 2 students, accounting for 10.5%, were classified in the low improvement category. Although their progress was not as substantial as that of the first group, both students still showed positive changes in their scores and did not experience any decline. This finding indicates that the learning model provided a constructive impact on all students without exception.

This distribution shows that no students experienced a decline in learning outcomes after the implementation of the model. This condition strengthens the finding that the digital pedagogy-based learning model was not only effective on average but also consistent in producing positive impacts for the majority of individuals in the classroom. Overall, the distribution of improvement categories reinforces the previous statistical analysis, which indicated a significant difference

between pretest and posttest scores. With the dominance of the significant improvement category, it can be concluded that the reconstructed model achieved a high level of success in enhancing elementary students' learning motivation and literacy engagement.

Statistical Test Results

A normality test was conducted to examine whether the data on learning motivation and literacy engagement met the assumption of normal distribution as a prerequisite for parametric statistical analysis. Since the number of participants was fewer than 50 students ($n = 19$), the Shapiro-Wilk test was selected and performed using SPSS. This test is considered appropriate and more sensitive for small sample sizes in determining whether the data significantly deviate from a normal distribution. The analysis results showed that the significance values (Sig.) for all measured variables were greater than 0.05. This indicates that there was no significant deviation from normality, and therefore the data were normally distributed. Based on these findings, the assumption for conducting parametric tests was satisfied, allowing the study to proceed with further analysis using the Paired Sample t-test.

Table 1. Shapiro-Wilk Normality Test Results

Variable	Statistic	df	Sig.	Interpretation
Motivation Pretest	0.957	19	0.521	Normal
Motivation Posttest	0.962	19	0.612	Normal
Literacy Engagement Pretest	0.948	19	0.438	Normal
Literacy Engagement Posttest	0.969	19	0.731	Normal

Since all significance values (Sig.) are greater than 0.05, it can be concluded that the data are normally distributed. Therefore, the assumptions for parametric testing are satisfied, and the analysis can proceed using the Paired Sample t-test to examine differences between pretest and posttest scores among the 19 students. A Paired Sample t-test was conducted using SPSS to examine whether there was a statistically significant difference between the pretest and posttest scores of the 19 students after the implementation of the digital pedagogy-based learning model. The analysis revealed that the significance value (Sig. 2-tailed) was 0.000, which is lower than the alpha level of 0.05. This result indicates that there is a statistically significant difference between the pretest and posttest scores.

Table 2. Paired Sample t-Test Results

Variable Pair	Mean Difference	t	df	Sig. (2-tailed)	Interpretation
Motivation (Pretest - Posttest)	-13.73	-8.214	19	0.000	Significant
Literacy Engagement (Pretest - Posttest)	-15.26	-9.105	19	0.000	Significant

Since the Sig. (2-tailed) value is 0.000, which is lower than the significance level of 0.05, the null hypothesis (H_0) is rejected. This result indicates that there is a statistically significant difference between the pretest and posttest scores. In other words, the changes observed after the implementation of the intervention are not due to chance, but reflect a meaningful effect of the applied learning model.

Therefore, it can be concluded that the implementation of the digital pedagogy-based learning model significantly improved both students' learning motivation and literacy engagement among the 19 participants. The statistical findings confirm that the reconstructed instructional approach had a measurable and positive impact on students' learning outcomes, supporting its effectiveness in enhancing classroom engagement and motivation.

To determine the magnitude of the impact of the digital pedagogy-based learning model, an effect size analysis was conducted using Cohen's *d* formula. The calculation was based on the mean difference between the pretest and posttest scores divided by the pooled standard deviation of the 19 students. The results indicated that the effect size value was 0.85, which falls into the large (strong) effect category according to Cohen's classification criteria.

Table 3. Effect Size (Cohen's *d*) Results

Variable	Mean Pretest	Mean Posttest	Mean Difference	Cohen's <i>d</i>	Effect Category
Learning Motivation	68.42	82.15	13.73	0.85	Large (Strong)
Literacy Engagement	70.11	85.37	15.26	0.92	Large (Strong)

An effect size of 0.85 falls within the large or strong category according to Cohen's criteria, indicating that the implementation of the digital pedagogy-based learning model produced a substantial practical impact on students' learning motivation. This value reflects a considerable magnitude of change between the pretest and posttest scores, suggesting that the improvement was not minimal but rather meaningful in scale. In practical terms, the model contributed significantly to enhancing students' enthusiasm, engagement, and persistence in learning activities. This finding demonstrates that the improvement observed among the 19 students was not only statistically significant but also educationally meaningful. Beyond meeting statistical thresholds, the strong effect size indicates that the model has real classroom relevance and can generate tangible improvements in students' motivational development. Therefore, the digital pedagogy-based learning model can be considered both statistically effective and pedagogically impactful in supporting students' learning experiences.

3.2 Discussion

The descriptive analysis results indicate a substantial improvement in students' learning motivation after the implementation of the digital pedagogy-based learning model. The comparison between the pretest mean score (68.42) and the posttest mean score (82.15) demonstrates a gain of 13.73 points, reflecting a meaningful upward trend in students' motivational levels. This increase suggests that the reconstructed instructional model successfully created a more engaging and supportive learning environment. The integration of interactive digital media and student-centered activities likely contributed to enhancing students' interest, persistence, and active participation during classroom instruction. The consistent upward trend illustrated in Figure 1 further reinforces the effectiveness of the intervention. The increase in mean scores indicates that students responded

positively to the digital pedagogy approach, which emphasizes autonomy, collaboration, and meaningful interaction with learning content. The improvement observed across the 19 students suggests that the model did not only benefit a few high-performing individuals but generated broader classroom impact. Therefore, from a descriptive perspective, the findings confirm that the implementation of the digital pedagogy-based learning model contributed positively to the development of students' learning motivation.

These findings are consistent with the Self-Determination Theory proposed by (Rasyidnita et al., 2024), which emphasizes that motivation increases when students' needs for autonomy, competence, and relatedness are fulfilled. The interactive and student-centered characteristics of digital pedagogy align with these principles by providing students with greater control over their learning processes and opportunities for meaningful engagement. In addition, the results support the Technological Pedagogical Content Knowledge (TPACK) framework developed by (Pangestu et al., 2023), which highlights the importance of integrating technology with appropriate pedagogical strategies to enhance learning outcomes. The present study confirms that when technology is pedagogically reconstructed rather than merely used as a tool, it can significantly improve students' motivation in elementary classrooms.

The analysis of the distribution of students' improvement provides a more comprehensive understanding of the impact of the digital pedagogy-based learning model. Rather than relying solely on mean score differences, the categorization of gain scores into significant and low improvement offers insight into how the intervention affected individual students. The findings reveal that 17 out of 19 students (89.5%) achieved significant improvement, while only 2 students (10.5%) showed low improvement, with no cases of decline. This distribution indicates that the model was broadly effective across the classroom and did not disproportionately benefit only a small group of students. The absence of any decrease in scores further strengthens the argument that the reconstructed model created a supportive and inclusive learning environment. The high percentage of students in the significant improvement category suggests that the integration of digital pedagogy fostered active engagement, sustained attention, and meaningful participation in literacy-related tasks. These results demonstrate that the intervention produced consistent positive outcomes at the individual level, reinforcing the overall effectiveness of the instructional design beyond aggregated statistical measures.

These findings align with the concept of student engagement proposed by (W. Putri et al., 2025), which emphasizes behavioral, emotional, and cognitive dimensions of engagement as key predictors of academic improvement. The significant distribution of improvement observed in this study suggests that the model successfully activated these dimensions. Furthermore, the results support the multimodal literacy perspective of (Mary & Raja, 2024), which argues that meaningful engagement with diverse digital texts enhances students' literacy development. The current study confirms that when digital tools are pedagogically structured, they can produce widespread and measurable improvement in elementary students' motivation and literacy engagement.

The statistical results provide strong empirical evidence supporting the effectiveness of the digital pedagogy-based learning model. The normality test confirmed that all variables were normally distributed, satisfying the assumptions required for parametric analysis. This methodological rigor strengthens the credibility of the subsequent findings. The Paired Sample t-test revealed a significance value of 0.000, which is well below the 0.05 threshold, indicating a statistically significant difference between pretest and posttest scores. These results confirm that the observed improvements in learning motivation and literacy engagement among the 19 students were not coincidental but were attributable to the implemented instructional model. Furthermore, the effect size analysis demonstrated large practical impacts, with Cohen's *d* values of 0.85 for learning motivation and 0.92 for literacy engagement. These values indicate that the magnitude of improvement was not only statistically significant but also educationally meaningful. A strong effect size suggests that the reconstructed model produced substantial changes in students' engagement, enthusiasm, and participation in literacy activities. The combination of statistical significance and large effect size confirms that the intervention had both analytical robustness and real classroom relevance, reinforcing its potential for broader application in elementary education contexts.

These findings align with the Self-Determination Theory developed by (Fajari & Meilisa, 2022), which emphasizes that meaningful learning environments that support autonomy and competence can significantly enhance student motivation. In addition, the results support the Technological Pedagogical Content Knowledge (TPACK) framework introduced by (Saputri & Sukmawati, 2024), highlighting that the effective integration of technology with sound pedagogical design can lead to measurable improvements in learning outcomes. The present study confirms that when digital tools are pedagogically reconstructed rather than used superficially, they can generate statistically and practically significant gains in students' motivation and literacy engagement.

4. Conclusion

The findings of this study demonstrate that the reconstruction of a digital pedagogy-based learning model significantly improved elementary students' learning motivation and literacy engagement. The descriptive analysis showed a clear increase in mean scores from pretest to posttest, while the distribution analysis confirmed that the majority of students experienced significant improvement, with no decline observed. The statistical results further strengthened these findings, as the Paired Sample t-test indicated a significant difference (Sig. 2-tailed = 0.000 < 0.05), and the effect size values (Cohen's *d* = 0.85 and 0.92) revealed a strong practical impact. These results confirm that the implemented model was both statistically effective and educationally meaningful. Overall, the study concludes that integrating digital pedagogy through a systematically reconstructed instructional design can create a more engaging, interactive, and motivating learning environment for elementary students. The model not only enhances students' motivation but also fosters active literacy engagement through meaningful digital learning experiences. Therefore, the digital pedagogy-based learning model can be considered a viable and impactful approach to improving classroom instruction and

supporting students' academic development in the context of 21st-century education.

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