

Development of an Engaging and Effective Digital Learning Model for Fifth-Grade Students at Private Elementary School RK 2

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Kata Kunci

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Keywords

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Interactive Learning
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Abstrak

Penelitian ini bertujuan untuk mengembangkan model pembelajaran digital yang menarik dan efektif untuk meningkatkan hasil belajar siswa kelas V di SD Swasta RK 2. Model pembelajaran yang dikembangkan menggunakan pendekatan berbasis aktivitas interaktif melalui platform digital sederhana seperti video animasi, kuis online, dan lembar kerja digital yang terintegrasi dalam modul pembelajaran tematik. Penelitian dilakukan dengan metode pengembangan (R&D) yang meliputi tahap analisis kebutuhan, desain model, validasi ahli, uji coba awal, dan revisi akhir. Subjek penelitian terdiri dari 30 siswa kelas V di SD Swasta RK 2. Pengumpulan data dilakukan melalui observasi, tes hasil belajar, dan angket respon siswa. Hasil penelitian menunjukkan bahwa model pembelajaran digital yang dikembangkan mampu meningkatkan partisipasi, motivasi, dan pemahaman belajar siswa secara signifikan. Respon positif dari siswa dan guru juga menunjukkan bahwa model ini mudah diterapkan dan sesuai dengan kebutuhan sekolah. Dengan demikian, model pembelajaran digital ini dapat menjadi inovasi strategis dalam mendukung transformasi pendidikan berbasis teknologi di SD Swasta RK 2 dan sekolah sejenis.

Abstract

This study aims to develop an engaging and effective digital learning model to improve the learning outcomes of fifth-grade students at RK 2 Private Elementary School. The developed model applies an interactive activity-based approach using simple digital platforms such as animated videos, online quizzes, and digital worksheets integrated into thematic learning modules. The research was conducted using a development (R&D) method including needs analysis, model design, expert validation, preliminary trials, and final revision. The research subjects consisted of 30 fifth-grade students from RK 2 Private Elementary School. Data were collected through observation, achievement tests, and student response questionnaires. The results showed that the developed digital learning model significantly improved student participation, motivation, and understanding. Positive responses from both students and teachers indicated that the model is easy to implement and suitable for the school's educational needs. Therefore, this digital learning model can serve as a strategic innovation to support technology-based educational transformation at RK 2 Private Elementary School and similar institutions.

1. Introduction

The rapid advancement of technology has significantly impacted various sectors, including education. In today's digital era, conventional teaching methods are gradually shifting toward more innovative, technology-based learning models. At the elementary school level particularly in private institutions such as RK 2 Private Elementary School there is a growing need to adapt teaching strategies to meet the demands of the times. Digital learning offers a relevant solution through the integration of interactive media that can enhance students' motivation, engagement, and learning outcomes. However, the implementation of digital learning at the elementary level remains limited, both in terms of content and pedagogical approaches appropriate for young learners.

The development of the digital learning model in this study is grounded in several key theoretical foundations, with Constructivist Learning Theory serving as the primary framework. According to constructivist theory, learning is an active process in which learners construct new understanding based on their existing knowledge and experiences (Piaget, 1970; Vygotsky, 1978). This perspective emphasizes the importance of student-centered learning environments where learners are encouraged to explore, interact, and reflect on their learning experiences. In line with this theory, digital learning tools such as interactive videos, online quizzes, and multimedia worksheets provide opportunities for students to actively engage with the content, collaborate with peers, and construct meaning through exploration and problem-solving. The role of the teacher shifts from being a knowledge transmitter to a facilitator who guides students in building their understanding, aligning with the principles of constructivism that support meaningful and contextual learning experiences.

Complementing the constructivist approach, this study incorporates the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006). TPACK provides a

comprehensive model for understanding the complex interplay between three core knowledge domains: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). For effective digital learning implementation, teachers must possess not only subject matter expertise and instructional strategies but also the ability to integrate technology meaningfully into their teaching practices. This framework ensures that the developed digital learning model considers teachers' technical competencies and provides appropriate support for seamless technology integration in elementary classrooms.

Additionally, the Substitution, Augmentation, Modification, and Redefinition (SAMR) model by Puentedura (2006) serves as a guiding framework for evaluating the level of technology integration in the proposed learning model. The SAMR model helps distinguish between using technology as a direct tool substitute (Substitution and Augmentation) versus transforming learning experiences through technology-enabled redesign (Modification and Redefinition). This study aims to develop a digital learning model that moves beyond simple substitution toward meaningful modification and redefinition of traditional learning activities, thereby enhancing student engagement and learning outcomes through innovative technological applications.

The integration of these theoretical frameworks ensures that the digital learning model is not only pedagogically sound but also technologically appropriate and transformative in nature. Moreover, the integration of technology in education should not only focus on delivering content but also on fostering critical thinking, creativity, and collaboration among students—key components emphasized in constructivist pedagogy. Therefore, the digital learning model developed in this study is designed to encourage active participation, peer interaction, and self-directed learning, all of which are central to the constructivist approach. In addition to these theoretical foundations, this study also draws upon insights from recent literature on digital learning in elementary education, which has shown that digital media such as animated videos, online quizzes, and digital worksheets can improve conceptual understanding through visual and interactive means (Wijaya & Suryadi, 2019; Lestari & Prayitno, 2021). However, many existing digital learning models have not been specifically tailored for elementary learners or failed to consider teachers' technical competencies and available technological infrastructure.

Several recent studies have indicated that the use of digital media such as animated videos, online quizzes, and digital worksheets can improve conceptual understanding through visual and interactive means (Wijaya & Suryadi, 2019; Lestari & Prayitno, 2021). Nonetheless, many existing digital learning models have not been specifically designed for elementary education or fail to consider teachers' technical competencies and the availability of technological infrastructure in schools. Therefore, there is a need to develop a digital learning model that is simple, engaging, and easy to implement for teachers in real classroom settings.

The significance of this study lies in the development of a digital learning model tailored to the characteristics of Grade 5 students, specifically at RK 2 Private Elementary School. This model has the potential to serve as an alternative solution to enhance the quality of learning amid the challenges of educational transformation driven by technology. The justification for publication is grounded in the importance of sharing innovative digital learning practices that can be replicated by other schools, particularly those with limited technological resources.

Thus, incorporating constructivist principles, TPACK framework, and SAMR model into the design of the digital learning model ensures that it supports not only cognitive development but also motivation and engagement among Grade 5 students. By aligning instructional strategies with how children naturally learn and considering the technological-pedagogical-content intersections, this model aims to create a more effective and meaningful learning experience that is both engaging and adaptable to real classroom conditions.

The research hypothesis posits that the implementation of the developed digital learning model will positively influence students' motivation, participation, and learning outcomes compared to conventional teaching methods. The objective of this study is to design, test, and evaluate a digital learning model that is effective, engaging, and feasible for use in Grade 5 elementary classrooms, particularly at RK 2 Private Elementary School.

2. Method

This study employed a Research and Development (R&D) approach to develop a digital learning model based on interactive activities specifically designed for Grade 5 students at RK 2 Private Elementary School. The development process consisted of five key stages: (1) needs analysis, (2) initial

model design, (3) expert validation and revision, (4) field testing, and (5) final evaluation.

During the needs analysis stage, interviews with Grade 5 teachers and direct classroom observations were conducted over a three-week period to assess the real conditions of the learning process and identify challenges in implementing technology in the classroom. Additionally, a questionnaire was administered to 30 students to explore their interests and learning habits related to digital media.

The model design stage involved the development of a thematic digital learning module integrated with animated videos, online quizzes (via Google Forms), and digital worksheets (using Google Slides). The design was based on principles of interactive learning and aligned with the 2013 national curriculum.

The developed model was then validated by three expert validators: two in primary education and one in digital instructional media. The validation process assessed the content, language, visual design, and age appropriateness. Revisions were made based on feedback from the validators before proceeding to field testing.

In the field testing phase, the model was implemented with 30 Grade 5 students over a four-week period. Instructional sessions were conducted twice per week, each lasting 60 minutes. Data were collected using three instruments: (1) observation of student participation during learning activities, (2) pretest-posttest assessments to measure improvements in learning outcomes, and (3) student response questionnaires evaluating the model.

The pretest and posttest data were analyzed using a paired sample t-test to determine whether there were statistically significant differences in student learning outcomes before and after the implementation of the model, using a significance level of $\alpha = 0.05$. Observational and questionnaire data were analyzed descriptively to evaluate student engagement and perceptions of the digital learning model.

The research procedures were designed to be easily replicable by other researchers. The R&D method was adapted from the model proposed by Borg & Gall (1983), with modifications in the field testing phase to accommodate local context and technological infrastructure available at the school.

3. Results and Discussion

3.1. Results

The findings indicate that the digital learning model based on interactive activities had a significant impact on improving students' learning outcomes, while also enhancing their participation and motivation to learn. These conclusions are supported by both quantitative (pretest–posttest scores) and qualitative (observations and student response questionnaires) analyses conducted following a four-week implementation period.

Quantitative Results: Improvement in Learning Outcomes

The comparison of pretest and posttest results from 30 students revealed a substantial increase in academic performance. Statistical analysis using a paired sample t-test showed a calculated t-value of 7.42 with a p-value < 0.001 , indicating that the difference was statistically significant at the 95% confidence level ($\alpha = 0.05$).

Table 1. Pretest and Posttest Mean Scores of Grade 5 Students

Assesment	Mean Score	Standar Deviasi
Pretest	62.3	8.5
Posttest	83.1	7.2
Difference	+20,8	-

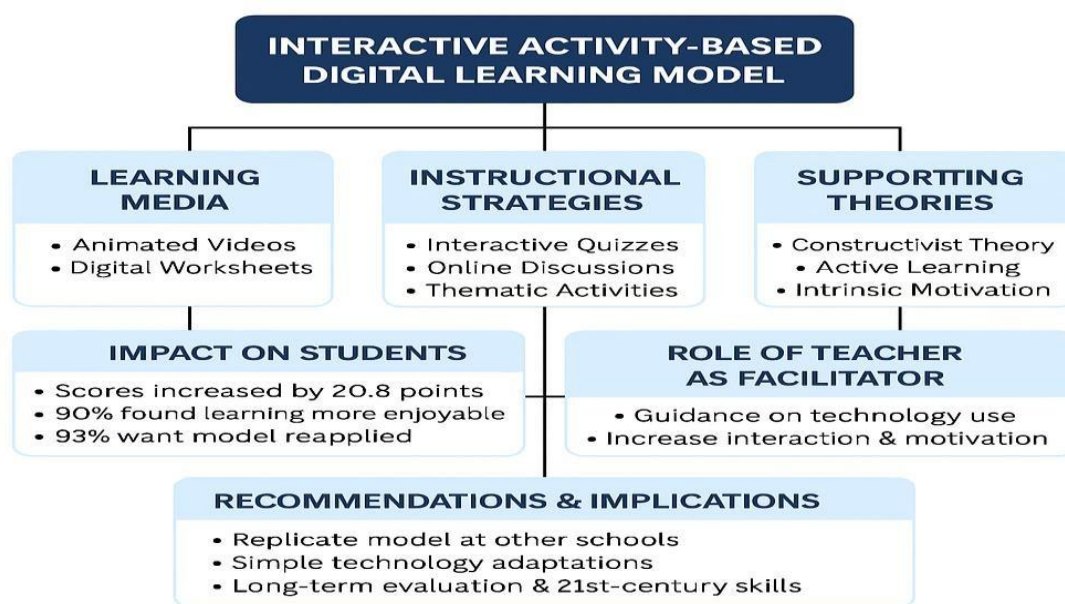
The average increase of 20.8 points indicates that learning through interactive digital media contributed positively to students' understanding of thematic material.

Qualitative Results: Student Participation and Feedback

Observation during the implementation phase indicated high levels of student engagement. More than 85% of students actively participated in online quizzes and discussions based on the animated video content. Most students completed digital worksheets enthusiastically and on time. Questionnaire responses further confirmed these findings:

- 90% of students reported that learning was more enjoyable compared to previous methods.
- 87% of students stated that it was easier to understand the material using digital media.
- 93% expressed interest in using the model again for other subjects.

Figure 1. Conceptual Map of the Learning Model



3.2. Discussion

These findings directly address the research objective, which was to develop and test the effectiveness of an interactive digital learning model for elementary school students. The significant improvement in learning outcomes demonstrates that pedagogically designed digital media can provide more meaningful learning experiences—especially at the elementary level, where visualization and engagement are crucial. The learning gains can be interpreted through the lens of constructivist theory, in which students understand concepts more effectively through active and interactive learning experiences. Animated videos served as cognitive stimuli, while online quizzes and digital worksheets reinforced concept retention and mastery.

This model aligns with the findings of Haryono et al. (2023), who emphasized that digital activity-based learning accelerates elementary students' understanding of thematic curricula. Similarly, Putri & Wahyuni (2022) noted that the integration of simple technologies can enhance learning outcomes, even in contexts with limited infrastructure. The high level of student engagement observed suggests that interactive learning is more effective in maintaining students' attention than traditional teaching methods. This is consistent with the study by Amin & Rachmawati (2021), which concluded that technology-based activities strengthen students' intrinsic motivation.

Nevertheless, student engagement was significantly influenced by the teacher's role as a facilitator who could effectively guide the use of digital media. A key limitation of this study lies in its narrow scope it was conducted at a single school and involved only one grade level. Moreover, the four-week implementation period did not allow for evaluation of the long-term effects of the learning model. Another challenge concerns the dependence on school technology readiness and teachers' digital competencies, which may hinder broader implementation.

The implications of this study suggest that digital learning transformation at the elementary level

can be conducted gradually and effectively through the design of simple yet meaningful activities. This model can be replicated in other schools, particularly those with limited access to technology, provided that adaptations are made to meet local needs. Future research should consider developing adaptive models based on individual learning data, expanding the scale of implementation, and examining the model's impact on 21st-century skills such as collaboration and problem-solving.

3.3. Conclusion

This study concludes that the interactive activity-based digital learning model developed systematically through a Research and Development (R&D) approach has proven effective in improving learning outcomes, participation, and motivation among fifth-grade students at SD Swasta RK 2. The integration of media such as animated videos, online quizzes, and digital worksheets within a thematic module successfully created engaging and meaningful learning experiences. These findings highlight the importance of instructional design that emphasizes active student engagement through simple yet contextual digital media. Based on these results, it is recommended that primary schools begin adopting similar approaches to support a gradual transformation toward technology-based learning. Future research is encouraged to examine the effectiveness of this model on a broader scale and to evaluate its impact on the development of 21st-century skills.

Author Contributions

Natasya Delila Theresia: Conceptualization, Data curation, Methodology, Investigation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing, Supervision, Project administration.

The author declares that all contributions to this research and the writing of the manuscript were carried out independently. The author has read and approved the final manuscript.

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Declaration of Conflicting Interests

The author declares that there are no financial or non-financial conflicts of interest that could have inappropriately influenced the results of this research and the writing of this article. The author has no professional, financial, or personal relationships with any individuals or organizations that could be perceived as having a potential conflict of interest related to this work.

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