

Enhancing Elementary Students' Learning Interest Through AI-Driven Canva Learning Tools: Evidence from a Pre-Experimental Study

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Abstract: *This study investigates the effectiveness of an AI-driven Canva learning tool in enhancing elementary students' learning interest within a pre-experimental pretest-posttest design. Twenty-five Grade 5 students from SD Baitul Amien Jember participated in a two-week intervention consisting of six sessions that integrated adaptive learning systems, personalized feedback, visual learning design, and gamified tasks. Learning interest was measured using a validated 20-item questionnaire covering attention, curiosity, persistence, enjoyment, engagement, and relevance. Descriptive statistics show a substantial improvement from the pretest ($M = 44.08$, $SD = 8.37$) to the posttest ($M = 81.84$, $SD = 6.26$). The paired sample t-test confirmed a highly significant effect, $t(24) = -15.611$, $p < .001$, with a very large effect size (Cohen's $d = 3.12$). These findings demonstrate that AI-driven Canva learning tools meaningfully enhance students' learning interest by providing adaptive, visually rich, and personalized learning experiences. The study contributes empirical evidence to the growing field of AI-supported learning in primary education and highlights the need for teacher digital-pedagogy readiness and adequate technological infrastructure to ensure effective AI integration.*

Keywords: Artificial Intelligence (AI); AI-driven learning; Canva-based learning; learning interest; student engagement; digital learning applications

Abstrak: *Penelitian ini mengkaji efektivitas alat belajar berbasis AI Canva dalam meningkatkan minat belajar siswa sekolah dasar dalam desain pra-eksperimental pra-tes-pasca-tes. Dua puluh lima siswa kelas 5 dari SD Baitul Amien Jember mengikuti intervensi selama dua minggu yang terdiri dari enam sesi yang mengintegrasikan sistem pembelajaran adaptif, umpan balik personal, desain pembelajaran visual, dan tugas-tugas yang digamifikasi. Minat belajar diukur menggunakan kuesioner valid berisikan 20 item yang mencakup perhatian, rasa ingin tahu, ketekunan, kesenangan, keterlibatan, dan relevansi. Statistik deskriptif menunjukkan peningkatan yang signifikan dari pra-tes ($M = 44,08$, $SD = 8,37$) ke pasca-tes ($M = 81,84$, $SD = 6,26$). Uji t sampel berpasangan mengonfirmasi efek yang sangat signifikan, $t(24) = -15,611$, $p < 0,001$, dengan ukuran efek yang sangat besar (Cohen's $d = 3,12$). Temuan ini menunjukkan bahwa alat pembelajaran Canva yang*

didukung AI secara berarti meningkatkan minat belajar siswa dengan menyediakan pengalaman pembelajaran yang adaptif, kaya visual, dan personal. Studi ini memberikan bukti empiris bagi bidang pembelajaran yang didukung AI dalam pendidikan dasar dan menyoroti kebutuhan akan kesiapan digital-pedagogi guru serta infrastruktur teknologi yang memadai untuk memastikan integrasi AI yang efektif.

Kata kunci: Kecerdasan Buatan (AI); Pembelajaran berbasis AI; Pembelajaran berbasis Canva; Minat belajar; Keterlibatan siswa; Aplikasi pembelajaran digital

Introduction

Rapid advancements in Artificial Intelligence (AI) are reshaping educational practices by introducing adaptive, interactive, and personalized learning environments across various levels of schooling. In elementary education, learning interest is particularly crucial because it shapes students' attention, engagement, persistence, and long-term academic development. Research indicates that early learning motivation has a significant predictive value for students' later academic success and engagement trajectories (Hidi & Renninger, 2019; Schunk & DiBenedetto, 2020). However, many elementary classrooms still struggle to sustain student interest in learning due to the limited use of engaging and student-centered learning tools (Hilmiyah, Muhith, et al., 2025).

International assessments consistently report that Indonesian students exhibit relatively low levels of learning engagement. Results from the Programme for International Student Assessment (PISA) show that Indonesia scores significantly below the OECD average in indicators related to student engagement, including perseverance, interest, and participation during learning activities (OECD, 2021, 2024). These findings indicate that many students struggle to maintain focus and actively participate in classroom tasks.

Empirical studies at the national level reinforce this pattern. Research Udin & Arfanaldy, (2025) found that elementary school students in Indonesia often show limited active involvement when learning relies heavily on teacher-centered approaches. Similar findings reported by Sumardi et al., (2020) highlight that low engagement is frequently associated with monotonous instructional methods and the lack of stimulating learning media. Studies focusing on digital and visual learning tools further demonstrate that interactive, technology-supported platforms significantly increase students' participation and motivation in primary classrooms (Alasmari et al., 2025; Velmurugan et al., 2025).

The integration of AI-based technologies offers a promising solution to these challenges. Among teachers who use AI, some 73% report leveraging it to efficiently learn about and summarise topics, and 69% use it to generate lesson plans (OECD, 2025; Sabharwal & Mitra, 2024). AI-driven learning tools can increase learners' motivation and engagement by providing personalized feedback, adaptive content, and supportive scaffolding (Chen et al., 2020; Holmes et al., 2019). Canva known initially as a visual design platform, has recently incorporated AI-driven features such as Magic Write, Text-to-Image generation, adaptive layout recommendations, and automated visual scaffolding. These features enable teachers to design instructional materials that are visually rich, responsive, and tailored to the diverse learning needs of students. Visual learning design supported by AI has been shown to enhance attention, cognitive processing, and motivational engagement among younger learners (Shopova & Dimitrov, 2025; Sung et al., 2016).

Theoretical perspectives further support the pedagogical value of AI-enhanced visual learning tools. Keller's ARCS motivational model emphasizes that attention, relevance, confidence, and satisfaction are foundational components for fostering learning interest. AI-supported visual design can attract attention through novelty, ensure relevance through personalized content, build confidence through structured scaffolding, and provide satisfaction through creative and interactive tasks (Keller, 1987). Likewise, Self-Determination Theory (SDT) posits that autonomy, competence, and relatedness are crucial elements for promoting intrinsic motivation (Ryan & Deci, 2020). AI-driven Canva tools allow learners to exercise autonomy in design choices, develop competence through guided AI support, and connect with peers during collaborative creation activities.

Although research on AI in education has grown rapidly, most studies have focused on secondary or higher education contexts. Prior research has shown that AI-supported platforms enhance motivation, engagement, and learning outcomes (Hwang et al., 2020; Zawacki-Richter et al., 2019). However, studies involving elementary school students remain limited and often rely on traditional multimedia tools rather than AI-driven visual design applications (Slamet et al., 2025); Patty & Lekatompessy, 2024). Empirical evidence on the use of AI-driven Canva learning tools specifically in primary education is still scarce. This gap is important because technological integration in early education must consider developmental appropriateness, intuitive interfaces, and visually based cognitive support.

Therefore, this study aims to investigate the effect of AI-driven Canva learning tools on elementary students' learning interest using a pre-experimental pretest-posttest design. The novelty of this study lies in: (1) employing AI-enhanced Canva features specifically in a primary school context, (2) measuring multiple validated indicators of learning interest, including attention, curiosity, persistence, enjoyment, engagement, and relevance, and (3) providing empirical evidence of AI-assisted learning implemented directly in real classroom settings in an Indonesian elementary school.

This research contributes to the growing body of AI-in-education scholarship by offering insights into the potential of AI-supported visual learning design to enhance learning interest at the foundational level. The findings are expected to inform instructional design, teacher professional development, and educational technology policy, aiming to create more adaptive, engaging, and student-centered learning environments in the era of AI-driven education.

Method

1. Research Design

This study employed a quantitative pre-experimental design using a one-group pretest-posttest model. This design was selected to measure changes in elementary students' learning interest before and after the use of AI-driven Canva learning tools. The structure of the design is represented as follows:

$$O_1 \rightarrow X \rightarrow O_2$$

Where O_1 represents the pretest, X the intervention using AI-driven Canva learning tools, and O_2 the posttest. This approach allows for the examination of treatment effects within the same group, providing preliminary causal evidence suitable for exploratory educational technology research.

2. Participants

The participants were 25 Grade 5 students from SD Baitul Amien Jember, selected through purposive sampling. This grade level was chosen because students at this developmental stage begin to show more stable motivational patterns, making them appropriate for examining learning interest. All students participated voluntarily with permission from the school and classroom teacher.

3. Instruments

Students' learning interest was measured using a 20-item Learning Interest Questionnaire developed based on established motivational indicators: attention, curiosity, persistence, enjoyment, engagement, and relevance. Items were rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Tabel 1. Indicators of Students' Learning Interest

Indicator	Operational Description	Example Questionnaire Items (Likert 1-5)
Attention	The extent to which students show focus, initial interest, and readiness to participate in learning activities using the AI Canva application.	"I feel more focused and interested when learning with the AI Canva based application."
Curiosity	The degree to which students demonstrate a desire to explore the material further, try new features, and ask questions when using the AI Canva platform.	"I want to learn more about the topic when using the AI Canva application."
Persistence	Students' willingness to continue working on tasks despite difficulty, and their tendency not to give up when using the AI Canva application.	"I keep working on the exercises even when the questions are difficult."
Enjoyment	Students' feelings of pleasure, enthusiasm, and comfort during AI-supported learning sessions.	"I enjoy learning when using the A Canva based application."
Engagement	The level of active participation, responsiveness to instructions, and involvement in using AI Canva features during learning.	"I am actively involved in all learning activities provided in the AI application."
Relevance	Students' perception that the AI-supported learning activities are meaningful and help them understand the content.	"Learning with the AI application helps me understand the material more easily."

4. Validity and Reliability

The instrument underwent expert validation by two specialists in educational technology. Empirical validation using Pearson Product Moment showed all items exceeding the minimum validity threshold ($r > 0.30$). Reliability analysis yielded a Cronbach's Alpha of 0.91, indicating excellent internal consistency.

5. Procedure

The study was conducted over two weeks and consisted of six instructional sessions, each lasting approximately 80 minutes.

- Pretest (O_1): Students completed the Learning Interest Questionnaire to capture baseline motivational levels prior to the intervention.
- Intervention (X): Students engaged with AI-driven Canva learning tools during thematic lessons. AI features used included adaptive layout suggestions, personalized content generation, visual scaffolding, and gamified tasks. Activities followed a structured sequence:

- 1) teacher introduction to lesson objectives
- 2) guided navigation of Canva AI features
- 3) completion of individual and small-group adaptive tasks
- 4) reflection and teacher feedback

The system provided automated difficulty adjustment and instant feedback to support personalized learning pathways.

- c. Posttest (O₂): After the sixth session, students completed the same questionnaire to assess changes in learning interest.

To ensure implementation fidelity, the classroom teacher received a one-hour training session on operating Canva AI tools, facilitating learning tasks, and supporting students during the intervention.

6. Data Analysis

Data were analyzed using SPSS 21. Descriptive statistics (mean, minimum, maximum, standard deviation) were applied to summarize pretest and posttest scores. The Shapiro–Wilk test assessed data normality. Since both datasets met the assumption of normality, a Paired Sample t-Test was used to evaluate differences between pretest and posttest scores. The significance level was set at $\alpha = .05$. Additionally, Cohen's *d* was calculated to determine the effect size and practical significance of the intervention.

7. Ethical Considerations

The study was conducted with permission from the school and adhered to ethical standards for research involving children. Students participated with teacher and school approval, and all data were treated confidentially and used solely for research purposes.

Result

1. Descriptive Statistics

Descriptive statistics were used to provide an overview of students' learning interest before and after the AI-driven Canva learning intervention. Table 2 presents the minimum, maximum, mean, and standard deviation values for both measurements.

Table 2. Descriptive Statistics of Students' Learning Interest

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	25	25	60	44.08	8.371
Posttest	25	65	90	81.84	6.263

Based on Table 2, it can be seen that the pretest scores had a minimum value of 24, a maximum value of 60, a mean of 44.08, and a standard deviation of 8.371. Meanwhile, the posttest scores had a minimum value of 65, a maximum value of 90, a mean of 81.84, and a standard deviation of 6.263. These results show that there was a substantial increase in the mean score from pretest to posttest, indicating a positive effect of AI-based learning applications on students' learning interest.

2. Normality Test

The normality test was conducted to determine whether the pretest and posttest data were normally distributed. The Shapiro–Wilk test was used, and the results are shown in Table 3.

Table 3. Shapiro–Wilk Normality Test

	Statistic	df	Sig.
Pretest	0.968	25	0.587
Posttest	0.931	25	0.090

Based on Table 2, the significance value (Sig.) for the pretest was 0.587 and for the posttest was 0.090. Both values were greater than 0.05, indicating that the data were normally distributed. Thus, parametric tests such as the Paired Sample t-Test could be applied for further analysis.

3. Paired Sample t-Test

A paired sample t-test was conducted to determine whether learning interest significantly increased after the intervention using AI-driven Canva learning tools. Table 4 summarizes the results.

Table 4. Paired Sample t-Test Results

Pair	Mean Difference	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	t	df	Sig. (2-tailed)
Pre–Post	-37.760	12.094	2.419	-42.752 to -32.768	-15.611	25	0.000

As shown in Table 3, the mean difference between pretest and posttest was -37.760, with a t-value of -15.611 and a significance level (Sig. 2-tailed) of 0.000, which is less than 0.05. This result indicates that there was a significant difference between the pretest and posttest scores. Therefore, the null hypothesis (H_0) was rejected, and the alternative hypothesis (H_1) was accepted. This means that the use of AI-based learning applications had a significant positive effect on students' learning interest.

Cohen's d was calculated to determine the magnitude of the treatment effect. With $d = 3.12$, the intervention demonstrates a very large effect size, indicating strong practical significance. To visually illustrate the results, Figure 1 presents the comparison of mean pretest and posttest scores, while Figure 2 displays individual score trajectories.

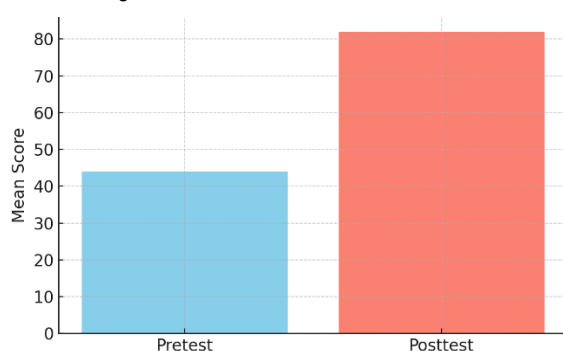


Figure 1. Mean Scores: Pretest vs Posttest

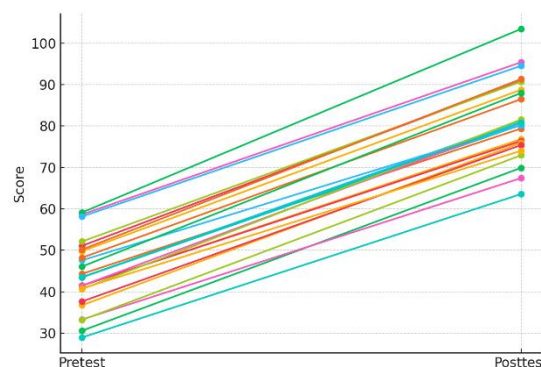


Figure 2. Individual Score Changes from Pretest to Posttest

Both visualizations corroborate the statistical findings: learning interest consistently improved across nearly all participants

4. Summary of Findings

The results demonstrate that:

1. Students' learning interest improved substantially following the AI-driven Canva learning intervention.
2. The increase in mean scores was statistically significant and practically meaningful.
3. The intervention had a positive impact on all indicators of interest, including attention, curiosity, persistence, enjoyment, engagement, and relevance.
4. The very large effect size confirms the strong impact of adaptive, AI-supported, and visually enriched learning experiences on elementary students.

These results provide robust evidence in support of using AI-driven Canva learning tools as an effective pedagogical strategy in primary education.

Discussion

The findings of this study demonstrate a substantial and statistically significant improvement in elementary students' learning interest after the implementation of AI-driven Canva learning tools. The increase in mean scores from 44.08 on the pretest to 81.84 on the posttest, supported by a very large effect size ($d = 3.12$), indicates that the intervention produced strong practical and educational benefits. These results suggest that integrating AI-supported visual learning tools in primary education can meaningfully enhance students' engagement and interest in learning activities.

One possible explanation for these findings is the pedagogical advantage provided by AI-enhanced visual learning design. Canva's AI features, including automated layout structuring, adaptive visual suggestions, text-to-image generation, and instant content personalization, enable teachers to create visually rich, relevant, and responsive learning materials that cater to students' needs ([Shopova & Dimitrov, 2025](#)). According to [Keller, \(1987\)](#) ARCS motivational model, such features directly address the components of attention (novelty and visual appeal), relevance (alignment with students' experiences), Confidence (clear structure and scaffolding), and Satisfaction (completion of meaningful tasks). The significant increase across all learning interest indicators is consistent with [Keller, \(1987\)](#) assertion that instructional design has a strong influence on motivation when it incorporates multimedia, interactivity, and personalized elements.

The findings also align with Self-Determination Theory (SDT), which states that students' intrinsic motivation increases when learning environments support autonomy, competence, and relatedness ([Ryan & Deci, 2020](#)). The AI-driven Canva tool enabled students to exercise autonomy by selecting designs, adjusting layouts, and generating content tailored to their preferences. Competence was fostered through adaptive feedback and user-friendly interfaces that enabled students to complete tasks with increasing mastery. Collaboration features in Canva and the classroom dynamic further promote a sense of relatedness. Together, these factors created a psychologically supportive environment conducive to the development of sustained learning interest ([Alasmari et al., 2025](#); [Velmurugan et al., 2025](#)).

The results of this study are consistent with prior research, which demonstrates that AI-based learning tools improve student motivation, engagement, and learning outcomes. Studies by [Patty & Lekatompessy \(2024\)](#), [Aini et al. \(2024\)](#), and ([Slamet et al., 2025](#)) similarly found that AI-enhanced platforms contribute to higher learning motivation and participation. AI tools can tailor educational content to meet the individual needs of students, enhancing learning effectiveness and engagement

(Umirova et al., 2024). However, most existing studies have focused on secondary or tertiary education. The present study extends the literature by providing empirical evidence from a primary school context, showing that even young learners benefit significantly from AI-assisted visual learning designs. This represents an important contribution because the majority of elementary school studies still rely on traditional multimedia or conventional worksheets without adaptive AI features.

In addition to confirming the effectiveness of the intervention, the findings underscore the importance of integrating AI-driven learning tools into early education. Elementary students generally respond well to visually appealing, interactive, and hands-on activities. The AI-driven Canva tool provided an environment that is consistent with these developmental needs. The large effect size indicates that the intervention not only statistically improved scores but also produced a meaningful and observable change in students' attitudes toward learning. This opens new avenues for leveraging AI technologies to address motivation challenges in primary classrooms, especially in contexts where student engagement is often low.

While these results are encouraging, it is important to recognize some limitations. The lack of a control group in the pre-experimental design makes it challenging to attribute the observed improvements solely to the intervention without considering other external factors. The study was also limited to a single school with a relatively small sample size ($N = 25$), which may limit generalizability. Furthermore, the two-week duration did not examine long-term retention or whether the increase in learning interest persists over time. Future research should adopt quasi-experimental or randomized controlled designs, include larger and more diverse populations, and explore long-term effects through delayed posttests.

Overall, the study contributes meaningful evidence that AI-driven Canva learning tools can effectively enhance learning interest among elementary students. It highlights the pedagogical potential of integrating AI-powered visual design platforms into classroom instruction and supports the growing body of research advocating for AI-assisted learning in early education. These findings can inform teacher training, school technology planning, and curriculum innovation aimed at creating adaptive, engaging, and student-centered learning environments.

Conclusion

This study provides clear evidence that AI-driven Canva learning tools significantly enhance elementary students' interest in learning. The sharp increase in mean scores from 44.08 (pretest) to 81.84 (posttest), supported by a statistically significant t-value ($t(24) = -15.611$, $p < .001$) and a very large effect size ($d = 3.12$), shows that the intervention meaningfully improved students' attention, curiosity, persistence, enjoyment, engagement, and perceived relevance. These findings confirm that AI-supported visual learning environments can effectively stimulate positive learning attitudes in primary education.

The study contributes to existing literature by demonstrating the effectiveness of AI-enhanced visual tools in a primary school setting, an area that remains underrepresented in AI-in-education research. The results highlight the pedagogical potential of integrating AI-driven Canva features to create adaptive, visually rich, and interactive learning experiences. This highlights the importance of enhancing teachers' digital-pedagogical competencies and ensuring sufficient infrastructure to support the implementation of AI-based instructional innovations in elementary classrooms.

Nevertheless, the study has limitations, including the absence of a control group, a relatively small sample size, and a short intervention period, which restrict the generalizability and long-term interpretation of the findings. Future research should expand this work by employing more rigorous experimental designs, involving larger and more diverse student populations, and examining whether the observed improvements in learning interest can be sustained over time. Despite these limitations, the present study provides strong preliminary evidence that AI-driven Canva learning tools can serve as an effective strategy for enhancing learning interest in elementary education.

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