# THE EFFECT OF USING THE CANVA PLAY EDU APPLICATION AS A DIGITAL ASSESSMENT TOOL ON ELEMENTARY SCHOOL SCIENCE LEARNING OUTCOMES

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**Abstract**

The integration of digital technology in education has transformed learning and assessment practices; however, assessment in elementary schools remains largely conventional and less engaging, limiting students' participation and higher-order thinking skills. Although prior studies have examined digital learning media, limited research has specifically explored gamification-based digital assessment tools in improving elementary science learning outcomes. This study aims to analyze the effect of using Canva Play Edu as a digital assessment tool on students' learning outcomes. This study employed a quasi-experimental design with a nonequivalent control group involving 38 fourth-grade students at SDN Kemayoran 02 Bangkalan. Data were collected through pretest and posttest and analyzed using the Shapiro–Wilk test, Mann–Whitney U test, and N-gain analysis. The results showed that the experimental group outperformed the control group, with mean scores of 86.63 and 81.68, respectively ($p < 0.05$). The N-gain score of 0.80 (high category) and N-gain percentage of 80.41% (very effective) indicate a substantial improvement in learning outcomes. These findings suggest that Canva Play Edu is an effective gamification-based digital assessment tool that enhances both learning outcomes and student engagement in elementary science education.

**Keywords**: Digital assessment, Canva Play Edu, science learning outcomes, elementary school, gamification.

## INTRODUCTION

The development of educational technology in the 21st century has brought significant changes to the field of education, both in the learning process and in assessment systems (Apriana et al., 2026)[1]. The use of digital technology enables teachers not only to act as transmitters of information but also as facilitators and learning innovators who can integrate technology effectively

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(Amri Nst et al., 2025)[2]. In this context, one essential competency that teachers must possess is digital literacy, particularly in the use of technology for assessment activities (Sitompul, 2022)[3]. Digital literacy encompasses not only the ability to operate technological devices but also the ability to access, analyze, design, and utilize digital platforms as innovative and effective assessment tools (Nurfadilah, 2022)[4]. Thus, assessment is no longer merely a tool for measuring learning outcomes but also a strategy to enhance student engagement and motivation (Prasetyo, 2020)[5].

Assessment is a crucial component of the learning process as it functions to measure the achievement of learning objectives and provide feedback on students' learning progress (Siahaan, 2020)[6]. However, assessment practices in elementary schools are still largely dominated by conventional methods, such as paper-based written tests, which tend to be monotonous and less engaging for students (Arikunto, 2019)[7]. This condition negatively affects students' motivation and participation, particularly in science subjects that require conceptual understanding and higher-order thinking skills. In fact, learning motivation plays a vital role in determining students' success, as it drives the intensity, direction, and persistence of their learning activities (Sardiman, 2018)[8]. Despite rapid technological advancements, the utilization of digital platforms as assessment tools in classroom practice remains suboptimal. In many cases, assessment activities still rely heavily on conventional approaches that lack variation and fail to create meaningful learning experiences. This issue is influenced by several factors, including limited time for designing digital assessments, insufficient teacher competence in using digital platforms, and a lack of training in technology-based assessment development (Zainuddin, 2021)[9]. Additionally, age-related factors and limited technological proficiency among some educators further hinder the effective implementation of digital platforms. As a result, students tend to show low enthusiasm during assessment activities and often perceive assessment as a monotonous task (Wijaya, 2021)[10].

Based on observations conducted at UPTD SDN Kemayoran 02 Bangkalan, particularly in fourth-grade classrooms, many students showed low motivation and participation during assessment activities. This was indicated by students' lack of enthusiasm in completing tasks and their tendency to feel bored easily. These findings suggest that current assessment practices have not yet succeeded in creating interactive, meaningful learning experiences. Therefore, innovation in assessment implementation is necessary to enhance student engagement and support optimal learning outcomes (Rahmawati, 2021)[11]. Along with technological advancements, various digital platforms have been developed to support more interactive and innovative assessment practices. One platform with strong potential as a digital assessment tool is Canva Play Edu. This platform enables teachers to design

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game-based assessments with visually appealing designs and interactive features that can be adapted to learning materials. Assessments can be presented in the form of interactive quizzes, educational games, and visual activities that encourage active student participation, making the evaluation process more engaging and less stressful.

This study is also supported by several prior empirical findings highlighting the effectiveness of digital media in improving student learning outcomes. A study conducted by Muhtar, Siti, and Dyan (2026)[12], revealed that the use of Canva-based learning media had a positive effect on students' learning outcomes, as indicated by a significant increase between pretest and posttest scores, with data showing normal distribution. In addition, research by Akbar, Burhan, and Susalti (2025)[13] demonstrated that the implementation of digital-based learning media significantly improved elementary students' learning outcomes, where the experimental group outperformed the control group based on hypothesis testing results. However, these studies primarily focus on the use of digital media as instructional tools rather than as structured digital assessment instruments integrated into the evaluation process. Moreover, most existing studies have focused on widely used platforms such as Quizizz and Kahoot, leaving Canva Play Edu, a digital assessment tool, relatively underexplored, particularly in the context of elementary school science learning. This indicates a clear research gap that needs further investigation.

Based on this gap, this study offers novelty by integrating Canva Play Edu, a game-based digital assessment tool, in elementary science learning. This study not only positions the platform as a learning medium but also as an assessment instrument for quantitatively measuring and improving students' learning outcomes. Therefore, this study aims to analyze the effect of using Canva Play Edu as a digital assessment tool on elementary school students' science learning outcomes. The findings of this study are expected to contribute to the development of innovative, interactive, and effective digital assessment strategies, as well as to enhance the quality of learning in elementary education.

## RESEARCH METHODS

This study employed a quantitative approach with an experimental method, specifically a quasi-experimental design. The design used was the nonequivalent control group design, which involves two groups that are not randomly assigned, namely the experimental group and the control group (Anantasia & Sulastri, 2025)[14]. These groups were given different treatments to determine the effect of using a digital assessment tool on students' learning outcomes. In this design, both groups were administered a pretest to assess their initial abilities, followed by the treatment in the experimental group, and concluded with a posttest in both groups to identify differences in learning outcomes after the treatment (Hastjarjo, 2019)[15]. This research was conducted at SDN Kemayoran 02 Bangkalan, located at Jl. Moh. Toha, Kemayoran, Bangkalan District, Bangkalan Regency, East Java. The subjects of this study were fourth-grade students from two classes, namely class IV-A and IV-B, each with 19 students, resulting in a total sample of 38 students. The sampling technique used was purposive sampling, which involves selecting samples based on specific considerations, in this case,

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the similarity of students' initial characteristics (Sugiyono, 2019)[16]. Class IV-A was designated as the experimental group, while Class IV-B served as the control group. The research procedure consisted of three stages: preparation, implementation, and data analysis. In the preparation stage, the researcher developed learning materials and research instruments, including learning outcome tests and a student response questionnaire. Prior to implementation, the test instruments underwent validity and reliability testing to ensure their appropriateness (Maulana, 2022)[17]. Furthermore, the validated and reliable test items were adapted and integrated into a digital assessment format using Canva Play Edu, ensuring that the instruments were not only content-valid but also suitable for digital-based assessment.

During the implementation stage, both groups were given a pretest to determine their initial abilities. The experimental group was then treated using Canva Play Edu as a digital assessment tool, while the control group used conventional assessment methods without digital media. After the learning process was completed, both groups were given a posttest to measure students' learning outcomes following the treatment. The instruments used in this study included learning outcome tests (pretest and posttest) and a student response questionnaire. The tests were used to measure students' understanding before and after the treatment, while the questionnaire assessed students' responses to using Canva Play Edu as a digital assessment tool. Data analysis was conducted using SPSS version 20 (Santoso, 2020)[18]. The analysis began with a normality test using the Kolmogorov–Smirnov method to determine whether the data were normally distributed. If the significance value was greater than 0.05, the data were considered normally distributed, and a parametric independent samples t-test was applied to assess differences in learning outcomes between the experimental and control groups. However, if the data were not normally distributed (significance value < 0.05), a nonparametric test, namely the Mann–Whitney U test, was used as an alternative. In addition, this study employed the N-gain test to measure the improvement in students' learning outcomes after the treatment. The N-gain test was chosen because it can measure learning improvement proportionally by comparing pretest and posttest scores. Therefore, the use of N-gain in educational research is considered relevant, as it not only indicates improvement but also reflects the treatment's effectiveness in enhancing students' understanding. This study obtained official permission from SDN Kemayoran 02 Bangkalan before its implementation. Furthermore, the researcher upheld ethical research principles by ensuring the confidentiality of student data, avoiding any harm to participants, and using the data solely for academic purposes.

## RESEARCH RESULTS AND DISCUSSION

### Research results

Three phases were involved in implementing the research procedures: planning, implementation, and data analysis.

a. Preparation Stage

In the preparation stage, the researcher first submitted a research permit request to the school principal, accompanied by an official permission letter from the university. This

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[18] S. Santoso, Panduan lengkap SPSS versi 20. PT Elex Media Komputindo. (2020)

letter served as the basis for obtaining approval to conduct the research and initial observations at SDN Kemayoran 02 Bangkalan. After obtaining permission, the researcher conducted preliminary observations of the learning process and the implementation of assessments in fourth grade. Based on this problem, the researcher proposed a solution by implementing a gamification-based digital assessment medium, namely the Canva Play Edu application, to examine the effect of its use as a digital assessment tool on students' learning outcomes. Furthermore, the researcher collaborated with the homeroom teachers of classes IV A and IV B to prepare the research materials, develop learning instruments, and organize the research implementation.

b. Implementation Stage

In this stage, the researcher developed a pretest instrument to determine students' initial level of understanding of the science material before the treatment was administered. The pretest instrument was developed based on predetermined competency achievement indicators and adapted to the characteristics of elementary school students.

Furthermore, the researcher developed a posttest instrument to be used as an evaluation tool to measure students' learning outcomes after the implementation of the Canva Play Edu application as a gamification-based digital assessment tool in the experimental class. The posttest was administered after the entire learning and assessment process was completed to assess changes and improvements in students' learning outcomes. After the pretest and posttest instruments were deemed appropriate for use, the researcher proceeded with data collection and processing. The data obtained were then analyzed to determine the effect of using Canva Play Edu as a digital assessment tool on students' learning outcomes.

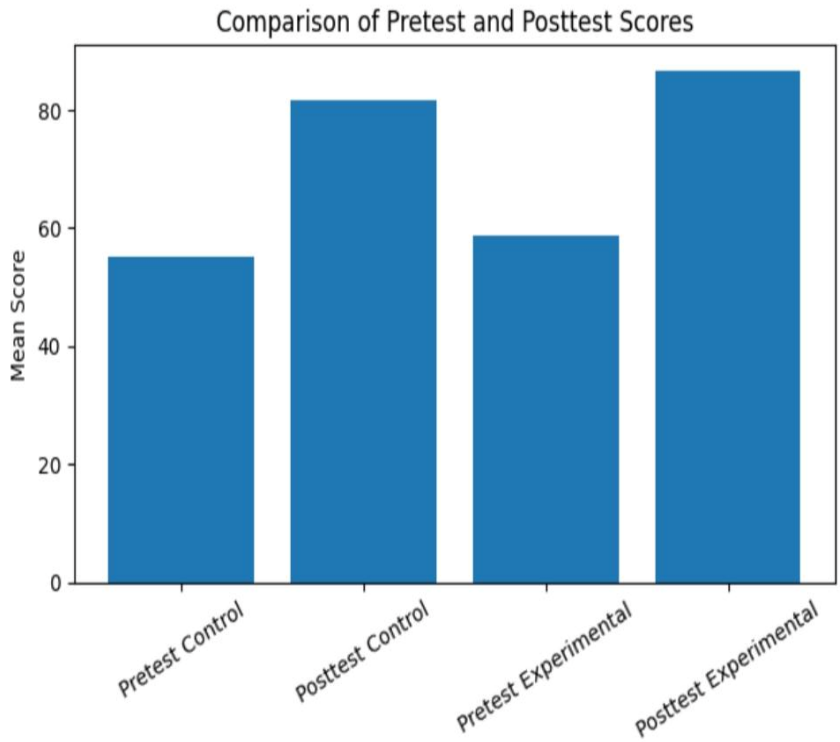
c. The analysis of test score data related to the implementation of gamified digital assessment using the Canva Play Edu application was conducted through the following stages:

1) Pretest and Posttest Results

| | | posttest kontrol | prettest kontrol | prettest eksperimen | posttest eksperimen |
|---|---|---|---|---|---|
| N | Valid | 19 | 19 | 19 | 19 |
| | Missing | 1 | 1 | 1 | 1 |
| Mean | | 81.6842 | 55.1053 | 58.6316 | 86.6316 |
| Median | | 87.0000 | 60.0000 | 60.0000 | 89.0000 |
| Mode | | 93.00 | 60.00 | 53.00 | 80.00 |
| Std. Deviation | | 15.54939 | 16.76933 | 17.42989 | 7.26644 |
| Variance | | 241.784 | 281.211 | 303.801 | 52.801 |
| Minimum | | 50.00 | 27.00 | 27.00 | 80.00 |
| Maximum | | 100.00 | 87.00 | 87.00 | 100.00 |
| Sum | | 1552.00 | 1047.00 | 1114.00 | 1646.00 |

Based on descriptive statistical analysis using SPSS, the data indicate an overall improvement in students' learning outcomes in both the control and experimental groups. This is indicated by comparing pretest and posttest scores across the two groups. In the control group, the mean score increased from 55.10 in the pretest to 81.68 in the posttest. The median score also increased from 60.00 to 87.00, while the mode remained at 60.00 in the pretest and increased to 93.00 in the posttest. The standard deviation decreased from 16.77 to 15.55, indicating a slightly more consistent distribution of scores after the learning process. The minimum score increased from 27.00 to 50.00, while the maximum score reached 100.00. In the experimental group, the improvement was more substantial. The mean score increased from 58.63 in the pretest to 86.63 in the posttest. The median increased from 60.00 to 89.00, and the mode changed from 53.00 to 80.00. Notably, the standard deviation decreased significantly from 17.43 to 7.27, indicating that students' scores became more homogeneous after the treatment. The minimum score increased from 27.00 to 80.00, while the maximum score reached 100.00. These findings indicate that both groups experienced improvements in learning outcomes; however, the experimental group showed a higher increase and more consistent performance compared to the control group. This suggests that the use of Canva Play Edu as a digital assessment tool contributed to better learning outcomes among fourth-grade students at SDN Kemayoran 02 Bangkalan.

2) Independent Sample T-Test




The figure compares the mean pretest and posttest scores of the control and experimental groups. Based on the graph, both groups show an improvement in learning outcomes after the learning process. However, the increase in the experimental group is higher than that of the control group. The experimental group improved from 58.63 to 86.63, while the control group increased from 55.10 to 81.68. This difference indicates that using Canva Play Edu as a digital assessment tool yields a greater impact on students' learning outcomes than conventional assessment methods. The greater improvement in the experimental group may be attributed to the use of interactive and engaging digital assessment media, which enhances students' motivation and participation during the learning process. This leads to a better understanding of the material and higher learning outcomes. However, these findings need to be further verified through inferential statistical analysis to determine whether the observed differences are statistically significant. Therefore, a hypothesis test was conducted on both groups.

The independent-samples t-test was used to assess whether there was a significant difference in learning outcomes between the control and experimental groups. This test was conducted by comparing the significance value (Sig.) obtained from the SPSS analysis. The decision criteria for the independent samples t-test are as follows: 1. $H_0$ is accepted, and $H_1$ is rejected if the significance value (Sig.) is greater than 0.05, indicating that there is no significant difference in learning

outcomes between the control group and the experimental group. 2. $H_0$ is rejected, and $H_1$ is accepted if the significance value (Sig.) is less than 0.05, indicating that there is a significant difference in learning outcomes between the control group and the experimental group. The following table presents the results of the independent samples t-test comparing the control and experimental groups of fourth-grade students at SDN Kemayoran 02 Bangkalan.

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| NILAI | Equal variances assumed | 5.278 | .028 | -7.840 | 36 | .000 | -27.947 | 3.565 | -35.177 | -20.718 |
| | Equal variances not assumed | | | -7.840 | 26.111 | .000 | -27.947 | 3.565 | -35.273 | -20.622 |

Based on the results of the hypothesis test, a significance value ($p < 0.05$) was obtained, indicating a statistically significant difference in learning outcomes between the experimental and control groups. Thus, $H_0$ is rejected, and $H_1$ is accepted. To further examine the magnitude of the effect, Cohen's d was calculated. The result showed a moderate effect size ($d \approx 0.45$), indicating that the use of Canva Play Edu as a digital assessment tool has a meaningful impact on students' learning outcomes. This finding suggests that the difference is not only statistically significant but also practically relevant in the context of classroom learning. The moderate effect size indicates that implementing gamification-based digital assessment improves students' understanding and engagement. However, it may still be influenced by other factors, such as prior knowledge, learning environment, and student characteristics.

3) Normality Test

The normality test was conducted to determine whether the students' learning outcome data were normally distributed. The data are considered normally distributed if the significance value (Sig.) obtained is greater than 0.05 (Sig. > 0.05). In this study, the normality test was performed as a prerequisite before conducting parametric statistical tests, specifically the independent samples t-test.

The following table presents the results of the normality test for the students' learning outcome data in the control group and the experimental group:

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| prettest kontrol | .194 | 19 | .059 | .941 | 19 | .272 |
| posttest kontrol | .227 | 19 | .011 | .912 | 19 | .082 |
| prettest eksperimen | .215 | 19 | .021 | .904 | 19 | .058 |
| posttest eksperimen | .199 | 19 | .046 | .851 | 19 | .007 |

The normality test in this study was conducted using the Shapiro–Wilk test in SPSS version 20, given that the sample size in each group was ≤ 30 students. The results of the normality test indicate that the data exhibit varied distribution characteristics across groups. Considering these characteristics, a non-parametric approach was employed to ensure the robustness of the analysis. Therefore, the Mann-Whitney U test was used to determine whether there was a significant difference in learning outcomes between the experimental and control groups. This test is considered appropriate as it is more flexible and does not strictly rely on distributional assumptions. The results of the Mann–Whitney U test showed a significance value of $p < 0.05$, indicating a statistically significant difference between the two groups. Thus, $H_0$ was rejected, and $H_1$ was accepted, confirming that the use of Canva Play Edu as a digital assessment tool has a significant effect on students' science learning outcomes.

4) N-Gain Test

The N-gain test was used to determine the improvement in students' learning outcomes after the treatment by comparing the pretest and posttest scores. This test aims to measure the extent to which a learning method or instructional media improves students' understanding and learning outcomes. The level of improvement in learning outcomes is expressed in the form of an N-gain score. To determine the level of improvement, the obtained N-gain score is classified based on specific criteria. The categories of N-gain score improvement can be classified according to the following criteria:

Table 1. Normalized Gain Criteria

| Nilai N-Gain | Interpretasi |
|---|---|
| 0,70 ≤ g ≤ 100 | High |
| 0,30 ≤ g ≤ 0,70 | Medium |
| 0,00 ≤ g ≤ 0,30 | Low |

| | |
|---|---|
| g = 0,00 | no increase |
| -1,00 ≤ g ≤ 0,00 | Increase occurs |

The effectiveness level of the intervention can be classified based on the following criteria:

Table 2. Criteria for determining the level of effectiveness

| Percentage | Criteria |
|---|---|
| < 40 | Ineffective |
| 40-55 | Less Effective |
| 56-75 | Moderately Effective |
| > 76 | Effectiveness |

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Ngain_score | 19 | .50 | 1.00 | .8042 | .15199 |
| Ngain_persen | 19 | 50.00 | 100.00 | 80.4197 | 15.19904 |
| Valid N (listwise) | 19 | | | | |

Based on the results of the normalized gain (N-gain) analysis, an improvement in students' cognitive achievement and conceptual understanding was observed following the implementation of the Canva Play Edu application as a digital assessment tool in science learning at SDN Kemayoran 02 Bangkalan. This improvement was determined by comparing the pretest and posttest scores of the experimental group. The analysis yielded a mean N-gain score of 0.80. Referring to the criteria proposed by Hake (1999), an N-gain value in the range of 0.70 ≤ g ≤ 1.00 is classified as a high level of learning gain. Accordingly, the results indicate that the implementation of the Canva Play Edu application produced a high magnitude of improvement in students' learning outcomes. Furthermore, the effectiveness of the Canva Play Edu application was also evaluated using the N-gain percentage. The analysis showed that the mean N-gain percentage reached 80.41%. Based on the established effectiveness classification, an N-gain percentage exceeding 76% is categorized as very effective. Thus, it can be concluded that the use of the Canva Play Edu application as a digital assessment medium demonstrates a very high level of effectiveness in enhancing the science learning outcomes of fourth-grade students at SDN Kemayoran 02 Bangkalan.

## Discussion

The findings of this study indicate that the use of Canva Play Edu, a gamification-based digital assessment tool, significantly improves students' science learning outcomes. This improvement is not merely reflected in higher posttest scores but also in increased student engagement and participation during the learning process. From a theoretical perspective, these findings can be explained through constructivist learning theory, which emphasizes that learning occurs when students actively construct their own understanding (Asrinawati et al. 2025)[19]. The use of interactive digital assessments allows students to engage directly with learning content through problem-solving activities, rather than passively receiving information. In this context, Canva Play Edu facilitates active learning by providing immediate feedback, visual stimuli, and interactive challenges that support deeper conceptual understanding (Mawarti, M., Irawan, A., & Suparjan, E., 2025)[20].

Furthermore, the results are consistent with motivation theory, which highlights the importance of intrinsic motivation in learning. The gamification elements embedded in Canva Play Edu, such as game-based quizzes, visual design, and interactive tasks, create a more enjoyable and less stressful assessment environment. This aligns with previous studies indicating that gamified digital assessments can enhance students' motivation, engagement, and learning outcomes compared to conventional assessment methods (Novitasari, 2023)[21]. The significant difference in learning outcomes between the experimental and control groups also supports previous research findings that digital-based learning media positively influence student achievement. However, this study extends previous research by specifically examining the role of digital assessment tools, rather than instructional media alone, highlighting that assessment itself can function as an effective learning strategy. The high N-gain results further indicate that the use of Canva Play Edu is not only statistically significant but also educationally meaningful. This suggests that integrating digital assessment into the learning process can substantially enhance students' conceptual understanding and learning effectiveness (Zega, B. H., Sibuea, M. N., & Ritonga, N., 2025)[22].

Despite these positive findings, this study has several limitations. First, the sample size was relatively small and limited to a single school, which may affect the generalizability of the results. Second, the treatment duration was relatively short, which may not fully capture the long-term impact of digital assessment tools. Third, external factors, such as students' prior digital literacy and access to technology, were not rigorously controlled. Therefore, future research is recommended to include a larger, more diverse sample, extend the implementation period, and explore additional variables, such as students' motivation, digital literacy, and learning styles. In terms of practical implications, this study suggests that teachers should consider integrating digital assessment tools such as Canva Play Edu into classroom practice. Not only can such tools improve learning outcomes, but they also transform the assessment process into a more engaging, interactive, and student-centered activity. Thus, digital assessment can serve as both an evaluation tool and a meaningful learning strategy in elementary science education.

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## CONCLUSION

Based on the results of the study, it can be concluded that the use of the Canva Play Edu application as a digital assessment tool has a statistically significant effect on improving fourth-grade students' science learning outcomes at SDN Kemayoran 02 Bangkalan, as indicated by the independent samples t-test ($p < 0.05$). The higher mean score of the experimental group compared to the control group, along with an average N-gain score of 0.80 (high category) and an N-gain percentage of 80.41% (very effective category), indicates that the intervention provides a substantial learning gain. These findings contribute to the growing body of literature on technology-enhanced assessment by providing empirical evidence that digital assessment tools can improve students' cognitive achievement in elementary science learning. In practice, the results suggest that integrating interactive and game-based digital assessment platforms, such as Canva Play Edu, can support more engaging, efficient, and meaningful evaluation processes in classroom settings. However, this study is limited to a relatively small sample. It focuses only on cognitive learning outcomes within a single subject and school context, which may limit the generalizability of the findings. Future research is recommended to involve larger and more diverse samples, different educational levels or subjects, and to examine additional variables, such as students' motivation, engagement, and participation in learning, to provide a more comprehensive understanding of the effectiveness of Canva Play Edu.

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