

THE EFFECT OF EDUCAPLAY INTERACTIVE MEDIA ON ACADEMIC ACHIEVEMENT AND ENVIRONMENTAL AWARENESS CHARACTER OF GRADE FIVE STUDENTS AT RURAL PRIMARY SCHOOL

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Abstract

Examining how Educaplay interactive learning materials affect students' cognitive learning results and environmental care character in Natural and Social Sciences (IPAS) at SDN Bojongsari 04 is the goal of this study. Students' lack of environmental awareness and poor academic performance—with an average IPAS score 64.84 below the minimal mastery criteria (KKM) of 75—were the driving forces for the study. A real experimental method—more precisely, the posttest-only control group design—was used to apply a quantitative approach. The study comprised 42 fifth-grade pupils from SDN Bojongsari 01 and SDN Bojongsari 04, who were split evenly between the experimental and control groups. Questionnaires to gauge environmental character and multiple-choice assessments to evaluate learning outcomes were used to gather data. Using SPSS version 26, an independent sample t-test was used to evaluate the data. The findings showed a significant positive effect of Educaplay on cognitive learning outcomes ($p = 0.017 < 0.05$) and on the development of environmental care character ($p = 0.033 < 0.05$). The study concludes that Educaplay is an effective interactive media tool that enhances both academic performance and environmental values in elementary students, contributing to more engaging and value-based learning practices in primary education.

Keywords: Interactive Learning Media, Learning Outcomes, Environmental Character

INTRODUCTION

Education plays a fundamental role in shaping the quality of human life and ensuring the sustainability of society. One of the primary indicators of a successful educational process is student learning outcomes, which reflect not only knowledge acquisition but also changes in attitudes and skills. At all levels of education, including elementary schools, achieving optimal learning outcomes remains a major concern (Fernando *et al.*, 2024). However, various challenges persist, including the ineffectiveness of traditional instructional methods and the lack of integration of character-building elements such as environmental awareness into formal curricula (Vivi *et al.*, 2023). In Indonesia, the average academic performance in core subjects such as Natural and Social Sciences (IPAS) remains below national standards. For instance, students at SDN Bojongsari 04 recorded an average IPAS score of 64.84, which falls below the minimum passing criterion (KKM) of 75. Compounding this issue is the limited emphasis on environmental character development in elementary education (Jayanti *et al.*, 2024). While environmental degradation continues to pose a global threat, many students remain indifferent or unaware of the importance of sustainable practices in their immediate surroundings (Hariyasasti *et al.*, 2025). This is partly due to the lack of contextual and value-based learning approaches in primary education curricula.

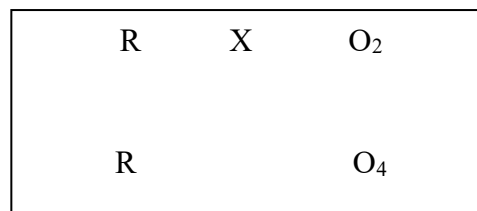
The literature suggests that character education particularly environmental character should be introduced early in a child's development to build responsible behavior and ecological empathy (Nurpratiwiningsih *et al.*, 2022). Scholars argue that the elementary school phase is critical for intellectual and character development because children are in the concrete operational stage of Piaget's cognitive development theory. At this stage, students require hands-on and contextual learning experiences to internalize abstract concepts such as environmental stewardship (Wardani *et al.*, 2024). Recent research underscores the potential of interactive learning media to enhance both cognitive and character-based learning outcomes (Ayu *et al.*, 2022). In particular, digital tools that incorporate gamification and multimedia components have been shown to improve student engagement and motivation (Nurfadhillah *et al.*, 2021). Among these tools, Educaplay has emerged as a promising platform that allows educators to create interactive activities such as quizzes, crosswords, and educational games. Early findings suggest that Educaplay can support active learning and foster critical thinking and character values (Wardani *et al.*, 2024).

Despite these developments, there is still a limited number of empirical studies that simultaneously investigate the cognitive and character-related impacts of Educaplay in primary education contexts (Clarista *et al.*, 2025). Most prior research tends to focus narrowly on cognitive achievement or general student engagement, without exploring the dual role of interactive media in academic and character development. This indicates a clear research gap, especially in terms of how tools like Educaplay can be strategically used to enhance both learning outcomes and environmental care values in young learners. In order to fill this knowledge vacuum, the current study will investigate how Educaplay interactive media affects learning outcomes and the growth of environmental concern character in fifth-grade students at SDN Bojongsari 04. The significance of this work is twofold. In the first place, it continues the conversation about how to incorporate environmental education into the digital age. Furthermore, it provides useful perspectives on how educational technology might be matched with the objectives of character education in elementary schools. With forty-two students split

into experimental and control groups, the study uses a posttest-only control group strategy and a genuine experimental design. The analysis focuses on two primary outcomes: (1) cognitive learning performance measured through standardized multiple-choice tests, and (2) environmental character assessed via structured questionnaires.

METHODOLOGY

This study used a real experimental methodology and a quantitative approach to examine how Educaplay interactive media affected elementary school children' learning results and environmental character development. This approach was used in the study to find quantifiable differences between a control group that used traditional learning techniques and an experimental group that was exposed to Educaplay. Examining if incorporating interactive digital tools such as Educaplay may improve students' academic performance and cultivate a greater sense of environmental responsibility was the main goal. Pre-tests and post-tests were used to gather data, with documentation and observation helping to guarantee the correctness and dependability of the findings from the viewpoints of character development and learning attainment. “The research design implemented was the *Posttest-Only Control Group Design*, as outlined by” (Sugiyono, 2022). The two groups in this design were the experimental group, which was treated using Educaplay media, and the control group, which was taught using traditional techniques without the use of interactive media. At the conclusion of the session, both groups were given just a posttest to gauge the impact of the treatment



Source: (Sugiyono, 2022)

Figure 1. Research Design

Key:

R: Random sampling

X: Treatment using Educaplay in the experimental class

O₂: Posttest in the experimental group

O₄: Posttest in the control group

This study employed a true experimental design with a posttest-only control group approach to investigate the effect of *Educaplay* on cognitive learning outcomes and environmental care character. The experimental group used *Educaplay* a web-based interactive platform developed by ADR Formación while the control group followed conventional teaching using printed materials and whiteboards. A 25-item multiple-choice posttest assessed cognitive outcomes, and a 20-item Likert-scale questionnaire measured environmental character (responsibility, awareness, and participation). Both instruments were validated by experts and tested for reliability using Cronbach’s Alpha. Data were analyzed using IBM SPSS Statistics version 26. Independent *t*-tests compared posttest scores between groups, with significance set at $p < 0.05$. Both groups followed the same IPAS curriculum and lesson plans, with media type as the only variable. The intervention lasted six sessions (35–40 minutes each). It was assumed participants had no prior *Educaplay* exposure, and classroom environments were comparable across schools to ensure validity and replicability.

RESULT AND DISCUSSION

The Effect of Educaplay Interactive Media on Learning Outcomes in Natural and Social Sciences Education

Table 1. Descriptive Analysis of Students' Learning Outcomes

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Learning Outcomes Eksperimen	21	57	100	80,24	11,140
Learning Outcomes Kontrol	21	38	95	69,71	15,935
Valid N (listwise)	21				

Both the experimental and control groups were given a post-test with multiple-choice questions to assess their learning results. While the control group was instructed using traditional teaching techniques, the experimental group was instructed utilizing interactive Educaplay media. According to descriptive statistical analysis, the experimental group's mean post-test score was 80.24, whereas the control group's was 69.71. This significant difference suggests that pupils' cognitive function has benefited from the interactive media therapy. According to the findings, Educaplay is a useful tool for raising academic success in primary school as it may improve kids' comprehension and recall of the subject matter. The IBM SPSS Statistics version 26 One-Sample Kolmogorov–Smirnov test was used to perform a normality test in order to evaluate the distribution of the post-test results. Determining if the data had a normal distribution—a key presumption for doing parametric statistical analyses like the independent samples t-test—was the aim of this test. A normal distribution makes it possible to compare groups more accurately and legitimately since it shows that the data are symmetrically distributed around the mean. Assuring that the study's conclusions were founded on accurate and trustworthy data interpretations, the normalcy test results served as a reference for choosing the best statistical techniques for additional research. “Based on the decision rule, the data are considered normally distributed if the significance value (p) is greater than 0.05, and not normally distributed if the value is less than 0.05” (Zulkifli *et al.*, 2025).

Table 2. Results of Normality Test for Learning Outcomes Data

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcomes Kelas Eksperimen	,146	21	,200	,973	21	,808
Learning Outcomes Kelas Kontrol	,142	21	,200	,965	21	,622

The results of the normality test for learning outcomes data indicate that the experimental class's significance value (Kolmogorov-Smirnov) is 0.200, and the control class's is likewise 0.200. When compared to the stated criteria for assessing data distribution normality, these numbers show that the data are normally distributed since they above the minimal significance criterion of 0.05. One statistical method for figuring out if two or more data groups have identical variances is the homogeneity test. A one-way ANOVA was used in this investigation, and the significant value in the "Test of Homogeneity of Variances" column was used as a guide. “The decision was based on the significance value: if > 0.05 , the data were considered homogeneous; conversely, if < 0.05 , the data were deemed non-homogeneous” (Sianturi, 2022).

Table 3. Results of Homogeneity Test for Learning Outcomes

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	3,551	1	40	,067
	Based on Median	3,262	1	40	,078
	Based on Median and with adjusted df	3,262	1	38,048	,079
	Based on trimmed mean	3,474	1	40	,070

The computed significance value, 0.067, is higher than the 0.05 cutoff. This finding supports the idea that the data have a normal distribution. Furthermore, the result satisfies one of the fundamental presumptions for doing parametric tests by showing that there is no discernible departure from normalcy. This suggests that the variance in the data is homogeneous or uniform, which makes it possible to compare the learning outcomes of the experimental and control groups in a valid and trustworthy way using additional statistical analyses like the independent samples *t*-test. “The subsequent hypothesis testing was conducted using an independent samples *t*-test with the assistance of SPSS 26, a method aimed at comparing the means of two data groups” (Syafriani *et al.*, 2023). According to the decision-making criteria, if the significance value is ≥ 0.05 , then H_0 is accepted and H_a is rejected, indicating no significant effect. Conversely, if the significance value is ≤ 0.05 , then H_0 is rejected and H_a is accepted, suggesting a significant effect.

Table 4. Results of the t-Test on Learning Outcomes

Independent Samples Test										
		Levene's Test for Equality of Variances				t-test for Equality of Means				
						95% Confidence Interval of the Difference				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar	Equal variances assumed	3,551	,067	2,480	40	,017	10,524	4,243	1,949	19,099
	Equal variances not assumed			2,480	35,780	,018	10,524	4,243	1,917	19,130

The results presented in Table 5 yielded a significance value (Sig. 2-tailed) of 0.017. The null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted as this value is less than 0.05. The use of Educaplay media has a favorable impact on students' learning outcomes in the Natural and Social Sciences (IPAS) course, especially when it comes to attitudes and actions related to environmental degradation and preservation. This is demonstrated by the experimental class's higher mean score (80.24), which was greater than that of the control group (69.71). A statistically significant impact of Educaplay on students' learning outcomes was confirmed by the t-test, which produced a significance value of 0.017 (< 0.05).

The Effect of Educaplay on Environmental Care Character in Natural and Social Education

The second aspect of the discussion aims to examine the influence of Educaplay on students' environmental care character. Data were collected through a questionnaire containing statements reflecting indicators of environmental care within the context of the IPAS subject. Elementary school is considered an ideal stage for fostering environmental awareness, as students at this level begin receiving systematic education. Thus, instilling pro-environmental values from an early age is more effective in shaping long-term attitudes toward environmental sustainability.

Table 5. Descriptive Analysis of Environmental Care Character

According to the findings of the descriptive statistical analysis, pupils in the experimental

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Karakter Cinta Lingkungan Eksperimen	21	61	97	79,62	8,709
Karakter Cinta Lingkungan Kontrol	21	55	87	73,71	8,603
Valid N (<i>listwise</i>)	21				

class—which used Educaplay media—had an average score of 79.62 for environmental care character, with values ranging from 61 to 97. By contrast, the control group, which did not utilize Educaplay, had a mean score of 73.71, with a minimum score of 55 and a maximum score of 87. These findings imply that Educaplay may have a favorable impact on kids' environmental character development. In order to confirm the results, a normality test was performed on the environmental care character data using SPSS version 26. This was done to see if the data were normally distributed, which is a crucial presumption for the parametric analysis that followed.

Table 6. Normality Test Results for Environmental Care Character

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Karakter Cinta Lingkungan Kelas Eksperimen	,117	21	,200	,977	21	,873
Karakter Cinta Lingkungan Kelas Kontrol	,178	21	,079	,952	21	,376

The experimental group's attained significance value was 0.200, whereas the control group's was 0.079. One of the main presumptions for parametric analysis is satisfied as both values are higher than the 0.05 cutoff, indicating that the data are normally distributed. To

determine if the differences between the two groups were equivalent, a homogeneity test was performed in addition to the normalcy test. This test is essential for evaluating if other comparable statistical techniques, like the independent samples t-test, are acceptable. Table 6 presents the full homogeneity test findings, which validate the assumption of equal variances and offer a thorough foundation for further data analysis.

Table 7. Homogeneity Test Results for Environmental Care Character

Test of Homogeneity of Variances					
		Levene			
		Statistic	df1	df2	Sig.
Karakter Cinta Lingkungan	Based on Mean	,008	1	40	,928
	Based on Median	,007	1	40	,933
	Based on Median and with adjusted df	,007	1	39,967	,933
	Based on trimmed mean	,002	1	40	,962

A significance value of 0.928 was determined using the homogeneity test findings shown in Table 7. It may be inferred that the data have homogenous variances because this number is higher than 0.05. The independent samples t-test, a parametric statistical test that was also used in the learning outcome analysis, was used to evaluate hypotheses for the environmental care character variable. Because the data satisfied the homogeneity of variance and normality criteria, this test was selected. This test was designed to find out how utilizing Educaplay media affected the environmental care character of students studying IPAS.

Table 8. Independent *t*-Test Results for Environmental Care Character

Independent Samples Test									
Levene's Test for Equality of Variances					t-test for Equality of Means				
					95% Confidence Interval of the Difference				
					Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal	F	Sig.	t	df					
	,008	,928	2,210	40	,033	5,905	2,671	,506	11,304

Karakter	variances							
Cinta	assumed							
Lingkungan	Equal variances	2,210	39,994	,033	5,905	2,671	,506	11,304
	not assumed							

The significant value (Sig. 2-tailed), based on the results shown in Table 8, was 0.033. The null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted as this value is less than 0.05. Positive effects on the development of environmental care character were seen during the learning process, especially in the experimental class that used Educaplay media. This is demonstrated by the experimental class's average questionnaire score of 79.62, which was higher than the control class's average of 73.71. An independent t-test was used to test the hypothesis and find a significant value (2-tailed) of 0.033 for this effect. As this value is below 0.05, it can be concluded that the use of Educaplay media has a significant and positive effect on students' environmental care character.

CONCLUSION

According to the study's findings, fifth-grade students studying Natural and Social Sciences (IPAS) at SD Negeri Bojongsari 04's utilization of Educaplay interactive media greatly improves their cognitive learning results and environmental care character. There was a statistically significant difference in cognitive performance between the experimental and control groups ($p = 0.017 < 0.05$), according to the findings of the independent t-test. The experimental group's mean score was higher (80.24), than the control group's (69.71). Educaplay also significantly impacted the development of environmental care character; the experimental group's mean score was 79.62, whereas the control group's was 73.71. These findings demonstrate that interactive media not only support academic achievement but also serve as an effective tool for character education, particularly in fostering early environmental awareness. Future studies may explore the integration of *Educaplay* in other subject areas and across different grade levels to assess its broader applicability and impact on various dimensions of student development.

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CONFLICT OF INTEREST

Regarding the composition and release of this work, the authors affirm that they have no conflicts of interest.

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