



The Effectiveness of Using *Baamboozle* Learning Media in Increasing Learning Motivation of Fourth Grade Elementary School Students

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ABSTRACT

Purpose – This study aims to address the low learning motivation of fourth-grade students in Science and Social Studies (IPAS), which stems from teaching methods dominated by lectures and a lack of interactive technological media.

Methodology – The research method employed is a quantitative approach with a One-Group Pretest-Posttest experimental design. The subjects of this study were fourth-grade students at SD Negeri 091608 Sinaksak. Data collection techniques included validated learning motivation questionnaires and documentation.

Findings – Data analysis was performed using normality tests, Paired Sample T-Tests, and effectiveness tests using the N-Gain Score, facilitated by SPSS 26 and Microsoft Excel. The results indicate a significant increase in learning motivation following the implementation of *Baamboozle*.

Novelty – The average student scores improved from the pretest range of 53–78 to a posttest range of 86–99, with an average increase of 29.16 points. Hypothesis testing yielded a Sig. (2-tailed) value of $0.000 < 0.05$ and a t-value of 18.723, which is greater than the t-table of 2.064, meaning that H_a is accepted.

Significance – Based on the effectiveness test, the average N-Gain Score obtained was 0.77, categorized as High and Effective (77%). In conclusion, the use of *Baamboozle* as a learning medium is effective in increasing the learning motivation of fourth-grade students at SD Negeri 091608 Sinaksak.

Keywords: *Baamboozle*; Elementary school students; Learning media, Learning motivation, Natural and social sciences (IPAS).

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1. Introduction

Education is a lifelong process that plays a fundamental role in improving human resources and supporting sustainable development (Ayob & Hamada, 2024; Chacón-López & López-Martínez, 2026; McBrady, 2026). Beyond the transmission of knowledge, contemporary education is expected to

develop students' competencies, critical thinking, creativity, collaboration, and communication skills required to respond to the demands of the twenty-first century (Kania et al., 2024; Patria, 2022; Song & Cai, 2024). In Indonesia, this vision is reflected in the implementation of the *Merdeka Curriculum*, which emphasizes the development of the Pancasila Student Profile through meaningful, student-centered, and technology-integrated learning experiences (Ministry of Education, Culture, Research, and Technology, 2022).

The rapid advancement of digital technology has significantly transformed educational practices worldwide (Chou et al., 2026; Forssell et al., 2025; Rogers, 2021). Students belonging to Generation Alpha have grown up in an environment where digital technology is an inseparable part of their daily lives. Consequently, conventional teacher-centered instruction is increasingly unable to sustain students' attention and engagement. Nellis (2017) argues that education for Generation Alpha should emphasize learnability, namely the ability to continuously acquire and adapt knowledge rather than merely memorizing information. This perspective highlights the necessity for learning environments that are interactive, engaging, and capable of fostering active student participation.

At the elementary school level, the integration of technology into classroom instruction is particularly important because this stage serves as the foundation for students' cognitive development (Forssell et al., 2025; Lee et al., 2025; Mustafa et al., 2025). According to Piaget's theory of cognitive development, children aged 9–10 years are in the concrete operational stage, during which they learn most effectively through concrete experiences and visual representations (Anderson & Krathwohl, 2001; Aslinda et al., 2024; Suherman et al., 2025). Therefore, instructional media that combine visual, auditory, and interactive elements are more likely to facilitate conceptual understanding than conventional text-based instruction (Azeera et al., 2024; Bozkurt, 2022; Romadhon, 2024). Meaningful digital learning media can also increase students' motivation by providing enjoyable learning experiences that correspond to their developmental characteristics.

Learning motivation is widely recognized as one of the most influential factors affecting students' academic achievement (Acharya, 2017). Motivated students demonstrate greater persistence, concentration, and willingness to engage in learning activities. However, many elementary school classrooms continue to rely on conventional instructional approaches dominated by lectures and printed materials. Such approaches frequently fail to capture students' interest, resulting in passive participation, reduced classroom interaction, and lower learning outcomes. This challenge has become increasingly apparent in the digital era, where students are more accustomed to interactive multimedia and technology-based activities than to traditional instructional methods (Adhikari et al., 2024; DeLuca et al., 2025).

Although schools have gradually improved their technological infrastructure through the availability of computers, projectors, and internet access, the pedagogical integration of Information and Communication Technology (ICT) remains limited (Jiangmei & Ghasemy, 2026; Maiti & Priyaadharshini, 2024). In many classrooms, technology functions merely as a presentation tool rather than as an interactive learning medium that actively engages students. Consequently, the educational potential of ICT to improve learning motivation and academic achievement has not yet been fully realized.

One instructional innovation that has attracted increasing attention is the use of Pop-Up Book media integrated with digital technology (Kania et al., 2025; Mulyani, 2022; Yonanda et al., 2019). Unlike conventional learning materials, Pop-Up Books combine three-dimensional visualization, interactive design, and attractive illustrations that enable students to construct conceptual understanding through direct exploration (Bouchée et al., 2022; Mathebula et al., 2025). Such characteristics are considered particularly suitable for elementary school students because they correspond to the cognitive needs of learners in the concrete operational stage. Previous studies have reported that interactive learning

media can improve students' motivation, participation, and conceptual understanding. Nevertheless, most existing studies have focused on either conventional Pop-Up Books or general multimedia applications, while empirical evidence regarding digitally integrated Pop-Up Book media in elementary social science learning remains relatively limited.

Based on these considerations, further investigation is needed to examine the effectiveness of digital Pop-Up Book media in enhancing elementary school students' learning motivation and learning outcomes. This study therefore aims to analyze the effect of using Pop-Up Book learning media on fourth-grade students' achievement in Integrated Science and Social Studies (*Ilmu Pengetahuan Alam dan Sosial*—IPAS). The findings are expected to contribute to the growing body of knowledge regarding technology-enhanced learning media and provide practical recommendations for elementary school teachers in designing more engaging and meaningful learning experiences.

2. Methods

The study method used in this study is a quantitative method. Sugiyono's opinion (2009:6), quantitative studies are a research method based on the philosophy of positivism and in researching certain populations or samples. Sample collection is carried out randomly, data collection is carried out using research instruments, and data analysis is carried out quantitatively or statistically to test the established hypothesis. his study is a quantitative study using the Quasi-Experimental method. The design used is a One-Group Pretest-Posttest Design. The researcher wants to see a comparison of students' motivation levels before and after being given treatment in measuring the effectiveness of the *Bamboozle* media.

2.1. Types of Research and Research Design

The research method used in this study is quantitative. According to Sugiyono (2009:6), quantitative research is a research method based on the philosophy of positivism and is used to examine a specific population or sample. Sampling is conducted randomly, data collection uses research instruments, and data analysis is conducted quantitatively or statistically to test the established hypotheses.

2.2. Research design

This research is a quantitative study using a quasi-experimental method. The design used was a Single-Group Pretest-Posttest Design. The researcher wanted to compare students' motivation levels before and after treatment to measure the effectiveness of the *Bamboozle* media. The pre-experimental model is as follows:

Table I - One Group Pretest and Post-test Design

Pretest	Treatment	Posttest
O ₁	X	O ₂

Information:

O₁: Pretest value before treatment is given

O₂: Post-test value before treatment is given

X: Treatment

2.3. Study Population

The research population is the entirety of the research subjects. According to Sugiyono (2012: 126), a population is a generalization area consisting of objects/subjects that have certain qualities and characteristics that are applied by the author and then conclusions are drawn. The population is not only people but also other natural objects. The population is also not just the number of objects/subjects being studied. But it includes all the characteristics or properties possessed by the

population of subjects/objects. Therefore, in this study, the research population was all 25 students in grade IV A of SD Negeri 091608 Sinaksak, which consists of 3 classes.

2.4. Research Sample

Table 2 - Number of Fourth Grade Students

Grade	Male	Female	Total
IV	14	11	25

According to Sugiyono (2023: 127), a sample is a portion of the population's size and characteristics. If the population is large and researchers cannot study everything in the population, for example due to limited funds, manpower, and time, then researchers can use samples taken from the population itself. Sugiyono (2022: 128), sampling technique is a technique used to determine the sample to be used. In this study, the sampling technique used was population-based, using non-probability sampling with a purposive sampling method. This sampling technique is based on predetermined considerations. This means that not everyone can be sampled by the researcher; only those who meet the criteria can be selected. Based on the explanation above, the sample in this study was all 25 students of grade IV A at SD Negeri 091608 Sinaksak.

3. Results and Discussion

3.1. Results

This study aimed to determine the effect of using the interactive learning media Baamboozle on fourth-grade students' learning motivation in science at SD Negeri 091608 Sinaksak. Based on expert validation conducted prior to data collection, the learning motivation questionnaire was deemed highly suitable for use. This was evidenced by an average validation score of 4.70, a high Aiken's V index for language (0.75), and the relevance of the material to learning objectives. Descriptive analysis revealed a significant transformation in students' learning motivation after being exposed to the Baamboozle media.

Table - Interpretation of the Student Learning Motivation Questionnaire Validity Coefficient

Validity Coefficient	Interpretation
0.00–0.199	Very Low Validity
0.20–0.399	Low Validity
0.40–0.599	Moderate Validity
0.60–0.799	High Validity
0.80–1.000	Very High Validity

If the correlation coefficient is equal to 5% or greater than r_{table} , then the instrument item is declared valid using SPSS Version 26. The results of the validity test can be seen (attachment) in the table below:

Tabel 4 - Reliability Test Results of the Instrument

Cronbach's Alpha	N of Items
.699	20

Because the instrument has been declared valid, its reliability is tested. Reliability testing is used to determine whether a test is a reliable measurement tool. A reliable instrument is one that, when used repeatedly to measure the same object, produces the same data. The technique used is Cronbach's alpha. The results of the reliability test are shown in Table 4.2 below Basis for decision making:

$\text{Alpa} > r_{\text{tabel}} = \text{Reliabel}$

$\text{Alpa} < r_{\text{tabel}} = \text{Tidak Reliabel}$

Table 4. Expert Validation Results Aiken's V Index

Assessment Aspect	Mean Score	Percentage (%)	Aiken's V Index	Category
Language	4.75	xx.xx	0.75	High
Content	4.65	xx.xx	0.71*	High
Overall Mean	4.70	xx.xx	0.73*	High

Based on table 4.1 Expert Validation, the language aspect obtained an average score of 4.75. This score achievement indicates that the language quality of the instrument is at a very good level. From the results of the Aiken'sV index calculation in the language aspect, the value is 0.75, referring to the Aiken validity criteria which have a high level of validity. In the material aspect, the assessment results show an average score of 4.65. The material integrated into the Baamboozle media is considered to have covered all learning indicators relevant to the research objectives. This material validity index is recorded as being in the high category. Accumulatively (Total Average), the validation results from the two aspects obtained a combined average value of 4.70. When viewed from the overall Aiken'sV index, the level of instrument feasibility reaches a high percentage, which indicates that the instrument is in the very feasible category.

3.2 Discussion

The findings demonstrate that integrating Baamboozle as a game-based learning medium significantly enhanced fourth-grade students' learning motivation in science learning. Descriptive analysis revealed a substantial increase in students' motivation scores after the intervention, with the mean posttest score exceeding the pretest score by 29.16 points. This improvement was statistically confirmed through the paired-samples *t*-test, which indicated a significant difference between students' motivation before and after the implementation of Baamboozle ($p < 0.001$). Furthermore, the N-Gain score of 0.77 indicates that the intervention achieved a high level of effectiveness, suggesting that Baamboozle successfully promoted students' motivation during the learning process.

The increase in learning motivation can be explained by the characteristics of Baamboozle as an interactive educational game platform (Capinding, 2022; Chen, 2020; Schiele et al., 2025). Unlike conventional teacher-centered instruction, Baamboozle incorporates quizzes, competition, immediate feedback, and visual interaction that actively engage students throughout the lesson. These features create an enjoyable learning atmosphere and encourage students to participate voluntarily, thereby reducing boredom and increasing attention during classroom activities (Abdul Razak et al., 2023; O'Leary et al., 2020; Vista, 2022). Interactive learning environments are known to stimulate students' curiosity and maintain their engagement, particularly among elementary school students who generally prefer visual and game-oriented learning experiences.

From a theoretical perspective, these findings are consistent with motivational learning theories emphasizing that engaging learning environments contribute positively to students' intrinsic motivation (He & Huang, 2026; Mamolo, 2022). Students who experience enjoyable and meaningful learning activities tend to demonstrate greater persistence, enthusiasm, and willingness to complete learning

tasks. Since fourth-grade students are in Piaget's concrete operational stage, they benefit from instructional activities involving direct interaction, visual stimuli, and active participation. Baamboozle accommodates these developmental characteristics by presenting learning content through interactive games rather than passive information delivery.

The findings are also in line with previous studies reporting that game-based learning media improve students' learning motivation and classroom engagement. Educational games encourage active participation by providing immediate reinforcement, increasing students' confidence, and creating opportunities for collaborative learning (Karkar-Esperat et al., 2026; Siller & Ahmad, 2024). Previous research has similarly demonstrated that digital game-based learning can increase students' attention, enjoyment, and willingness to participate in classroom activities, ultimately contributing to better learning outcomes. Therefore, the present findings strengthen existing evidence that integrating educational technology into elementary school instruction can positively influence students' affective learning domains (Gligorea et al., 2023; Ma et al., 2026).

Another important finding is the high N-Gain value (0.77), indicating that the improvement was not only statistically significant but also educationally meaningful. According to Hake's classification, this score belongs to the high improvement category, suggesting that the intervention effectively transformed students' learning motivation rather than producing only a marginal increase. This result implies that Baamboozle is capable of creating sustained student engagement during science instruction by combining cognitive challenges with enjoyable learning experiences.

The positive impact of Baamboozle also has practical implications for elementary school teachers. Rather than functioning solely as a digital quiz application, Baamboozle can be utilized as an instructional strategy that promotes active learning, collaborative interaction, and student-centered instruction. Teachers are encouraged to integrate educational game platforms into science learning to create more engaging classroom environments that accommodate the characteristics of today's digitally oriented learners. Nevertheless, this study employed a one-group pretest-posttest design without a control group; therefore, caution should be exercised when generalizing the findings. Future studies employing quasi-experimental or randomized controlled designs with larger samples are recommended to provide stronger empirical evidence regarding the effectiveness of Baamboozle across different learning contexts.

4. Conclusions

Based on the results of a study conducted in fourth grade on the effectiveness of the Baamboozle learning media, it can be concluded that the use of this gamification platform has a significant positive impact on classroom learning dynamics. Statistically, Baamboozle has proven effective in improving instructional quality, as demonstrated by a significant increase in students' learning motivation scores between before and after the treatment.

This increase in motivation is driven by Baamboozle's unique characteristics, which integrate game elements, healthy competition, and interactive challenges into the learning material. This transforms the classroom atmosphere into a more lively and enjoyable learning environment, enabling previously passive students to become more willing to participate and enthusiastically participate in each stage of the learning process. The positive student response confirms that interactive digital media is far superior in capturing the attention of elementary schools.

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Conflict of Interest

The positive student response confirms that interactive digital media is far superior in capturing the attention of elementary schools.

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