

The Effectiveness of Baamboozle Game as a Learning Media for Flat Geometry in Improving Students' Problem-Solving Skills

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ABSTRAK

Masalah rendahnya kemampuan pemecahan masalah matematika pada siswa memerlukan inovasi media pembelajaran yang interaktif dan efektif. Penelitian ini bertujuan untuk mengembangkan dan mengimplementasikan game Baamboozle sebagai media pembelajaran matematika pada materi bangun datar untuk siswa kelas V. Penelitian ini menggunakan metode Research and Development (R&D) dengan model ADDIE, yang mencakup lima tahapan: analisis, desain, pengembangan, implementasi, dan evaluasi. Subjek penelitian adalah siswa dan guru kelas V. Data dikumpulkan melalui uji validasi ahli, angket tanggapan siswa, serta tes pretest dan posttest. Analisis data dilakukan secara deskriptif dan inferensial untuk mengukur kelayakan media serta efektivitas penggunaannya. Hasil penelitian menunjukkan bahwa game Baamboozle sangat layak digunakan dalam pembelajaran, berdasarkan validasi ahli yang memberikan skor tinggi dan tanggapan positif dari siswa. Selain itu, penggunaan game ini terbukti meningkatkan kemampuan pemecahan masalah matematika siswa secara signifikan, sebagaimana ditunjukkan oleh peningkatan nilai posttest dibandingkan pretest dengan tingkat signifikansi $< 0,001$. Simpulan dari penelitian ini adalah game Baamboozle efektif digunakan sebagai media pembelajaran matematika, khususnya pada materi bangun datar, untuk meningkatkan kemampuan pemecahan masalah siswa.

ABSTRACT

The issue of low mathematical problem-solving abilities among students requires innovative, interactive, and effective learning media. This study aims to develop and implement the Baamboozle game as a mathematical learning media for flat geometry material for fifth-grade students. The study employed the Research and Development (R&D) method with the ADDIE model, which includes five stages: analysis, design, development, implementation, and evaluation. The research subjects consisted of fifth-grade students and teachers. Data were collected through expert validation tests, student response questionnaires, and pretest and posttest assessments. Data analysis was performed descriptively and inferentially to assess the media's feasibility and effectiveness. The results showed that the Baamboozle game was highly feasible for use in learning, based on expert validation with high scores and positive student feedback. Moreover, the use of this game significantly improved students' mathematical problem-solving abilities, as evidenced by the significant increase in posttest scores compared to pretest scores, with a significance level of < 0.001 . The conclusion of this study is that the Baamboozle game is effective as a mathematical learning media, particularly for flat geometry material, in enhancing students' problem-solving abilities.

1. INTRODUCTION

Mathematics is a fundamental science that serves as the foundation for all knowledge, crucial for developing critical thinking, problem-solving, and creative skills needed to solve complex problems both academically and in daily life (Daut Siagian, 2017; Hayati & Jannah, 2024; Sari & Hasanudin, 2023; Susilawati & Prasetyo, 2023). Despite its significance, many students find mathematics challenging due to lack of interest, motivation, and the perception of its difficulty (Aulia & Kartini, 2021; Widayati, 2022), yet it is essential for logical and analytical reasoning. Given its abstract nature, mathematics should be taught

in a way that connects to real-life scenarios, allowing students to explore concepts through prior knowledge and experiences (Kamarullah, 2017; Nurdiana & Hasanudin, 2023). Introducing mathematics at the elementary level fosters critical and creative thinking, along with teamwork skills, preparing students for future challenges (Muharni et al., 2024; Nuha et al., 2024). Mathematics education aims to enhance students' problem-solving skills, as outlined in the National Minister of Education Regulation No. 22 of 2016, which is vital for both learning and real-world applications (Albay, 2019; Cahyani & Setyawati, 2016; Maesari & Marta, 2019). Mastering problem-solving equips students to handle routine and non-routine problems, making it a valuable skill in both academic and everyday contexts (Hidayati & Wagiran, 2020; Rambe & Afri, 2020).

Problem-solving skills in mathematics can be enhanced through the use of interactive and engaging learning media. In the context of 21st-century learning, technology-based learning media play a crucial role in increasing student motivation and engagement (Nisa Maghfiroh et al., 2024; Oktara et al., 2019). These media, which include various elements such as people, objects, or the surrounding environment, serve to deliver content in a way that captures students' attention, interests, thoughts, and emotions, thus facilitating the achievement of learning objectives. The appropriate use of learning media aims to make the learning process more effective, productive, and enjoyable (Dewi Mariani et al., 2022; Mansur, 2020; Nurrita, 2018). Suitable media can enhance interaction between teachers and students, stimulate students' activity and creativity during the learning process. Additionally, relevant and engaging materials help teachers convey information more clearly, making it easier for students to understand the content. One example of learning media that meets these criteria is Baamboozle. As a virtual game-based learning media similar to quiz games, Baamboozle not only sparks curiosity but also provides an enjoyable new experience for students (Iskandar et al., 2022; Nurrita, 2018).

The interview with the fifth-grade teacher at SDN Kalisegoro revealed that students struggle with understanding flat shapes in mathematics, particularly in comparing their characteristics. The majority of students find the lessons difficult and boring, as shown by low learning outcomes, with only 5 out of 31 students mastering the topic. The teaching method is mostly lecture-based due to limited resources and media, leading to student disengagement. Many students lack understanding in basic concepts like area, perimeter, and the characteristics of flat shapes. Educational games are rarely used, with videos and images being the primary media. Despite having digital learning tools, they are seldom used, and students are more interested in lessons involving games. Observations showed that many students were disinterested and frequently left the class during lessons.

Previous findings have been conducted to enhance student activity and enthusiasm for learning, receiving positive responses as an evaluation tool. A study on the development of game-based learning (GBL) using the Baamboozle game as an evaluation media in English learning revealed that the use of Baamboozle increased student interest by sparking their enthusiasm from the start (Murti et al., 2023). Other findings emphasized that Baamboozle improved motivation, student participation, and interaction, creating an enjoyable and interactive learning environment. The study also explored the application of Baamboozle in a learning model integrating artificial intelligence, showing that the model successfully enhanced student engagement and learning outcomes. Furthermore, the increased student involvement was supported by positive survey results and observations regarding the use of Baamboozle as a game-based learning media (Wardani & Kiptiyah, 2024). Additionally, the implementation of Baamboozle contributed to boosting student enthusiasm for learning in elementary schools, making it easier for students to answer questions, understand the material, and stay motivated to learn (Iskandar et al., 2022).

The novelty of this study lies in the application of Baamboozle as an educational game in mathematics learning in fifth-grade classrooms, an area still rarely researched. This study was conducted at SDN Kalisegoro, a school that had never used Baamboozle as a learning media for grades I through VI. The research not only evaluated students' learning outcomes and academic achievements but also specifically examined their problem-solving skills in mathematics, as well as their interest and motivation in the subject. Thus, the study provides concrete solutions for teachers to improve learning quality through the use of digital media. Moreover, it offers a significant contribution to addressing the issues of low problem-solving skills, academic performance, and student interest in mathematics.

This study aims to develop and implement the Baamboozle game as a teaching media to improve students' problem-solving skills in mathematics, specifically for fifth-grade students at SDN Kalisegoro. The Baamboozle game-based learning media includes story-based questions related to comparing the characteristics of flat shapes. A pretest and posttest were conducted to evaluate students' mathematics problem-solving abilities throughout the learning process. The results of the study will determine whether the use of Baamboozle as a teaching media affects the problem-solving skills of fifth-grade students at SDN Kalisegoro.

2. METHOD

This study was conducted using a Research and Development (R&D) method. The research was carried out at SDN Kalisegoro, with the subjects being fifth-grade students and the fifth-grade teacher. The total number of fifth-grade students involved in the study was 31, while there was one teacher, the class teacher. The development process in this study followed the five stages of the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) (Branch, 2010). The stages in the ADDIE model are presented in Figure 1.



Figure 1. ADDIE Model

Figure 1 shows the five stages of developing the Baamboozle game learning media using the ADDIE model: (1) Analysis: includes needs, curriculum, and material analysis, gathering data through teacher interviews, classroom observations, and questionnaires to understand student needs and challenges; (2) Design: developing the media based on analysis results, ensuring alignment with curriculum and learning objectives; (3) Development: creating a prototype and validating it through expert feedback to ensure it meets expectations; (4) Implementation: implementing the media with 31 fifth-grade students, including a pretest and two math lessons; (5) Evaluation: measuring the media's practicality and effectiveness by comparing pretest and posttest results and gathering student feedback via questionnaires.

Data for this study were collected through observation, tests, interviews, and questionnaires. The interview instrument grid, presented in Table 1, includes questions about students' difficulties, the learning process, and challenges faced in mathematics learning. Media validation was conducted by subject matter and media experts using the instrument framework shown in Table 2. The written test consisted of pretests and post-tests with short-answer story problems designed to measure students' problem-solving skills in mathematics after using the Baamboozle game as a learning medium. The pretest and posttest framework are presented in Table 3. Data analysis techniques included analyzing initial data, product data, and final data. Data normality was tested using the SPSS application with the Shapiro-Wilk test, suitable for samples smaller than 50, as this study involved 31 students. Product analysis involved expert validation to assess media design, and student response questionnaires were used to evaluate the product's feasibility, with the questionnaire framework presented in Table 4. Data from pretests and post-tests were analyzed using a paired-sample t-test to determine significant improvements in students' mathematics problem-solving abilities after using the Baamboozle media.

Table 1. Teacher Interview Grid

| Aspect Investigated | Indicator | Questions |
|-------------------------|--------------------------------------|--|
| Student Characteristics | Difficulty, interest, learning style | What are the main difficulties students face in learning mathematics? What makes students interested or disinterested in math lessons? How would you describe students' general learning styles? |
| Learning Process | Model, methods, media, | What teaching methods do you most often use? |

| Aspect Investigated | Indicator | Questions |
|--------------------------|--|---|
| Challenges and Solutions | evaluation | Which media do you find most effective? How do you evaluate student understanding? |
| | Obstacles, solutions, innovations | What are the biggest challenges in teaching mathematics? What solutions have you implemented? Are there any teaching innovations you would like to try? |
| Lesson Material | Difficult topics, learning resources, facilities | What topics do students find difficult to understand? Are the learning resources adequate? Are the facilities sufficient for the learning process? |

Table 2. Expert Validation Instrument Framework for Content and Media

| Expert Validation | Assessment Aspect | Indicators | Question Numbers |
|-------------------|--|---|------------------|
| Content | Relevance | Relevance of content with the learning outcomes (CP) and teaching objectives (TP) | 1,2 |
| | Accuracy | Accuracy of content in relation to CP and TP | 3 |
| | | Content is appropriate to the developmental level of students | 4,5 |
| | Clarity of presentation | Clear and structured presentation of content | 6,7 |
| | Effectiveness of learning | Effective presentation of mathematics content | 8,9,10 |
| Media | Language accuracy | Clarity of language and ease of understanding | 11,12 |
| | Usefulness of content | Content stimulates students' knowledge | 13 |
| | Media relevance | Content in media is relevant to CP and TP | 1,2 |
| | Appearance | Language suitability | |
| | | Consistency in term usage | 3,4, 5 |
| Ease of use | Image relevance to content Clear and attractive images Instructions for use are clear and easy to understand | 6 | |

Table 3. Pretest and Posttest Framework

| Learning Outcome | Indicators | Question Type | Question Numbers |
|--|---|---------------|--------------------|
| Students can compare the characteristics of triangular shapes | 1. Identify the types of triangles | Essay | 1 to 5 (Pretest) |
| | 2. Analyze the properties of triangles | | 1 to 10 (Posttest) |
| Students can compare the characteristics of quadrilateral shapes | 1. Identify the types of quadrilaterals | Essay | 1 to 10 (Pretest) |
| | 2. Analyze the properties of quadrilaterals | | 1 to 15 (Posttest) |

Table 4. Student Response Questionnaire Framework

| Assessment Aspect | Indicator | Question Numbers |
|-------------------|--|--------------------------------------|
| Function | Ease of use of the Baamboozle game media Influence of media on student comprehension Student interest in using Baamboozle game media Satisfaction with Baamboozle game media Media appearance is attractive and easy to understand | 1,2,3,4,5,6,7,8,9,10,11,12, 13,14,15 |

3. RESULT AND DISCUSSION

Result

The Baamboozle game-based learning media has been developed using the ADDIE development model, which consists of five stages: analysis, design, development, implementation, and evaluation. The analysis phase includes needs, curriculum, and content analysis. Data was collected through interviews, observations, and questionnaires with both teachers and students. In the analysis phase of the ADDIE model, the researcher at SDN Kalisegoro focused on three main aspects: needs, curriculum, and content. The needs analysis identified issues in mathematics learning, particularly in the topic of flat shapes. These issues include students' difficulties in understanding and distinguishing the characteristics of geometric shapes and their low ability to solve word problems. The research revealed that the limited learning media, which only includes textbooks, images, and videos, along with conventional teaching methods, negatively impacted student learning outcomes. Therefore, the researcher sought more effective alternative learning media.

Next, the curriculum analysis aimed to ensure that the developed learning media, Baamboozle, aligns with the Merdeka Curriculum. This involved reviewing the Learning Outcomes (*Capaian Pembelajaran* - CP), Learning Objectives (*Tujuan Pembelajaran* - TP), and indicators to ensure that the game supports the achievement of competencies outlined in the curriculum and meets the needs of the students. The content analysis assessed the materials to be included in the game, focusing on the topic of flat shapes. The researcher ensured that the topics and questions presented in the Baamboozle game align with the curriculum and the cognitive level of the fifth-grade students. The goal was to ensure that the game effectively helps students understand the concepts and improves their ability to solve mathematical word problems.

In the design phase, the researcher designed a web-based Baamboozle game intended to address the identified issues. The game was designed to enhance student engagement and understanding of the material on flat shapes. The media includes features that stimulate students' curiosity, encourage active participation, and boost learning motivation. Baamboozle was chosen because it had not been implemented at SDN Kalisegoro before and offered advantages such as an attractive interface and flexibility for use both in school and at home. In the development phase, the researcher developed the Baamboozle game, which contains content about comparing the characteristics of flat shapes in the form of story problems, both illustrated and non-illustrated. The game also incorporates game features such as point collection, subtraction, and addition, aimed at increasing excitement and student engagement.

In the implementation phase, the Baamboozle game was trialed in a fifth-grade class to assess its effectiveness in enhancing students' understanding and motivation towards the topic of flat shapes. During this phase, the researcher conducted observations and gathered feedback from both students and teachers. Finally, in the evaluation phase, the developed product was reviewed by content and media experts to ensure its suitability before being used more widely. The validation results from the content and media experts are presented in [Table 5](#), which includes assessments of the material quality, media suitability, and the product's effectiveness in achieving learning objectives. The ADDIE model ensures that the media development process is carried out systematically, focusing on student needs, with evaluations aimed at improving the quality and effectiveness of the product.

Table 5. Product Validation Results

| No | Product Validation | Validation Result | Criteria |
|----|---------------------------|-------------------|---------------|
| 1 | Content Expert Validation | 88% | Very Feasible |
| 2 | Media Expert Validation | 92% | Very Feasible |

Based on the [Table 5](#), it is known that the content expert validation test obtained a percentage of 88%, and the media expert validation test obtained 92%. Both validation results received the "very feasible" criteria. Therefore, the Baamboozle game media for the material on flat shapes in mathematics instruction for 5th grade students at SDN Kalisegoro can be considered highly feasible for implementation. After the validation process, the researcher made revisions to the product design based on the feedback from the content and media experts before implementing it. The product, before and after the revision, is presented in [Table 6](#).

Table 6. Revised Product

| Before Revision | After Revision |
|---|---|
|  <p>berdasarkan sudutnya, bangun datar tersebut bernama</p> <p>✓ 20</p> | <p>Bangun datar yang memiliki 3 sisi dan 3 sudut disebut(5 Poin)</p> <p>✓ 5</p>  <p>Cici sedang membuat sosis dengan bentuk yang berbeda-beda. Dari</p> |
| <p>sudut yang besarnya 90 derajat disebut dengan sudut....</p> <p>✓ 20</p> | <p>cici memiliki sebuah bangun datar yang telah ia ukur sudutnya dengan total jumlah sudutnya 180 derajat. Bangun datar yang diukur cici adalah.....(5 poin)</p> <p>✓ 5</p>  <p>Cia sedang berbelanja di Mall dekat rumahnya. Ia membeli 3 jenis makanan yang berbentuk segitiga. Salah satunya memiliki ciri-ciri 2 sisinya sama panjang. Dari ketiga jenis makanan tersebut yang dimaksud makanan berbentuk segitiga. (10 poin)</p> |
| <p>sudut yang besarnya lebih dari 90 derajat disebut dengan sudut....</p> <p>✓ 20</p> | <p>Andi sedang mengukur sebuah segitiga dengan besar sudutnya < 90 derajat. Segitiga tersebut merupakan segitiga(10 Poin)</p> <p>✓ 10</p>  <p>Lulu mempunyai 2 jenis sandwich yang berbentuk segitiga. Satu diantaranya memiliki ciri-ciri yaitu memiliki salah satu sudutnya 90 derajat. Sandwich Lulu yang dimaksud berbentuk segitiga.....(10 poin)</p> |
| <p>sudut siku-siku adalah....</p> <p>✓ 20</p> | |

The product revision was carried out based on the feedback and suggestions from the content and media experts. Specifically, the story problems in the product were revised to incorporate concrete images and higher-order thinking skills (HOTS) questions, making the display in the Baamboozle game media more engaging. The final result of the Baamboozle game learning media is presented in Figure 2.

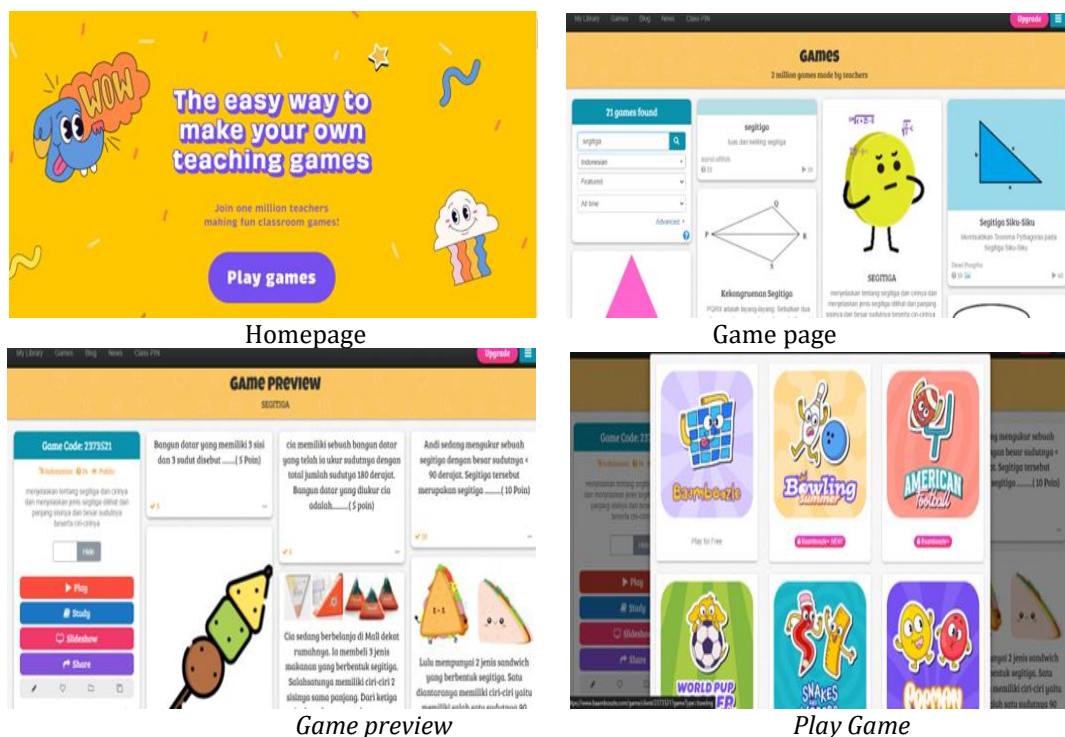


Figure 2. Final Result of the Media

Next, the implementation phase, where the product will be used in the learning process, is carried out. The implementation is conducted by the researcher using the One Group Pretest-Posttest Design with a sample of 31 students. The implementation is carried out over two meetings, each focusing on different topics. The first meeting addresses Topic A, which involves comparing the characteristics of triangles, while the second meeting covers Topic B, which involves comparing the characteristics of quadrilaterals. Before using the Baamboozle game-based learning media, all students complete a pretest to assess their prior knowledge and understanding of the topics to be studied. Afterward, all students engage in learning using the Baamboozle game-based learning media to study the topic of comparing the characteristics of plane figures in mathematics.

After the product has been used, students are given a feedback questionnaire containing several questions to measure the feasibility of the Baamboozle game-based learning media. The results of the student feedback questionnaire regarding the use of the product are presented in Table 7.

Table 7. Student Feedback Results

| Aspects | Score | Criteria |
|----------|-------|---------------|
| Function | 95.8% | Very Feasible |

Based on Table 7, the score of 95.8% falls under the "Very Feasible" category, reflecting the positive feedback from students regarding the Baamboozle game-based learning media. After using this media, students expressed satisfaction and found the learning experience more enjoyable. Moreover, most students agreed that the Baamboozle game media made it easier to understand the topic of comparing the characteristics of flat shapes in mathematics. The final stage is the evaluation phase. All students were given a posttest and completed it within the allotted time. The results from both the pretest and posttest were used to assess the effectiveness of the Baamboozle game media in teaching the topic of comparing the characteristics of flat shapes in mathematics to fifth-grade students at SDN Kalisegoro. To analyze the pretest and posttest data, a normality test was conducted using SPSS. Since the sample size is less than 50, the Shapiro-Wilk test was applied. The results of the Shapiro-Wilk test for Topic A and Topic B are presented in Table 8.

Table 8. Results of the Normality Test using the Shapiro-Wilk Test

| Score | Statistic | df | Sig. |
|------------|-----------|----|-------|
| Pretest A | 0.937 | 31 | 0.690 |
| Posttest A | 0.955 | 31 | 0.214 |
| Pretest B | 0.963 | 31 | 0.356 |
| Posttest B | 0.914 | 31 | 0.160 |

Based on Table 8, the results of the normality test for the Pretest Topic A show a significance value of 0.69, while the Posttest Topic A results show a significance value of 0.214. Since the significance values are greater than 0.05, the data for both the pretest and posttest of Topic A follow a normal distribution. Similarly, the normality test for the Pretest Topic B shows a significance value of 0.356, and the Posttest Topic B results have a significance value of 0.16. As the significance values for both are greater than 0.05, the data for both the pretest and posttest of Topic B are also normally distributed. Therefore, the data for both the pretest and posttest of Topic A and Topic B are normally distributed. When the data follows a normal distribution, the appropriate statistical test to use is a parametric test. The parametric test employed to determine the effectiveness of the learning media based on the pretest and posttest scores is the paired samples t-test. The results of the t-test are presented in Table 9 for Topic A and Topic B.

Table 9. Results of the Effectiveness Test Based on the Pretest and Posttest Scores

| Paired Groups | Paired Differences | | | | | t | df | Significance (p) | |
|---------------|--------------------|----------------|-----------------|--|---------|---------|----|------------------|-----------|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Differences | | | | One-sided | Two-sided |
| | | | | Lower | Upper | | | | |
| Topic A | -24.516 | 10.905 | 1.959 | -28.516 | -20.516 | -12.517 | 30 | <0.001 | <0.001 |
| Topic B | -21.935 | 7.492 | 1.346 | -24.684 | -19.187 | -16.302 | 30 | <0.001 | <0.001 |

Based on the results of the t-test for the pretest and posttest scores for Topics A and B, the significance value was found to be < 0.001 , indicating that the sig (2-tailed) value is smaller than $\alpha = 0.05$. This means there is a significant difference between the pretest and posttest results after the use of the Baamboozle game-based learning media. This is evidenced by the average pretest score for Topic A, which was 51.7742, and the average posttest score for Topic A, which was 72.2903. For Topic B, the average pretest score was 59.1935, and the average posttest score was 81.1290. The difference in average scores shows that the use of the Baamboozle game-based learning media was effective in improving students' learning outcomes in the topic of comparing the characteristics of flat shapes.

Discussion

The results of this study indicate that the Baamboozle game-based learning media is proven to be effective, highly feasible, and applicable in the learning process. This is evidenced by the t-test results for the pretest and posttest scores for Topics A and B, which both show a significance value (2-tailed) of $<$

0.001, smaller than 0.05. Thus, it can be concluded that the use of Baamboozle game-based learning media is effective for the flat shapes topic in the fifth-grade students of SDN Kalisegoro in mathematics learning. The Baamboozle game contains short-answer story problems that stimulate students to think critically and improve their ability to solve mathematical problems. This media not only makes students more interested and motivated to learn, but also helps them solve story problems more effectively. Furthermore, Baamboozle can be applied to other subjects, such as English, Science, Javanese, and History, as demonstrated in previous studies (Iskandar et al., 2022; Khoiro et al., 2023; Murti et al., 2023; Rohman, 2024).

According to Piaget's theory, children in the concrete operational stage are better able to understand abstract concepts through concrete and interactive media (Antara et al., 2022; Parmiti et al., 2021). This study supports that theory by showing how Baamboozle, as a concrete learning tool, can assist students in understanding abstract mathematical concepts (Marinda, 2020; Ummi & Yusuf, 2021). Interactive and game-based learning media such as Baamboozle has also been shown to enhance student learning outcomes (Azzahra & Pramudiani, 2022; Khairunnisa & Ilmi, 2020; Ula et al., 2020). Therefore, it is crucial for teachers to master technology in order to create learning experiences that align with current educational developments, as learning media can facilitate student understanding and positively influence their learning outcomes (Hanifah et al., 2019; Pangestu et al., 2019).

This study focuses on the development and implementation of interactive learning media to enhance students' mathematical problem-solving abilities. By developing engaging and enjoyable learning media, it is expected to increase students' interest and ability to solve mathematical problems (Buchori, 2019; Ira Harahap et al., 2021; Tampubolon & Manurung, 2022). Mathematical problem-solving skills are essential, not only for academic success but also as vital life skills in society (Candra & Rahayu, 2021; Nugraha, 2024). However, the reality is that students' mathematics achievement is often low, indicating the need for more effective learning media, such as the Baamboozle game (Iskandar et al., 2022; Murti et al., 2023). As a game-based learning media, Baamboozle has been proven effective in increasing student motivation, interest, and engagement in learning. Several previous studies have shown that Baamboozle can enhance student engagement and motivation, as well as their academic achievement (Iskandar et al., 2022; Khoiro et al., 2023; Sa'diyah et al., 2021). However, no research has specifically demonstrated that Baamboozle can improve students' mathematical problem-solving abilities. Through interviews and observations, it was found that students faced difficulties in understanding mathematical concepts and that the current learning media were not engaging. Thus, this study offers a concrete solution by using the Baamboozle game, which is designed to address the needs and challenges of teaching mathematics at SDN Kalisegoro. After using Baamboozle, students will take a post-test to evaluate the impact of this media on their mathematical problem-solving skills. The evaluation results provide strong empirical evidence of Baamboozle's effectiveness as a learning tool, as well as its positive impact on increasing students' interest and motivation.

This study offers the advantage of introducing and implementing the Baamboozle game as a mathematics learning media at the elementary school level. The primary focus of this research is to enhance students' problem-solving abilities in mathematics, specifically in the topic of comparing the characteristics of flat shapes. This research contributes significantly to the development of critical and analytical thinking skills among students, which are crucial in mathematics education. Moreover, this study presents an innovative approach to teaching mathematics through interactive and enjoyable methods. However, the study has some limitations, such as focusing on only one topic and using limited data collection methods. Additionally, the sample only includes one school, and the duration of the study was relatively short. To obtain more comprehensive results, further research is needed with a larger sample, a broader scope of learning material, and more diverse data collection methods. This study makes a significant contribution to the development of innovative and interactive technology-based learning media. The findings may encourage the integration of technology into the elementary education curriculum, enhance the effectiveness of learning, and provide an effective alternative for improving the quality of education in schools.

The findings of this study contribute significantly to the field of education, particularly in the integration of game-based learning in mathematics instruction. The use of the Baamboozle game as a learning media has proven effective in enhancing students' problem-solving skills and increasing their motivation and engagement in mathematics. This suggests that interactive, game-based media can be a valuable tool in improving learning outcomes, particularly in abstract subjects like mathematics. The implications of these findings are broad, as they highlight the potential for incorporating more innovative and engaging teaching methods to address the challenges of traditional learning environments. It is recommended that educators incorporate game-based learning tools, such as Baamboozle, into their teaching practices to enhance student engagement, motivation, and achievement. Additionally, future

research should explore the application of similar tools across different subjects and educational levels to further validate their effectiveness in diverse learning contexts.

4. CONCLUSION

The conceptual findings of this study highlight the significant role of interactive, game-based learning media, specifically Baamboozle, in enhancing students' mathematical problem-solving abilities. By integrating engaging and flexible learning tools, this research underscores the importance of bridging traditional teaching methods with innovative approaches to cater to the diverse needs of students. The study also demonstrates how the use of game-based media can foster a deeper understanding of abstract concepts, increase motivation, and create a more dynamic learning environment. Ultimately, the findings emphasize the value of incorporating technology-driven, student-centered methods to support effective learning and improve educational outcomes in mathematics.

5. REFERENCES

- Albay, E. M. (2019). Analyzing the effects of the problem solving approach to the performance and attitude of first year university students. *Social Sciences & Humanities Open*, 1(1). <https://doi.org/10.1016/j.ssaho.2019.100006>.
- Antara, I. G. W. S., Suma, K., & Parmiti, D. P. (2022). E-Scrapbook: Konstruksi Media Pembelajaran Digital Bermuatan Soal-soal Higher Order Thinking Skills. *Jurnal Edutech Undiksha*, 10(1), 11–20. <https://doi.org/10.23887/jeu.v10i1.47559>.
- Aulia, J., & Kartini, K. (2021). Analisis kesalahan siswa dalam menyelesaikan soal matematika pada materi himpunan kelas VII SMP/MTs. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 5(1), 484–500. <https://doi.org/10.31004/cendekia.v5i1.503>.
- Azzahra, M. D., & Pramudiani, P. (2022). Pengaruh Quizizz sebagai media interaktif terhadap minat belajar siswa pada pelajaran matematika kelas V di sekolah dasar. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 3203–3213. <http://repository.uhamka.ac.id/id/eprint/21067/>.
- Branch, R. M. (2010). Instructional design: The ADDIE approach. In *Instructional Design: The ADDIE Approach*. Springer. <https://doi.org/10.1007/978-0-387-09506-6>.
- Buchori, A. (2019). Pengembangan multimedia interaktif dengan pendekatan kontekstual untuk meningkatkan pemecahan masalah kemampuan matematika. *Jurnal Inovasi Teknologi Pendidikan*, 6(1), 104–115. <https://doi.org/10.21831/jitp.v6i1.20094>.
- Cahyani, H., & Setyawati, R. W. (2016). Pentingnya peningkatan kemampuan pemecahan masalah melalui PBL untuk mempersiapkan generasi unggul menghadapi MEA. *Prisma*, 2. <https://journal.unnes.ac.id/sju/index.php/prisma/article/download/21635/10234>.
- Candra, A. M., & Rahayu, T. S. (2021). Pengembangan media pembelajaran berbasis game interaktif untuk meningkatkan kemampuan pemecahan masalah tematik di sekolah dasar. *Jurnal Basicedu*, 5(4), 2311–2321. <https://doi.org/10.31004/basicedu.v5i4.1212>.
- Daut Siagian, M. (2017). Pembelajaran matematika dalam perspektif konstruktivisme. *Jurnal Pendidikan Islam Dan Teknologi Pendidikan*, 7(2). <https://jurnaltarbiyah.uinsu.ac.id/index.php/nizhamiyah/article/download/188/175>.
- Dewi Mariani, S., Ayu Larasati, D., Perdana Prasetya, S., & Stiawan, A. (2022). Pengaruh pembelajaran hybrid learning menggunakan media Baamboozle terhadap hasil belajar dan minat belajar siswa SMP. *PENIPS*, 2(2), 206 – 216. <https://ejournal.unesa.ac.id/index.php/PENIPS/article/view/48607>.
- Hanifah, H., Supriadi, N., & Widyastuti, R. (2019). Pengaruh model pembelajaran e-learning berbantuan media pembelajaran Edmodo terhadap kemampuan pemecahan masalah matematis peserta didik. *NUMERIK: Jurnal Matematika Dan Pendidikan Matematika*, 3(1). <https://doi.org/10.25217/numerical.v3i1.453>.
- Hayati, M., & Jannah, M. (2024). Pentingnya kemampuan literasi matematika dalam pembelajaran matematika. *Journal of Mathematics Education and Application*, 4(1), 40. <https://mathjournal.unram.ac.id/index.php/Griya/article/view/416/400>.
- Hidayati, R. M., & Wagiran, W. (2020). Implementation of problem-based learning to improve problem-solving skills in vocational high school. *Jurnal Pendidikan Vokasi*, 10(2), 177–187. <https://doi.org/10.21831/jpv.v10i2.31210>.
- Ira Harahap, A., Musdi, E., & Asmar, A. (2021). Pengembangan media pembelajaran interaktif berbasis problem based learning (PBL) berbantuan Android untuk meningkatkan kemampuan pemecahan masalah matematis peserta didik kelas VII SMP Negeri 1 Sosopan. *Jurnal Edukasi Matematika Dan*

- Sains, 9(2), 371–383. <https://doi.org/10.25273/jems.v9i2.10634>.
- Iskandar, R., F., A., & S. (2022). Penggunaan aplikasi Baamboozle untuk meningkatkan antusias belajar siswa di sekolah dasar. *Jurnal Pendidikan Dan Pembelajaran Dasar*, 4(1), 1251–1252. <https://journal.universitaspahlawan.ac.id/index.php/jpdk/article/view/10545/8052>.
- Kamarullah. (2017). Pendidikan Matematika Di Sekolah Kita. *Al Khawarizmi: Jurnal Pendidikan Dan Pembelajaran Matematika*, 1(1), 21–32. <https://www.jurnal.ar-raniry.ac.id/index.php/alkhawarizmi/article/download/1729/1272>.
- Khairunnisa, G. F., & Ilmi, Y. I. N. (2020). Media pembelajaran matematika konkret versus digital: Sistematis tinjauan pustaka di era revolusi industri 4.0. *Jurnal Tadris Matematika*, 3(2). <https://ejournal.uinsatu.ac.id/index.php/jtm/article/view/3243/1527>.
- Khoiro, D. M., Samsiah, A., & Kegiatan, A. (2023). Penerapan media pembelajaran Baamboozle dalam meningkatkan motivasi belajar pada siswa kelas X di SMAN 1 Pamarayan. *Edukasi Dan Sains*, 6(1). <https://stkipbima.ac.id/jurnal/index.php/ES/article/view/1457>.
- Maesari, C., & Marta, R. (2019). Penerapan model pembelajaran problem solving untuk meningkatkan kemampuan pemecahan masalah matematika siswa sekolah dasar. *Journal on Teacher Education*, 1(1). <https://journal.universitaspahlawan.ac.id/index.php/jote/article/download/508/435>.
- Mansur, H. (2020). Pengembangan media pembelajaran infografis untuk meningkatkan minat belajar mahasiswa. *Jurnal Komunikasi Pendidikan*, 4(1), 37–48. <https://doi.org/10.32585/jkp.v4i1.443>.
- Marinda, L. (2020). Teori perkembangan kognitif Jean Piaget dan problematiknya pada anak usia sekolah dasar. *Insani: Jurnal Pendidikan Dasar*, 1(1). <https://journal.unimar-amni.ac.id/index.php/insdun/article/download/2249/1875/6728>.
- Muharni, F., Anitra, R., & Husna, N. (2024). Kemampuan pemecahan masalah matematis ditinjau dari rasa ingin tahu siswa sekolah dasar. *Pedadidaktika: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 11(1), 55–56. <https://ejournal.upi.edu/index.php/pedadidaktika/article/download/69197/27085>.
- Murti, M., Jais, M., & Rahim, F. (2023). Pengaruh penerapan metode game based learning (Baamboozle) sebagai media evaluasi terhadap hasil belajar bahasa Inggris siswa SMP Negeri 40 Bulukumba. *Jurnal Kependidikan Media*, 12. <https://journal.unismuh.ac.id/index.php/media/article/view/13026>.
- Nisa Maghfiroh, A., Ferelian El Hilaly Daksana, M., & Nikhlatus Salma, S. (2024). Efektivitas penggunaan media pembelajaran interaktif dalam pembelajaran matematika di sekolah dasar. *Griya Journal of Mathematics Education and Application*, 4(1). <https://mathjournal.unram.ac.id/index.php/Griya/article/view/429/401>.
- Nugraha, C. (2024). Pengembangan media pembelajaran interaktif untuk meningkatkan kemampuan pemecahan masalah matematika. *Dunia Ilmu*, 4(1). <http://duniailmu.org/index.php/repo/article/view/318>.
- Nuha, N. T., Putri, S. A., Azzunkha, P. L., & Susilo, B. E. (2024). Kajian teori: Pendekatan pembelajaran kontekstual guna meningkatkan kemampuan pemecahan masalah matematis. *PRISMA, Prosiding Seminar Nasional Matematika*, 4, 324–327. <https://proceeding.unnes.ac.id/prisma/article/download/2969/2432/7290>.
- Nurdiana, A., & Hasanudin, C. (2023). Penggunaan teknologi dalam pembelajaran matematika. *Prosiding Seminar Nasional Pendidikan*, 1. <https://prosiding.ikipgribojonegoro.ac.id/index.php/SND/article/view/1704>.
- Nurrita, T. (2018). Pengembangan media pembelajaran untuk meningkatkan hasil belajar siswa. *MISYKAT: Jurnal Ilmu-Ilmu Al-Quran, Hadist, Syari'ah Dan Tarbiyah*, 3(1), 171. <https://core.ac.uk/download/pdf/268180802.pdf>.
- Oktara, D. Y. C., Anggraini, F., & Studi Pendidikan Matematika, P. (2019). Media pembelajaran matematika interaktif dalam upaya menumbuhkan karakter siswa. *Jurnal Ilmiah Pendidikan Matematika*, 1(2), 15–22. <https://jurnal.umj.ac.id/index.php/SEMNASFIP/article/download/5128/3410>.
- Pangestu, A., Purwadi, H., & Agustini, F. (2019). Pengembangan media Parajo (Puzzle Gambar Rumah Adat Joglo) berbasis model Number Head Together pada pembelajaran matematika. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 3(2), 117–126. <https://garuda.kemdikbud.go.id/documents/detail/2688382>.
- Parmiti, D., Rediani, N., Antara, I., & Jayadiningrat, M. (2021). The Effectiveness of Local Culture-Integrated Science Learning Through Project Based Assessment on Scientific Attitudes and Science Process Skills of Elementary School Students. *Jurnal Pendidikan IPA Indonesia*, 10(3), 439–446. <https://doi.org/10.15294/jpii.v10i3.31301>.
- Rambe, A. Y. F., & Afri, L. D. (2020). Analisis kemampuan pemecahan masalah matematis siswa dalam menyelesaikan soal materi barisan dan deret. *AXIOM: Jurnal Pendidikan Dan Matematika*, 9(2),

- 175–185. <https://doi.org/10.30821/axiom.v9i2.8069>.
- Rohman, N. F. (2024). Penerapan model PBL berbantuan aplikasi Baamboozle untuk meningkatkan hasil belajar aksara Jawa pada siswa kelas IV SDN Banjarpanjang 1. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 8(2), 2152–2155. <https://journal.unpas.ac.id/index.php/pendas/article/view/9982/4014>.
- Sa'diyah, I., Savitri, A., Febiola, S., Widjaya, G., & Wicaksono, F. (2021). Peningkatan keterampilan mengajar guru SD/MI melalui pelatihan media pembelajaran edugames berbasis teknologi: Quizizz dan Baamboozle. *Jurnal Publikasi Pendidikan (Publikan Journals UNM)*, 11, 198–204. <https://doi.org/10.26858/publikan.v11i3.22951>.
- Sari, M., & Hasanudin, C. (2023). Manfaat ilmu matematika bagi peserta didik dalam kehidupan sehari-hari. In *Prosiding Seminar Nasional Pendidikan* (p. 1). <https://prosiding.ikipgribojonegoro.ac.id/index.php/SND/article/view/1929>.
- Susilawati, R., & Prasetyo, M. P. (2023). Analisis berpikir reflektif siswa dalam memecahkan masalah matematika dengan konteks budaya berdasarkan gaya kognitif di MAN 2 Aceh Besar. *Jurnal Ilmiah Mahasiswa*, 4(1). <https://jim.bbg.ac.id/pendidikan/article/download/780/511/2347>.
- Tampubolon, R., & Manurung, N. (2022). Pengembangan media pembelajaran berbasis multimedia interaktif untuk meningkatkan kemampuan pemecahan masalah matematis siswa kelas VIII SMP. *Jurnal Inspiratif*, 8(2), 125–135. <https://jurnal.unimed.ac.id/2012/index.php/jpmi/article/download/37198/19005>.
- Ula, N., Hartatik, S., Nafiah, N., & Akhwani, A. (2020). Meta-analisis pengaruh media visual terhadap minat belajar siswa SD pada pembelajaran matematika. *AKSIOMA: Jurnal Matematika Dan Pendidikan Matematika*, 11(1), 82–92. <https://journal.upgris.ac.id/index.php/aksioma/article/view/6223>.
- Ummi, R. S., & Yusuf, S. (2021). Teori perkembangan belajar psikologis kognitif Jean Piaget: Implementasi dalam pembelajaran matematika di bangku sekolah dasar. *Jurnal Karimah Tauhid*, 3(2), 1490–1501. <https://doi.org/10.30997/karimahtauhid.v3i2.11810>.
- Wardani, M. E., & Kiptiyah, S. M. (2024). Game-based learning model with Baamboozle media based on artificial intelligence increases student engagement and learning outcomes. *Jurnal Ilmiah Sekolah Dasar*, 8(2), 293–303. <https://doi.org/10.23887/jisd.v8i2.67141>.
- Widayati, E. W. (2022). Pembelajaran matematika di era “Merdeka Belajar,” suatu tantangan bagi guru matematika. *SEPREN: Jurnal Pendidikan*, 04(01), 1–10. <https://jurnal.uhn.ac.id/index.php/sepren/article/view/770>.