

# GeoCanBlo Interactive Learning Media Implementation Assistance to Improve Spatial Skills

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**Abstract.** The mathematical spatial abilities of junior high school/MTsN students are often problematic; they frequently experience difficulties in visualizing and manipulating 2D and 3D objects in geometry. In addition, the use of digital media in mathematics learning is not yet optimal. Therefore, systematic assistance is needed to integrate visual, interactive, and game-based learning technologies. This community service aims to implement GeoCanBlo interactive learning media in geometry lessons to improve the mathematical spatial abilities of ninth-grade students at MTsN 5 Padang City. GeoCanBlo is an innovative learning medium that integrates Canva as a visual medium, GeoGebra as a means of dynamic geometry exploration, and Blooket games as an interactive evaluation medium for flat-sided shapes. This community service method uses the Implementation and Evaluation Method, which combines the implementation of teaching aids, student hands-on practice, and evaluation of learning products. The subjects of this community service are ninth-grade students at MTsN 5 Padang City, totaling . The research instrument is a mathematical spatial ability test that has been tested for validity and reliability. The research data was analyzed using a paired samples t-test. The results of this activity showed that there was an increase in students' mathematical spatial abilities before and after the application of the GeoCanBlo interactive learning media, as indicated by a significance value of less than 0.05. In addition, the use of GeoCanBlo media can increase student engagement in learning and help students understand spatial concepts in a more visual and interactive way. The implications of this activity show that GeoCanBlo media can be used as an alternative sustainable innovative learning model, supporting the strengthening of teachers' digital literacy, and encouraging the creation of more effective, interesting, and student-oriented mathematical learning that focuses on the development of spatial thinking skills.

**Keywords:** GeoCanBlo, interactive, learning, media

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## INTRODUCTION

The development of information and communication technology has brought significant changes in the world of education, including in mathematics learning. The use of digital technology in the learning process not only acts as a supporting tool, but also as the main medium in building a more meaningful understanding of concepts [1]. Technology-based learning allows students to gain a more visual, interactive, and contextual learning experience, thereby increasing engagement and motivation to learn, especially in mathematics learning [2]. Mathematics learning plays an important role in developing students' thinking competencies, especially in higher-order thinking skills, one of which is spatial ability.

Spatial ability is related to students' ability to visualize, manipulate, and understand the relationships between objects in space [3]. Spatial ability in mathematics refers to a person's ability to visualize, manipulate, and understand the relationships between shapes in three-dimensional space and represent them in two-dimensional form accurately [4]. Spatial understanding is a crucial skill in geometry learning because it helps students understand abstract mathematical objects and solve problems related to the shape, size, and orientation of flat-sided and three-dimensional shapes effectively [5]. Several studies have shown that spatial ability is strongly related to geometry learning achievement and students' mathematical representation abilities in the context of spatial and plane geometry [6]. This ability is very necessary in understanding the concept of flat shapes, spatial shapes, geometric transformations, and other visual representations [7].

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However, in reality, many students still experience difficulties in developing spatial abilities, especially when learning is still dominated by conventional methods that lack visualization. Based on the results of initial observations at MTsN 5 Padang City, it was found that the spatial abilities of grade IX students are still relatively low. Students tend to experience difficulties in imagining three-dimensional shapes, determining the position and orientation of objects, and solving problems that require spatial visualization skills. In addition, the use of digital learning media by teachers has not been optimal, so that mathematics learning is still centered on verbal explanations and the use of textbooks. In line with that, geometry learning, especially on the material of flat-sided solid shapes, still uses a conventional approach. This approach tends to be less supportive of the development of students' spatial abilities [8]. Learning that only focuses on teacher lectures without the support of visual and interactive media makes students experience difficulties in visualizing geometric objects concretely [9]. This has the potential to cause low learning motivation and students have difficulty in solving geometric problems that require spatial representation thinking. Low student involvement is also a factor that weakens the development of spatial abilities in the learning process [10].

Advances in information and communication technology have opened up new opportunities for the development of more interactive, visual, and contextual learning media to help students understand geometric concepts more meaningfully [11]. One of the software widely used in geometry learning is GeoGebra, which allows students to explore geometric objects dynamically, including manipulating geometric shapes and forming them based on different viewpoints [12]. Previous research has shown that the use of GeoGebra can improve students' spatial abilities in geometry material, because this software helps visualize, manipulate and form more concrete geometric representations [13].

In addition, the use of visual media such as Canva has also been proven to increase student interest and understanding through creative and informative presentation of materials, while educational games such as Blooket can increase student motivation and learning engagement through interesting game elements [14]. The combination of these three elements of visualization (Canva), dynamic exploration (GeoGebra), and motivational interactivity (Blooket game) is designed in the form of a Magic Space-based learning media which is expected to increase student engagement and provide a more varied and meaningful learning experience [15].

Along with technological advancements, various digital applications and platforms have become available to support mathematics learning. GeoGebra is dynamic mathematics software that can be used to visualize geometric concepts interactively. Canva can be used as a design tool to present learning materials in an engaging and systematic manner. Meanwhile, Blooket is a game-based learning platform that can be used for evaluation and reinforcement. The integration of these three platforms has the potential to create more innovative, enjoyable, and meaningful learning. In this community service activity, these three platforms are integrated into a single learning model called GeoCanBlo (GeoGebra, Canva, and Blooket). GeoCanBlo is designed to optimize concept visualization, enhance student interaction, and strengthen understanding through game-based evaluation. Through this approach, students are expected to not only understand concepts theoretically but also develop optimal spatial thinking skills.

Therefore, this community service activity focused on mentoring the implementation of the interactive learning media GeoCanBlo in mathematics learning in ninth-grade students at MTsN 5 Padang City. The mentoring was conducted systematically through training, hands-on practice, and ongoing evaluation for both teachers and students. This activity is expected to improve the quality of mathematics learning and strengthen students' spatial abilities.

## **METHODS**

This community service uses the Implementation and Evaluation Method approach, commonly used in educational studies, to implement learning media and evaluate its impact on student learning outcomes [16]. This approach has a scientific basis in the literature, which shows that implementing media in effective learning improves conceptual understanding and student learning outcomes when evaluated through appropriate instruments [17]. Research on the use of learning media in learning contexts is found in studies that show that real media implementation improves learning outcomes through pretest-posttest tests (for example in mathematics learning) and can be analyzed quantitatively to measure the improvement.

The research was conducted at MTsN 5 Padang City during the odd semester of the 2025-2026 academic year. The subjects were ninth-grade students directly involved in the implementation of learning using GeoCanBlo media. This study did not use a specific sampling technique, but rather implemented the learning media directly in classroom activities as part of the regular school learning process. The GeoCanBlo learning media used in this study integrates three main components: Canva as a visual medium for presenting material on flat-sided geometric shapes, GeoGebra as a dynamic geometric exploration tool for visualizing and manipulating three-dimensional objects, and the Blooket game as an interactive evaluation tool to increase student motivation and engagement.

The research instrument used was a spatial mathematics ability test administered before (pretest) and after (posttest) the implementation of the learning media. The test was structured based on spatial ability indicators, including visualization, spatial orientation, and representation of flat-sided geometric shapes. The test instrument was first tested for validity and reliability to ensure its suitability for use as a measure of students' spatial ability. Data obtained from the pretest and posttest results were analyzed using paired samples t-tests with the aid of statistical software. This test was used to determine whether there was a significant difference between students' spatial ability scores before and after the implementation of the learning media. The decision-making criteria were determined based on the significance value; if the significance value was less than 0.05, a significant difference was found.

## **RESULT AND DISCUSSION**

### **Preparation Stage**

The preparation stage began with the design of GeoCanBlo learning media tailored to the characteristics of the flat-sided geometric shapes material and student needs. The media was designed to engage students' visual interest through interactive visualizations using GeoGebra, engaging material packaging using Canva, and learning reinforcement through educational games based on Blooket. The integration of these three platforms aims to create a more enjoyable, active, and understandable learning experience.

Furthermore, research instruments were developed, including a learning outcome test in the form of fill-in-the-blank questions to measure students' spatial abilities and a student response questionnaire consisting of 15 statements. These instruments were used to obtain quantitative and qualitative data regarding the effectiveness of the learning media. The research subjects were 25 ninth-grade students at MTsN 5 Padang, selected as the sample for the activity.

### **Implementation**

The activity used a paired samples t-test research design and was conducted on Monday, November 24, 2025. The initial phase of the activity began with a pretest administered to 25 students to measure their initial spatial abilities before using the learning media. Pretest data was obtained from test results administered by subject teachers. Next, the GeoCanBlo media was implemented in mathematics learning. In this phase, students learned all the elements of flat-sided geometric shapes through interactive visualizations using GeoGebra. The material was presented systematically and engagingly using Canva, making it easier for students to understand the concepts. Furthermore, students actively engaged in Blooket-based games that served as a means of evaluation and reinforcement of the material. These activities encouraged a more interactive learning environment, increased learning motivation, and strengthened student participation.

After the learning process was completed, students were given a posttest with a difficulty level and question weight equivalent to the pretest. The posttest aimed to determine the improvement in students' spatial abilities after the implementation of the GeoCanBlo learning media. The implementation of this media can be seen in Figure 1 below:



Figure 1. Implementation of the GeoCanBlo learning media

## Results and Evaluation

This study aims to determine the implementation of GeoCanBlo learning media on the spatial mathematics abilities of ninth-grade students at MTsN 5 Padang City. The research data were obtained from the results of spatial mathematics ability tests given before (pretest) and after (posttest) the implementation of the learning media. The results of the data analysis can be seen in figure 2 below:

		Paired Samples Test							
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pai	pretest - postes	19.34783	15.32262	3.19499	-25.97382	12.72183	-6.056	22	.000

Figure 2. SPSS output results

Based on the analysis using a paired samples t-test, a difference in mean scores was obtained between the pretest and posttest results of students' spatial mathematical abilities. The statistical test results showed that the mean difference between the pretest and posttest was -19.35, indicating an increase in students' spatial mathematical abilities after the implementation of the GeoCanBlo learning media. The 95% confidence interval ranged from -25.97 to -12.72, which did not contain the zero value, indicating a significant difference. Furthermore, the results of the paired samples t-test showed a calculated t value of -6.056 with 22 degrees of freedom ( $df = 22$ ) and a significance value of Sig. (2-tailed) = 0.000. Because the significance value was less than 0.05 ( $0.000 < 0.05$ ), it can be concluded that there was a significant difference between students' spatial mathematical abilities before and after the implementation of the GeoCanBlo learning media. Thus, the application of GeoCanBlo media improves students' spatial mathematical abilities. These results indicate that implementing learning media that integrates visualization, dynamic exploration, and interactive evaluation can improve students' ability to understand the concept of flat-sided geometric shapes.

Based on the analysis of posttest results, students demonstrated improved abilities in naming the elements of geometric shapes, determining correct formulas, and performing calculations in a more structured manner. One example of student work after implementing the Magic Room media is shown in Figure 3:

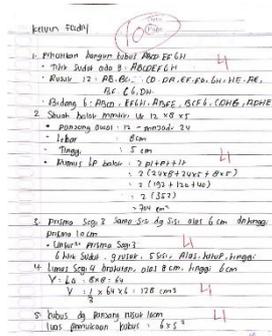


Figure 3. student spatial ability answer sheet

Based on student work and statistical analysis, it can be concluded that the GeoCanBlo learning media positively contributed to improving students' spatial mathematical abilities. The students' answers in Figure 1 demonstrate their ability to represent geometric shapes symbolically and visually, which is an important indicator of spatial ability. The use of Canva in GeoCanBlo media helps students understand the structure of geometric shapes through clear and engaging visualizations. This is evident in the students' ability to fully identify the elements of a cube and a prism. Furthermore, GeoGebra provides students with the opportunity to dynamically manipulate geometric shapes, making it easier for them to understand the relationships between sides, edges, and vertices. These findings align with research demonstrating that GeoGebra is effective in improving students' visualization and spatial representation skills.

Furthermore, the use of Blooket as an interactive evaluation medium increased student engagement in the learning process [18]. This active engagement impacted students' ability to systematically develop problem-solving steps [19], as seen in the calculations for surface area and volume written coherently by students in Figure 3. Thus, the qualitative analysis of student responses supported the quantitative analysis, which showed a significant improvement in students' spatial mathematical abilities after the implementation of the media[20]. The integration of visual, exploratory, and interactive media proved effective in helping students understand the concept of flat-sided geometric shapes more deeply.

In addition to using a mathematical spatial ability test, this study also included a student response questionnaire to assess students' responses to the use of the GeoCanBlo learning media. The questionnaire was structured using a Likert scale and addressed several aspects, including interest in the media, ease of use, clarity of visualization of geometric shapes, and the media's benefits in aiding understanding of the material on flat-sided geometric shapes. The results of the questionnaire analysis showed that the majority of students responded positively to the use of GeoCanBlo media. Students stated that the media was interesting, easy to use, and helped them better understand the concept of flat-sided geometric shapes. This positive response indicates that GeoCanBlo media was well-received by students and supported the geometry learning process in the classroom.

The improvement in students' spatial abilities after implementing GeoCanBlo media demonstrates that the integration of dynamic visualizations, engaging design, and educational games effectively supports the mathematics learning process [21]. Interactive visualizations through GeoGebra help students construct mental representations of geometric objects, thus facilitating their understanding of spatial concepts. Packaging the materials using Canva provides a systematic and engaging display, enabling students to focus more on the learning process. Meanwhile, the use of Blooket as a game-based evaluation tool creates a fun learning environment, reduces boredom, and increases student motivation and participation.

These results align with previous research findings that technology-based learning and interactive visualization can improve students' spatial thinking skills. The integration of these three platforms within the GeoCanBlo learning model provides a more comprehensive and meaningful learning experience[22]. Therefore, GeoCanBlo learning media can be used as an innovative alternative in mathematics learning, particularly geometry. This media not only helps visualize abstract concepts but also encourages active student engagement in the learning process.

## **CONCLUSION**

Based on the results of the mentoring activities and discussions, it can be concluded that the implementation of the interactive learning media GeoCanBlo (GeoGebra, Canva, and Blooket) in mathematics learning on flat-sided solids significantly improved the spatial abilities of ninth-grade students at MTsN 5 Kota Padang. This was demonstrated by an increase in the average posttest score compared to the pretest, as well as the results of the paired samples t-test, which showed a significance value of less than 0.05. The use of GeoGebra helps students visualize geometric concepts dynamically, Canva supports engaging and systematic presentation of material, and Blooket increases learning motivation through game-based evaluation. The integration of these three platforms creates a more interactive, enjoyable, and meaningful learning environment. In addition to positively impacting students, this mentoring activity also improves teachers' competency in utilizing digital learning media effectively. Therefore, the GeoCanBlo learning media can be used as an innovative alternative in mathematics learning, particularly geometry, and has the potential for sustainable implementation to support improved learning quality in schools.

Based on the results of this community service activity, the use of GeoCanBlo learning media needs to be continuously developed and utilized by teachers in the mathematics learning process. Teachers are expected to be able to creatively integrate this media according to the characteristics of the material and students' needs, so that learning becomes more effective and meaningful. Schools are also advised to provide support by providing adequate facilities and infrastructure, such as technological devices and stable internet access, to support the optimization of digital-based learning. Furthermore, students are expected to utilize GeoCanBlo media optimally as a tool for independent and collaborative learning to improve conceptual understanding and spatial thinking skills. The positive use of digital media is expected to foster learning independence and increase student motivation in mathematics learning.

The implications of this activity indicate that the implementation of GeoCanBlo media can be an alternative, innovative learning model that can be widely applied across various levels of education. This model has the potential to support strengthening digital literacy in teachers and students, improve the quality of mathematics learning, and encourage the creation of more interactive, adaptive learning that is oriented towards the development of higher-order thinking skills. Furthermore, the results of this activity can serve as a basis for further research and community service to develop digital learning media for a wider variety of materials and contexts.

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