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The Use of the Gamelan-Room Website in Ethnomatics-Based Geometry Instruction for Second-Grade Elementary School Students

Zumrotus Sa'diyah✉, Universitas Negeri Surabaya
Zaenal Abidin, Universitas Negeri Surabaya
Wiryanto, Universitas Negeri Surabaya

✉ zumrotussadiyah.23349@mhs.unesa.ac.id

Abstract: This study aims to determine the effectiveness of using the Gamelan-Room website as a learning medium on student achievement in the topic of plane figures. This study employed a quasi-experimental method using a nonequivalent control group design. The study involved two groups: a control class and an experimental class. Both groups were administered pretests and posttests to observe differences in learning outcomes before and after the intervention. The research subjects were second-grade students, with 26 students in the control class and 26 students in the experimental class. The results of the normality and homogeneity tests indicated that the data met the requirements for hypothesis testing. The results of the independent samples t-test showed that the control group's average pretest score of 67.0 increased to 78.5 on the posttest, while the experimental group's average pretest score of 60.5 increased to 84.0 on the posttest. The increase in learning outcomes for the experimental class was greater than that of the control class. From these research results, it can be concluded that the use of the Gamelan-Room website as a visual learning medium for the shapes and characteristics of plane figures proved to be effective in improving students' mathematics learning outcomes compared to conventional instruction.

Keywords: Educational Media, Gamelan-Room, Flat Shapes

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INTRODUCTION

Indonesia is a country with the richest cultural diversity (Faqih et al., 2021). According to Astriandini et al. (2021), Indonesia has a variety of distinct cultures in each region. These cultures are shaped by customs that embody important and fundamental values, and are passed down from one generation to the next. This cultural diversity is a source of pride for the Indonesian people; therefore, it deserves to be appreciated, and its existence must be safeguarded and preserved.

In this era of technological advancement and modern progress, cultural preservation efforts can be integrated into learning activities (Kurniawan, 2021). However, obstacles have been identified in these efforts, namely the difficulty of integrating cultural elements into the learning process. Generation Alpha tends to lack interest in exploring culture because they find it so boring. According to Faqih et al. (2021), some members of Generation Alpha view cultural learning as an uninteresting activity that offers no immediate benefits. Given these challenges, a shift in perspective toward culture is needed through innovations that can provide more tangible and relevant solutions.

One solution to overcoming these obstacles is to integrate cultural elements into subjects that are often perceived as difficult, such as mathematics. Culture-based mathematics learning through the Realistic Mathematics Education (RME) approach can serve as an alternative to create a more engaging learning environment that does not feel boring (Ul-Haq, 2023). A series of learning activities that integrate cultural elements through mathematics can be implemented using the RME approach. RME is an approach within the field of learning theory applied to mathematics education. This approach was first introduced by the Freudenthal Institute in the Netherlands in 1970. RME is understood as a learning strategy that emphasizes meaningful conceptual understanding, thereby encouraging students to actively engage in every learning activity (Afriansyah, 2022). This learning approach can make students more active in learning activities and provide them with memorable experiences during the learning process.

Mathematics instruction consists of a set of activities designed to provide students with learning experiences in mathematics (Andriliani et al., 2022). From elementary through high school, mathematics is a required subject (Jannah & Hayati, 2024). According to Ernia & Wahyudi (2023), mathematics instruction involves a process in

which educators convey information to students with the aim of stimulating the creative exchange of ideas, enhancing students' ability to visualize the concepts being explored, and reinforcing their mastery of the material. Improving the quality of classroom learning is the responsibility of educators, which includes forming and instilling new concepts as well as developing students' skills (Rahmawati & Chintia, 2021).

Mathematics education plays a central role in the world of education. However, given the current state of education among the millennial generation, many students still view mathematics as a daunting and boring subject. This is due to the perception that mathematics is solely about calculating formulas and numbers which are considered difficult to understand thereby causing students to struggle (Desanti et al., 2023). According to Pratiwi et al. (2020), most people assume that mathematics is merely a subject studied in school, even though unbeknownst to them mathematical concepts are applied in their daily activities. Therefore, teaching strategies are needed that can connect the material to real life through the use of concrete objects.

In mathematics education, the use of visual media is crucial for understanding the material, because teachers who use such media find it easier to present the material, and students gain a better understanding of the subject matter (Nurfadhillah et al., 2021). In today's world, teachers must be increasingly creative and innovative in the learning process so that their role cannot be replaced by rapidly advancing technology (Hasriadi, 2022). As facilitators, educators are obligated to provide learning resources that can spark students' interest, one of which is through the use of technology-based learning media.

Media refers to anything that can be perceived by the senses and used as an intermediary or tool in the communication process, including in teaching and learning activities (Fadilah et al., 2023). According to Zahrani (2023), instructional media encompasses various methods and strategies whether in the form of materials, tools, or techniques used in the learning process to foster communicative interaction and provide an effective learning experience between educators and students. In line with this view, Stit & Nusantara (2020) add that instructional media play a role in making abstract concepts more concrete, thereby making it easier for students to grasp the material.

Based on his various opinions, it can be concluded that instructional media are not merely tools, but also encompass the strategies, methods, and techniques used to convey messages and information throughout the learning process. The use of instructional media

plays a key role in boosting students' motivation to learn and helping them gain a deeper understanding of the material, particularly in mathematics, which often requires concrete representations.

One area of mathematics that requires the use of instructional media is plane figures, which are a component of geometry (Solihin & Rahmawati, 2024). Geometry is a branch of mathematics that studies the relationships between points, lines, angles, and planes within a figure (Nuraini et al., 2023). At the elementary school level, geometry instruction focuses on the topic of plane figures (Simbolon & Sapri, 2022). Therefore, when teaching the topic of plane figures, the use of instructional media is most essential.

Mathematics is a useful subject that should be introduced starting in elementary school because of its relevance to everyday life. Mathematical skills are necessary in many fields and serve as an effective means of communication. Many daily activities involve mathematical concepts, such as observing the shapes of two-dimensional figures in the surrounding environment. Therefore, learning mathematics should not merely be understood as a process of calculation, but also as a means to help students understand real-world problems. Through learning mathematics, students are expected to develop the ability to solve problems using a mathematical approach (Unaenah et al., 2023).

The teaching of two-dimensional shapes in elementary school is often presented in an abstract manner and disconnected from contexts relevant to students' daily lives, resulting in a lack of meaningful understanding of the concepts of shape, sides, and angles. Based on observations in the second-grade class at SDN Simomulyo V/102 in Surabaya, students tend to become confused when asked to identify the shapes of two-dimensional figures solely through pictures in their textbooks without the aid of concrete objects or engaging teaching aids. As a result, some students are not yet able to properly distinguish the characteristics of each two-dimensional shape. This situation highlights the need for instruction that connects geometric concepts to real-world contexts familiar to students through the use of interactive and contextual media.

Mathematics learning is not merely about understanding concepts and structures, but also about the interconnections between those concepts and structures. Through a solid understanding of mathematical concepts, students can tackle various problems related to mathematics (Retnodari et al., 2020). Each student has a different level of understanding of the subject matter, so educators often face difficulties in presenting

concrete concepts to them. As a result, educators find it challenging to help students grasp the material. Educators need to understand the developmental stages of students so they can identify the difficulties students experience when learning about plane figures in mathematics (Jannah et al., 2025).

Many students are unable to relate two-dimensional geometric shapes to real-world objects, such as recognizing a wheel as a circle or a door as a rectangle. This occurs because they lack concrete learning experiences, causing the material to feel abstract and irrelevant (Desanti et al., 2023). Therefore, educators need to implement varied instructional approaches by utilizing teaching aids, such as learning media, to help students understand different two-dimensional geometric shapes. Another issue is that students are often unwilling to review or revisit the material that has been explained by their teachers at school (Solehah et al., 2022). Furthermore, a study conducted by Abdullah (2026) found that students tended to pay less attention during lessons because they became bored when instruction relied solely on the whiteboard, particularly those seated at the back of the classroom.

In the learning process, educators are advised to carefully plan the use of media. In addition, educators need to design an approach that encourages active student participation throughout the learning activity. This is useful so that interactive mathematics learning can enable students to actively participate when relating mathematical concepts to real-world objects (Radiusman, 2020). According to Masdar, students will find it easier to understand the material, and the quality of learning can improve when supported by the appropriate use of media. Through the use of instructional media, abstract concepts can be made more concrete, thereby enhancing students' retention and understanding (Masdar et al., 2024). A solution to this issue involves using digital instructional media rooted in local culture that visually and interactively presents real-world objects from the students' environment. The effectiveness of flashcards is supported by Miftahuddin's findings, which conclude that the use of effective visual media can improve understanding of the material by 88% (Nurdianti & Sholikhah, 2024).

Mathematics is often perceived as a challenging and intimidating subject by many students (Wulandari et al., 2020). Therefore, mathematics instruction requires innovative approaches that can foster students' motivation and increase their interest in learning mathematics (Rahmawati & Febriyanti, 2020). Although the Merdeka Curriculum does

not explicitly require mathematics learning to incorporate cultural elements, one strategy that can be implemented is the Realistic Mathematics Education (RME) approach. This approach enables educators to facilitate students' understanding of mathematical concepts by connecting the learning material to cultural contexts that are familiar to them. Furthermore, an instructional approach that can both enhance mathematical understanding and foster appreciation for local culture is ethnomathematics (Rahmawati & Zulkifli, 2020).

Ethnomathematics was first introduced by Ubiratan D'Ambrosio. It is defined as the study of mathematics that considers the cultural context in which mathematical ideas emerge and are understood through the reasoning systems and mathematical practices embedded within a particular culture (Fauzi, 2022). According to Bill Barton, ethnomathematics is the study of how cultural groups develop mathematical ideas, ways of thinking, and practices that are recognized and shaped by their own cultural traditions (Dari, 2024). In essence, ethnomathematics refers to the cultural values and practices that are embedded in mathematical concepts and activities (Putri & Wulandari, 2025).

Culture-based learning has emerged as an alternative instructional approach that emphasizes active student engagement while accommodating diverse cultural backgrounds (Widyaningrum & Prihastari, 2021). This approach helps create a more comfortable classroom environment and encourages students to participate enthusiastically in the learning process (Zulfa et al., 2023). More importantly, it is expected that students will be able to recall mathematical concepts when they encounter elements of their own culture in everyday life. In this context, ethnomathematics can be understood as the study of mathematics within cultural contexts, where its development and application contribute to making mathematics learning more meaningful, engaging, and enjoyable.

Therefore, the Gamelan-Room website-based learning media was developed as an effort to increase students' interest in mathematics by encouraging them to explore their cultural heritage through observing traditional Javanese musical instruments presented in a visual and interactive format. The use of this learning media aims to transform students' perception that mathematics, particularly the topic of two-dimensional geometric shapes, is difficult and uninteresting. By utilizing website technology that is accessible through digital devices, students can directly observe the

shapes of traditional musical instruments and relate them to the concepts of two-dimensional geometry.

This study is titled "The Use of the Gamelan-Room Website in Ethnomathematics-Based Geometric Shapes Instruction for Second-Grade Elementary School Students." This study focuses on the second-grade elementary school curriculum for the introduction to plane figures, including circles, squares, and rectangles. The media used in this study presents images and depictions of traditional Javanese musical instruments that students can observe to identify the shapes of plane figures, their sides, and angles through a familiar cultural context. The use of this website is considered capable of providing more concrete and engaging learning experiences, as well as facilitating students' understanding of geometric concepts through an ethnomathematics approach. In addition, this study aims to determine the effectiveness of using this website as a medium to facilitate students' understanding of plane figure concepts.

METHOD

The study on the Gamelan-Room website in the context of second-grade elementary school geometry falls under the category of quantitative research, specifically employing quantitative methods such as experimental research and surveys (Sugiyono, 2023). The choice of methods was based on their suitability for research on the application of the Gamelan-Room website as a teaching medium.

This study employed a quasi-experimental research method involving two sample groups: an experimental group and a control group. The research adopted a nonequivalent control group design, in which both groups were selected without random assignment. The experimental and control groups were assigned without randomization and subsequently compared to evaluate the effects of the intervention. Prior to the implementation of the treatment, both groups were administered a pretest to determine their baseline conditions and identify any initial differences between the experimental and control groups.

Tabel 1 Nonequivalent Group Design

E	O_{1X}	O_2
K	O_3	O_4

Description:

E: experimental group

K: control group

O1 and O3: pretest

O2 and O4: posttest

X: treatment of the experimental group

The study was conducted from January to February 2026. The study was conducted at SDN Simomulyo V/102 in Surabaya, East Java. The study site is located at Jl. Simohilir Timur XIV/25, Simomulyo Baru Village, Sukomanunggal Subdistrict, Surabaya, East Java.

In this study, the population selected by the researcher consisted of second-grade students at SDN Simomulyo V/102 in Surabaya, East Java Province. However, the researcher included all students to form a sample of 40 students: 26 from Class IIA and 26 from Class IIB. Data collection techniques refer to the methods used to obtain data from the field so that the research findings can contribute to the development of existing theories or generate new knowledge (Achjar, 2023). In this study, the data collection technique employed was a test. The test consisted of a set of questions designed to measure students' knowledge, understanding, abilities, and learning outcomes. It was administered to assess the mathematics learning outcomes of fifth-grade students. The test was conducted twice: before the intervention as a pre-test and after the intervention as a post-test.

RESULTS

Table 2 Normality Test and Homogeneity Test for the Control Group

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	kelas	Statistic	df	Sig.	Statistic	df	Sig.
nilai	pretest	.156	26	.103	.959	26	.376
	posttest	.173	26	.044	.955	26	.305

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
nilai	Based on Mean	.545	1	50	.464
	Based on Median	.481	1	50	.491
	Based on Median and with adjusted df	.481	1	45.473	.492
	Based on trimmed mean	.568	1	50	.455

From the table, it can be seen that the significance value of 0.376 is greater than 0.05, and 0.305 is also greater than 0.05. Therefore, based on the decision criteria for the previous Shapiro-Wilk normality test, it can be concluded that the data are normally distributed.

Based on the previous table, the Sig. value (Based on Mean) for the mathematics achievement variable is 0.464. Since the Sig. value of 0.464 is greater than 0.05, it can be concluded that the variances of the data for the two groups of students are homogeneous.

Table 3 Normality Test and Homogeneity Test for the Experimental Group

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	kelas	Statistic	df	Sig.	Statistic	df	Sig.
nilai	pretest	.178	26	.034	.891	26	.010
	posttest	.124	26	.200*	.968	26	.584

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
nilai	Based on Mean	.006	1	50	.940
	Based on Median	.000	1	50	1.000
	Based on Median and with adjusted df	.000	1	45.207	1.000
	Based on trimmed mean	.007	1	50	.935

From the table, it can be seen that the p-value of 0.010 is less than 0.05, while 0.584 is greater than 0.05. Therefore, based on the decision criteria from the previous Shapiro-Wilk normality test, it can be concluded that the pretest data are not normally distributed, while the posttest data are normally distributed.

Based on the previous table, the Sig. value (Based on Mean) for the mathematics achievement variable is 0.940. Since the Sig. value of 0.940 is greater than 0.05, it can be concluded that the variances of the data for the two groups of students are homogeneous.

Table 4. Results of the Hypothesis Test for the Control Group

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
nilai	Equal variances assumed	.545	.464	-9.095	50	<.001	-10.76923	1.18412	-13.14760	-8.39086
	Equal variances not assumed			-9.095	48.286	<.001	-10.76923	1.18412	-13.14969	-8.38877

From the previous output, it was found that the Sig. value for Levene's Test for Equality of Variances was 0.464 > 0.05, which indicates that the variances of the data between the pretest and posttest are homogeneous and equal. Therefore, the interpretation of the Independent Samples Test output table above is based on the values in the "Equal variances assumed" table".

From the "Independent Samples Test" output table under the "Equal variances assumed" section, a Sig. (2-tailed) value of 0.001 < 0.05 was found; therefore, based on the decision criteria for the independent samples t-test, it can be concluded that the null hypothesis (HO) is rejected and the alternative hypothesis (Ha) is accepted. Based on the analysis results, it can be concluded that there is a significant difference between the mean student learning outcomes on the pretest and posttest. This is evident from the Mean Difference value of -10.76923, which shows the difference between the mean student learning outcomes before and after the treatment. The range of this difference is between -13.14760 and -8.39086 at a 95% confidence level.

In addition, the calculated t-value was found to be 9.015. Meanwhile, the critical t-value for a significance level of 0.05 with 50 degrees of freedom (df) is 1.676. Since the calculated t-value is greater than the critical t-value (9.015 > 1.676), H_0 is rejected and H_1 is accepted. Based on this, it can be concluded that there is a significant difference in students' average learning outcomes between the pretest and the posttest.

Table 5. Results of the Hypothesis Test for the Experimental Class

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
nilai	Equal variances assumed	.006	.940	-20.383	50	<.001	-30.92308	1.51708	-33.97023	-27.87593
	Equal variances not assumed			-20.383	49.368	<.001	-30.92308	1.51708	-33.97119	-27.87496

From the previous output, the value of Sig. for Levene's Test for Equality of Variances was found to be 0.940 > 0.05; therefore, it can be concluded that the variances of the data between the pretest and posttest are homogeneous or equal. Consequently, the interpretation of the Independent Samples Test output table above is based on the values in the "Equal variances assumed" table.

From the output table of the "Independent Samples Test" under the "Equal variances assumed" section, the Sig. (2-tailed) value was found to be 0.001 < 0.05;

therefore, based on the decision criteria for the independent samples t-test, it can be concluded that the null hypothesis (HO) is rejected and the alternative hypothesis (Ha) is accepted. Based on this, it can be concluded that there is a significant (statistically significant) difference between the mean student learning outcomes on the pretest and the posttest.

From the previous output table, it was found that the Mean Difference was -30.92308. This figure represents the difference between the average student learning outcomes on the pretest and the posttest. The range of this difference is between -33.97023 and -27.87593 at a 95% confidence level (Confidence Interval of the Difference).

The calculated t-value obtained is 20.383. Next, the critical t-value was determined using a significance level of 0.05 and 50 degrees of freedom (df), resulting in a critical t-value of 1.676. Since the calculated t-value (20.383) is greater than the critical t-value (1.676), H_0 is rejected and H_1 is accepted. This indicates a difference in the mean student learning outcomes between the pretest and the posttest.

The results of the independent samples t-test also showed a significant difference between the control class and the experimental class. This finding is supported by the fact that the calculated t-value was greater than the critical t-value. Thus, it can be concluded that there is a significant difference in learning outcomes between the two classes. Consequently, the use of the Gamelan-Room website as a learning medium proved to be more effective and had a significant impact on student learning outcomes than instruction in the control class.

DISCUSSION

a. An Exploration of Ethnomathematics in Javanese Gamelan

Exploration is the process of investigating and gathering information with the aim of deepening and reinforcing concepts that will later be discussed in a research study with a broader scope (Aisyah, 2025). According to Nurina & Indrawati (2021), exploration is the process of investigating and collecting data in the field to obtain and gain a deeper understanding of the necessary information. The purpose of exploration is to understand the suspected problems being experienced. Thus, exploration can be understood as a deliberate search designed to discover and obtain new insights.

Ethnomathematics involves studying or discussing, through specific methods used by social and cultural groups, their mathematical activities (Andriono, 2021). Ethnomathematics was first introduced in 1977 by D'Ambrosio, a mathematician from Brazil. He explained that ethnomathematics is the study of mathematics that takes into account the cultural context in which mathematics develops and is understood through reasoning based on the mathematical systems used within that culture (Weniarni, 2022). According to Barton, ethnomathematics is a field of study that examines how a cultural group develops mathematical ideas, ways of thinking, and practices that emerge from their culture. According to Abroriy (2020), every culture gives rise to mathematical values that align with its cultural characteristics. Mathematics itself can be viewed as an abstraction derived from cultural products, in which human thought plays a crucial role in the problem-solving process (Retnodari et al., 2020). Therefore, ethnomathematics is not merely concerned with mathematical concepts but also links cultural activities to the application of mathematics in people's daily lives.

Based on these perspectives, the exploration of ethnomathematics can be defined as the deliberate process of tracing and uncovering various mathematical concepts and practices found within a culture. In line with the development research to be conducted, this study explores ethnomathematics within Javanese culture specifically, East Javanese musical instruments which will then be applied to mathematics instruction. There are several aspects of Javanese culture related to mathematics; elements relevant to Javanese culture that are easily found in everyday life can be identified and utilized in mathematics instruction (Zulaekhoh & Hakim, 2021). Mathematics or mathematical knowledge is present in every culture through various cultural artifacts in Indonesia, such as architectural forms, carvings, jewelry, and so on. In this context, geometry is a branch of mathematics that discusses points as the basis for forming lines, which in turn form planes, and these planes compose polygonal two-dimensional shapes used to construct three-dimensional figures (Amalliyah et al., 2021). The geometry in question is embodied in the Javanese gamelan musical instruments. The mathematical analysis of the Javanese gamelan is presented in the following table.

Table 6 An Exploratory Analysis of the Ethnomathematics of Javanese Gamelan Musical Instruments

No	Identification	Discovery of Mathematical Concepts
1	 Gong (front view)	Shows the shape of a circle. Students can use this to identify two-dimensional shapes that do not have straight sides. Shows the shape of a circle. Students can use this to identify two-dimensional shapes that do not have straight sides and do not have any angles.
2	 Kempul (front view)	It has a circular shape that helps students identify two-dimensional shapes with curved sides. There are ethnomathematics activities on the concept of numbers as counting.
3	 Bilah Saron	It is rectangular. Students can learn about a two-dimensional shape that has four sides, with two long sides and two short sides.
4	 Bilah Demug	Each bar is rectangular. The arrangement of the bars from largest to smallest can be seen as a variation in the size of the rectangles.
5		Forming a trapezoid-like pattern, it illustrates the variety of two-dimensional shapes created by arranging several rectangles.

No	Identification	Discovery of Mathematical Concepts
	Arrangement of the Bilah Demung (overall view)	
6	 Upper Surface of the Kendang	Circular in shape, it can be used to reintroduce the concept of a circle in cultural artifacts.
7	 Pencon Bonang (top view)	In Javanese gamelan, the pencon bonang has a shape that reflects the concept of two-dimensional figures in geometry; the pencon bonang is shaped like a hemisphere or dome, which is the main part where the mallet strikes the instrument. The lower part of the pencon is shaped like a short cylinder or disc, which serves as the base and helps transmit sound vibrations. The mathematical element of the bonang lies in its congruence, meaning it has the same shape as the mirror image of another object.

The table above shows that the results of the ethnomathematics exploration of Javanese gamelan, along with its mathematical analysis, will serve as a reference for the ethnomathematics approach in the upcoming research and development project. It is hoped that this can serve as an alternative solution to help boost students' motivation to learn by providing hands-on experiences and enhancing their understanding of both mathematical concepts and cultural preservation.

b. Exploring the Gamelan-Room Website

Gamelan-Room is an educational platform that uses an innovative approach combining the principles of ethnomathematics and technology. The cultural elements highlighted consist of geometric shapes found in local culture, linked to examples of the application of plane figures from the research by Indrawati & Salsabilah (2021). This

website is designed to help students play Javanese gamelan instruments, but it also enables them to understand the concepts of plane figures through engaging visuals. Students are guided to discover the concepts of plane figures on their own through observing the shapes of the gong, kempul, saron, and demung. In this way, mathematical concepts are not derived from abstract explanations but from the experience of directly observing cultural objects. This makes learning more contextual and meaningful.

The visual representation of traditional musical instruments in the Gamelan-Room website enables students to explore learning materials independently using digital devices such as laptops or tablets. Through this interactive and visually engaging web-based learning media, students are able to observe learning objects from different perspectives and at their own pace, allowing the learning process to be adapted to individual abilities (Nurhayari, 2025). Students can enlarge the images, examine the details of each instrument, and identify the characteristics of two-dimensional geometric shapes directly from familiar cultural objects.

This approach is consistent with the findings of Siregar and Adinda (2025), who reported that the use of digital learning media provides more concrete and engaging learning experiences for elementary school students. Furthermore, exploring ethnomathematics through the website offers students a more contextual learning experience that is closely connected to their cultural environment. Such contextual learning enables students to relate mathematical concepts to their everyday lives, making abstract concepts more tangible and meaningful (Yolanda et al., 2024). By incorporating an interactive technology-based approach, Gamelan-Room also enhances students' engagement in the learning process. This finding is supported by Sofiah and Isdaryanti (2023), who found that students become more independent learners and experience greater enjoyment because they are able to explore the learning materials directly. Therefore, the implementation of Gamelan-Room in teaching two-dimensional geometric shapes to second-grade elementary school students not only creates a more engaging learning experience through the use of technology but also integrates local cultural wisdom with an ethnomathematical approach, making mathematics learning more meaningful for students.

CONCLUSION

Based on the research findings presented by the researcher and the accompanying analysis, it can be concluded that, in both the control and experimental classes, there were significant differences between the pretest and posttest scores, as indicated by a p-value < 0.05 and a calculated t-value greater than the critical t-value. Descriptively, the mean pretest score for the control class was 67.0 and increased to 78.5 on the posttest. Meanwhile, for the experimental class, the mean pretest score of 60.5 increased significantly to 84.0 on the posttest. The improvement in the experimental class was greater than that in the control class, as indicated by a larger mean difference. Based on these findings, it can be concluded that the use of the Gamelan-Room website as a learning medium proved to be effective and had a significant impact on improving student learning outcomes compared to the control class's learning experience.

REFERENCES

Abdullah, M. R., Agussalim, Fatimah, A., & Karadona, R. (2026). IMPLEMENTASI MEDIA PEMBELAJARAN POWER POINT DALAM MENINGKATKAN MINAT BELAJAR PADA MATA PELAJARAN FIQIH SISWA KELAS VII DI MTS AINUS SYAMSI KABUPATEN MAROS. *JURNAL INOVASI PENDIDIKAN*, *4*(1). https://edukhasi.org/index.php/jip

Abroriy, D. (2020). *Etnomatematika dalam Perspektif Budaya Madura*. http://mass.iain-jember.ac.id

Afriansyah, E. A. (2022). Peran RME terhadap Miskonsepsi Siswa MTs pada Materi Bangun Datar Segi Empat. *Mosharafa: Jurnal Pendidikan Matematika*, *11*(3). http://journal.institutpendidikan.ac.id/index.php/mosharafa

Andriliani, L., Amaliyah, A., Putry Prikustini, V., & Daffah, V. (2022). ANALISIS PEMBELAJARAN MATEMATIKA PADA MATERI GEOMETRI. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, dan Pendidikan*, *1*(7), 1169–1178. https://doi.org/10.54443/sibatik.v1i7.138

Amalliyah, N., Dewi, N. R., & Dwijanto, D. (2021). Tahap Berpikir Geometri Siswa SMA Berdasarkan Teori Van Hiele Ditinjau dari Perbedaan Gender. JNPM (Jurnal Nasional Pendidikan https://doi.org/10.33603/jnpm.v5i2.4550 Matematika), 5(2), 352.

Andriono, R. (2021). Analisis Peran Etnomatematika dalam Pembelajaran Matematika. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, *4*(2). https://doi.org/10.24176/anargya.v4i2.6370

Astriandini, M. G., Yosep, D., & Kristanto, D. (2021). Kajian *Etnomatematika* Pola Batik Keraton Surakarta Melalui Analisis Simetri. *Mosharafa: Jurnal Pendidikan Matematika* , *10*(1). http://journal.institutpendidikan.ac.id/index.php/mosharafa

Desanti, L., Lestari, S., Purwaningsih, D., & Damariswara, R. (2023). ANALISIS KESULITAN SISWA SEKOLAH DASAR DALAM MATA PELAJARAN

MATEMATIKA. *Jurnal Pendidikan Dasar Flobamorata*, *4*(3), 747–752. https://doi.org/10.51494/jpdf.v4i3.1059

Dewi, A. (2025). *Transformasi Pembelajaran Menulis Teks melalui Media Visual Interaktif*. *1*(3), 99–111.

Ernia, S., & Wahyudi. (2023). Peningkatan Keaktifan Peserta Didik pada Pembelajaran Matematika melalui Model Discovery Learning. *Journal Of Social Science Research*, *3*, 3017–3026.

Fadilah, A., Nurzakiyah, K. R., Kanya, N. A., Hidayat, S. P., & Setiawan, U. (2023). Pengertian Media, Tujuan, Fungsi, Manfaat dan Urgensi Media Pembelajaran. *Journal of Student Research (JSR)*, *1*(2), 1–17.

Faqih, A., Nurdiawan, O., & Setiawan, A. (2021). Pengembangan Media pembelajaran Multimedia Interaktif Alat Masak Tradisional Berbasis *Etnomatematika*. *Mosharafa: Jurnal Pendidikan Matematika* , *10*(2). http://journal.institutpendidikan.ac.id/index.php/mosharafa

Jannah, M., & Hayati, M. (2024). Pentingnya kemampuan literasi matematika dalam pembelajaran matematika. *Griya Journal of Mathematics Education and Application*, *4*(1), 40–54. https://doi.org/10.29303/griya.v4i1.416

Hasriadi, H. (2022). Metode pembelajaran inovatif di era digitalisasi. Jurnal Sinestesia, 12(1), 136-151.

Kurniawan, D. A. (2021). Pelestarian Budaya Jawa Melalui Pembelajaran Kreatif di Desa Slogoretno Sebagai Wujud Gerakan Nasionalisme. *JURNAL CANDI*, *21*.

Masdar, A., Nadira, L., Murnika, Y., & Wismanto. (2024). Pemilihan Media Pembelajaran Yang Tepat Untuk Meningkatkan Hasil Pencapaian Belajar Peserta Didik. *Edukasi Elita : Jurnal Inovasi Pendidikan*, *1*(3), 76–85. https://doi.org/10.62383/edukasi.v1i3.243

Nurdianti, P., & Sholikhah, O. H. (2024). *PENINGKATAN PEMAHAMAN PESERTA DIDIK KELAS 4 TERHADAP MATERI PIKTOGRAM MELALUI PENGGUNAAN MEDIA VISUAL INTERAKTIF*. *2*(9), 1–8. https://doi.org/10.62281

Nurfadhillah, S., Handayani, N. R., & Ningsih, P. A. (2021). PENGAPLIKASIAN MEDIA PEMBELAJARAN VISUAL PADA PEMBELAJARAN MATEMATIKA SEKOLAH DASAR BINA BANGSA. *Jurnal Edukasi dan Sains*, *3*(2), 253–263. https://ejournal.stitpn.ac.id/index.php/edisi

Nurina, A., & Indrawati, D. (2021). *EKSPLORASI ETNOMATEMATIKA PADA TARI TOPENG MALANGAN SEBAGAI SUMBER BELAJAR MATEMATIKA SEKOLAH DASAR*. *09*(08), 3114–3123.

Pratiwi, J. W., Pujiastuti, H., Sultan, U., & Tirtayasa, A. (2020). *Eksplorasi Etnomatematika Pada Permainan Tradisional Kelereng* (Vol. 05, Nomor 02). https://ejournal.unib.ac.id/index.php/jpmr

Perdana Aprilianti, P., Astuti, D., & Dahlan, A. (2020). Pengembangan LKPD Berbasis STEM Pada Materi Bangun Ruang Sisi Datar SMP Kelas VIII. *Jurnal Pembelajaran Matematika Inovatif*, *3*(6). https://doi.org/10.22460/jpmi.v3i6.691-702

Putri, S. T. M., & Wulandari, A. A. (2025). EKSPLORASI ETNOMATEMATIKA PADA PERMAINAN CONGKLAK DENGAN APLIKASI DIGITAL MANCALA. *SIGMA: JURNAL PENDIDIKAN MATEMATIKA*, *17*(1), 229–240. https://doi.org/10.26618/sigma.v17i1.17536

Radiusman, R. (2020). STUDI LITERASI: PEMAHAMAN KONSEP ANAK PADA PEMBELAJARAN MATEMATIKA. *FIBONACCI: Jurnal Pendidikan Matematika dan Matematika*, *6*(1), 1. https://doi.org/10.24853/fbc.6.1.1-8

Retnodari, W., Faddia Elbas, W., & Loviana, D. S. (2020). *Scaffolding Dalam Pembelajaran Matematika* (Vol. 1).

Simbolon, S., & Sapri, S. (2022). Analisis Kesulitan Belajar Siswa Kelas IV Materi Bangun Datar di Sekolah Dasar. *EDUKATIF : JURNAL ILMU PENDIDIKAN*, *4*(2), 2510–2515. https://doi.org/10.31004/edukatif.v4i2.2081

Siregar, T., & Adinda, A. (2025). PEMBELAJARAN MATEMATIKA DENGAN MENGGUNAKAN MEDIA BERHITUNG DI SD NEGERI 327 SINUNUKAN DALAM MENINGKATKAN PEMAHAMAN SISWA. *Jurnal Didaktika Pendidikan Dasar*, *9*(3), 1165–1184. https://doi.org/10.26811/didaktika.v9i3.2028

Solehah, N. N., Saputra, H. H., & Setiwan, H. (2022). Analisis Minat Belajar Siswa Kelas IV SDN 20 Ampenan pada Masa Pandemi Covid-19 Tahun Pelajaran 2021/2022. *Jurnal Ilmiah Profesi Pendidikan*, *7*(1), 229–235. https://doi.org/10.29303/jipp.v7i1.449

Solihin, A., & Rahmawati, I. (2024). KOMET-QR: KARTU EKSPLORASI ETNOMATEMATIKA-QR PADA MATERI BANGUN DATAR KELAS IV SEKOLAH DASAR. *Jurnal Review Pendidikan Dasar*, *10*(01), 64–79. http://journal.unesa.ac.id/index.php/PD

Stit, Y. S., & Nusantara, P. (2020). Pembelajaran Matematika Dengan Menggunakan Media Berhitung Di Sekolah Dasar Dalam Meningkatkan Pemahaman Siswa. Dalam *EDISI : Jurnal Edukasi dan Sains* (Vol. 2, Nomor 3). https://ejournal.stitpn.ac.id/index.php/edisi

Ul-Haq, W. R. (2023). *Pengaruh Model Realistic Mathematics Education Berbasis Etnomatematika Permainan Tradisional Terhadap Pemahaman Konsep Geometri Siswa* (Bachelor's thesis, Jakarta: FITK UIN Syarif Hidayatullah Jakarta).

Unaenah, E., Ayumi, A., Nuraulia, D., & Sundari, L. (2023). *Konsep Matematika Siswa Dalam Menuntaskan Permasalahan Bangun Datar*. *2*(4). http://jurnal.anfa.co.id

Yolanda, A., Sihotang, M., Zebua, J., Hutasoit, M., & Sinaga, Y. (2024). Strategi Pembelajaran Kontekstual untuk Meningkatkan Pemahaman Konsep Siswa Sekolah Dasar. *Pragmatik : Jurnal Rumpun Ilmu Bahasa dan Pendidikan*, *2*(3), 301–308. https://doi.org/10.61132/pragmatik.v2i3.941

Weniarni, L. (2022). Etnomatematika 1. Penerbit NEM.

Zahrani, N. (2023). Pemanfaatan Smart Apps Creator (Sac) Sebagai Alternatif Media Pembelajaran Berbasis Aplikasi: Rubik (Rumah Bahasa Indonesia Kita). *Jurnal Ilmiah Multidisipline*, *1*(7). https://doi.org/10.5281/zenodo.8289840

Zebua, E. K., Waruwu, N., & Santosa, M. (2024). Pengaruh Nilai-Nilai Kebudayaan terhadap Pembentukan Kepribadian Manusia: Tinjauan Psikologi Perkembangan. *Mei*, *1*(3), 138–149. https://doi.org/10.37985/sj.v1i3.11

Zulaekhoh, D., & Hakim, A. R. (2021). Analisis Kajian Etnomatematika pada Pembelajaran Matematika Merujuk Budaya Jawa. JPT: Jurnal Pendidikan Tematik, 2(2), 216–226. https://siducat.org/index.php/jpt/article/view/289