The Effect of Quizizz Media on Learning Outcomes and Self-Confidence of Eighth Grade Mathematics Students Junior High School

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ABSTRAK	ABSTRACT
Penelitian ini dilatar belakangi oleh rendahnya hasil belajar dan kepercayaan diri siswa dalam menjawab soal matematika. Tujuan penelitian ini untuk mengetahui pengaruh media interaktif berbasis *Quizizz* terhadap peningkatan hasil belajar dan kepercayaan diri siswa dalam menjawab soal matematika kelas VIII SMP Muhammadiyah 01 Medan Tahun Ajaran 2025/2026. Penelitian ini menggunakan pendekatan kuantitatif dengan metode eksperimen semu (*quasi-experimental design*) tipe *pretest-posttest control group design*. Sampel penelitian terdiri atas dua kelas, yaitu kelas eksperimen yang menggunakan media *Quizizz* dan kelas kontrol dengan pembelajaran konvensional, masing-masing berjumlah 30 siswa. Hasil penelitian ini menunjukkan bahwa nilai *t* hitung hasil belajar (2,737) dan kepercayaan diri (3,208) lebih besar dari *t* tabel (1,672), sehingga H_0 ditolak. Dengan demikian, media interaktif berbasis *Quizizz* berpengaruh signifikan terhadap peningkatan hasil belajar dan kepercayaan diri siswa menjawab soal matematika.	This study was motivated by the low learning outcomes and self-confidence of students in answering mathematics questions. The purpose of this study was to determine the effect of Quizizz-based interactive media on improving learning outcomes and self-confidence of students in answering mathematics questions in grade VIII at SMP Muhammadiyah 01 Medan in the 2025/2026 academic year. This study used a quantitative approach with a quasi-experimental design, specifically a pretest-posttest control group design. The research sample consisted of two classes, namely the experimental class that used Quizizz media and the control class with conventional learning, each consisting of 30 students. The results of this study indicate that the calculated t-value for learning outcomes (2.737) and confidence (3.208) is greater than the t-table (1.672), so H_0 is rejected. Thus, Quizizz-based interactive media has a significant effect on improving students' learning outcomes and confidence in answering math questions.

Kata Kunci: Quizizz; media interaktif; hasil belajar matematika; kepercayaan diri siswa.

Keywords: Quizizz; interactive media; mathematics learning outcomes; student confidence.

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1. INTRODUCTION

Education is a planned process to help students acquire knowledge, understanding, skills, and attitudes in accordance with their developmental needs. As an important factor in human resource development, education plays a strategic role in producing a generation that is intelligent, virtuous, and competent (Priswanti et al., 2022). In order for students to actively develop their spiritual potential, self-control, personality, intelligence, and skills needed by the state, society, nation, and themselves, Law Number 20 of 2003 emphasizes that education is a deliberate and planned effort to create a learning environment and learning process. In the context of learning, mathematics plays an important role because it is the basis of various disciplines. Mathematics not only teaches concepts of numbers, shapes, and logic, but also trains critical, systematic, and analytical thinking skills (Rachmantika & Wardono, 2019). Therefore, one of the main indicators of academic achievement is mathematical ability.

However, the reality in the field shows that there are still difficulties in learning mathematics. Low learning outcomes and lack of confidence are caused by the fact that many students have difficulty understanding the material. After engaging in the learning process, changes in student behavior in the cognitive, emotional, and psychomotor domains are measured through learning outcomes (Maharani et al., 2024). Meanwhile, confidence is an internal factor that greatly influences students' readiness to face academic challenges. Previous studies show that many students exhibit low self-confidence in answering mathematics questions. Most only understand the problems without daring to formulate steps to solve them, and more than 70% of students are in the low problem-solving ability category (Rahmawati & Munandar, 2025). Observations at SMP Muhammadiyah 01 Medan support these findings, where many eighth-grade students tend to be passive, dependent on friends or teachers, and obtain final semester exam scores below average, which is around 70. A lack of interesting learning materials, monotonous teaching strategies, and little positive reinforcement are some of the factors contributing to low self-confidence and poor learning outcomes (Susanti et al., 2024).

The use of technology-based interactive learning materials is one way to try to overcome this problem. Students and learning resources can interact bidirectionally thanks to interactive media, which increases the effectiveness and interest in the learning process (Munawir et al., 2024). The use of interactive media has been proven to improve student learning outcomes, understanding, and motivation (Sabani & Eka, 2024). Quizizz, a game-based learning platform that allows educators to conduct interactive quizzes with instant results and feedback, is one such tool that can be used (Kuswanto & Walusfa, 2017). Through a fun learning environment, Quizizz has been proven to increase student motivation, engagement, and understanding (Citra & Rosy, 2020).

Given these concerns, this study examines how student learning outcomes and their confidence in answering math questions are influenced by the use of Quizizz-based interactive media. The objectives of this study are: (1) to determine how Quizizz-based interactive media affects student learning outcomes in mathematics; (2) to determine how Quizizz-based interactive media affects student confidence; and (3) to measure the extent to which Quizizz-based interactive media affects these two variables. To implement the problem-solving strategy, the experimental class used Quizizz as an interactive learning tool for mathematics, and the results were compared with the control group that used traditional methods. Therefore, it is hoped that this study can contribute to the development of technology-based learning models and provide useful guidance for teachers in designing more interesting and successful mathematics learning processes that can increase student confidence. The novelty of this study lies in the simultaneous effect of Quizizz-based interactive media on students' learning outcomes and confidence in answering mathematics questions. This study not only utilizes Quizizz as an evaluation tool but also integrates it into the problem-solving-based learning process. In addition, this study specifically highlights the aspect of student confidence as an affective variable that is still rarely studied in conjunction with mathematics learning outcomes at the junior high school level.

2. METHOD

This study used a quasi-experimental design and quantitative methodology. The experimental group and control group were two groups in the pretest-posttest control group design used in this study. While the control group used traditional teaching methods without digital media, the experimental group was given interactive material based on Quizizz.

This study was conducted at SMP Muhammadiyah 01 Medan in the even semester of the 2025/2026 academic year. The population in this study was all 307 eighth-grade students. The sampling technique used was purposive sampling, which is the determination of samples based on certain considerations relevant to the research objectives.

The considerations for sample selection included: (1) equality of students' academic abilities based on their previous mathematics scores; (2) similarity of the curriculum and learning materials used; (3) classroom conditions that allowed for the optimal application of Quizizz-based interactive media; and (4) the readiness of teachers and learning support facilities. Based on these considerations, class VIII Unggul was selected as the experimental class because it was considered suitable for treatment in the form of using Quizizz-based interactive media, while class VIII-T1 was selected as the control class, which used conventional learning methods as a comparison. There were 30 students in the experimental class VIII Unggul, while there were 30 students in the control class VIII-T1, bringing the total sample in this study to 60 students.

The research instruments used consisted of a multiple-choice mathematics achievement test and a student confidence questionnaire. The achievement test was used to measure students' cognitive abilities in the Pythagorean Theorem material, while the confidence questionnaire was used to measure students' confidence in learning the material.

The research procedure was carried out in three stages, namely: a) The preparation stage, which included the preparation of instruments, testing, and determining the sample class; b) The implementation stage, which involved administering a pretest, implementing learning with Quizizz media in the experimental class, and conventional learning in the control class; and c) The evaluation stage, which involved administering a posttest, collecting questionnaires, and analyzing the results.

At a significance level of α = 0,05, the data were analyzed using an independent two-sample t-test, homogeneity test, and normality test. The purpose of this study was to determine the differences between the experimental group and the control group in terms of learning outcomes and self-confidence.

Table 1. Research Design

Sample	Pretest	Treatment	Posttest
Experimental	0_1	X	0_2
Control	0_1	-	0_2

3. RESULTS AND DISCUSSION

The purpose of this study was to determine how the use of Quizizz-based interactive media affects students' learning outcomes and confidence in answering mathematics questions. All eighth-grade students at SMP Muhammadiyah 01 Medan constituted the research population. Two classes were randomly selected from the population to serve as the research sample.

This research was conducted at SMP Muhammadiyah 01 Medan, located in Medan City, North Sumatra, at Jl. Demak No. 3, Kelurahan Sei Rengas Permata, Kecamatan Medan Area. The experimental group in this study used Quizizz-based interactive learning materials for four meetings, while the control group received traditional classroom teaching, or regular learning. Tests were used as data collection tools in this study. There were two types of assessments used: a student confidence questionnaire with 39 items and a multiple-choice test with 17 questions. The indicators measured in the learning outcome test include: (1) understanding of the Pythagorean Theorem concept; (2) ability to apply formulas in solving routine math problems; (3) problem-solving skills in contextual math problems; and (4) accuracy in performing calculations and interpreting mathematical calculation results.

Meanwhile, the student confidence questionnaire consists of 39 statements aimed at measuring students' confidence levels in answering math questions. The indicators of student

confidence include: (1) confidence in understanding mathematical concepts; (2) courage to answer questions independently; (3) perseverance in facing difficult math questions; (4) confidence in one's ability to solve math questions; and (5) willingness to give answers without fear of making mistakes. Each statement was compiled using a Likert scale to reflect the level of student agreement.

Before being tested, the instruments used were validated by expert lecturers and teachers who declared them valid with minor revisions. The final results of the validation produced questions that were suitable for use as data collection instruments. The following will describe in detail the data for each sample group.

a. **Data from Pre-Test Results of Student Learning Outcomes and Student Confidence Questionnaire in Answering Math Questions**

Table 2. Pre-Test Results for Control and Experimental Classes

Statistics	Control Class	Experimental Class
Average	11,4	12,366667
SD	1,354431	1,245221
Variance	1,834483	1,550575
Maximum Value	14	15
Minimum Value	9	9
Number of Students	30	30

Based on Table 2, the average score for the experimental class was 12,37, compared to 11,40 for the control class, based on the results of descriptive statistical analysis. This shows that the experimental class had a higher average learning outcome. The distribution of data in both groups was relatively balanced, as seen from the variance of the experimental class of 1,55 and the variance of the control class of 1.83. The experimental class data was more homogeneous, as evidenced by the fact that the standard deviation (1,25) was lower than that of the control class (1,35). The control class had a score range of 5 with a maximum of 14 and a minimum of 9, while the experimental class had a maximum score of 15 and a minimum of 10.

Table 3. Results of Student Self-Confidence Questionnaire Data Calculations

Statistics	Control Class	Experimental Class
Average	91,141490	104,058651
SD	15,714755	15,143364
Variance	246,953520	229,321460
Maximum Value	117	140
Minimum Value	69	88
Number of Students	30	30

Based on Table 3, the descriptive analysis of the pretest questionnaire on student self-confidence, the average score for the experimental class was 104,06, while the average score for the control group was 91,14. This shows that students in the experimental class had slightly higher self-confidence levels before therapy than students in the control group. The data distribution was relatively even in both groups, as seen from the standard deviation value of the experimental class of 15,14 and the standard deviation value of the control group of 15,71. The maximum score in the experimental class was 140 and the minimum was 88, while in the control class, the maximum was 117 and the minimum was 69. In general, the distribution of questionnaire scores in both classes was balanced with a sample size of 30 students per class.

b. Post-test Data on Student Learning Outcomes and Student Confidence Questionnaire in Answering Math Questions

Table 4. Post-Test Results for Control and Experimental Classes

Statistics	Control Class	Experimental Class
Average	13,166667	14,066667
SD	1,288767	1,257620
Variance	1,660920	1,581609
Maximum Value	15	16
Minimum Value	11	11

Based on Table 4, the average score for the experimental class was 14,07, while the average score for the control class was 13,17, according to the results of the descriptive analysis of post-test learning outcomes. This shows that the learning outcomes of the experimental class have increased more significantly. With a standard deviation of 1,26 and 1,29 for the experimental class, and 1,58 and 1,66 for the control class, the variance values indicate a relatively even distribution of data. The experimental class had a maximum score of 16, the control class had a maximum score of 15, and both classes had a minimum score of 11. Each class consisted of thirty students.

The following are the results of the calculation of the students' confidence questionnaire in answering the mathematics questions given after the Post Test.

Table 5. Results of Student Self-Confidence Questionnaire Data CalculationsResults of Student Self-Confidence Questionnaire Data Calculations

Statistics	Control Class	Experimental Class
Average	97,134203	109,438528
SD	15,208676	14,489551
Variance	231,303813	209,947098
Maximum Value	133	153
Minimum Value	82	115
Number of Students	30	30

Based on Table 5, the descriptive analysis of the posttest self-confidence questionnaire, the average score for the experimental class was 109,44, while the average score for the control group was 97,13. This shows that after using the interactive Quizizz media for learning, students in the experimental class experienced a greater increase in self-confidence. The experimental class data was more homogeneous, as seen from the standard deviation value of 14,49 for the experimental class and 15,21 for the control class. The data distribution was relatively even, as seen from the variance values for the experimental class (209,95) and the control class (231,30). In terms of score achievement, the maximum score in the experimental class reached 153 and the minimum was 115, while in the control class, the maximum was 133 and the minimum was 82, with a sample size of 30 students in each class.

Researchers must conduct the necessary tests before evaluating hypotheses. Normality and homogeneity tests will be conducted in this preparatory test. The results of the normality test on student learning outcomes and their confidence in their ability to solve math problems are shown below by the researchers.

1) Pre-Test Data Normality Test

    To determine whether student learning outcomes and confidence levels are normally distributed, a normality test is conducted. The Liliefors method is used in this test, and at a significance level of 0,05, the data is considered normally distributed if $L_{count} < L_{table}$.

Table 6. Pretest Results Student Learning Outcomes and Self-Confidence

Class	N	L_{Count}	L_{Table}	Description
Learning Outcomes (Control)	30	0,116128	0,161	Normal
Learning Outcomes (Experimental)	30	0,149130	0,161	Normal
Self-Confidence (Control)	30	0,124143	0,161	Normal
Self-Confidence (Experimental)	30	0,140998	0,161	Normal

Based on Table 6, both the learning outcome data and the students' confidence levels in the pre-test stage had L_{count} values smaller than L_{table} (0,161), based on the normality test results. As a result, it was determined that the data from the experimental class and the control class were normally distributed. This shows that one of the requirements for conducting a t-test in hypothesis testing was met by the data.

2) Post-Test Data Normality Test

Table 7. Post Test Results Student Learning Outcomes and Self-Confidence

Class	N	L_{Count}	L_{Table}	Description
Learning Outcomes (Control)	30	0,125608	0,161	Normal
Learning Outcomes (Experimental)	30	0,129001	0,161	Normal
Self-Confidence (Control)	30	0,154067	0,161	Normal

Self-Confidence (Experimental)	30	0,157228	0,161	Normal

Based on Table 7, the results of normality testing at a significance level of 0,05, the data on learning outcomes and student confidence levels in the posttest stage had a value of $L_{count} < L_{table}$ (0,161). The data from the experimental and control classes were therefore normally distributed, meeting the criteria for using parametric statistical tests (t-tests) in hypothesis testing.

3)   Pre-Test Data Homogeneity Test

Table 8. Testing the Homogeneity of Learning Outcomes in Pre-Tests and Post-Tests in Control and Experimental Classes

Class	Variance		F_{Count}	F_{Table}	Description
	Control	Experimental			
Pre-Test for Control and Experimental Classes	1,834483	1,550575	1,183099	1,860811	Homogenous
Post-Test for Control and Experimental Classes	1,660920	1,581609	1,050145	1,860811	Homogenous

Based on Table 8, the results of the homogeneity test, the F_{count} value is smaller than the F_{table} value in the pre-test and post-test data (1,860811). The learning outcome data of the experimental class and the control class are considered homogeneous, indicating that both groups have consistent levels of data dispersion and can be tested with a t-test for further analysis.

4)   Post-Test Data Homogeneity Test

Table 9. Homogeneity Test of Pre-Test and Post-Test Self-Confidence Questionnaires for Control and Experimental Classes

Class	Variance		F_{Count}	F_{Table}	Description
	Control	Experimental			
Questionnaire After Pre-Test for Control and Experimental Classes	246,953520	229,321460	1,076888	1,860811	Homogenous
Questionnaire After Post Test for Control and Experimental Classes	231,303813	209,947098	1,101724	1,860811	Homogenous

Based on Table 9, the results of the homogeneity test, the F_{count} value for the student self-confidence questionnaire data in the pre-test and post-test was smaller than the F_{table} value (1,860811). The data met the criteria for additional analysis using an independent two-sample t-test to determine the impact of using Quizizz interactive media in increasing student confidence, because the variances of the two groups were homogeneous.

Hypothesis testing was performed using an independent two-sample t-test with a significance level of α = 0,05 to determine the impact of Quizizz-based interactive media on improving student learning outcomes and their confidence after the prerequisite test and the data was determined to have a normal and homogeneous distribution.

Table 10. Results of Hypothesis Testing of Student Learning Outcomes

Class	Number of Samples	Average Difference Value Post Test	Variance	T_{Count}	T_{Table}	Description
Control	30	13,166667	1,660920	2,737545	1,672	H_0 is rejected
Experimental	30	14,066667	1,581609			

Table 11. Results of Student Self-Confidence Hypothesis Testing

Class	Number of Samples	Average Difference Value Post Test	Variance	T_{Count}	T_{Table}	Description
Control	30	97,134203	231,303813	3,208305	1,672	H_0 is rejected
Experimental	30	109,438528	209,947098			

Based on Table 10 and Table 11, explanation: all $t_{calculated}$ values are greater than t_{table}, so H_0 is rejected and H_1 is accepted.

The experimental class and control class showed significant differences in terms of student learning outcomes and self-confidence, based on the t-test results. At a significance level of 5%, the t-values for self-confidence (3,208) and learning outcomes (2,737) were higher than the t-table value (1,672). In addition, the effect size calculation shows that the influence of Quizizz-based interactive media is significant on students' self-confidence (d = 0.83) and moderate to significant on student learning outcomes (d = 0.71). Therefore, it can be concluded that Quizizz-based interactive media significantly improves students' learning outcomes and their confidence in solving mathematical problems.

c. Discussion

The purpose of this study was to determine how Quizizz-based interactive media could improve student learning outcomes and confidence in answering math questions involving the Pythagorean Theorem. Two classes, each with 30 students, were used in this study: the experimental class (VIII Terpadu 1), which used Quizizz media, and the control class (VIII Unggul), which used traditional methods. The research tools included a confidence questionnaire and a learning outcome test that had been validated and tested for reliability, with results of $r > r_{table}$ and $r_{alpha} > 0,70$ indicating that the tools were suitable for use.

The data from both classes met the requirements for the t-test, as the normality and homogeneity tests showed that the data were normally distributed and had homogeneous variance. The t-values calculated for learning outcomes and confidence, respectively, were 2,737 and 3,208 based on the independent two-sample t-test, and both were greater than the t-table value (1,672) at a significance level of 0,05. Therefore, H_0 was rejected and Ha was accepted, indicating that Quizizz had a significant impact on improving students' confidence and learning outcomes.

Based on the empirical findings of this study, students in the experimental class showed better performance than the control group in terms of average scores and self-confidence. This is in line with research conducted by (Pamungkas et al., 2025), which shows that through engaging and interactive learning, technology-based media such as Quizizz can increase student motivation, engagement, and self-confidence. These findings also support the theory (Wulandari et al., 2023) that good learning media must be able to facilitate two-way interaction and increase learning motivation.

Theoretically, the use of Quizizz in mathematics learning can change students' perceptions of lessons that tend to be considered difficult into more interesting and challenging activities (Supriyatin, 2024). Features such as leaderboards, timers, and automatic feedback create a competitive yet enjoyable learning atmosphere, which has a positive impact on students' cognitive (learning outcomes) and affective (self-confidence) aspects (Ningsih et al., 2025). Thus, it can be concluded that Quizizz-based interactive media is effective as a digital learning innovation that supports the improvement of mathematics learning quality.

4. CONCLUSION

Based on the results of the study, students' learning outcomes and their confidence in answering math questions were positively and significantly influenced by the use of Quizizz-based interactive learning materials. The results of the hypothesis test calculations for post-test scores and questionnaires show this evidence, indicating that the use of Quizizz improves student learning outcomes. The average post-test score for the experimental class was 14,07, which was

higher than the control class score of 13,17, proving this point. These results show that Quizizz-based learning is more effective in helping students understand the subject matter in an interesting and interactive way. Similarly, after using Quizizz, the final scores on the student confidence assessment also increased. The average score of the experimental class on the Post Test questionnaire was 109,438528, which was higher than the control class score of 97,134203. As a result, it has been proven that the use of Quizizz can improve students' cognitive and affective skills while making mathematics learning more interesting, dynamic, and inspiring.

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