The effect of using the team quiz method on student learning outcomes in mathematics subjects

Wakhidatul fitriah[1], Agus Setiawan[2*], Saidun Anwar[3], Fitroh Ariansyah[4], and Manteena Madhavi[5]

1. *Universitas Ma'arif Lampung (UMALA), Indonesia*
2. *Universitas Ma'arif Lampung (UMALA), Indonesia*
3. *Universitas Ma'arif Lampung (UMALA), Indonesia*
4. *SMP Islam Nurul Anwar Pasuruan, Indonesia*
5. *GITAM (Deemed to be University), Visakhapatnam, India*
E-mail correspondence to: saidun.anwar@gmail.com

Abstract

The team quiz learning method is tested to see if it improves math learning for Mts Tri Bakti Al-Ikhlas Seputih Agung pupils. This research uses quantitative quasi-experimental methods. This study included Mts Tri Bakti Al-Ikhlas Seputih Agung class VII pupils. For this study, class VIIA was experimental, and class VIIB was control. The practical and control classes each have 20 students. Students took multiple-choice pretests and posttests in this study. This study processed data using normality, homogeneity, and t-tests. Data processing showed that the experimental class posttest> control class posttest (0.539> 0.149), indicating that the team quiz learning method had an impact on class VII mathematics learning at Mts Tri Bakti Al-Sincere Bumi Mas Seputih Agung.

Keywords: Integers, Learning Results, Team Quiz

Introduction

Education has a pivotal role in the holistic growth and advancement of individuals, commencing from the earliest stages of life and continuing through several phases of formal education (Choirudin et al., 2021; Segara et al., 2023). The purpose of education is to promote the accumulation of information on a universal scale (Anwar et al., 2019; Sekaryanti et al., 2023). The perpetuity of education remains an essential requirement as long as mankind continues to endure and advance (Jannah et al., 2023)

The definition of education, as outlined in the statute that governs the national education system, is praiseworthy (Sajadi & Khaghanizadeh, 2016; Shi, 2020). However, the problem is how it is operationalized or implemented in practice in reality (Verbruggen, 2021a). So education is defined in two senses; firstly, in just one word, it means education is "training"; secondly (Tong et al., 2022; Verbruggen, 2021b), education is a process or activity of teaching students to know themselves within them they have enormous potential (Amos Neolaka, Grace Amialia, 2017).

At this time, education needs the hands of creative and innovative teachers, and in the teaching and learning process, a teacher must be able to use exciting learning strategies (Bača1 et al., 2005; Sugianto et al., 2022; Wicaksono et al., 2021). Teaching strategy is a teacher's action in implementing a teaching plan (Almeida et al., 2021; Montiel & Gomez-Zermeño, 2021). This implies that the instructor uses multiple elements in their teaching approach to motivate pupils to attain predetermined objectives (Setiyanti et al., 2022; Sopa et al., 2022; Suharsiwi et al., 2022). The achievement of positive learning outcomes is inherently linked to the crucial role that teachers play in effectively imparting educational content to pupils, particularly in the domain of mathematics (Sprunt & Marella, 2021; Szumski, 2020; Tkacová et al., 2022); In order for students to comprehend the information effectively, it is imperative for a teacher to possess a thorough mastery of the subject matter being transmitted.

The attainment of competencies achieved can serve as an indicator of learning outcomes. Learning outcomes serve as a measure of achievement in the educational endeavours pursued. According to the findings derived from the observations conducted at Mts Tri Bakti Al-Ikhlas Bumi Mas, it was determined that certain pupils exhibited a need for additional learning outcomes. Many individuals experience drowsiness throughout the process of learning. Nonetheless, students' interests change during their academic careers.

The influence of using the Team Quiz learning method has been researched by (Maha et al., 2021 Gusti Agung Sri Parnayati, 2020; Hamidatun Nihayah et al., 2022). Nonetheless, some of these academics are only concerned with student learning achievement. This study differs in that it focuses on student learning outcomes in mathematics and boosts students' interest in mathematics while implementing mathematics instruction.

The teacher's teaching approach remains boring, and he or she solely employs the lecture method, which is quite effective when learning occurs (Mabingo, 2022; Mendoza-González, 2019; Suriyadi et al., 2021) As a result, students soon become bored and lose interest in learning in class. Due to a lack of media, teachers are forced to utilize dull teaching methods, which means that the teaching style used by teachers during the learning process has a big impact on student learning outcomes, guaranteeing that students are never bored while learning (Nurlaili Anwaria, 2022).

Learning outcomes are one metric of national education achievement(Darmayanti et al., 2022; Sugianto et al., 2017). Student learning outcomes are criteria for assessing student progress in mastering the topic matter presented during the learning process. If the learning process is effective, student learning outcomes will be more meaningful. Learning outcomes are critical measures of success for both teachers and students (Ratten & Jones, 2021; Sukarsono, 2019).

As a result, an appropriate teaching style can boost student learning activities. The team quiz method is one learning strategy that engages pupils. Team Quiz is an engaging learning tool that can boost students' motivation and thinking. A team quiz is a technique in which students are taught to study and discuss in groups (Dineu et al., 2022). Using this strategy can boost pupils' willingness to ask questions.

Research Method

This research uses a type of quasi-experimental research with a quantitative approach. Muhammad Ali explained that:

"Quasi experiments are almost similar to real experiments. "The difference lies in using subjects, namely in quasi-experiments random assignment is not carried out, but instead using existing groups"(Edi Junaidi, 2013).

The Quasi-experimental method is based on balance, so learning occurs naturally in this research, and students do not feel like being experimented on. In such a situation, it is hoped that it can contribute to the research's validity level. Before the learning outcomes test was held at Mts Tri Bakti Al-Ikhlas Seputih Agung, researchers conducted a validity test of the questionnaire instrument given to 40 class VII students at Mts Tri Bakti Al-Ikhlas Seputih Agung for the 2022-2023 academic year. Researchers carried out validity calculations regarding mathematics subjects using the SPSS 25 program.

From the calculation results, 15 questions on the questionnaire instrument were declared valid for each item where the calculated r-value of each statement item is more than the table r-value, namely 0.304. Each questionnaire statement item is declared suitable for use.

After validating the test questions, the next thing the researcher did was test the reliability of the test question instrument. The questionnaire reliability test in this study used the alpha formula with calculations using the SPSS 25 program. The condition in calculating this reliability is that if it≥ 0.600, then the questionnaire instrument is reliable. If that < 0.600, then the device has low reliability. Data from calculating the reliability of the mathematics questionnaire instrument using SPSS 25 is shown in Table 1.

Table1.Reliability Test Results Using the Alpa Formula

Reliability Statistics	
Cronbach's Alpha	N of Items
,643	15

Based on Table 1 above, it appears that the Cronbach's alpha value obtained from the calculation is 0.643, where 0.643 ≥ 0.600, which means that the student perception questionnaire instrument regarding mathematics education subjects has a very high level of reliability. From the results of the validity and reliability test of the student questionnaire instrument on mathematics subjects, it can be concluded that it is feasible and can be used for research.

After testing validity and reliability, the researcher then carried out the research by giving questionnaires to be filled out to the research sample, namely class VII students at Mts Tri Bakti Al-Ikhlas, totalling 40 students.

The normality test is carried out to determine whether the distribution of data obtained is normal. This normality test uses the help of the SPSS version 25 program. The processing results will produce a sig value. (signification). In Kolmogorov, Smirnov can show whether the distribution of the data that has been obtained is normal or not. The condition for data to be normally distributed is if the significance is greater than the 5% alpha level (energy>0.05).

Table 2. Posttest Question Normality Test

	Tests of Normality Group	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Ngan	Experimental Class	.132	20	,200*	,960	20	,539
	Control Class	,188	13	,200*	,903	13	,149

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

a. Lilliefors Significance Correction

From decision making, if the probability value is >0.05, then the sig value. It is normal; if the probability value is <0.05, the sign is abnormal. So, from the Kolmogorov-Smirnov results above, it follows:

1) Experimental class posttest with a significance of 0.200, which means> 0.05, then the population is normally distributed.
2) The population is generally distributed in the posttest control class with a significance of 0.200, which means> 0.05.

After carrying out the normality test on the two samples declared typically distributed, the next test is the homogeneity test. The homogeneity test was carried out to find the homogeneity value of the pretest and posttest variants of the two classes. In this homogeneity test, the researcher used the SPSS 25 program. The test criteria are as follows:

a. If the probability is >0.05, the variance is declared homogeneous.
b. If the likelihood is <0.05, the conflict is declared heterogeneous.

To find out the results of the data homogeneity test, you can see the following table:

Table 4. *Homogeneity Test of Posttest Questions for Experiment Class and Control Class*

Test of Homogeneity of Variance					
		Levene Statistics	df1	df2	Sig.
Learning outcomes	Based on Mean	.013	1	38	,908
	Based on Median	.012	1	38	,913
	Based on the Median and with adjusted df	.012	1	33,361	,913
	Based on trimmed mean	.012	1	38	,912

Based on homogeneity of variance, the Levene statistic value is 0.013, and the significance value is 0.908. with a significance value of 0.980>0.05, both samples (experimental and control classes) come

from homogeneous types.

The Independent Sample T Test is used to determine whether there are differences between two paired samples. The Independent Sample T Test in this research was used to answer the problem formulation "Does the quiz team method influence student learning outcomes in class VII mathematics?" To answer the problem formulation, the Independent Sample T Test was carried out on experimental and control class posttest data. The results of the hypothesis test calculation can be seen in the following table:

Table 3. *Independent Sample T-Test*

Independent Samples Test

		Levene's Test for Equality of Variances F Si		T-test for Equality of Means					95% Confidence Interval of the Difference	
				t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Learning outcomes	Equal variances assumed	.013	,908	8,546	38	,000	14,000	1,638	10,683	17,317
	Equal variances are not assumed			8,546	37,355	,000	14,000	1,638	10,682	17,318

Based on the table above, the sig value (2-tailed) is 000<0.05, so it can be concluded that there is a difference in the average learning outcomes between the team quiz and individual quiz learning models.

You can see the following statistical table for more details on the post-test average for the experimental and control classes.

Table 4. *Group Statistics*

	Class	N	Mean	Std. Deviation	Std. Error Mean
Learning outcomes	Posttest_Experiment	20	89.95	5,511	1,232
	Posttest_Control	20	75.95	4,828	1,080

Based on the discussion table above, using the team quiz method has a significant influence on student learning outcomes, or Ha is accepted, and Ho is rejected.

These results align with research conducted by Dona Mawarni, who said that the Team Quiz method was effective on student learning outcomes, obtaining an average percentage of 94.00% in the outstanding category. This shows that the team quiz method received a very excellent positive response from students. Thus, the team quiz method can effectively improve student learning outcomes.

Results and Discussion

Making learning plans aims to make the teaching and learning process more focused and can run well according to the program. Efforts to improve student learning outcomes in mathematics subjects at Mts Tri Bakti Al-Ikhlas Bumi Mas are creating effective learning; one is implementing the team quiz learning method when education is carried out. Using the team quiz method, students can absorb the material quickly and remember it easily. Implementing varied learning models will attract students' interest in participating in learning and influence student learning achievement.

Team Quiz is an active learning model developed by Silberman. In this team quiz learning method, students are divided into three teams. Each student on the team is responsible for preparing short-answer quizzes, and the rest of the team checks notes (Gamage et al., 2019; Hasanah et al., 2022; Saefurohman et al., 2021). In team quiz learning, students are actively involved by creating quizzes in the form of questions and answers, which will later be compared between groups.

The team quiz method begins with the teacher explaining the material classically; then, students are divided into large groups. All group members study the material provided together, give each other directions, and ask each other questions and answers to understand the material provided. After completing the material, an academic competition was held. This intellectual competition creates competition between groups, and students will always try to study with high motivation to get high scores. This technique can increase students' ability to take responsibility for what they learn in a fun and non-threatening way.

When observations were made in class VII Mts Tri Bakti Al-Ikhlas Bumi Mas in mathematics subjects by applying the team quiz learning model, the teacher delivered the material. The teacher divided the students into 3 groups: A and B, consisting of 7 students, and group C, comprising 6 students. The teacher explains the team quiz learning method to students; then, the teacher delivers material for 15 minutes regarding integers. Then, the teacher asks group A to prepare questions related to the material that has just been presented. Groups B and C were allowed to reread the notebook. And so on until all groups have a turn to provide questions/answers to the opposing group. Then, when finished, the teacher concludes the question and solution and explains the students' incorrect understanding. Learning is said to be successful if it requires the active involvement of students because they are the center of learning activities. The student's achievements determine student increases. Because the results in the form of grades will show the student's accomplishments. To what extent is the student's level of success during the lesson?

Conclusion

Based on the results of the T-Test analysis on the sample class, a sig value was obtained. (2-tailed) 0.000 <0.05, there is a significant influence. This shows that using the Team Quiz Model in the Experimental class for students can improve the learning outcomes of class VIII students at Mts Tri Bakti Al-Ikhlas.

Based on the explanation above, according to the learning conditions, it further strengthens that learning Mathematics in whole numbers and fractions using the Team Quiz learning model has made students more active in learning and made it easier for them to understand the material presented by the teacher. This is because learning using the Team Quiz learning model can receive and process material more efficiently, and students discover new things so that students are more enthusiastic about following the lesson.

The author's suggestions are: (1). The Team Quiz learning model is efficient when applied in teaching and learning activities, so this model is highly recommended for teachers. (2). In implementing this learning model, students must be conditioned as well as possible because this model can cause noisy classroom conditions.

Reference

Almeida, J., Daniel, A. D., & Figueiredo, C. (2021). The future of management education: The role of entrepreneurship education and junior enterprises. *International Journal of Management Education*, *19*(1). https://doi.org/10.1016/j.ijme.2019.100318

Anwar, M. S., Choirudin, C., Ningsih, E. F., Dewi, T., & Maseleno, A. (2019). Developing an Interactive Mathematics Multimedia Learning Based on Ispring Presenter in Increasing Students' Interest in Learning Mathematics. *Al-Jabar : Jurnal Pendidikan Matematika*, *10*(1), 135–150. https://doi.org/10.24042/ajpm.v10i1.4445

Bača[1], M., Baskoro, E. T., & Cholily, Y. M. (2005). Face antimagic labelings for a special class of plane graphs Co. *JCMCC: The Journal of Combinatorial Mathematics and Combinatorial Computing ...*.

Choirudin, C., Anwar, M. S., Azizah, I. N., Wawan, W., & Wahyudi, A. (2021). Pengembangan LKPD Matematika Berbasis Kaligrafi dengan Pendekatan Guided Discovery Learning. *Jurnal Pendidikan Matematika (JPM)*, *7*(1), 52. https://doi.org/10.33474/jpm.v7i1.6738

Darmayanti, R., Sugianto, R., Baiduri, Choirudin, & Wawan. (2022). Digital comic learning media based on character values on students' critical thinking in solving mathematical problems in terms of learning styles. *Al-Jabar: Jurnal Pendidikan Matematika*, *13*(1), 49–66. http://ejournal.radenintan.ac.id/index.php/al-jabar/index

Gamage, S. H. P. W., Ayres, J. R., Behrend, M. B., & Smith, E. J. (2019). Optimising Moodle quizzes for online assessments. *International Journal of STEM Education*, *6*(1). https://doi.org/10.1186/s40594-019-0181-4

Hasanah, N., Syaifuddin, M., & Darmayanti, R. (2022). Analysis of the Need for Mathematics Teaching Materials "Digital Comic Based on Islamic Values" for Class X SMA Students in Era 5.0. *Numerical: Jurnal Matematika Dan Pendidikan Matematika*, *6*(2). http://ejournal.radenintan.ac.id/index.php/al-jabar/index

Jannah, S. R., Yusuf, M., Choirudin, C., & ... (2023). The Effect of Instructional Media and Interpersonal Intelligence on Early Reading Skills. *Jurnal Obsesi: Jurnal ...*. https://mail.obsesi.or.id/index.php/obsesi/article/view/3515

Mabingo, A. (2022). Decolonizing Assessment in Dance Education: Ubuntu as an Evaluative Framework in Indigenous African Dance Education Practices. *Journal of Dance Education*. https://doi.org/10.1080/15290824.2021.2004313

Mendoza-González, A. (2019). A strategy based in ICT for inclusion of a student with multiple disability into regular education: A case of educational rehabilitation. *ACM International Conference Proceeding Series*, 101–105. https://doi.org/10.1145/3364138.3364177

Montiel, H., & Gomez-Zermeño, M. G. (2021). Educational challenges for computational thinking in k–12 education: A systematic literature review of "scratch" as an innovative programming tool. *Computers*, *10*(6). https://doi.org/10.3390/computers10060069

Ratten, V., & Jones, P. (2021). Entrepreneurship and management education: Exploring trends and gaps. *International Journal of Management Education*, *19*(1). https://doi.org/10.1016/j.ijme.2020.100431

Saefurohman, S., Maryanti, R., Azizah, N. N., Fitria, D., Husaeni, A., Wulandary, V., & Irawan, A. R. (2021). Efforts to increasing numeracy literacy of Elementary School Students through Quiziz learning media. *ASEAN Journal of Science and Engineering Education*, *1*(3).

Sajadi, S. A., & Khaghanizadeh, M. (2016). Effectiveness and Challenges of Mastery Learning in Nursing Education:Asystematic review. *International Journal of Medical Reviews*, *2*(4), 309–316. https://www.researchgate.net/publication/290194510

Segara, B., Choirudin, C., Setiawan, A., & Risnanda Arif, V. (2023). Metode Inquiry: Meningkatkan Hasil Belajar Matematika Siswa SMP Pada Materi Luas Bangun Datar. *JUrnal Penelitian Tindakan Kelas*, *1*(1), 19–27. https://www.journal.assyfa.com/index.php/JPTK/

Sekaryanti, R., Darmayanti, R., Choirudin, C., Usmiyatun, U., Kestoro, E., & Bausir, U. (2023). Analysis of Mathematics Problem-Solving Ability of Junior High School Students in Emotional Intelligence. *Jurnal Gantang*, *7*(2), 149–161. https://doi.org/10.31629/jg.v7i2.4944

Setiyanti, A., Basit, A., & Suharsiwi, S. (2022). Observation and Improvement to Undergraduate Student Activities in English Skill Using Mobile-Assisted Language Learning. *English Language in Focus (ELIF)*, *4*(2), 137–148.

Shi, Y. (2020). Who benefits from selective education? Evidence from elite boarding school admissions. *Economics of Education Review*, *74*. https://doi.org/10.1016/j.econedurev.2019.07.001

Sopa, S., Suharsiwi, D., & Anis, S. (2022). Buku pedoman praktikum penelitian 2022. *Fakultas Agama Islam Universitas Muhammadiyah Jakarta*.

Sprunt, B., & Marella, M. (2021). Combining child functioning data with learning and support needs data to create disability-identification algorithms in Fiji's education-management information system. *International Journal of Environmental Research and Public Health*, *18*(17). https://doi.org/10.3390/ijerph18179413

Sugianto, R., Cholily, Y. M., Darmayanti, R., Rahmah, K., & Hasanah, N. (2022). Development of Rainbow Mathematics Card in TGT Learning For Increasing Mathematics Communication Ability. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *13*(2), 221–233.

Sugianto, R., Darmayanti, R., Aprilani, D., Amany, L., Rachmawati, L. N., Hasanah, S. N., & Aji, F. B. (2017). Experiment on Ability to Understand Three-Dimensional Material Concepts Related to Learning Styles Using the Geogebra-Supported STAD Learning Model Abstra ct. *Al-Jabar: Jurnal Pendidikan Matematika*, *8*(2), 205–212.

Suharsiwi, S., Fadilah, N., & Farokhah, L. (2022). The Use of Audio-Visual Media in Improving Students' Reading Comprehension and Sholat Movements in Online Learning. *Journal of Education Technology*, *6*(1), 19–28.

Sukarsono, S. (2019). Knowledge system of religious communities in watershed conservation education; Case studies in Islamic Boarding Schools in East Java and West Nusa Tenggara, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *314*(1). https://doi.org/10.1088/1755-1315/314/1/012057

Suriyadi, S., Jamin, A., & Musdizal, M. (2021). The Integrative Education: The Vision of Character Education Based on Al-Qur'an. *AL QUDS : Jurnal Studi Alquran Dan Hadis*, *5*(1). https://doi.org/10.29240/alquds.v5i1.2006

Szumski, G. (2020). Attitudes of students toward people with disabilities, moral identity and inclusive education—A two-level analysis. *Research in Developmental Disabilities*, *102*. https://doi.org/10.1016/j.ridd.2020.103685

Tkacová, H., Králik, R., Tvrdoň, M., Jenisová, Z., & Martin, J. G. (2022). Credibility and Involvement of Social Media in Education—Recommendations for Mitigating the Negative Effects of the Pandemic among High School Students. *International Journal of Environmental Research and Public Health*, *19*(5). https://doi.org/10.3390/ijerph19052767

Tong, D. H., Nguyen, T. T., Uyen, B. P., Ngan, L. K., Khanh, L. T., & Tinh, P. T. (2022). Realistic Mathematics Education's Effect on Students' Performance and Attitudes: A Case of Ellipse Topics Learning. *European Journal of Educational Research*, *11*(1). https://doi.org/10.12973/eu-jer.11.1.403

Verbruggen, S. (2021a). Effectiveness of educational technology in early mathematics education: A systematic literature review. *International Journal of Child-Computer Interaction*, *27*. https://doi.org/10.1016/j.ijcci.2020.100220

Verbruggen, S. (2021b). Effectiveness of educational technology in early mathematics education: A systematic literature review. *International Journal of Child-Computer Interaction*, *27*. https://doi.org/10.1016/j.ijcci.2020.100220

Wicaksono, G. W., Nawisworo, P. B., Wahyuni, E. D., & Cholily, Y. M. (2021). Canvas learning management system feature analysis using feature-oriented domain analysis (FODA). *IOP Conference Series: Materials Science and Engineering*, *1077*(1), 12041.