The Effect of the Team Games Tournament Model Assisted by the Quizizz Application on the Learning Outcomes of Mathematics Education Students at Bengkulu University

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Abstract

This research aims to determine the effect of the Teams Games Tournament (TGT) learning model assisted by the Quizizz application on Integral Calculus learning outcomes for students in the Bachelor of Mathematics Education study program at Bengkulu University. The Integral Calculus course is a compulsory course offered in the FKIP UNIB Mathematics Education Undergraduate Study Program with a weight of 4 credits. However, the learning outcomes of students from the class of 2023 in the previous class were still low, namely only getting an average score of 57,7. So researchers applied a student-centered learning model to improve student learning outcomes. One of the learning models that can be used is the Teams Games Tournament with the help of the Quizizz application. The type of research carried out was quasi experimental research with a pre-test post-test control group design. The research sample was students from the Bachelor of Mathematics Education study program at Bengkulu University, semester 3A with a total of 29 students and semester 3B with a total of 29 students. Semester 3A students applied the Teams Games Tournament (TGT) model assisted by the Quizizz application and semester 3B students applied the Leaturing method or telling method. The data was analyzed statistically descriptively and inferentially through a t-test with the help of SPSS and obtained a value of p-value or sig < 0.05 namely 0.00 < 0.05, so it can be concluded that the use of the Teams Games Tournament (TGT) learning model assisted by the Quizizz application on the learning outcomes of students in the Bachelor of Mathematics Education study program at Bengkulu University, it has a positive effect on student learning outcomes. During the learning process in the classroom, the Teams Games Tournament model assisted by the Quizizz application creates a dynamic, interactive and motivating learning environment. By combining competitive, collaborative, and technological elements, this model helps increase student participation, deepen understanding of concepts, and create memorable learning experiences.

Keywords: Learning Outcomes; Quizizz; Quasi Experiment; Team Games Tournament

INTRODUCTION

The Integral Calculus course is a compulsory course offered in the FKIP UNIB Mathematics Education Undergraduate Study Program with a weight of 4 credits. This course aims to enable students to be able to solve problems related to integral concept. Hernawati *et al*. (2021) revealed that students still make many facts and principle errors in Integral Calculus courses. Apart from that, in previous Integral Calculus lessons, students experienced many difficulties in determining the roots of solutions to equations and quadratic functions, as well as difficulties in drawing graphs of quadratic functions. Then the UAS learning results of students from the class of 2023 in the previous Integral Calculus study were still low, namely only getting an average score of 57.7. This is clearly a problem that must be resolved as early as possible.

Lecturers as facilitators in lectures must be able to facilitate students so that they can obtain the expected abilities. This ability will be maximized through activities that are centered on the students themselves. In the Minister of Education and Culture Regulation No. 3 of 2020, the characteristics of the learning process are regulated, which consist of interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative and student-centered characteristics. Lecturers should be able to design learning that meets these characteristics. One of the learning models that can be used is Team Games Tournament. This is in line with research conducted by Suwarno (2019) which states that one learning model that can be used to make students active is the Team Games Tournament.

The Teams Games Tournament (TGT) type cooperative learning model is a type or model of cooperative learning that is easy to implement, involves the activities of all students without having to have differences in status, involves the role of students as peer tutors and contains elements of play and reinforcement. The advantage of TGT type learning is that there are academic tournaments in the learning process. Where each group member represents their group to hold a tournament (Yudianto *et al*., 2014). The characteristic of TGT is that students learn in small groups where in the learning process there are games tournaments which will later have group awards (Yudianto *et al*., 2016). Learning activities with games designed in the TGT model of cooperative learning enable students to learn more relaxed while fostering responsibility, self-confidence, respect for others, discipline, competitiveness, sportsmanship, cooperation and learning involvement for all students.

One of the game applications that can be ssssused in TGT learning is the Quizizz application. Quizizz is a game-based learning application that lecturers can use to review students' knowledge and make learning possible (Tan & Tasir, 2022; Utaminingsih & Setiawaty, 2023). Quizizz is a simple application where educators can create tests and students can access them via cellphone or computer (Pratama, 2019). This application can also be used as a medium for creating quizzes complete with images and videos. The Quizizz application is suitable for use in the classroom because this application is free and easy to access by lecturers and students. Another potential that this application has is that it can stimulate students' learning motivation with feedback and strategies like a game (Utaminingsih & Setiawaty, 2023). Based on this, it can be stated that the problem formulation in this research is how effective the Team Games Tournament model is based on the Quizizz application on the learning outcomes of students in the Bachelor of Mathematics Education Study Program at Bengkulu University. Based on the problems above, the researcher wanted to see whether there was an influence of the Team Games Tournament Model Assisted by the Quizizz Application on the Learning Outcomes of Mathematics Education Undergraduate Study Program Students at Bengkulu University.

METHOD

This type of research is Quasi Experimental, which is a type of experiment with the main characteristic of not using random assignment, but using existing groups, namely ordinary classes. This method is often used to assess the impact or cause-and-effect relationship between certain variables without using full randomization as in a true experiment. By using a research design*pretest-posttest control group design*.

As explained by Sugiyono (2018), this experimental design is an extension of an experimental design which is actually difficult to carry out. Although this design includes a control group, it is unable to fully control external variables that influence the conduct of the experiment.

The pretest-posttest control group design approach compares two groups, the first group will apply the TGT method supported by the Quizizz application as the experimental group, while the second group will use the lecture method as the control group. The control group is selected non-equivalently because there is no randomization, by looking for a group that is comparable to the treatment group in baseline characteristics or conditions.

Before providing treatment, a pre-test was carried out to measure the initial learning outcomes of the two groups. After that, the experimental group will receive treatment in the

form of the TGT method which is supported by the Quizizz application in learning, while the control group will continue learning using conventional methods without using Quizizz, namely the lecture learning method.

After treatment, a posttest was carried out on both groups to measure final learning outcomes. The differences between learning outcomes in the pre-test and post-test in the two groups will be analyzed to assess the effect of using the TGT method supported by the Quizizz application on student learning outcomes.

The subjects of this research consisted of students from the Bachelor of Mathematics Education study program at Bengkulu University, semester 3A with a total of 29 students and semester 3B with a total of 29 students. Semester 3A students applied the TGT method supported by the Quizizz application as the experimental class and semester 3B students applied the conventional method as the control class.

The data analysis technique used is inferential statistical techniques, namely prerequisite tests which include normality tests and homogeneity tests. After that, a t test was carried out to test the hypothesis taken. The normality test is carried out to determine whether the population of each variable in the study follows a normal distribution or not. In this context, the Lilliefors test is used as a testing method (Nuryadi, 2017). In this study using SPSS, the sig value can be seen, when the sig. > 0.05 then the data is normal. Homogeneity test to evaluate whether the data is homogeneous or not, the Fisher test is used, which is a method for testing the equality of two variances. When using SPSS you can see the sig value, when the sig. > 0.05 then the two sample groups are homogeneous. Based on the relatively small number of samples $n < 30$, we used the t test to test the hypothesis that had been determined Gunawan (2017). The criteria for this t test are if the t-count value $>$ t-table then H_0 is rejected. Apart from that, we can use the SPSS application, by looking at the sig. value,when the sig value. < 0.05 then H_0 is rejected. Information:

H_0 = Student learning outcomes using the TGT model assisted by the Quizizz application are the same as using the conventional model (Lecture)

H_1 = Student learning outcomes using the TGT model assisted by the Quizizz application are better than using the conventional model (Lecture)

RESULTS AND DISCUSSION
Description of Assessment Results

This research was carried out at Bengkulu University with the aim of determining the significant influence of the Quizizz-assisted TGT model on student learning outcomes in the Integral Calculus course.This research involved two research groups, namely the experimental class and the control class. The experimental class uses the TGT learning model with the help of Quizizz and the control class uses the conventional learning model. This research method is a Quasi Experimental research method. This research data consists of an initial test (pre-test) and a final test (post-test) and the researcher obtained data from the results of the initial test (pre-test) and final test (post-test) carried out on the experimental class and control class. The recapitulation of the pre-test and post-test results in this research can be seen in Table 1.

Table 1. Descriptive of students' pre-test and post-test results

Description	Pre-testConventional	TGT pre-test	Post-testConventional	TGT post-test
Number of Students	29	29	29	29

Description	Pre-test Conventional	TGT pre-test	Post-test Conventional	TGT post-test
Average	22.76	23.8	60.87	71.9
Median	25	25	60	70
The highest score	40	45	80	90
Lowest Value	10	10	40	50
Standard Deviation	1.6	9.87	11.8	10.56
Variance	74.26	97.6	139.4	111.45
Skewness	0.22	0.18	-0.256	-0.27

Based on table 1, there was an increase in student learning outcomes before and after being given learning using the TGT model.

Test prerequisites
Pre-test normality test for experimental class and control class
The results of the normality test for the initial test (pre-test) using the SPSS application on experimental class data (TGT learning model assisted by the Quizizz application) and control class (conventional model) with a sample size of 29 students each, obtained results as in Table 2.

Table 2. Pre-test normality test results

	Experimental class	Control class
Sig value.	0.200	0.200

From the table above, the sig value is obtained. the experimental class and control class is $0.200 > 0.05$. So both classes have a normal distribution.

Pre-test homogeneity test for experimental class and control class
The results of the homogeneity test for the initial test (pre-test) using the SPSS application on experimental class data (TGT learning model assisted by the Quizizz application) and control class (conventional model), obtained results as in Table 3.

Table 3. Pre-test homogeneity test results

		Levene Statistics	df1	df2	Sig.
Mark	Based on Mean	0.695	1	56	0.408

From the table above, the sig value is obtained. $= 0.408 > 0.05$. So the two groups/classes are homogeneous. Based on the results of the normality and homogeneity tests, the two classes can be used for research.

Post-test normality test for experimental class and control class
Normality test results for the final test (post-test) using the SPSS application on experimental class data (TGT learning model assisted by the Quizizz application) and control class (conventional model) with a sample size of 29 students each, the results obtained are as in table 4.

Table 4. Post-test normality test results

	Experimental class	Control class
Sig value.	0.062	0.200

From the table above, the sig value is obtained. experimental class and control class more than 0.05. So both classes have a normal distribution.

Post-test homogeneity test of the experimental class and control class

The results of the homogeneity test for the initial test (post-test) using the SPSS application on experimental class data (TGT learning model assisted by the Quizizz application) and control class (conventional model), obtained results as in table 5.

Table 5. Post-test homogeneity test results

		Levene Statistics	df1	df2	Sig.
Mark	Based on Mean	0.136	1	56	0.713

From the table above, the sig value is obtained. $= 0.713 > 0.05$. So the two groups/classes are homogeneous.

- t test

It is known that the two experimental classes and the control class are normally distributed and have the same or homogeneous variance, so hypothesis testing can be continued using the t test statistic.

Hypothesis:
H0:$\mu_1 = \mu_0$
H1:$\mu_1 > \mu_0$
With :

μ_1 adalah rata − rata hasil belajar mahasiswa model $TGT\ berbatuan\ Quizizz$
μ_0 adalah rata − rata hasil belajar mahasiswa model $Konvensional$

Table 6. Hypothesis test results

t-test for Equality of Means		
t	df	Sig.
3,752	56	0

Based on the t test results in table 6, the price is $= 3,752$ and we know the price is $= 2,668$. In accordance with the hypothesis testing criteria, H_0 is rejected and H_1 is accepted. Which means it is true that learning using the TGT method with the help of the Quizizz application can influence the Integral Calculus learning outcomes of Bengkulu University students.

The TGT learning model with the help of Quizizz is an active learning model that can be used in the classroom. This statement is in accordance with opinion Adiputra & Heryadi (2021) which states that using the TGT learning method with the help of Quizizz can improve students' learning outcomes, because they become more active during the learning process, especially during games and tournaments.

The group learning model based on games and tournaments is known as TGT (Andrijanto, 2023). TGT components include class presentations, group study, games, tournaments and group awards (Astuti & Kristin, 2017). Researchers used the Slavin method (Tukiran Taniredja *et al*., 2014). Because of group work, TGT can improve learning outcomes. These results are in accordance with the research results (Astuti & Kristin, 2017), which states that when the group formation learning process is carried out heterogeneously, the learning outcomes of low and medium ability students can be influenced by the learning process of high ability students. Apart from that, in research conducted by Rosidin (2019), the TGT model is a learning model that encourages students to actively learn concepts.

Apart from that, using Quizizz can also make students more interested and active in class. This is in line with research conducted by Utaminingsih & Setiawaty, (2023)which states that learning using Quizizz can make students more active in the learning process.

CONCLUSION

Based on the t test results in table 6, the price is = 3,752 and we know the price is = 2,668. In accordance with the hypothesis testing criteria, H_0 is rejected and H_1 is accepted. Which means it is true that learning using the TGT method with the help of the Quizizz application can influence the Integral Calculus learning outcomes of Bengkulu University students. The TGT learning model with the help of Quizizz is an active learning model that can be used in the classroom. This statement is in accordance with opinion Adiputra & Heryadi (2021) which states that using the TGT learning method with the help of Quizizz can improve students' learning outcomes, because they become more active during the learning process, especially during games and tournaments.

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