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THE EFFECTIVENESS OF TEAMS GAMES TOURNAMENT IN BILINGUAL MATHEMATICS LEARNING AGAINTS ACTIVITIES AND LEARNING OUTCOME

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Abstract

The research aims is testing theories in field they are engaged in. The theory that will be tested is Teams Game Tournament (TGT) method in bilingual mathematics learning. Research aims to determine the effectiveness of cooperative learning TGT improving learning outcomes and activeness of English speaking on mathematics learning. Pre-experimental methodology was employed in this study with research subject as many as 30 students in informatics study program. Research data in the form of results data pretest and posttest. To find out the condition of the data obtained, the researchers performed calculations using the statistical software package for the social sciences (SPSS). Analysis of data performed descriptive analysis form of paired-sample t-test. Obtained that cooperative learning type TGT is effective in improve learning outcomes and students' activeness of English speaking. Based on the result of pretest and posttest, there is an increase in the value of test results from 59.23 to 83.87. The cooperative learning model of TGT is able improving learning outcomes. The difference in percentage of students' activeness recorded at the second and third meetings shows a significant increase of 47.41% and 65.56%. The cooperative learning model of TGT type is able to make speaking activeness increase.

Keywords: Activeness; effectiveness; learning outcome; cooperative learning; teams games tournament.

Abstrak

Penelitian ini bertujuan untuk menguji teori-teori di bidang yang digelutinya. Teori yang akan diujikan adalah metode Teams Game Tournament (TGT) dalam pembelajaran matematika bilingual. Penelitian bertujuan untuk mengetahui keefektifan pembelajaran kooperatif tipe TGT dalam meningkatkan hasil belajar dan keaktifan berbicara bahasa Inggris pada pembelajaran matematika. Penelitian ini menggunakan metode pra eksperimen dengan subjek penelitian sebanyak 30 mahasiswa program studi teknik informatika. Data penelitian berupa data hasil pretest dan posttest. Untuk mengetahui dan mengetahui kondisi data yang diperoleh, peneliti melakukan perhitungan dengan menggunakan software statistika paket untuk ilmu-ilmu sosial (SPSS). Analisis data dilakukan analisis deskriptif berupa uji normalitas dan uji t sampel berpasangan. Didapatkan bahwa pembelajaran kooperatif tipe TGT efektif dalam meningkatkan hasil belajar dan keaktifan berbahasa Inggris siswa. Berdasarkan hasil pretes dan postes, terdapat peningkatan nilai hasil tes dari 59.23 menjadi 83.87. Model pembelajaran kooperatif tipe TGT mampu meningkatkan hasil belajar. Perbedaan persentase keaktifan siswa dalam berbicara bahasa Inggris yang tercatat pada pertemuan kedua dan ketiga menunjukkan peningkatan yang signifikan sebesar 47,41% dan 65,56%. Model pembelajaran kooperatif tipe TGT mampu meningkatkan keaktifan berbicara.

***Kata kunci**: Efektivitas; hasil belajar; keaktifan; pembelajaran kooperatif; teams games tournament.*

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INTRODUCTION

In the course of informatics technology can't be separated from the discussion of mathematics, especially logic. Well-known mathematics is hard to learn for both elementary, junior, high school, and college students. One of the causes that makes mathematics difficult for students is the lack of student activity in discussions or activities that foster an active and creative mindset (Amri et al., 2022). It needs an innovation in mathematics learning so that math can change fun in the mind of the students.

Based on a survey during instructional activity, the character of informatics engineering students is less active and individualistic. Cooperative learning with games can boost students' motivation to learn. The main focus of cooperative learning is the establishment of small groups of students with diverse backgrounds, abilities, and goals who collaborate to achieve the highest levels of individual and group performance by collaboration, trust, and communication (Luo et al., 2020).

Based on the research by Agustina & Humairoh (2020), use of a modified version of the Teams Games Tournament technique can effectively increase students' desire to speak English. Robert Slavin created the Teams Games Tournament teaching and learning approach, which combines study groups with team competition to improve the retention of a variety of knowledge, ideas, and abilities (Widhiastuti & Fachrurrozie, 2014). Cooperative learning type TGT is a type that is easy to apply, fun, involves the activities of all students without having any status differences, involves the role of students as peer tutors and contains elements of games and strengthening (Rahmawati, 2019). According to the findings of Fitriasari (2019)' research, using the Teams Game Tournament (TGT) learning model will improve student participation and understanding. Teams Games Tournament (TGT) is a type of learning model cooperative.

TGT improves learning by organizing a tournament in which the class is divided into small academically balanced teams that compete against one another. The serious game can increase students' engagement with the material, inspire interest in it, and support deep learning (Adame et al., 2022). The game consists of questions with content related to the main topic and is designed to increase students' self-confidence in their ability to exert self-control over motivation, behavior, and social environment (Annurwanda, 2018). In the TGT learning strategy enable students to learn more convenient and develop responsibility, cooperation, competition healthy, and participation in practical learning (Murtiyasa & Hidayah, 2022)

Based on the presentation of facts and previous research, this research is needed to be able to find out how effectively TGT is applied to support student learning outcomes and activeness in learning bilingual mathematics. By reviewing previous research, it is known that the value of the novelty of this research is the integration of mathematics and English in a lesson to enhance the learning of informatics engineering. So the goal of this research is to describe how effective TGT is to be applied to student engagement and learning outcomes in bilingual mathematics learning.

RESEARCH METHODS

The research aims at testing theories in the field they are engaged in. The method used in this research is pre-

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experimental method. The method used is using a pretest-posttest design sample. Sugiono Akhir (2017) states that, "Pre-experimental research results are the dependent variable, not solely influenced by the independent variable". Therefore, in this study uses only one class, namely the experimental class. Pre-experimental is designed with one class of research subject and with pretest and posttest data.

The inclusion character of this research sample is informatics engineering students who take basic mathematics courses in odd semester. The subjects of the study were the students of the study program of informatics engineering that took the basic mathematics as many as 30 people. Research class students have heterogeneous abilities. The material used in learning is the material of the real number system. The material of real number system is important for the student of informatics technique department because this material is the basis of the programming. The survey is conducted for 4 semesters in the student of informatics technique department, in making coding and even the meaning of the word "integer" which many students do not yet know. In addition, many found that students of informatics engineering in STMIK Asia many are difficult to coding, this is because the understanding of English and mathematics are lacking.

Mathematics learning done in 3 meetings. Measurement of learning effectiveness using pretest and posttest ability to complete English math test. In addition, the skills of students' English communication activeness is also measured using observation sheets of communication activeness. Before applied learning using cooperative model of TGT type, students are asked to do pretest problem consist of 5 problem. After doing the pretest done at the first meeting, the lecturers do the learning about the material of real number system for 3 times meeting.

The data obtained in the form of pretest and posttest score will be done descriptive analysis include data normality test and paired sample t-test to know the comparison of pretest and posttest value. This study's data analysis includes descriptive data, requirements testing, and hypothesis testing. The analyzed data is described in descriptive data, which includes the mean, amount of data, standard deviation, and percentage. After describing the data, the researcher performed a normality test to determine whether the data was normal or not. Furthermore, the t-test is used to determine whether there is an effect after the researcher's treatment. The analysis performed using the level of significance 0.05. H_0 on hypothesis test of this research is there is no significant difference of mean between learning result before getting learning with model of cooperative type TGT and after obtaining learning. While H1 in the hypothesis test is There is a sizable average difference between learning results before obtaining learning with cooperative model type TGT and after obtaining learning. Test data analysis using software SPSS 16.0.

The research steps are as follows:

a. Giving pretest questions to students consisting of 10 questions
b. Provide material about the real number system using cooperative model of the TGT type for 3 meetings supported by English mathematics teaching materials and observing the number of active students from the first to the third meeting.

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c. Delivering posttest questions consisting of 10 questions
d. Perform data processing
e. Doing testing and making hypotheses conclusion.

RESULT AND DISCUSSION

After obtaining the data, the researcher conducted an analysis. Figure 1 will display the analysis' findings.

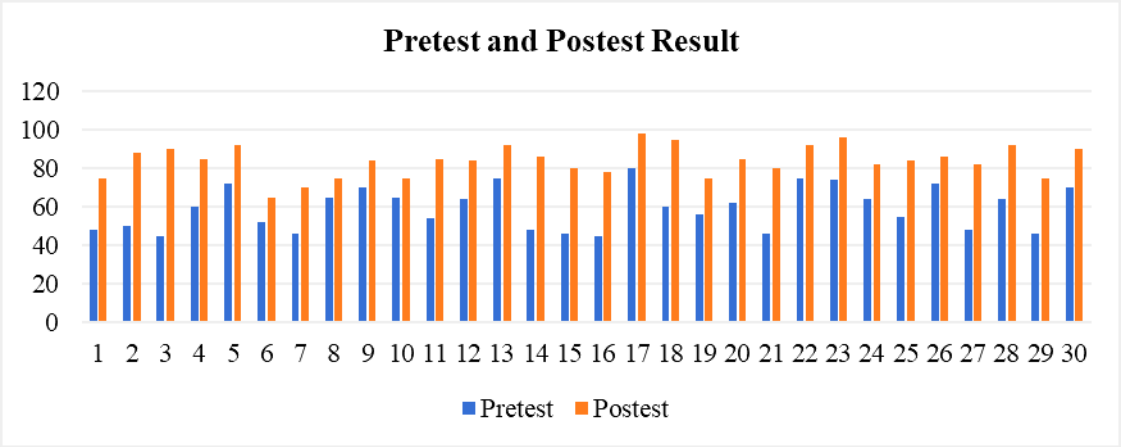

Figure 1. Pretest and posttest distribution data on solving mathematics problems in bilingual

The results of normality test data obtained from the pretest and posttest of mathematics learning with cooperative learning model type TGT can be shown by Table 1. Based on the Table 1 can be seen that the pretest value of 30 students obtained mean 59.23 and standard errors 2.01. Test output test of normality, hypothesis: Ho = Data spread following normal distribution and H1 = Data not spread following normal distribution. The result of the test of Kolmogorov-Smirnov got significance value equal to 0.103 shows probability value> alpha (0.05) hence its decision Ho accepted so that data said normal spread.

Posttest are done after 3 meetings of learning and learning using cooperative learning type teams game tournament done at the second and third meeting. Descriptive analysis in the form of normality test of data posttest using SPSS 16.0 software can be shown as the Table 2.

Table 1. Results test normality of pretest data

Variables	N	Mean	Std. Error	Significance
Pretest	30	59.23	2.03	0.103

Table 2. Results test data posttest normality

Variables	N	Mean	Std. Error	Significance
Posttest	30	83.87	1.46	0.200

Based on the Table 2 can be seen that the posttest value of 30 students obtained mean 83.87 and standard error 1.46. This suggests that posttest results are seen to increase compared to pretest results. The output of the normality test of the data shows the Kolmogorov Smirnov obtained a significance value

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of 0.200 shows the probability value> alpha (0.05) then Ho decision is accepted so that the data is said to spread normally.

After pretest and posttest data are confirmed to spread normally, we can test the average difference using paired sample t-test. This is because the sample used the same and using data before and after the treatment of mathematics learning using cooperative learning model type TGT. Table 3 displays the average test results for the difference between the pretest and posttest data.

Table 3 Test average difference results pretest and posttest

Variables	N	Mean	Std. Deviation	t-Count	Level Significant	Percentage Improvement
Pretest	30	59.23	11.03	-14.804	5%	40.76%
Posttest	30	83.87	7.99			

Table 3 shows the average test results of pretest and posttest average using SPSS 16.0 software. Tests carried out using the SPSS 16.0 application. The test results show the value of t-count = -14.804. While t-table for and with degrees of freedom 29 (30-1), then t-table value is 2,145. Therefore t-count (-14.804) <-t-table (-2.145) or error probability (0,000) <0.05, then H_0 is rejected.

In relation to the activeness of English speaking' students communication. There is also increased activeness at the second and third meeting for cooperative learning type TGT. Here is, the data percentage of students who communicate during the learning.

Table 4. Communication activity data

No	Aspect	Criteria Assessment	Score	Before	After
1.	Asking to lecturer	3. Ask with active to lecturer	3	1	5
		2. Less active asking about the material being studied	2	5	10
		1. No filed question or do activity outside activities	1	24	15
2.	Suggest opinion	3. Often give opinion	3	1	10
		2. Rarely give opinion	2	9	7
		1. No suggests opinion or do outside activities observed	1	20	13
3.	Presentation results discussion	3. Able do presentation active results discussion with speak English	3	5	12
		2. Able do presentation results discussion with Indonesian language	2	10	16
		1. No presentation or only accompany friend group in front class	1	15	2
Total Score				**128**	**177**
Percentage Score				**47.41%**	**65.56%**

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Based on the Table 4, the difference in the percentage of students' communication activeness recorded at the second and third meetings shows a significant increase of 47.41% and 65.56%. Active English-language communication increased by 18.15 percent when using the Teams games tournament learning method.

Based on the study results, it was found that there was an increase in the posttest result and communication activeness in the classroom using the team games tournament method. The posttest results show that students' understanding of the real number system material improves. These results are in line with research conducted by Panggabean et al. (2021) that TGT is able to improve students' achievement of conceptual knowledge competencies.

Herpratiwi et al. (2019) also discovered that the cooperative learning in a team-games competition significantly improved the learning outcomes for fifth-grade pupils. The conclusion of the research Adam et al. (2022) that pupils who participated in the game had higher growth mindset scores. This is also in line with Damarwan et al. (2018) research that the TGT model is helpful for boosting fundamental skills, particularly in the cognitive and psychomotor domains. This is so because the TGT concept includes games and challenges. Students are more engaged in learning activities when games and rewards are included.

In order to ensure that student participation in discussions and student reasoning are successful, language use is also crucial during discussions in a mathematics classroom (Veloo & Chairhany, 2013). The cooperative learning model of TGT type is able to make communication activity increase. According to the findings of the study by Rihanah & Sudiyono (2020), using the TGT (Teams Game Tournament) method in Classroom Action Research is effective for increasing vocabulary, as evidenced by an increase in the average value of pretest then posttest.

Veloo et al (2016) said A suggested educational strategy to boost student motivation in actively learning mathematics with peers through competitions is cooperative TGT. Along with learning math, students in cooperative TGT classrooms have also developed their social skills. The TGT type cooperative learning model is useful for improving conceptual knowledge because it has a number of benefits, such as 1) making students more engaged in learning, 2) enabling students to learn more comfortably and not easily get bored, 3) creating a sense of responsibility towards the group when appointed as representatives to play games, and 4) inspiring students to practice more for competitions (Panggabean et al., 2021).

Research by Azis & Pertiwi (2021), learning with the TGT method can increase student interest, students are more active and understand the concepts of momentum and impulse more easily. According to Azis and Pertiwi's (2021) statistical analysis, interest has a significant impact on learning outcomes. Someone who is interested in something is likely to be interested in and encouraged to participate in activities related to that interest. They will do anything to participate in the activity and achieve the desired result out of pleasure and interest. Students who are enthusiastic about learning achieve better results, and vice versa (Azis & Pertiwi, 2021).

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Teams games tournament method is part of the cooperative learning model. When this occurs in cooperative learning, students tend to engage in more helpful behaviors, such as providing more detailed assistance and guided directions to aid understanding, as well as demonstrating more complex thinking and problem-solving skills in both their language content and ongoing learning. Through the TGT context, different and efficient learning techniques can be offered, improving students' active learning and enhancing their learning interest, leading to a favorable change in their learning attitude (Luo et al., 2020). Frianto & Amirudin (2016) said that the imple-mentation of the TGT and Fan Pick n cooperative learning model went very well. This model has the potential to boost students' motivation and learning outcomes.

CONCLUSION AND SUGGESTION

Learning mathematics in English through cooperative learning type TGT can improve students' learning outcomes and active speaking in English. Before the treatment, a pretest was carried out and saw the effectiveness of learning using TGT type cooperative learning through the provision of a post-test with indicators for assessing the results of the post-test and the activeness of speaking English. TGT that requires students to actively solve problems both individually and in groups requires students to have a sense of responsibility for themselves.

This research still needs some improvements so it is highly recommended for further research to analyze the effectiveness of TGT in improving the character of the students, because character development is required in the current learning.

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