THE EFFECT OF COOPERATIVE LEARNING MODEL TEAM GAMES TOURNAMENT (TGT) ASSISTED BY QUIZIZZ APPLICATION ON STUDENT LEARNING OUTCOMES IN REDOX REACTION TOPIC

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ABSTRACT

This study aims to analyze the effect of type cooperative learning model Team Games Tournament (TGT) assisted by the Quizizz application on student learning outcomes in redox reaction topic. The type of research is quasi-experimental, with the research design in the form of a pretest-posttest control group design. The population in this study were all students of class X IPA SMAN 7 Mataram, consisting of 206 students and divided into six classes selection of sampling in this study using cluster random sampling technique. The sample in this study was class X IPA 3 as the control class, which was treated with the conventional learning model, and students in class X IPA 4 as the experimental class who were treated with the learning model Team Games Tournament (TGT) assisted by Quizizz application. The instrument used in this study was a cognitive knowledge test in the form of multiple choices. Test the hypothesis with t-test polled varians show results t_{count} (2,70) > t_{table} (1.67) at a significant level of 5%. In conclusion, the type of cooperative learning model Team Games Tournament (TGT) assisted by Quizizz application effect on student learning outcomes on the subject matter of redox reaction class X IPA SMAN 7 Mataram.

Keywords: team games tournament, quizizz application, learning outcomes

INTRODUCTION

Chemistry is a part of science that specifically studies matter, its properties, changes, and the energy accompanying it (Fadly et al., 2020). Chemistry is important in learning activities, where it is hoped that students can get grades on the minimum completeness criteria (KKM) as material that students have achieved the goal of chemistry learning (Sulistyanti et al., 2019). According to Abdullah (2017), chemistry has abstract concepts and many calculations and formulas, so chemistry subjects become difficult for students to understand. The many abstract chemical concepts that students must absorb in a relatively limited time make chemistry a difficult subject for students (Suyanti, 2013).

These constraints are caused by factors like the teacher directly discussing theoretical things without looking at student understanding so that students have difficulty absorbing theory which is displayed. Students memorize knowledge without understanding the concepts of chemical material, so they cannot build their concepts (Gunawan et al., 2019). Even though the teacher's explanation was complete, the students remembered only a few words. These circumstances and situations make student learning outcomes less than optimal in chemistry subjects, likewise with the subject matter of redox reaction (Hasniyah & Muchtar, 2021).

Redox reactions are chemistry that studies reducing substances. These are substances that release or donate electrons or undergo oxidation, whose oxidation number increases, and oxidizing agents, which gain electrons oxidation number (NARICT, 2013). The development of redox reactions consists of the definition of oxygen transfer at the start of the topic. It turns to electron transfer on the topic continued after discussing the material structure of an atom. The subject matter of redox reactions changes the concept's meaning four times. Redox reactions are based on the transfer of oxygen, hydrogen,

electrons and change in oxidation number. Changes in the meaning of concepts and solving redox problems that require many stages make it difficult for students to solve problems and redox reactions so that students' chemistry scores are below the minimum completeness (Anshory et al., 2016).

One of the causes of failure in learning chemistry can be seen in the learning outcomes of students who still need to improve their completeness. It happens due to the need for teacher innovation in conditioning the learning atmosphere, decreasing student learning motivation. It can be seen from the student's lack of focus during learning and the need to prepare for learning the material to be taught (Sukardi, 2019). Learning conditions often found in schools include students needing to pay more attention to lessons because they are bored, sleepy, or busy doing other things that can interfere with the learning process (Sumiati et al., 2019).

The results of observations at SMAN 7 Mataram, especially class X Science, show that student learning outcomes are low because student scores tend to be below the KKM, which is 75. Hints of low learning outcomes for chemistry students can also be seen from the calculations of classical completeness in all class X IPA which is still below 40% (Ardiyansyah et al., 2019). It was also supported by an interview with a chemistry teacher who stated that students' responses to teaching and learning activities were still ordinary and could have been more active. This problem is caused by the learning model and methods used tend to be monotonous and the need for more utilization of learning media so that student learning outcomes are not optimal. Most teachers teach using the lecture method and PowerPoint to deliver the material.

The results of research by Yuniarti et al. (2020) show that misconceptions arise in all sub-concepts in the redox concept material, namely the highest misconception occurs in the sub-concept of determining oxidation number in molecules and ions, namely as much as 46% and misconceptions the lowest occurred in the sub material or concept definition of oxidation and reduction reactions redox reaction as seen from the change oxidation number of as much as 23%. Research by Nadiyya et al. (2020) shows that students' misconceptions are found in the redox reaction material, the sub-concepts of releasing and accepting electrons, combining

and releasing oxygen, understanding redox, determining oxidation numbers, changing oxidation numbers, oxidizer and reducing agents, as well as autoredox reactions with the percentage of students misconceptions of class X IPA for redox reaction material as much as 34.49%. Therefore, studying redox reaction material requires a good and appropriate learning model so that students become more motivated. According to Aini (2021), student motivation and interest in learning greatly affect the learning outcomes obtained by students. If student learning motivation is high, student learning outcomes are also high, and vice versa.

These problems must be addressed by paying attention to the factors that influence learning success, for example, using models and methods in learning activities (Irawan & Suharmanto, 2014). Teachers can use more varied learning models and media to encourage students to be more active. One solution to these problems is implementing a learning model and media that can involve students directly in learning, namely, type cooperative learning model Team Games Tournament (TGT) and Quizizz application.

Type cooperative learning model Team Games Tournament (TGT) is a model that can increase students' social interaction in learning (Muldayanti, 2013). The TGT model has five stages: presentation class, a study in groups, games, tournaments, and group awards (Tyasning et al., 2014). Learning with this model can be done while playing as an effort to create an activity for all students. Games can also interest students in increasing activity students in the class so they are motivated to learn (Yolageldili & Arikan, 2013). Next, Ahriani (2013) confirms that some games and tournaments make students work together and help each other so that student activity increases. This TGT model is better in supporting students to deepen difficult and powerful concepts to differences in attitudes between individuals of both races and cultural diversity (Wiwit & Putra, 2014).

Using instructional media is another factor that can support teaching and learning activities (Wardani et al., 2019). The learning media in question is the Quizizz application. Quizizz is an educational application in the form of an online quiz game. Quizizz application can be used for games in teams or individually so students will be more active and able to work with their team to beat another team. The teacher

can also use this application to incorporate instruction, discussion, and evaluation of learning. Besides that, Quizizz can be used anywhere without being bound by space and time. This matter is due to the Quizizz application, which has timing so that the quiz can be opened and ended anytime. Students only need to enter a password or game code to start the quiz without being in the same place as the teacher or friends (Sitorus & Santoso, 2022).

Implementation of a cooperative learning model type Team Games Tournament (TGT) assisted by the Quizizz application is expected to improve student learning outcomes because some previous research shows that the learning model Team Games Tournament (TGT) with card media can increase participation and learning outcomes. Annisa and Erwin (2021), stated that the model Team Games Tournament (TGT) is more effective in improving student achievement, memory skills, and activeness. The current research focuses on The Effect of the Type Cooperative Learning Model Team Games Tournament Assisted by Quizizz Application on Student Learning Outcomes Subject Matter of Redox Reaction.

RESEARCH METHODS

This research begins with the research preparation stage in November 2022, and research activities will be carried out in February 2023. Types of research in this are included in the quasi-experiment, which consists of classes control and experimental. Quasi-experimental research is used because, in this study, the sample cannot be fully controlled by the variables external variables that affect learning outcomes. The design or research design used in this research is the pretest-posttest control group design. The samples in this study were students in class X IPA 3 (35 students) as the control class and X IPA 4 (35 students) as the experimental class. Sampling was done by cluster random sampling technique or with clusters/classes (Sugiyono, 2014). The selection of clusters/classes is done randomly (Suji et al., 2017).

This research was conducted with the treatment of learning in the control class using the conventional learning model, namely lectures, questions, answers, discussions, and experiments, while in the experimental class using the cooperative learning model. Team Games Tournament (TGT) assisted application Quizizz The application of the learning model

was carried out in 3 meetings with a time allocation of 3 hours of lessons (3×45 minutes). The first meeting was held pre-test, and the fifth meeting was held post-test with the instrument in the form of multiple choice questions.

Data analysis using index Aiken'V to determine the content validity of the instrument questions-test and post-test, formula biserial point correlations to determine the validity of the items, and formulas Kuder-Richardson (KR-20) to determine instrument reliability and t-test statistic polled variants to test the research hypothesis. The normality test was performed using the chi-square formula, and the homogeneity test using the F-test formula.

RESULTS AND DISCUSSION

This study aims to analyze the effect of type cooperative learning model Team Games Tournament (TGT) assisted by Quizizz application on student results in the cognitive domain achieved in redox reaction material for class X IPA at SMAN 7 Mataram after participating through the learning process by taking samples from class X IPA 3 as the control class and X IPA 4 as the experimental class.

According to Moningka et al (2022), the TGT learning model can make students more active in learning and the results of student learning evaluations have increased. The TGT model is quite effective in conceptual and calculation topics such as redox reactions. Redox reactions are reactions that involve redox reactions and oxidation reactions. Reduction is a reaction that experiences a decrease in oxidation number and an increase in electrons or it can be said that reduction is a reaction in which a substance loses oxygen. Oxidation is a reaction that experiences an increase in oxidation number and a decrease in electrons or it can be said that oxidation is a reaction in which a substance binds oxygen. Reduction reactions and oxidation reactions occur in everyday life, for example combustion reactions, the manufacture of vinegar from alcohol, the breakdown of glucose in the body, iron, and others.

$$\text{Fe}_2\text{O}_3 + 3\text{CO} \longrightarrow 2\text{Fe} + 3\text{CO}_2$$
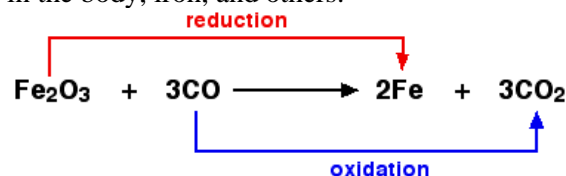
Figure 1 Example of Redox Reaction

Assessment of student learning outcomes in this research is in the form of student learning outcomes in the cognitive domain obtained from

pre-test and post-test. The purpose of giving pre-test and post-test is to determine differences in the ability or student learning outcomes before and after treatment. Results pre-test and post-test included in the calculation of the hypothesis. After conducting research by implementing the TGT learning model assisted by the Quizizz application on a redox reaction, the results show differences in chemistry learning outcomes between students taught using the conventional learning model. The average value pre-test and post-test control and experimental classes are presented in Figure 2.
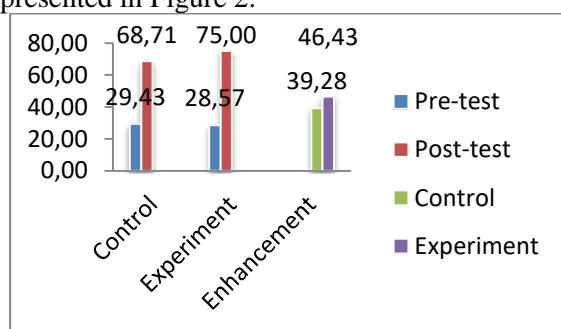

Figure 2 Comparison Pretest-Posttest

Figure 2 shows that there is a difference between the value of student learning outcomes in the control class and the experimental class. The average value pre-test in the control class is 29.43 points, and for the experimental class is 28.57 points, while the average value post-test of the two classes, namely 68.71 points for the control class and 75.00 points for the experimental class. It can be interpreted that the increase in the average value pre-test going to post-test (gain) in the control class was 39.28 points, while the experimental class was 46.43 points. Based on the upgrade, the average value of students obtained, then known that the results of learning in the class experiment are higher than the control class.

It is caused by several factors that strengthen the learning process, namely learning with type cooperative model Team Games Tournament assisted by the Quizizz application in this research. The factor is that students can develop and find their way of learning so that the learning outcomes obtained will last a long time in memory and are not easily forgotten. It is to the opinion of Drayatun and Rahmawati (2017), the TGT-type cooperative learning model will be able to strengthen students' memories of the material they are studying because the academic games that students experience in the tournament aim to Review and reinforce student

understanding of the material that has been studied.

Using the Quizizz application as an instructional medium can also increase student interest and motivation because Quizizz is an application-based game with educational games for interesting learning. Quizizz application has interesting features such as the display of color themes, images/avatars, and music learning with games (educational games) accompaniment games. According to Dewi (2018) can increase student learning potential because of the presence of verbal and visual components of stimulation.

This increase in learning outcomes is reinforced by the data obtained from the test results n-gain. According to Lestari and Mujib (2018), testing n-gain this is done to measure the increase in student learning outcomes between before and after learning. Based on the test results, if there is a difference in the average value of learning outcomes, there is a significant increase, so it is calculated by n-gain score to find out the improvement criteria that occur. Score data analysis gain normalization is done to test the hypothesis if the learning outcomes of control and experimental class students are significantly different. A comparison of the average score calculation results in n-gain in the control and experimental classes can be seen in Figure 3.
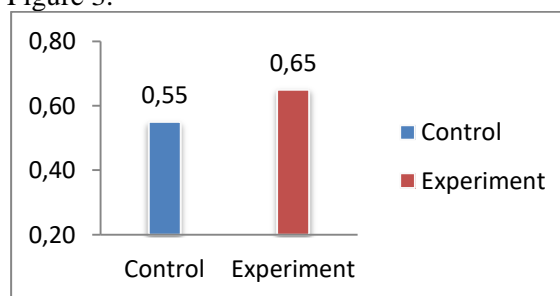

Figure 3 Comparison N-Gain

Based on the results of calculating the gain score, the average value is obtained in the control class pre-test of 29.43 and post-test of 68.71. Calculation data in the control class shows that there is 1 student in the low category, 27 students in the medium category, and 7 students in the high category, so a gain score of 0.55 is obtained, which means that the control class has increased learning outcomes in the medium category. The experimental class obtained the average value pre-test of 28.57 and post-test of 75.00. Score calculation results gained in the experimental class show that there is 1 student in the low category, 21 students in

the medium category, and 13 students in the high category, so a score is obtained gain of 0.65, which means that the experimental class also experienced an increase in learning outcomes in the medium category. Based on the results of the comparison of values n-gain in the control class and the experimental class, it can be concluded that the TGT cooperative learning model assisted by the application Quizizz is more effective for improving student learning outcomes compared to the conventional learning model because it has a score gain higher. It is by the opinion of Moningka et al. (2022), who stated that the TGT learning model could make students more active in learning, and the results of student learning evaluation have increased.

According to Kristianty and Sulastri (2021), the low student learning outcomes using a conventional learning model in the control class can be caused by several factors, namely: 1) the dominant use of the lecture method in learning by teachers can make students bored; 2) students in the control class did not pay much attention to the teacher's explanation because they were noisy and talked a lot with their friends; 3) the lack of use of other learning resources or media so that students are less motivated in learning the chemical material discussed. Learning in the experimental class has constraints like the students who still do not understand how to use the Quizizz application, so it needs to be explained again until it is understood.

The student learning outcomes data were then analyzed using the t-test, where the results of the t-test analysis showed a value of t_{count} of 2.70. Meanwhile, for t_{table} at a significant level of 5% with dk obtained value of 1.67. Based on these values, it is known that the value of $t_{count} > t_{table}$ so that the implementation of the type cooperative learning model Team Games Tournament (TGT) assisted by Quizizz application effect on student learning outcomes on the subject matter of redox reaction class X IPA SMAN 7 Mataram. The results of the analysis carried out in this study are relevant to those carried out by Atikah (2020), namely the positive effect of the implementation of the learning model Team Game Tournament on learning outcomes with results $t_{count} > t_{table}$, and it was found that at a significant level of 5%, namely 2.095 > 2.060, it means H_1 accepted.

CONCLUSION

Based on the research data and discussion, it can be concluded that the implementation of the type cooperative learning model Team Games Tournament (TGT) assisted by Quizizz application effect on student learning outcomes on the subject matter of redox reaction class X IPA SMAN 7 Mataram.

The suggestions put forward for the continuation of this research are: 1) student learning outcomes are expected to be measurable to cover the affective and psychomotor domains with the same learning approach and model; 2) quizizz application it is hoped that this can be used in other research in a more innovative and creative manner.; 3) learning model Team Games Tournament (TGT) can be used as an alternative learning model to improve students chemistry learning outcomes in other subject matter; 4) quizizz application can be used as one of the supporting media for teachers in increasing student learning activity.

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