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Article

The Effect of the Quiz Team Method in the Discovery Learning Models of the Learning Outcomes of the StudentsRiswandi^{1*}, Army Auliah², Jusniar³^{1,2,3} Universitas Negeri Makassar, Indonesia*Corresponding Address: army.auliah@unm.ac.id**Article Info**

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ABSTRACT

This quasi-experimental study aims to determine the effect of the *Quiz Team* Method in the *Discovery Learning* Model on the learning outcomes of students of class XI MIPA SMA Negeri 7 Takalar on the buffer solution material. The posttest only control group design was carried out on class XI SMA Negeri 7 Takalar successively as the experimental class and the control class which was determined by random sampling from class XI MIPA SMA Negeri 7 Takalar as the population. This study uses descriptive analysis and inferential analysis. The results of the descriptive analysis obtained that the average learning outcomes of the experimental group were 78.9 higher than the control group, which was 76.70. The results of inferential statistical analysis on student learning outcomes showed that the experimental group and control group data came from a homogeneous population $F_{count} < F_{table}$ 1.59 < 1.78 but not normally distributed so that the hypothesis test used was a non-parametric statistical test, Mann-Whitney with $\alpha = 0.05$ obtained $Z_{count} > Z_{table}$ (2.08 > 1.64). So it can be concluded that there is an effect of the *Quiz Team* method in the *Discovery Learning* model on the learning outcomes of class XI MIPA students at SMA Negeri 7 Takalar on the buffer solution material.

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INTRODUCTION

The 2013 curriculum is a competency-based curriculum that is strengthened by scientific learning processes and authentic assessments to achieve competence in spiritual attitudes, social attitudes, knowledge and skills (Permendikbud. 2013). The 2013 curriculum has characteristics on the standard process in the form of a learning approach scientific (Scientific Approach). This approach emphasizes the learning process through the application of scientific principles. The learning method developed in this approach is Learning by Doing (Siti Nugraha & Suherdi, 2017). One of the learning models that is applied according to the method is the Discovery Learning Model by the 2013 curriculum, namely the Discovery Learning Model. Through a scientific approach, students are actively involved in the learning process and can systematically find and build their knowledge independently. students to be

better at observing, asking questions, reasoning, and presenting what they get or know after receiving learning materials. Completion of the 2013 curriculum emphasizes natural, social, artistic, and cultural phenomena. The 2013 curriculum emphasizes more on three aspects, namely producing students with noble character (affective), skilled (psychomotor), and having knowledge (cognitive) that is sustainable, so that students are expected to be more creative, innovative and more productive (Wiwin. 2018). However, the factual phenomena found indicate that many teachers consider implementation of 2013 curriculum with approach scientific very complicated to be applied in learning activities, including in chemistry learning (Asih. 2014). Quality learning is largely determined by the teacher's ability to manage learning. The 2013 curriculum which emphasizes active learning and can train higher-order thinking skills, especially students' conceptual understanding is expected to produce quality learning (Kemendikbud, 2013). Efforts to realize quality learning cannot be separated from the role of teachers as educators. Teachers play an important role in conveying knowledge and guiding students to be able to understand the material given during the learning process (Hosnan, 2014).

The learning process of chemistry which has the characteristics of a link between concepts, where the concept develops from simple concepts to more complex concepts, really needs the role of the teacher. However, chemistry lessons become a frightening specter for students because of the wrong view of chemistry itself. So far, students consider concepts that are difficult to apply in real life. As a result, chemical concepts become very distant from the daily reality in their lives (Winarti, 2001). The results of observations made on December 6, 2021 at SMA Negeri 7 Takalar showed that most of the students complained of difficulties in understanding the concepts of chemistry lessons. which study of the composition, structure, properties, from the atomic to molecular scale and the energy changes that accompany a change of matter or substance. In learning chemistry, many students consider the subject to be difficult and they believe that there is no talent for chemistry. As a result of this mindset their learning motivation in chemistry lessons is lacking and has an impact on students' low grades. Through the results of interviews with teachers obtained information that at school This program has implemented the 2013 curriculum and implemented the Discovery Learning Model, but in the learning process the teacher still explains the material first before the discussion session, and during the discussion only students who are ready to present their answers so that other students become less active. This is one of the causes of the low learning outcomes of chemistry students. The data on the results of the mid-semester and test results showed that only 21% of the total students reached the KKM in chemistry.

One way to create an effective and efficient learning process, the teacher must have a learning model in order to achieve the expected goals and be able to attract someone's interest and motivation to learn mathematics by using the Team Quiz model. Team Quiz is one of the methods in the active learning model. This can increase student involvement to be effective and efficient in learning. The use of appropriate learning methods in the Discovery Learning Model is expected to be able to solve problems. The right learning method will really make students actively involved in the learning process in the classroom. One of the learning methods that can make students more active in implementing the Discovery Learning Model is using the Quiz Team method. The selection of the Quiz Team method was based on several considerations, including being quite easy to do in the learning process.

The Quiz Team method in the Discovery Learning Model aims to generate enthusiasm for learning, learning motivation, curiosity, and stimulating students to play an active role in the learning process. Through the Quiz Team method in the Discovery Learning model, it is hoped that it can facilitate understanding the concepts or subject matter provided by the teacher and later can facilitate understanding of the concepts or materials provided by the teacher and later can increase the quality of the learning process which can further improve student learning

outcomes, so it can be understood that the Quiz Team method in Discovery Learning can improve student learning outcomes in chemistry subjects.

According to Silberman (2012: 175), Team Quiz can increase students' sense of responsibility for what they learn in a fun way and do not threaten or frighten them. Zaini, Munthe and Aryani (2008:54), stated that Team Quiz can increase students' learning responsibilities in a pleasant atmosphere. According to Marno and Idris (2009: 160), the Team Quiz model is applied to empower all students by studying a learning topic and dividing study groups where each group will make a quiz to ask other groups whose rules have been applied by the previous teacher. While Silberman (2007:163), states that this team technique can increase students' sense of responsibility for what they learn in a fun way that is not threatening or scary.

METHODS

This research refers to a quantitative research approach. According to Nana S. Sukmadinata (2010: 53), quantitative research is based on philosophy positivism which emphasizes objective phenomena that are studied quantitatively or done using numbers, statistical processing, structure, and controlled experiment. While the type of research used in research. This is a quasi-experimental design research. Sugiyono (2007: 107) defines that experimental research is research that is used to look for the effect of certain treatments on others in the condition controlled. A similar opinion was also expressed by Suharsimi Arikunto (2000: 272) which defines experimental research as research which is intended to determine whether there is a result of treatment on investigated subject. The way to find out is to compare one or more experimental groups that are given treatment with one group non-treated comparison.

According to Sugiyono (2010: 73), there are several forms of design experiments namely: pre-experimental design, true experimental design, factorial design, and quasi experimental design. Sugiyono (2010: 75) states that the main feature of quasi-experimental design is the development of true experimental design, which has a control group but cannot fully functioning to control the external variables affect the implementation of the experiment.

Based on the explanation above, it can be concluded that quasi Experimental design is a type of research design that has groups the control and experimental groups were not randomly selected. Researcher using a quasi-experimental design because in this study there are external variables that cannot be controlled by the researcher.

This research is a quasi-experimental research (quasi-experimental). This study aims to determine the effect of Quiz Team in Model *Discovery Learning* on the learning outcomes of class XI students of SMA Negeri 7 Takalar on the subject matter of buffer solutions.

The variables in this study consisted of two kinds, namely the independent variable and the dependent variable. There are two independent variables, namely the Quiz Team method in the Discovery Learning model and Discovery Learning without the Quiz Team method. The dependent variable is the learning outcomes (cognitive) of class XI MIPA students at SMA Negeri 7 Takalar.

The population in this study is whole students of class XI MIPA SMA Negeri 7 Takalar, which consists of 2 classes. With a total of 68 students. In this school, students randomly assign each class or there is no superior class. SMA Negeri 7 Takalar is located in Mangarabombang District, Takalar Regency, South Sulawesi Province.

The data collection technique used in this study was to give a final test (posttest) for each experimental group and control group with the aim of knowing the differences in student learning outcomes between the experimental class and the control class. The provision of learning outcomes tests is carried out at the end of learning which aims to determine the students' achievement of learning materials after learning activities. The test results from the

experimental group and the control group were compared to determine whether there was an effect of the Quiz Team method on the Discovery Learning Model on student learning outcomes on the buffer solution material.

Instruments used in study This is in the form of a learning outcome test (posttest), namely the cognitive aspect in the form of multiple choice questions and observation sheets. The learning outcomes test consists of 25 multiple choice questions that have been validated by an expert validator. The validation carried out is content validation. In addition, item validation is also carried out. Item validation, carried out include determining the difficulty index, discriminating power, validation using Product Moment correlation with rough numbers and reliability.

RESULTS AND DISCUSSION

a. Descriptive Statistical Analysis

Descriptive statistical analysis provides an overview of the characteristics of learning outcomes at SMA Negeri 7 Takalar Class XI MIPA for the buffer solution material in the experimental group and the control group during learning. Based on the descriptive analysis of the learning outcomes of the students of Class XI MIPA 2 as an experimental group using the Quiz Team method with the Discovery Learning Model and Class XI MIPA 1 as a control group that did not use the Quiz Team method with the Discovery Learning Model, and obtained the learning outcomes of students who were can be seen in Table 1.

Table 1. Descriptive Statistic

No.	Statistics	Statistical Value	
		Experimental group	control group
1.	Number of Students	35	34
2.	The highest score	92	92
3.	Lowest Value	44	48
4.	Average value	78.09	76,70
5.	Median (Me)	81	75.5
6.	Mode (Mo)	82.5	79
7.	Standard Deviation	8.11	10.23

Table 1 shows that there are clear differences seen in the test scores of students' learning outcomes in the experimental group and the control group. This can be seen in the mean, median and mode values for the experimental group which are higher than the control group. in the descriptive statistics table it shows that there are 39 students overall, the highest score in the experimental group is 92 while in the control group it is 92, the lowest value for the experimental group is 44 and for the control group it is 44. For the average value it has an average value of 78.09 while in control group 76.70. The median for descriptive statistical tables is 81 for the experimental class and 75.5 for the control class, 82.5 for the experimental class mode and 79 for the control group. The standard deviation for the experimental class reaches 8.11 and for the control group 10.23.

If the value of student learning outcomes obtained by students in the experimental group and the control group is grouped in the category of mastery learning outcomes based on the standard of mastery learning chemistry class XI MIPA SMA Negeri 7 Takalar, then the data on the frequency and percentage of completeness of student learning outcomes are obtained as in Table 2.

Table 2. Result of Learning Outcomes

Category	Score	Experimental group		control group	
		F	%	F	%
Complete	75	29	80.55%	23	67.64%
Not Complete	<75	6	19.45%	10	32.36%
Amount		35	100%	34	100%

Table 2 shows that the learning outcomes achieved by students in the experimental group were higher than the learning outcomes obtained by students in the control group during the learning process.

The percentage of achievement of each student indicator for the buffer solution material in the experimental group obtained four indicators that were completed, four indicators were incomplete, while in the control group, three indicators were completed and five indicators were incomplete. Complete indicators are classified if they reach a percentage of 75% in accordance with the learning outcomes of students in class XI MIPA SMA Negeri 7 Takalar. The indicators that were completed in the experimental group were indicator two with a percentage of 76%, indicator four with a percentage of 75%, indicator five with a percentage of 77.85% and indicator eight with a percentage of 76.18%. As for the control group with complete indicators, indicator one with a percentage of 88.2%, indicator three with a percentage of 81.17%, and indicator eight with a percentage of 75.71%.

1) Normality test

The normality test was conducted to determine whether the data obtained came from a normally distributed population or data that were not normally distributed. The normality test uses the chi-square test statistic (X), which is categorized as normal if $F \text{ count} < F \text{ table}$. Based on the results of the normality test for the experimental class, obtained $X \text{ count} = 14,303$ while $X \text{ tabel} = 7,815$ so it can be concluded that the sample in the experimental class is not normally distributed because $X \text{ count}(14,303) > X \text{ tabel}(7,815)$. In the control class, the value of $X \text{ count} = 12,351$ while $X \text{ tabel} = 7,815$ so it can be concluded that the sample in the control class uses data that is not normally distributed $X \text{ count}(12,351) > X \text{ tabel}(7,815)$. The results of testing the normality of learning outcomes for students in the experimental group and the control group can be seen in table 3.

Table 3. Prerequisite Test

Class	$X \text{count}$	$X \text{table}$	Information
Experiment	14,303	7,815	No data Normal Distributed
Control	12,351	7,815	No data Normal Distributed

2) Homogeneity Test

Homogeneity test is a test to determine whether the data under study comes from homogeneous or non-homogeneous variance. Homogeneity test criteria, namely if $F \text{count} < F \text{table}$, then the variance of the experimental class and the control class is declared to come from a homogeneous variance. Based on the results of the calculation on the homogeneity test, the value of $F \text{count} = 1.59$ and the value of $F \text{table}$ at a significance level of 0.05 was 1.78. The value of $F \text{count}(1.59) < F \text{table}(1.78)$, so it can be concluded that the two classes, namely the experimental class and the control class, come from a homogeneous population. The results of testing the homogeneity of student learning outcomes in the experimental class and control class can be seen in table 4.

Table 4. Homogeneity Test

Class	F F count	X F table	Conclusion
Experiment	1.59	1.78	Homogeneous
Control			

Hypothesis testing

Learning outcomes data from the experimental and control groups came from homogeneous populations but the data were not normally distributed, so hypothesis testing could not be done using parametric statistics (t-test), must use non-parametric statistical tests (Mann-Whitney test). Based on the results of the calculation of student learning outcomes using the Mann-Whitney test, Z count is 2.08 and the Z table value for $\alpha = 0.05$ is 1.64. Because Z count $>$ Z table ($2.08 > 1.64$), H₁ is accepted and H₀ is rejected. This shows that there is an effect of the Quiz Team method in the Discovery Learning model on the learning outcomes of class XI MIPA students at SMA Negeri 7 Takalar on the subject matter of buffer solutions.

Based on the results of observations made in the experimental group and control group, the percentage of learning implementation can be seen in table 5. Result of Activity.

Table 5. Result of aActivity

No	Syntax	Percentage (%)	Category
1	Preliminary Stage	100	Very high
2	Stimulus	100	Very high
3	Problem Statement	100	Very high
4	Data Collection	100	Very high
5	Data Processing	100	Very high
6	Verification	89	Very high
7	Generalization	85	Very high
8	Closing Stage	100	Very high
	Amount	96.75	Very high

From the results of the study, it was found that the average value of student learning outcomes in the experimental group was higher than in the control group. The difference in the average value of student learning outcomes is caused by differences in treatment in the two research samples. The difference is, in the experimental group the Quiz Team method is applied in the Discovery Learning Model, while the control group uses the Discovery Learning Model without the Quiz Team learning method applied during the learning process.

The percentage of students' complete learning outcomes in the experimental group was higher than the control group. This means that the learning outcomes of students in the experimental group were higher using the Quiz Team method in the Discovery Learning Model compared to the control group using the Discovery Learning Model without the Quiz Team method. This is in accordance with the results of research (Sutardi, 2013), who concluded that students who study with the Quiz method can improve student learning outcomes. have higher academic achievement than students who study with conventional learning models.

The average percentage of student learning outcomes indicators completeness in the experimental group was higher than in the control group. The number of indicators that were completed in the experimental group was four, while in the control group there were three indicators that were completed. The indicators that were completed were in the experimental group (2, 4, 5 and 8) while in the control group the indicators were completed (1, 4, and 8). The percentage of achievement of each indicator shows that the completeness of each indicator on the subject matter of the buffer solution for the experimental group is on average higher than the control group. This is in line with research by Putri (2013), learning with quiz teams has an effect on increasing the percentage of chemistry learning outcomes in the buffer solution material.

The results of the hypothesis test show that the learning outcomes of students in the experimental group using the Quiz Team method in the Discovery Learning Model are higher than the learning outcomes of students who are taught without using the Quiz Team method.

This is due to the use of the Quiz Team method affecting student learning outcomes, because the Quiz Team method in the Discovery Learning Model involves students actively in discovering concepts. This research is in accordance with the results of previous research conducted by (Epinur, et al. 2013) which concluded that this was due to the Quiz Team method making students able to communicate directly and the resulting interaction can create a more effective learning atmosphere.

The use of learning using the Quiz Team method in the Discovery Learning Model can be an alternative for teachers to facilitate learning that is narrative and computational in nature, and can foster student interest. In addition, the use of the Discovery Learning learning model provides opportunities for students to be actively involved in the learning process and find a concept, so that it is stored in students' long-term memory.

This shows that the use of the Quiz Team method in the Discovery Learning Model is able to influence student learning outcomes in the experimental group compared to the control group without using the Quiz Team method in the Discovery Learning Model for buffer solution material. This is in accordance with research what was done by Putri (2013) concluded that learning chemistry using the active method Quiz team type assisted by question cards had an effect on chemistry learning outcomes in the material of buffer solutions and hydrolysis.

The quiz team method can improve understanding and mastery of the material better regarding the concepts contained in the buffer solution material. Giving this method triggers students to learn from their friends and at the same time teach their friends, so that positive mutual dependence arises. This is in line with research conducted by Pratiwi (2016), which states that one of the improvements in student learning outcomes is due to discussions between groups. In addition, students better understand the material being studied because all students practice answering questions given by other groups. Thus, the quiz team method in the discovery learning model is one of the learning methods that can help students be actively involved in learning, also have a good impact on high learning outcomes. This is in accordance with research conducted by Hermanto (2018), stating that the application of the discovery learning model with a variety of quiz teams achieves complete learning outcomes.

CONCLUSION

The use of the Quiz Team Method in the Discovery Learning Model has an effect on student learning outcomes, especially aspects of the cognitive domain. By implementing the Quiz Team Method in the Discovery Learning Model, students can become more active in learning activities. Based on the results of data analysis, it can be concluded that there is an effect of using the Quiz Team Method in the Discovery Learning Model on the learning outcomes of students in class XI MIPA SMA Negeri 7 Takalar.

Based on the results of the research that has been done, the researchers propose suggestions, namely:

1. For students, it is expected to be able to take lessons seriously, especially in reasoning activities. Students can develop their reasoning abilities optimally in order to improve their learning outcomes.
2. For teachers, it is expected to get used to applying the Quiz Team method in the Discovery Learning Model in the learning process because this model makes students more active in class and can improve student learning outcomes.

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