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THE APPLICATION OF ROUND ROBIN TECHNIQUES COOPERATIVE LEARNING MODEL TO IMPROVE THE STUDENTS' LEARNING OUTCOMES

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Abstract: The development of education must be considered, because education can develop students' self-ability through the learning process. A teacher must have fun teaching skills to improve student learning outcomes. Therefore, This study aims to determine whether there is an increase in student chemistry learning outcomes with the application model of cooperative learning techniques in Round Robin. The method used is quasi-experimental with a nonequivalent control group design. The subjects in this study were class XI IPA 1 and XI IPA 2 SMAN 1 Tambang, Riau. Data collection techniques using homogeneity test, documentation, observation, pretest and posttest. The homogeneity test analysis on the sample used the Bartlett test and variance test, while the final data analysis used the t-test. The results showed that there was an effect of increasing student chemistry learning outcomes with the application model of cooperative learning techniques in Round Robin. This is evidenced by the difference in the posttest average of the experimental class of 85.65 and the control class of 76.77. Based on the dissimilarity of this posttest value, the normalized N-Gain value for the experimental class is 0.773 which includes the high criteria and the control class is 0.61 including the medium criteria.

Keywords: Model of Cooperative Learning Techniques in Round Robin, Learning Outcomes, Thermochemistry

Abstrak: Perkembangan kualitas dunia pendidikan harus diperhatikan, karena pendidikan dapat mengembangkan kemampuan diri siswa melalui proses pembelajaran. Salah satu penunjang pengembangan kompetensi siswa yaitu kemampuan guru dalam mengajar. Guru diharapkan bijak dalam memilih cara penyampaian materi agar tercipta pembelajaran yang menyenangkan, sehingga memudahkan siswa dalam meningkatkan hasil belajar. Oleh karena itu penelitian ini bertujuan untuk mengetahui seberapa besar pengaruh peningkatan hasil belajar kimia siswa melalui penerapan model pembelajaran teknik Round Robin pada materi termokimia. Metode yang dipakai pada penelitian ini yaitu kuasi eksperimen dengan pola nonequivalent control group design. Subjek pada penelitian ini adalah kelas XI IPA 1 dan XI IPA 2 SMAN 1 Tambang, Riau. Teknik pengumpulan data menggunakan uji homogenitas,

dokumentasi, observasi, pretest dan posttest. Analisis uji homogenitas pada sampel memakai uji bartlett dan uji varians, sedangkan analisis data akhir menggunakan uji-t. Hasil penelitian menunjukkan bahwa terdapat pengaruh peningkatan hasil belajar kimia siswa melalui penerapan model pembelajaran teknik Round Robin pada materi termokimia. Hal ini dibuktikan dari perbedaan rata-rata posttest kelas eksperimen sebesar 85,65 dan kelas kontrol sebesar 76,77. Berdasarkan ketidaksamaan nilai posttest ini menunjukkan terjadinya peningkatan hasil belajar dengan nilai N-Gain ternormalisasi kelas eksperimen sebesar 0,773 yang termasuk kriteria tinggi dan kelas kontrol sebesar 0,61 termasuk kriteria sedang.

Kata kunci: Model Pembelajaran Teknik *Round Robin*, Hasil Belajar, Termokimia

INTRODUCTION

Education is an issue that ought to be observed by all states. A country can be in regard to quality when advancing in aspects of education. Education objectives to increase the ability of students in order to become a man or woman being that has good manners, skilled, independent, creative, and responsible (Hayati, 2012). This means that education is all forms of action to develop students' abilities through the learning process.

Learning can be interpreted as a process of changing a person's attitude based on the experience of his active reaction to the universe (Suyono & Hariyanto, 2014). This interaction process can be influenced by internal and external factors, so that not only one ability develops (Suprijono, 2013). The form of change that develops can be in the form of mastery of concepts, personality traits, skills, and expertise.

The competency development of students' abilities in the learning process is supported by facilities and infrastructure as well as teacher ability factors. Teachers are expected to be wise in choosing how to deliver teaching materials in order to create a pleasant learning environment.

Based on the data obtained in the field, most of the students' chemistry learning outcomes are still in the low category. This is influenced by the mindset of students who think that learning chemistry is difficult, students pay less attention to teacher delivery, students lack communication with their friends in discussing subject matter, students lack confidence in conveying arguments or questions, and teachers are still not optimal in using the discussion method. Therefore, it is necessary to apply a learning style that can liven up

the classroom, so that you get the end result of a good learning process.

Learning outcomes are a result that can be seen from changes in understanding, behavior and skills after getting the subject matter (Rizqi *et al*, 2018). Besides the definition of learning outcomes by Yusniar (2018) is the change in the skills that the student gets after taking the learning that shows the value of the learning outcomes that can be influenced by internal and external factors, as well as relationship with the indicator achieved to be expected after the learning process. So, we can conclude the purpose of understanding the learning outcomes that is a thing that earned the student after follow lesson.

Nasution (2017) states that to get the results of a good student learning and quality, accuracy required of a teacher in choosing learning model, if the teacher is less careful in choosing the discrepancy in the learning model use can degrade the quality of the learning process. As for factors that lead to a lack of student learning outcomes, interests and activities of students according to Rostika (2020), it is common for teachers to it use a teaching style with the lecture method, resulting impressed rigid, students were treated to a theoretical as well as the lack of scientific literacy in the example.

Therefore, to foster student learning outcomes in need of right change. On learning implementation is expected to motivate students and provide facility for students to engage in discussion, and can activate the ability of students (Kartini, 2019). Thus, one way that can be applied to foster student learning outcomes is by using the example of cooperative learning.

According to Pardeep (2017) cooperative learning is one form of learning model that makes the students learn in groups to maximize their learning well for alone or in groups. For the sake of the task group, each member should work together to understand the teaching materials. In addition, cooperative learning is also a model that prioritizes working in groups to achieve learning goals (Nurdiana, 2020).

So, cooperative learning can be defined as a model in which in the learning process groups of around 4-6 people are formed to work together with the aim of achieving learning indicators. Therefore, model learning that can be in use in materials chemistry is a model of cooperative learning techniques Round Robin.

The cooperative learning model of the Round Robin technique is a learning model that trains sharing skills, this

condition is because each student takes turns providing answers to problems using short statements, so that each student gets the same opportunity in argument and reduces the involvement of certain students in answering all questions and listen to the views from thought the other members (Barkley *et al*, 2012; Nurdiana, 2020; Ula & Barutu, 2019). Based on these definitions, the Round Robin technique learning model is a learning model in which students work in groups by taking turns expressing opinions, so that it can reduce the dominance of clever students.

The stages of implementing the Round Robin technique learning model, where the teacher gives different pieces of questions to each student. Students are given time to solve questions. Students answered questions appropriate to using the sequence obtained about the piece (every student gets the pen with color is not the same with the goal of reducing fraud in answering questions). After answering the manner shift, the students had a discussion to determine the correct answer. Students present their answers and give awards for best group.

The use of this model makes all students feel responsibility to resolve all the problems in proposing to the group with a way of answering the question of the appropriate order. Based on these stages, it can minimize students who dominate in groups and students become active, so that they can improve student learning outcomes which before the application of this model student learning outcomes are still low under the Minimum Completeness Criteria (KKM).

Based on the explanation above, the authors are interested in conducting research on the application of the cooperative learning model of the Round Robin technique to improve student learning outcomes in thermochemistry materials at SMAN 1 Tambang Kampar Regency.

METHOD

In this study, using a method that is quasi experimental research, the pattern applied is the nonequivalent control group design. The form of the research pattern can be seen in Table 1.

Table 1. Research Design

Group	Pretest	Treatment	Posttest
Experiment	O_1	X_1	O_2
Control	O_1	X_2	O_2

Information:
O_1 : Giving the initial test (pretest)
O_2 : Giving the final test (posttest)
X_1 : Learning to use a model of learning techniques Round Robin
X_2 : Learning uses a conventional learning model

The location of this experimental research data collection is at SMAN 1

Tambang, Riau province, in the odd semester year. The population came from all students of class XI IPA SMAN 1 Tambang which included 3 classes. The sample selection for grouping classes that will be investigated using the term random sampling, on the condition that its use is all the subject is homogeneous. If all subjects are homongent, then the sample can be randomly selected, so that 2 classes are obtained, namely XI IPA 1 for the experimental class and XI IPA 2 for the control class. This research is on the subject of thermochemistry.

Instrument data collection using the techniques of data collection in the form of tests. The test is applied using a multiple choice test of 20 questions. The data collected aims to determine the increase in student learning outcomes in the discussion of thermochemistry.

The data collection implementation procedure begins with the preparation stage. The preparation stage begins with completing teaching materials in the form of a syllabus, lesson plans, worksheets, and questions. All contents and validated research instruments construct with expert lecturers, and validated empirical students of class XII Science at SMAN 1 Tambang Kampar Regency.

At the implementation stage, the two classes of the research sample will be applied in the form of pretest and posttest test assessments. At class experiment given action with wearing a learning model technique Round Robin namely teacher to theory in general, teachers divide pieces about worksheets (each student gets a piece of matter that can not be confused with using color markers are not the same), students answer worksheets, students discuss the answers to the worksheets in groups, students present the answers to the worksheets, the teacher confirms the answers expressed by the students.

In the control class actions that will be given is use a learning model conventional by way initiated by teachers who convey the concept of the theory. After that the students conducted group discussions with the help of using worksheets, then the students presented the group results and finally the teacher and students concluded the thermochemistry material.

Problems were tested must be analyzed in order to determine validity, reliability, discriminating power and level of difficulty. Formula t-test in use to analyze the data, before it is necessary to examine the preliminary data for the sake of obtaining the data homogeneous from each of the data, then resume the final data analysis in the form of proof

hypothesis. Analysis of the hypothesis statement must meet the data requirements and must be homongent (using the F test) and normality with Chi Square. Data is said to be homogeneous if $F_{Count} \leq F_{Table}$ and normal if $X^2_{Count} \leq X^2_{Table}$.

How interpret statistical tests to prove the hypothesis statement that if $t_{Count} \geq t_{Table}$, the null hypothesis (H_0) rejected this shows that there are differences in learning outcomes of students wearing cooperative learning techniques Round Robin with students applying conventional teaching on the subject of thermochemistry. Additionally, a test of data determination degree student learning outcome chemistry after receiving cooperative learning techniques Round Robin, is required by using the formula N-Gain. The following is the N-Gain formula according to Meltzer in (Puspita *et al*, 2017).

$$(G) = \frac{S_{Post} - S_{Pre}}{Score\ Max - S_{pre}}$$

Information:

G = Normalized N-Gain

S_{Post} = Posttest Score

S_{Pre} = Pretest Score

The value of N-Gain can be grouped into categories, namely: the high category group ($g > 0,7$), the medium category ($0,3 \leq g \leq 0,7$), and the low category ($g < 0,3$).

RESULTS AND DISCUSSION

Homogeneity Test

This research intends to prove the existence of differences in student learning outcomes through the application of the cooperative learning model of the Round Robin technique and the application of conventional learning models. The population in this data collection comes from class XI IPA SMAN 1 Tambang which includes three classes. Sampling was selected by means of the homogeneity test. The homogeneity test data was collected through the results of the daily test results of the discussion of structures, the periodic table and chemical bonds. Furthermore, the homogeneity test data were analyzed using the Bartlett test formula and the variance test. Based on the applied test, it turns out that the three classes are homogeneous. This is evidenced by the value results of the Bartlett test in the form of $X^2_{Count} = 5,021$ and $X^2_{Table} = 5,99$ and it is found that $X^2_{Count} \leq X^2_{Table}$. The conditions for selecting the use of this Bartlett test can only be used in groups with a different number of class groups.

The three classes that were tested had a different number of samples and showed homogeneous abilities. Condition shows that all three subjects were observed to be homogeneous. Furthermore, the sample selection was carried out by means of simple random sampling technique, obtained class XI IPA 1 (experimental class) and XI IPA 2 (control class). After selecting the two samples tested by variance test and obtained the value of F_{Count} = 1,283 and F_{Table} = 1,84. This means that $F_{Count} < F_{Table}$. The simple random sampling technique itself is a way of selecting samples from the population by randomizing them regardless of the strata of the population as long as the population is homogeneous.

Based on the homogeneity data, it shows that the basic level abilities of the two sample classes are not different. So, if we apply a learning model that is not the same and there is a change in learning outcomes, it means that this is not influenced by the basic abilities of students, but rather comes from the application of the learning model to be studied.

Question Item Analysis

Data collection tools that will be used first in the analysis of each item of the problem. It is intended that the posttest question instrument is well used as a means of measuring student learning outcomes. Instrument analysis using validity, reliability, discriminating power and level of difficulty.

Question which will be given in the form of multiple choice with the number because as many as 30 questions. Test questions were carried out in class XII IPA. After doing the validation test about the obtained results of 100% valid, whereas for reliability test by wearing a formula that was proposed by Kuder and Richardson, the KR20, thus obtained value by 0,813 category the selected very high.

Analysis of test difficulty level matters aim to value the performance measurement tool as well as the student's ability for understanding the discussion that teachers taught. Nice questions, it has a value level of difficulty that is not too hard and not too difficult. Data obtained from tests of the level of difficulty matter is presented in Figure 1. In this study item matter used in the collection of data through tests pretest and posttest is a matter of the category level of difficulty, a matter of easy, average and difficult. The problem comparison pattern is 3-5-2.

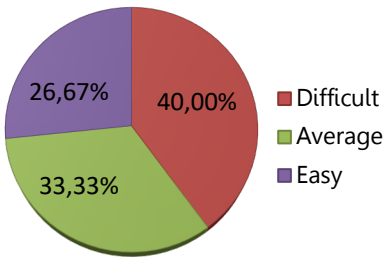

Figure 1. Level of Difficult Test

The ability of discriminating power is a way of questions for group between high-ability students with students of their poor performance. The results of data collection with the test of discriminating power of questions, obtained data 3,33% very poor category questions, amounting to 1 item, 20% poor category questions totaling 6 items, 26,67% fair category questions, amounting to 8 items, 36,67% of the items in the good category, amounting to 11 items and 13,33% for the very good category, which amounted to 4 items. Based on data from the test instrument, the final results about the number of instruments by 20 questions are eligible for use in collecting data.

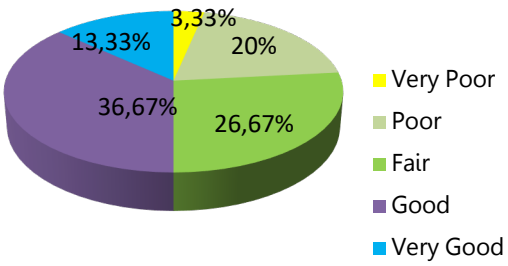

Figure 2. Discriminating Power

Final Data Analysis

After the instrument preparation stage is complete, it is followed by the stage of giving pretest and treatment questions. Class XI IPA 1 uses the Round Robin technique learning model, while class XI IPA 2 is a control class using conventional learning models. The treatment was given in 6 meetings and after the treatment was finished, it was given posttest questions. The data value of pretest and posttest of the class under study can look through Figure 3.

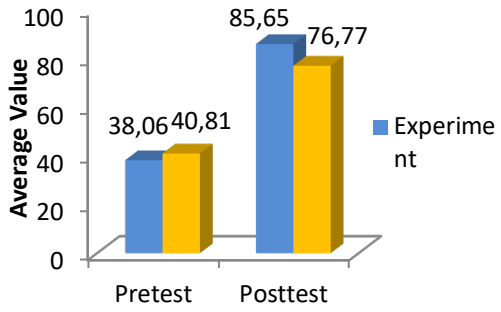

Figure 3. Data on the Results of Pretest and Posttest Scores

The data analysis stage was carried out by using the t-test. The t-test formula can be used if it meets two conditions, namely the normality and homogeneity test.

Normality Test Results

The results of the normality test are summarized in Table 2.

Table 2. Results of Normality Test Data Analysis

Class	X^2_{Count}	X^2_{Table}	Criteria
Experiment	9,81	11,07	Normal
Control	9,42	11,07	Normal

Based on the table above, data is obtained from $X^2_{Count} < X^2_{Table}$, so it can be said that the data obtained is normally distributed.

Homogeneity Test Results

Table 3 presents a value test for the homogeneity of the posttest. Based on Table 3, it can be concluded that $F_{Count} \leq F_{Table}$, so the data is homogeneous.

Table 3. Results of Homogeneity Test Data Analysis

Class	N	Variance	Fc	Ft
Experiment	31	82,903	1,142	1,84
Control	31	72,581		

After the data is homogeneous and normality is obtained, then the hypothesis testing is continued. The t-test results of the hypothesis test results can be seen in Table 4.

Table 4. Results of Hypothesis Test Data Analysis

T_{Count}	$-t_{Table}$	T_{Table}	Information
5,18	-2,00	2,00	H_o was rejected

Referring to the data from Table 4 shows the amount of the number t_{Count} = 5,18. Thus, the magnitude of this number means that the t_{Table} and $-t_{Table}$ values are smaller than the tCount value using a significant level of 5%, meaning that it can be concluded that H_0 is rejected. Other conditions also show that there are differences in the average value of the test results posttest, for the experimental class to get a value of 85,65 and the control class at 76,77. From this unequal average value, to see the great increase in learning outcomes we continue the analysis by using the N-Gain formula, so that the experimental class results are 0,773 (high criteria) and 0,61 for the control class (moderate criteria).

Based on the presentation of the data above, it shows that the mean posttest value of the class that gets the Round Robin technique application action is higher than the class that gets the conventional learning model action (Figure 3). This condition is caused because in the learning process, the experimental class appears to be more responsible in working on the division of tasks and reducing the ability of the student group that dominates. In addition, the use of cooperative learning models can provide science knowledge, the mastery of the concept of matter, to skills, and engage in discussions.

Cooperative learning has an effect on increasing student learning outcomes, so that a teacher is required to have the ability to choose and determine methods,

models, media and learning approaches that are varied and innovative for achieving learning objectives (Sudjana & Wijayanti, 2018).

The application of cooperative learning has various advantages, namely, it can improve students' abilities, students are trained to learn independently, grow courage, increase their own learning abilities to dig up information from various sources, and learn together with a team (Nurdiana, 2020).

In addition, the advantages of implementing cooperative learning are that it can show positive effects in developing student leadership skills such as critical thinking, effective communication, conclusion making, and teamwork (Petre, 2020). Cooperative learning can also form a stress-free classroom environment, increase self-confidence and reduce their nervousness in communicating (Siriphot & Hamcumpai, 2020).

There is also a large increase in learning outcomes can be seen from the mean pretest and posttest in the experimental class and the control class. Before giving the action, the pretest mean value for the experimental class was obtained at 38,06 and the pretest mean value for the control class was 40,81. After the two classes were given the action, it turned out that there was an increase in learning outcomes. Experiment class to get the results of 85,65 this means that the class experiments already achieve KKM, where do not control class 76,77. Comparison of the mean value posttest comparisons give rise to the presence of the value of N-Gain for both classes. The experimental class obtained a result of 0,773 which listed the type of high group and for the control class 0,61 which listed the type of the medium group.

The improvement of student learning outcomes using the Round Robin technique is also supported by the stages of the learning process which facilitate students to wait their turn to answer questions during group discussions. So students can contribute opinions in turn if each person has the opportunity to speak (Yusniar, 2018). Based on these stages, the adoption of the Round Robin technique can reduce the involvement of only active students in discussions with the method of limiting the presentation of arguments by one student continuously but by taking turns (Rizqi *et al*, 2018).

Round Robin is also able to cultivate the students' knowledge, the subject is due to the students always interacting in a given material and repeating against of discussion given. In addition, Round

Robin also has good learning stages in solving problems and presenting the results of arguments thus also fostering student thinking skills (Sari & Maimunah, 2017).

Technique Round Robin has advantages such as (1) to encourage the participation of students, this is because all students have an equal right to express ideas and opinions, (2) can improve students' speaking skills, and (3) to foster tolerance and trust in students (Nurdiana, 2020).

Besides, the implementation of model learning can also make students more eager to follow learn, because students are eager to collect a score that is not less than any other group, so that students can be more critical and creative in responding to the problems that are conveyed by the teacher. This subject can increase student knowledge and help students remember the discussions being taught. When compared with the use of conventional learning, students only watch the description given by the teacher, so that makes students feel bored and sleepy in scrutinizing the explanation by the teacher. Because students are not given a stimulus that can trigger a long memory of the concept of the material being taught (Hazmi, 2019).

The technique of Round Robin can also train skill speaking students and attract students to be able to express opinions using their own sentences. All members in the group have the same opportunity to provide opinions, so students can find out the opinions of other friends (Nurdiana, 2020).

The application of the Round Robin technique learning model can create effective learning. A learning is said to be effective, which is marked by the activeness of students in participating in learning. Students can actively build knowledge with various supportive activities such as communicating, thinking and moving in learning (Hiliasih *et al*, 2017).

The application of the Round Robin technique learning model can foster student motivation to learn. The greater the motivation of a student in facing challenges in learning activities, the self-awareness of students will try to be better at obtaining, processing and managing information on solving the problems presented (Hiliasih, Bahriah and Zidny, 2017).

By observing the learning process that takes place, the model is able to stimulate group members to express ideas in their own words so that it can tell the factual story with a variety of different

topics for each student. Student activities in the learning process using this learning model can also lead to team building through group worksheets that must be done together which encourages students to make a mutually agreed upon decision (Nurdiana, 2020).

In this model, students can equate answers he had to answer to a friend group her. Students also can ask, explain and respond to the answer filed by a friend of the group. So between students there is interaction and similarity in the description of the material. Students who already know so much and understand why explain to their friends and students who do not understand so help to master the subject matter (Ula & Barutu, 2019).

The application of the Round Robin learning technique can make students more enthusiastic and more involved in the learning process, this condition is because students are trained to be active during learning. As a result of learning to do this is not only dominated by the students who are good alone, but all of the students involved in the learning process. Students try to master the material by asking friends, teachers, and listening to presentations from friends' discussions. This condition makes the student progress in learning with students' progress being demonstrated in bravery, the argument expressed during the discussion, and the presentation and being able resolve issues assigned by the teacher (Yusniar, 2018).

Hazmi (2019) states that the technique Round Robin can make students active, motivated, and create a learning environment that trains students to think critically, creatively and foster behavior of courage in expressing an opinion for the ultimate goal of getting output which is in line with expectations.

Relevant research which states that the use of the Round Robin technique learning model can repair student learning outcomes in line with the results of research conducted by Ula & Barutu (2019); Yusniar (2018); Hazmi (2019); Jumiati *et al*, (2019).

The study uses a model of learning type Round Robin This can be combined to approach another example of research conducted by Isroil & Hakimah (2020) using cooperative learning Round Robin approach problem posing; and Nahdi (2019) and Suyantana (2018) using the Round Robin technique with the Brainstorming approach.

The process of learning the technique Round Robin greatly assist students in studying, because to repair student learning outcomes as well as make grow speaking skills (Nurdiana, 2020; Mayuni

& Hidayat, 2020; Sahardin *et al*, 2019); understanding concepts and problem solving (Wulandari *et al*, 2019); student learning activities (Ayu *et al*, 2019); students' holistic abilities, and can improve critical thinking skills, presentment skills, self-assurance and autonomous learning (Asari *et al*, 2017).

CONCLUSION

The improvement of student learning outcomes after carrying out learning through the Round Robin technique is better than conventional learning. Therefore, it is able to be concluded that the implementation of the cooperative learning model of the Round Robin technique can raise student learning outcomes towards thermochemistry material, which is 0,773 in the high category and the control class is 0,61 which is in the moderate category.

The implication of the results of this study is that it has been proven that the application of the Round Robin effect on learning outcomes. This shows that the application of the Round Robin technique learning model the learning process shows good learning outcomes, it would be even better if the application of this model was more effective, especially in terms of discipline in the division of time in the game stage, so that the learning objectives were achieved optimally.

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