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Application of Think-Pair-Share (TPS) Cooperative Learning Model to Student Learning Outcomes in Hydrocarbon Material in Senior High School

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Abstract

This study aims to describe the improvement of student learning outcomes by applying the Think-Pair-Share (TPS) cooperative learning model on hydrocarbon material in class XI SMA Negeri 2 Sigi. This study's research type is pre-experimental with a one-group pretest posttest design. This study utilized purposive sampling. The sample consisted of two classes: class XI IPA 3 as the experimental class 1 (n = 22) and class XI IPA 4 as the experimental class 2 (n = 24). Student learning outcomes data are processed using the learning improvement test (N-gain). The application of the Think Pair Share (TPS) cooperative learning model to improve student learning outcomes on Hydrocarbons can be seen from the average N-gain value in the two experimental classes, including in the high category, namely 0.77 and 0.78. Therefore, applying the Think Pair Share (TPS) cooperative learning model can improve student learning outcomes on average greater than 75 (KKM) of SMA Negeri 2 Sigi students in Class XI on hydrocarbon material.

Keywords: Think-pair-share, cooperative learning, learning outcomes

Introduction

One of the national goals of the Indonesian nation in the preamble to the Constitution of the Republic of Indonesia in 1945 is to educate the nation's life. The national goal of informing the nation's life is achieved through education. Education involves learning activities and learning processes. As one of the factors in the learning implementation process, teachers are always required to improve their quality of learning. The quality of teachers can be reviewed from two aspects, namely in terms of process and results (Mulyasa, 2019).

The 2013 curriculum was developed to strengthen students' learning patterns (Nurzannah & Setiawan, 2022). Strengthening learning patterns results in understanding the material. The most important learning process is the achievement of learning objectives so that students can know what they have learned (Erza & Nasrudin, 2017).

Learning is a human behavior that includes everything that is thought and done (De Houwer et al., 2013). Learning seeks or guides knowledge, including subjects, mastery, habits, perceptions, pleasures, interests, social adjustments, various skills, and ideals (Masitoh, 2011).

Chemistry is a subject that has a lot of abstract material (Cardellini, 2012). Certain concepts cannot be explained without analogies or models, requiring high reasoning power in studying chemistry. In addition, chemistry is continuous, namely interconnected between concepts one another (Taber, 2020). Therefore, chemistry must be studied continuously so that the concepts received by students can be assimilated and accommodated properly. Often, the student interprets difficult concepts according to the preconcepts that students already have. Sometimes, students' interpretations are not based on the concepts agreed upon by experts (Yunitasari et al., 2013).

TPS is a type of learning in the cooperative learning model that uses a collaborative or group learning system with structured tasks referring to the achievement of goals in solving problems (Kaddoura, 2013; Rahmah et al., 2019). This is supported by Sukelasmini (2019) in his research, which stated that the reason for implementing TPS learning is because the TPS learning process requires students to be actively involved in the learning process. The implementation of TPS learning can cause student involvement in learning activities. The involvement in question is physical and mental involvement, which must

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always be related to each other. This physical and psychological involvement will result in optimal learning activities and can improve the quality of the learning process, ultimately affecting the quality of student learning outcomes (Syahrastani, 2022).

TPS cooperative learning is a group learning model where students are given more time to think about the answers and help each other (Marhaeni et al., 2022). The procedure is also quite simple because a group only consists of two people. The advantage of this method is that a small number of groups makes it easier for them to communicate to facilitate the discussion and optimize student participation, while the disadvantage is that if the student partner does not understand the information at all, the student can be slowed down because he has to think for himself first before he discusses the problem with his friend (Mundelsee & Jurkowski, 2021).

Based on interviews with chemistry teachers in grade XI at SMA Negeri 2 Sigi, most students struggle to learn and understand chemical materials, especially hydrocarbon materials. This is because the teaching methods used by teachers are not creative. So, the chemistry subject matter becomes less interesting for the students, and the students become bored. As a result, the student does not understand the subject matter taught by the teacher, which will make it difficult for the student and even cause the student to be unable to solve a problem. This will certainly reduce student learning outcomes.

Based on the description above, the researcher was encouraged to conduct a study entitled application of the tps type cooperative learning model on hydrocarbon materials on the learning outcomes.

Methods

This research is a type of pre-experimental research. This type of design is not yet a real experiment because there are still external variables that affect the research to be carried out (Sugiyono, 2015).

The research design used is *the one-group pretest-posttest design*. The design has one experimental group: students whose learning results do not reach KKM. The experimental group is then given a pretest to determine its initial state, then treated and given *a posttest* (Sugiyono, 2015). The design of the research implementation is shown in **Table 1.**

Table 1. One group pretest posttest design

Group	Pretest	Perlakuan	Posttest
Experiment	O_1	X	O_2

Where:
O1 = keadaan awal (*Pre-test*).
O2 = final State's's (*Post-test*)
X = treatment through applying the *Think Pair Share* (TPS) learning model.

The population in this study is all students of class XI Science SMA Negeri 2 Sigi who are registered in the 2018/2019 school year, with a total of 115 students. The sample in this study consists of classes, namely class XI Science 3 as experimental class 1 and class XI Science 4 as experimental class 2. The sampling technique in this study was determined by simple *random sampling*. This method is done because the population is homogeneous (Sugiyono, 2015).

The types of data used in this study are quantitative and qualitative data. Quantitative data is in the form of numbers, namely student learning outcome data (pretest and posttest), and qualitative data is in the form of descriptions of student learning outcomes during the learning process. Meanwhile, the data source in this study is primary data, which is data from the teaching and learning process and learning outcomes taken from test results (multiple-choice questions).

The data analysis techniques used in this study are descriptive statistical analysis techniques and inferential statistics. Descriptive statistics describe the characteristics of the distribution of results for each variable, while inferential statistics are used for hypothesis testing, which can further draw conclusions regarding the improvement of learning outcomes obtained by students. Inferential statistical analysis is a statistical technique used to analyze sample data, and the results are applied to the population. Inferential statistical analysis is applied after the data obtained is normally distributed and homogeneous (Sugiyono, 2015).

Results and Discussion

The data on student learning outcomes in the study were obtained from the initial ability test (*pretest*) and final ability test (*posttest*) given to 46 students consisting of experimental class 1, namely class XI Science 3 with a total of 22 students and experimental class 2, namely class XI Science 4 with a total of 24 students.

Pretest

Based on the research conducted, Table 2 shows the results of calculating the average score of the initial test of student learning outcomes in the hydrocarbon material of experimental class 1 and experimental class 2**.**

Table 2. Initial test of student learning outcomes

Informmation	Class XI Science 3	Class XI Science 4
	Experiment 1	Experiment 2
Number of sample	22	24
Minimum score	8	8
Maximum score	36	36
Average score	18.5	23.8

Final ability test (posttest)

Based on the research conducted, Table 3 shows the results of calculating the average score of the final test of students on hydrocarbon material for experimental classes 1 and 2**.**

Table 3. Final test of student learning outcomes

Informmation	Class XI Science 3	Class XI Science 4
	Experiment 1	Experiment 2
Number of sample	22	24
Minimum score	76	76
Maximum score	92	88
Average score	81.3	80.5

Learning effectiveness testing

The effectiveness of learning to achieve learning objectives with the TPS model is carried out by *N-gain* testing, describing or describing the data collected based on the achievement of each variable in the relationship between *student pretest* and *posttest* scores. Based on the results of the research carried out, the results of *the N-gain* test from the two experimental classes were included in the high category so that the application of the TPS learning model was effectively applied to learning hydrocarbon materials. Student learning outcome data with *N-gain* calculation can be seen in **Table 4.**

Table 4. Data from *N-gain calculation*

Class	Pretest	Posttest	N-gain	Criterion
Experiment 1	18.54	81.27	0.77	High
Experiment 2	24.83	80.50	0.78	High

Although the difference in *N-gain* scores from the two classes is not significantly different, learning using the TPS learning model provides higher learning outcomes; this is because the TPS learning model is an effective learning model to be applied to students (Mufarizuddin, 2018). It was obtained that in the experimental class of 1 out of 22 students, there was 1 student in the medium category and 21 students in the high category. Meanwhile, in the experimental class 2 out of 24 students, 5 students were in the medium category, and 19 were in the high category.

This experimental research aims to improve student learning outcomes through the TPS learning model on hydrocarbon material in class XI science at SMA Negeri 2 Sigi. The data sources used in this study come from observation sheets, teaching and learning processes, and student learning outcome tests. The observation sheet used aims to assess the implementation of the stages of the TPS learning model for experimental class 1 and experimental class 2. As for the student learning outcome, the test has multiple-choice questions totaling 25 validated questions. The research object used in this study is class XI Science 3 as experimental class 1 and class XI Science 4 as experimental class 2, where these two classes apply the same learning model, namely the TPS learning model on hydrocarbon materials. This was done to see if the applied model's success rate could improve student learning outcomes on hydrocarbon materials in the two experimental classes.

Student learning outcomes are measured using written test instruments that have been validated and given to students before *(pretest)* and after *(posttest)* learning is provided. The provision of the initial test *(Pretest)* in experimental class 1 and experimental class 2 aimed to see the initial ability of students before the learning process was carried out on the buffer solution material. Then, the treatment (presentation of material) was carried out by applying the TPS model. Finally, the final test *(Posttest)* was given in experimental class 1 and experimental class 2, which aimed to see an improvement in student learning outcomes after the hydrocarbon material learning process was carried out. *The average pretest* score of students obtained in experimental class 1 was 18.54; in experimental class 2, it was 24.83. The average *posttest* score of students obtained in experimental class 1 was 81.27, and experimental class 2 was 80.50. The data on student learning outcomes in the pretest and posttest from experimental class 1 and experimental class 2, by applying the TPS learning model, shows an increase in student learning outcomes greater than 75 (KKM).

N-gain calculation shows increased students' understanding or mastery of concepts after applied learning. The *N-gain* value is the difference between *the posttest* and *pre-test* scores. Based on the study results, data were obtained from the results of experimental class 1 and experimental class 2, respectively, namely medium category 1 person and 5 people, and high category 21 people and 19 people. The average N-gain value of experimental class 1 was 0.77, and that of experimental class 2 was 0.78. This shows that the increase in learning outcomes of experimental class 1 and experimental class 2 has experienced a significant increase in learning outcomes in the high category; the *N-gain test* is at a value of (<g>) ≥ 0.70 (Lumentut et al., 2017). The improvement of learning outcomes shows that learning with the TPS model is effectively applied to improve student learning outcomes, especially in hydrocarbon materials.

The treatment of teachers in the classroom is described in 3 stages. At the *think* stage, students solve problems individually. Before students solve problems with their peers, the teacher allows students to solve problems individually to get an understanding or initial answer that will be developed with their group friends/peers. The problem referred to at this stage includes ignorance of concepts related to the problem or difficulty in determining the steps to

be taken to solve the problem. In the *pair* stage, students cooperate in solving problems that have been solved individually to obtain the accuracy of the answers carried out by uniting the results of thinking together to get more accurate answers (Tullis & Goldstone, 2020). Teachers organize study groups/pairs so that students can discuss to check their understanding of the material or work together to apply, integrate, and deepen the individual and collective knowledge of the concepts learned. In the *share* stage, students make presentations on the results of cooperation obtained with their bench mates, and at this stage, students try to get the right answers through responses or input from other groups. Through discussion, it can develop understanding and reasoning by having the opportunity to think and share the results of his thoughts (Southworth, 2022). The activities carried out by students are supported by the value of learning outcomes in psychomotor aspects, which are in the good category so that cognitive learning outcomes are generally improved.

Conclusions

Based on the results of data analysis and discussion, it can be concluded that there is an increase in the learning outcomes of students in grades XI Science 3 and XI Science 4 SMA Negeri 2 Sigi after the application of the TPS type cooperative learning model on Hydrocarbon materials seen from the assessment of student learning outcomes which include affective, psychomotor and cognitive aspects. Experimental class 1 obtained student learning outcomes of 81.27, and experimental class 2 obtained 80.16. This means there is an increase in student learning outcomes after implementing *the* TPS type cooperative learning model.

Based on the analysis of data obtained using statistical testing, the TPS learning model influences student learning outcomes, as can be seen from the average score of student learning outcomes. Students who follow the learning process using the TPS learning model obtain higher scores than students who follow the learning process using the learning model applied by the previous teacher.

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