

## The use of the Think Pair Share (TPS) Cooperative Model with LKS with Mind Maps on Biology Learning Competencies for Class X SMAN Airpura

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### Keywords Abstract

Think Pare  
Share  
Kompetensi  
LKS

*This type of research is quasi-experimental, using the Randomized Posttest Only Control Group design. The research population was all students of class X SMAN Airpura in the second semester of the 2021/2022 academic year, as many as six classes, while the sample was class X4 as the experimental class and class X5 as the control class, which was taken using the Purposive Sampling technique. The instruments used are objective tests for cognitive domain competencies and observation sheets for affective and psychomotor competencies. Based on the study's results, the biology learning competence of students with TPS-type cooperative learning with mind maps was better than students with conventional learning with mind maps. Evidently, the average value of the cognitive domain of the experimental class students was 74.92, while the control class was 65.42. The average value of the affective competence of the experimental class students was 91.50, while the average value of the control class students was 70.57. The average value of the psychomotor competence of the experimental class students was 88.70, while the average value of the control class students was 67.50. Based on the results of the study, it can be concluded that students' cognitive, affective, and psychomotor learning competencies in the TPS-type cooperative learning model with mind map content are higher than in conventional learning with mind map content worksheets.*

### Introduction

Education is a way to develop quality human resources, including those with knowledge, skills, and a positive outlook. Education is an interaction between educators and students to achieve educational goals in a particular environment (Mudjrimin et al, 2013). Improving the learning process, which results in higher-quality educational outputs, is one way to raise educational standards. The ability to cooperate and solve difficulties with other students is one of the requirements for education in the 21st century. According to the Ministry of Education and Culture (2014), the 21st-century learning paradigm emphasizes the ability of students to (a) learn from various learning sources, (b) think critically, (c) formulate problems, and (d) work collaboratively to solve problems. Learning is a purposeful activity that teaches students how to develop the necessary competencies. From the learning process carried out, the results of the competence of these subjects were obtained. Learning outcomes are skills students possess due

to their involvement in the learning process. All knowledge, attitudes, and abilities that children learn in school are included in learning outcomes. Student's ability to understand and analyze the knowledge that will be used to solve a particular problem is a good indicator of how well they are learning.

Biology subjects provide various learning opportunities to understand scientific ideas and procedures. These process skills include observing, creating hypotheses, using tools and materials correctly, asking questions, classifying and interpreting data, and communicating findings orally or in writing. Biology also includes the ability to search for and organize related factual information to test theories or solve problems. The ability to reason analytically, inductively, and deductively to answer problems related to surrounding natural events is fostered through learning biology (Depdiknas, 2006). Biology learning also fosters a good attitude toward students' ability to recognize the natural environment. Given the importance of learning biology on student competence, appropriate learning models and media are needed to improve student competence.

Based on the results of observations at SMAN 1 Air Pura, in biology learning, there are still many students who are passive, less active in asking and responding during learning, and lack student motivation to learn. In addition, the researchers also found the following facts: 1) teachers use Student Worksheets (LKS) which are usually purchased in the market and are not following the character of students and the conditions of their respective schools, 2) the books used by students are books published by the Ministry of National Education. These books and worksheets are considered less attractive to students because the pictures are not colored, so students are lazy to read, 3) the average value of mid-semester 1 shows that there are still many students who are below the Minimum Completeness Criteria (KKM).

The media used by the teacher has not been able to arouse students' motivation in learning, so students are not accustomed to thinking and developing creativity according to their abilities; the media that teachers often use is a concept map made by themselves with cardboard written with black markers and charts. The teacher has carried out the discussion method but determined the group members only based on the seating order so that there are groups consisting of only high-ability students, and there are also groups consisting of only low-ability students.

The teacher does not emphasize the importance of the role of each student in the group to achieve the learning objectives. Students who have high abilities seem to dominate so that the learning process takes place. Students who are willing to go forward are just that. Vice versa, students who have low/passive abilities, do not take advantage of existing opportunities to develop their potential, so students are increasingly passive and dependent on friends who are considered capable. If this is allowed to continue, it is feared that student learning outcomes will be lower. To overcome some of these problems, teachers are expected to create a learning atmosphere that allows students to be actively involved in the learning process.

Based on the explanation of the problems above, one of the efforts teachers must make to help students become active and better understand the subject matter is to use a cooperative model. Cooperative learning has several types with different steps, one of which is Think Pair Share type cooperative learning, hereinafter abbreviated as TPS. Think Pair Share (TPS) cooperative learning model is a type of cooperative learning designed to influence student interaction patterns. Assuming that all recitations or discussions require arrangements to control the class as a whole, and the procedures used in TPS can give students more time to think, respond and

help each other. The Think Pair Share method can encourage students to actively learn with peers to communicate the results of discussions to other group pairs (Marlina et al., 2017). The teacher also gives students a choice to respond using their own assumptions. Students then work in pairs to discuss the results of their responses with their classmates to discuss and find solutions together, forming a concept that affects how students interact with each other (Bakri, 2014).

Optimizing student learning outcomes through the application of the TPS learning model still requires stimulating media that makes students more involved and play an active role in learning. One of the simple media that can eliminate the abstraction of material is student worksheets, as previously conducted by Rosba (2012). From the results of his research, it was concluded that there was an increase in indicators of student learning activities, where the influence of the learning model accompanied by worksheets emphasized the ability of students to think creatively. Individually and work together in groups in pairs and able to be active in learning, so as to improve student learning outcomes. In this study, the LKS that will be designed is not only in the form of a description of the material and questions are done by students, but also contains a mind map. The existence of this mind map content illustrates that there is an emphasis on concepts that will be trained by students themselves by making mind maps. In this regard, Audio (2010) says that learning by using mind maps will involve both hemispheres of the brain, making it easier for the brain to absorb the information it receives. Mind maps are supported in biology learning activities that can make it easier for students to organize, remember, compare, organize and make connections between concepts in Biology learning that can support student activities in the thinking process and cooperate well in solving problems during the Biology learning process. With a mind map, all the key and important information from each lesson material can be organized using a radian structure that is in accordance with the natural working mechanism of the brain so that it is easier to understand and remember.

## **Method**

Based on the formulation of the problem and the objectives to be achieved, this type of research is a quasi-experimental (quasi-experimental). This study used two classes, namely the experimental class and the control class. In the experimental class, students were taught using the TPS type of cooperative learning model with LKS containing mind maps, while in the control class, students were taught using conventional learning accompanied by LKS with mind maps. Randomized posttest only control group will be the design in this study. Posttest questions were given to the experimental class and control class in the final activity.

The research population was all students of class X SMAN 1 Airpura semester 2, totaling 215 people, grouped into six classes. The samples in this study were experimental class students and control class students who were observed from members of the population who were taken by purposive sampling technique, namely the sampling technique was carried out by considering the need that the number of students was the same and the average value of students was almost the same. To take the experimental class and control class is done by lottery. After the draw, the samples of class X4 and X5 were obtained. The independent variable in the study was the use of the TPS type of cooperative learning model, while the dependent variable was the student's biology learning competence (cognitive, affective, and psychomotor) after the treatment was given.

Learning in the sample class was carried out using a different learning model. The experimental class used a TPS-type cooperative learning model accompanied by worksheets containing mind

maps. While in the control class students are taught using conventional learning models accompanied by worksheets containing mind maps. There are three stages that are passed in the research, namely preparation, implementation, and the final stage. The instrument of this research is test and non-test. This instrument was designed by the researcher himself. Test trials were conducted to determine the validity of the test items, the level of difficulty of the questions, the discriminatory power, and the reliability of the test. Arikunto (2012) states that a test is said to have content validity if it is able to measure certain specific objectives that are parallel to the material or content of the lessons provided in accordance with the curriculum used. In the research that will be conducted, the validity that will be measured is content validity.

Each instrument design is validated by an expert/expert. The data analysis technique used in this research is the t-test (hypothesis test). Hypothesis testing can be done if the normality test and homogeneity test of the variance of the two samples have been tested. The normality test of this study was carried out using the Liliefors test at a significance level of 0.05. The data obtained were normally distributed because  $L_0 < L_{table}$ . The homogeneity test of this study was obtained by calculating the variance of each sample class, then performing the F test, it was obtained that  $F_{count} < F_{table}$ , meaning that the two groups of research samples had homogeneous variances.

## Results and Discussion

Based on the research that has been done in the two sample classes, data obtained in the form of students' biology learning competencies in the cognitive, affective and psychomotor domains. Data on the cognitive domain was obtained after completing the learning process for the two basic competencies, while the data on the affective and psychomotor domains were taken by two observers during the learning process.

### Cognitive Domain Competency Test

Based on the normality test and the final test homogeneity test, it is known that the two sample classes are normally distributed and have homogeneous variance. Therefore, the t-test is used to test the knowledge domain hypothesis. The t-test aims to determine the differences in students' cognitive learning competencies using the TPS cooperative learning model with mind map content worksheets and conventional learning with mind map content worksheets. According to Sugiyono (2011), hypothesis testing using t-test aims to determine the relationship between independent variables on the dependent variable under study, the hypothesis is accepted or rejected. The cognitive domain competency hypothesis test can be seen in Table 1.

Table 1. Hypothesis Testing for Cognitive Domain Competence

Class	$\bar{X}$	$T_{count}$	$T_{table}$	Conclusion
Experimen	74,92	2,55	2,00	$T_{count} > t_{table}$ , so that hypothesis accepted
Control	65,42			

Based on the table, it can be seen that the value of the Tcount is 2.55 and Ttable is 2.00. This shows that  $t_{count} > t_{table}$  so that the hypothesis is accepted, that is, there is an influence of cognitive competence of students who follow the TPS type of cooperative learning model.

Thus, there are differences in the competence of the cognitive domain between the experimental and control classes. It can be seen that the cognitive domain learning competencies of students who follow the TPS-type cooperative learning model with mind map content worksheets are better than the cognitive domain learning competencies of students who follow conventional learning accompanied by mind map content worksheets.

### Affective Domain Competency Test

Hypothesis analysis in the affective domain uses the Mann Whitney U test because in this domain, it uses an ordinal scale from 1-3. This hypothesis test was conducted to determine the affective domain learning competencies of students who followed the TPS type cooperative learning model with mind maps and students who participated in conventional learning accompanied by mind map worksheets. The summary of the affective domain competence hypothesis test can be seen in Table 2.

Tabel 2. Hypothesis Testing for Affective Domain Competence

Class	$\bar{X}$	Z <sub>count</sub>	Z <sub>table</sub> real level ( $\alpha = 0,025$ )	Information
Experimen	91,50	4,80	2,04	Hypothesis is accepted
Control	70,57			

Based on Table 2, it can be seen that the value of Zcount is 4.80 and Ztable is 2.04. this shows that Zcount > Ztable so that the hypothesis is accepted. Thus it can be said that the affective domain learning competencies of students who follow the TPS type cooperative learning model with mind map content worksheets are better than the affective domain learning competencies of students who follow conventional learning accompanied by mind map content worksheets.

### Psychomotor Domain Competency Test

Hypothesis analysis in the psychomotor domain has the same formula and calculations in the affective domain, namely by using the Mann Whitney U test, because the psychomotor domain also uses an ordinate scale from 1-3. This hypothesis test was carried out to determine the psychomotor learning competence of students who followed the TPS type cooperative learning model with mind maps and students who participated in conventional learning accompanied by mind map worksheets. The summary of the attitude domain hypothesis test can be seen in Table 3.

Table 3. Results of the Psychomotor Competency Hypothesis Testing

Class	$\bar{X}$	Z <sub>count</sub>	Z <sub>table</sub> real level ( $\alpha = 0,025$ )	Information
Experimen	88,70	5,39	2,04	Hypothesis is accepted
Control	67,50			

Based on Table 3, it can be seen that the value of Zcount is 5.39 and Ztable is 2.04. This shows that Zcount > Ztable so that the hypothesis is accepted. Thus, it can be said that the psychomotor domain learning competencies of students who follow the TPS type cooperative learning model with mind map content LKS are better than the psychomotor domain learning competencies of students who take conventional learning accompanied by mind map content worksheets.

Based on the author's observations during the lesson, students discussed reading the material in the LKS enthusiastically. Students discuss the exercises contained in the LKS in the form of mind maps and description questions. The provision of training in this worksheet aims to train students to think critically and understand the material with their group members so that each group member can understand the material being studied. This is in accordance with Rosba's research (2012), concluding that there is an increase in indicators of student learning activities, the influence of the learning model accompanied by worksheets emphasizes the ability of students to think individually and work together in groups in pairs and be able to be active in learning, so as to improve student learning outcomes. . Furthermore, the worksheet also contains a mind map, which is a creative note-taking method that makes it easier for students to remember a lot of information. At the time of research, it can be seen that mind maps help natural thinking processes both randomly and nonlinearly. Each idea generated can be linked directly to the mind map so that the idea is recorded. Mind maps let students' cognitive honed. At the beginning of the lesson, the teacher gave an explanation in advance of the mind map. After students understand, the teacher directs the material to be studied. A mind map provides a pattern of interrelated ideas, with the main topic in the middle and the sub-topics and details being the branches. This relationship that is formed makes all the branches interconnected so that the concepts are likewise. This factor gives mind maps a deep and broad scope, which the ordinary list of ideas does not have. According to DePotter (2000) mind maps mimic the thought process, which allows students to switch topics. Mind maps help students capture thoughts and ideas by putting them on a piece of paper clearly, completely, and easily. It is also based on the working mechanism of the left and right brain. The created material goes into long term memory, so that if needed it can be more easily recalled. It is also in line with research by Rambe et al (2014) that the TPS type cooperative learning model assisted by mind maps can provide opportunities for students to explore collecting and analyzing data to solve problems and foster student creativity in studying physics so that students are able to think critically, analytical, systematic, and logical in finding alternative solutions to problems. Students in this case are active and enthusiastic about working with their group partners in solving problems that have been given by the researcher.

Worksheets contain mind maps as one of the learning media tools that utilize various notes made creatively, both accompanied by pictures and graphics to form an impression in the brain. Students can easily remember sheets of paper in the form of information and questions that must be answered by students. in biology learning LKS containing mind maps can stimulate students to think systematically, activate students during the biology learning process, make it easier for students to remember biological concepts and make it easier for teachers to find out the extent of students' abilities in understanding the biological concepts they have learned.

TPS type cooperative learning model is very effective to improve student achievement because students are more active in learning, both individually and in groups. Studying in groups will increase students' understanding to remember and understand the subject matter longer. In contrast to conventional learning, teachers tend to be more active so that students are less enthusiastic and sometimes sleepy during learning. TPS type cooperative learning model, students understand the subject matter faster because they tend to be more active in finding answers to the problems given by the teacher. This self-search process will accelerate and strengthen student understanding so that student achievement can be increased easily. According to Gunter the Think Pair Share model is learning in which students learn from each other and get a way out of their ideas after discussing and making their ideas to be discussed in the whole class (Mutatik, 2018).

Based on the results of statistical analysis, it is known that the TPS type cooperative learning model with mind map-laden worksheets has an effect on students' learning competence in biology. The results of the hypothesis test show that the average biology learning competence obtained by students who follow the TPS cooperative learning model with mind map content is better than the biology learning competence of students who take conventional learning accompanied by mind map content worksheets. This is evidenced by the data analysis of the experimental class that was treated in the form of TPS cooperative learning better than the control class that was not given treatment. The learning process in the classroom through the TPS learning model using Mind Mapping media will give students much time to carry out learning activities. It will trigger students to solve problems that exist in the LKPD individually. Answers (Wardani, A.I, 2013). This means that TPS cooperative learning has an effect on students' cognitive, affective and psychomotor competencies. In accordance with Rusmaryanti's research (2013) concluded that student achievement with the Think Pair Share type cooperative learning model is better than student achievement using conventional learning models.

Students in the experimental class participate in the learning process because this learning model requires students to share their opinions with their partners. Students must also be able to respond to friends who argue without bringing each other down. This is in accordance with what was expressed by Majid (2014) in the learning process. Students need to have a positive attitude. With a positive attitude, students will grow and develop learning intentions, it will be easier to be motivated, and it will be easy to absorb the lessons being taught. The learning process with the TPS type cooperative model in the field proved that the students' affective domain was higher than the control class using the conventional learning model. Students' curiosity about the subject matter makes students focus and be active in the learning process. This is in accordance with the research of Nurfadillah (2008) the application of the TPS type cooperative learning model can improve student learning outcomes, activities, interests, and attitudes towards a better direction.

In the learning process when students present the results of their discussions, students are more confident in conveying the results, and other students also listen. This shows that students are curious about questions about the material. When group pairs do not understand the questions at hand, the other groups add, correct, and even ask about the problems discussed by the presenting group. The cooperative learning process using the TPS-type cooperative learning model can make students express ideas or ideas, students have great curiosity, and make students more confident (Hardiyanti, 2013). The learning process in the control class uses conventional learning where students are still less active in the learning process, students are still less able to work together, be responsible in discussions, and students still seem to still maintain their respective egos in working to complete the tasks given by the teacher, causing students to lack of confidence in asking, providing responses, and responding to questions posed by the teacher as well as when discussing.

High student cognitive results, will affect the psychomotor of students. In students, a high enthusiasm for learning has grown, so that it will affect the skills that students do in learning. The use of the TPS type of cooperative learning model is able to foster a positive attitude in students. With the positive attitude of students during learning, it makes students motivated to learn so as to increase their curiosity. Indirectly the learning motivation that grows in students will lead to a positive attitude and discipline in learning. If the attitude of discipline, and responsibility already exists in students, then students will carry out learning seriously and have high motivation.

Position of competence in the experimental class also has a positive influence on learning using the TPS type of cooperative learning model where students are required to have student discussion skills, communication skills, skills to display group discussion results, writing skills from discussion results, and skills to make conclusions. This is in accordance with what was expressed by Lord (2001) that group discussions make students more often talk, ask questions, and be directly involved in learning, compared to teacher-centered learning. The teacher is also tasked with providing motivation so that students are more active and serious in discussions during the learning process because students' motivation and willingness to learn will determine the learning outcomes achieved so that students are able to make conclusions correctly, precisely, and in accordance with the material being studied. In accordance with the research results of Mutakinati (2015) that the TPS type cooperative learning model can improve student skills. The learning process becomes more interesting and involves students directly in finding and formulating concepts. In line with Pratama's research (2016), it concludes that the Think Pair Share (TPS) type cooperative learning model influences students' biological psychomotor domain competencies.

## **Conclusion**

After doing the research, it can be concluded that the hypothesis is accepted. The conclusions obtained are: a) The competence of the cognitive domain of students who follow the TPS type cooperative learning model with LKS containing mind maps is better than the students who take conventional learning with mind maps of LKS, b) The competence of the affective domain of students who follow the TPS type of cooperative learning model accompanied by LKS containing mind maps is better than students taking conventional learning with LKS containing mind maps, c) The psychomotor competence of students participating in the TPS type cooperative learning model accompanied by LKS containing mind maps is better than students taking conventional learning accompanied by LKS containing mind maps.

## **Recommendations**

Based on the research that has been carried out, it can be seen that the learning competencies of students who follow the TPS cooperative learning model with mind map content worksheets are better than students' learning competencies who follow conventional learning with mind map content worksheets. The use of TPS type of cooperative learning model with LKS containing mind maps will make it easier for students to master material concepts, increase student motivation in learning, and make students more active in discussions. Therefore, it can be a consideration for other biology teachers to use the TPS type cooperative learning model with mind map-laden worksheets to improve student competence. It is hoped that teachers who will apply mind maps to be able and very proficient in making mind maps in order to create interesting and fun mind maps. The advantages of the TPS type cooperative learning model are that it can increase student activity in learning, encourage students to increase a high social sense in learning, improve their critical thinking, and make them learn independently.



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