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The Influence of Jigsaw and Mind Mapping of Cooperative Learning Model on Students' Natural Science Learning Outcomes at Demak District Elementary School

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Abstract: 1) There is an effect of the jigsaw-type cooperative learning model on the science learning outcomes of sixth graders in elementary school. Paired samples test the value of Sig. (2-tailed) obtained 0.000 < 0.05, or t-count 16,428 > t-table 1.97783, 2) There is an effect of the mind mapping learning model on science learning outcomes of fourth-grade students in elementary schools, based on the paired samples test, the value of Sig. (2-tailed) obtained 0.000 <0.05 or t-count 8.609 > t-table 1.68957, 3) There is a difference in the effect of the jigsaw cooperative learning model and mind mapping on the science learning outcomes of grade VI students in elementary schools based on the paired samples test. The influence of the jigsaw learning model on learning outcomes is 26.22. The influence of the mind mapping learning model is 21.23. Also, the N-Gain test obtained mean value results of post-test experiment 1 of 90.22 and post-test of experiment 2 of 84.44. In conclusion, the jigsaw cooperative learning model is more effective than the mind mapping learning model.

Keywords: Jigsaw, mind mapping, cooperative learning, natural science, learning outcomes

1. Introduction

Education is an aspect of life that is very basic for the development of a country. Education plays an essential role in developing and improving the quality of human resources. In improving the quality of human resources, various efforts have been made by the government, starting from training to improve the quality of teachers, improving the curriculum, and providing facilities and infrastructure that can support the quality of education (Srivastava, De Boer, & Pijl, 2015). This is so that the learning process in schools can run optimally. This is so that the learning process in schools can run optimally. The learning process in schools can run optimally if education in schools involves teachers and students in the form of teaching and learning interactions. In providing education in schools, teachers must plan learning activities systematically and based on the applicable curriculum. Systematic planning guided by the curriculum will determine success in achieving learning objectives.

Gradually the curriculum underwent improvements aimed at improving the quality of education that was oriented towards the advancement of the national education system. However, the progress of the curriculum is not balanced with the implementation of the curriculum in schools in the form of a learning process (Hargreaves, 2012). Based on actual observations in the field, there are still many learning processes in schools that do not involve students, so students are less creative. There are still many teachers who use the lecture method where the teacher as an information centre explains the material and students sit quietly listening and taking notes on the material presented by the teacher so that students become passive and not creative.

In learning at school, students are expected to experience changes in knowledge, attitudes and skills. So using the lecture method will not be able to achieve the desired changes in students. These changes can be achieved if supported by various factors. One of them requires creative teachers who can make learning more engaging and liked by students (Sadler et al., 2013). Teachers must be creative in planning learning so that students become active and creative and are directly involved in learning. By applying students now, students' understanding of learning will be maximised. With whole experience, the learning objectives will be more easily achieved. One of the subjects contained in the curriculum is natural science subjects.

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Based on the problems found in the science learning process, there needs to be an improvement in the learning process so that student learning outcomes in science subjects are better. Improvement efforts that can be made include using a jigsaw-type cooperative learning model and mind mapping. Through the use of the jigsaw type of cooperative learning model and mind mapping, it is expected to increase the achievement of more optimal science learning outcomes.

2. Literature Review

Cooperative learning is one of many student-centered learning approaches. Cooperative learning is learning that demands cooperation, complements each other, and can solve problems. Through cooperative learning strategies, students not only learn and accept what is presented by the teacher in learning, but can learn from other students, and at the same time have the opportunity to teach other students.

Tran et al. (2019) state that cooperative learning is a learning model in which the learning system and working in small groups of 4-6 people collaboratively can stimulate students to be more passionate about learning. Chen (2021) describes several cooperative learning methods, including Teams Games Tournament (TGT), Group Investigation (GI), jigsaw, Student Teams Achievement Divisions (STAD), and a structural approach that includes Think Pair Share (TPS) and Number Hend Together (NHT).

One of the good cooperative models to be applied in science subjects is the Jigsaw type cooperative model, this Jigsaw type learning model is a cooperative learning model in which students learn in small groups consisting of 4-5 people with attention to heterogeneity, positive cooperation, and each member responsible for studying certain problems from the material provided and conveying the material to other group members. Al-Yaseen (2020), the Jigsaw cooperative learning model is very appropriate to use if the material to be studied is in the form of a written narrative. In line with Al-Yaseen's opinion, Karacop (2017) suggests that cooperative learning is more appropriate to use in science learning. So this method is very suitable if applied in the subjects of Natural Sciences. Even the discussions contained in the jigsaw learning model allow students to transfer knowledge to each other. The results showed that the Jigsaw learning model was able to significantly improve learning outcomes (Fadliyani, Muhibbuddin, & Sarong, 2018). The basic principle of cooperative learning is that students form small groups and teach each other to achieve common goals, even in this learning students are good at teaching less intelligent students without feeling disadvantaged (Syarifuddin, 2011). One type of cooperative learning model that can be used to overcome this problem is the jigsaw cooperative learning model.

In addition to using the jigsaw learning model to improve science learning outcomes, solar system material can also be supported by mind mapping learning media. The use of mind maps will be able to improve student learning outcomes because the mind map media made by students are built based on students' thinking flow. This will give results in the form of a mind map that is different between each student. In addition to being able to improve students' thinking skills, Wycoft in Listyawati, Suarjana, & Sudana (2013) the advantages of the mind map itself include, a) seeing the "overall" picture, b) remembering well, c) being more creative, d) easy to make details plans, e) facilitates communication, f) saves time, g) solves problems, h) is easy to concentrate, and i) organizes and clears the mind. Learning by applying the mind map method can improve students' memory of the material which is marked by the average value of students' cognitive learning outcomes who reach the minimum completeness criteria (Fauzia & Purwantoyo, 2015). Meanwhile, Darusman (2014) state that Mind Mapping is the easiest way to enter information into the brain and retrieve information from the brain. This method is the most creative and effective way of taking notes, so it can be said that Mind Mapping maps the minds of the person who made it.

Part of the regulatory system material that is considered difficult by students is in learning science. The contributing factors are the teacher's inappropriate teaching style, and students' negative views of the material (Atilla, 2012). Students learning styles use rote learning, complicated material characteristics, and students' views that consider the endocrine system as a separate system so that it is difficult to connect with the system others (Tekkaya, Özkan, & Sungur, 2011). Seeing these problems, an effort is needed that can motivate students and make it easier for students to understand the material on the endocrine system, one of which is by applying a jigsaw-type cooperative learning model with mind maps.

Many studies have succeeded in conducting research on the jigsaw type cooperative learning model, including research conducted by Ifa (2013) which states that the application of the jigsaw type cooperative learning model can improve student learning outcomes in class X Public Vocational High School No. 3 Boyolangu. Research from Trisianawati, Djudin, & Setiawan (2016) revealed that the jigsaw-type cooperative learning model based on Macromedia flash can improve student learning outcomes on Newton's law material. Nurhaeni (2011) states that students' understanding of the concept of electricity through jigsaw cooperative learning has increased.

3. Methodology

This study uses an experimental method with a quasi-experimental or quasi-experimental type consisting of two research groups, namely the experimental class learning with jigsaw learning models and Mind Mapping, while the control class is learning as usual with conventional learning models. The research design used in this study is the pretest-posttest control group design. In this design, the experimental group received treatment and received a pretest before treatment and a posttest after treatment, the experimental group and control class did not receive treatment but received a pretest and posttest.

The population in this study was grade VI Elementary School in Demak District. The sample in this study amounted to 87 students consisting of 30 grade VI students at Public Elementary School Bolo, Demak District, 30 grade VI students at Public Elementary School No. 2 Sedo, Demak District, and 27 grade VI students at Public Elementary School No. 2 Cabean, Demak District.

Data collection techniques in this study consisted of, tests, questionnaires, and documentation. The test technique in this study was used to determine student learning outcomes in science subjects. The test was conducted by giving a pretest and post-test to the experimental and control groups. Documentation is used to strengthen the data obtained and is also used as authentic evidence that the researcher has carried out the research, while the questionnaire is used to determine student responses to the learning model. Analysis of the data in this study through validity test, reliability test, normality test, homogeneity test, average similarity test, paired sample T-test and gain index calculation.

4. Findings and Discussion

4.1 The Influence of the Jigsaw Learning Model on The Science Learning Outcomes of Class VI Students in Elementary Schools

In this first discussion, it is whether there is an effect of the jigsaw-type learning model on improving student learning outcomes for the solar material in class VI Public Elementary School No. 2 Sedo, Demak. To get these answers, a test is carried out before being given a treatment called pre-test experiment 1 and after being given treatment using a jigsaw-type learning model called posttest experiment 1.

Based on the research data, it is known that in the pretest the experimental class one, namely class VI Public Elementary School No. 2 Sedo got a minimum score of 46.67 while the maximum value was 73.33 and the mean or average was 64.00, the standard deviation was 6.91479. in the post-test test, experimental class 1 has an average/mean of 90.22, a standard deviation of 5.99562, a minimum value of 80, and a maximum value of 100.

The assessment data after treatment, namely learning using the jigsaw approach at Public Elementary School No. 2 Sedo, Demak was then analyzed using the normality test, this was done to determine whether the data were normally distributed or not. If the data is normally distributed, the next analysis will use parametric statistics. From the normality test data, the pre-test value of student learning outcomes was obtained with a significance value of experimental class 1 of 0.534 > 0.05 and a post-test significance value of 0.760 > 0.05. So that it can be concluded that the data of the pre-test and post-test scores of students' learning outcomes from experimental class 1 are normally distributed and can then be used for analysis with parametric statistics.

If the normality data has been obtained, then what is done is the similarity test of two variances or the homogeneity test. Based on the results of the analysis of the homogeneity test of the posttest value of the learning outcomes of students in the experimental class and the control class using the test of homogeneity of variances, the significance value of learning outcomes was 0.209 > 0.05, so it can be concluded that the two sample classes (experimental and control classes) have the same or homogeneous variance.

The next data needed is data to find out whether the two sample classes have the same average or not, so the average similarity test is carried out. From the data from the analysis of the average similarity test in the pre-test or the test before being given treatment between the experimental class 1 and the control class, the significance value of learning outcomes was 0.913 > 0.05, so it can be concluded that the two classes (experimental and control), have the same average score or the initial ability of the experimental class students is not better than the control class.

However, after being given treatment, namely the experimental class 1 using the jigsaw learning model in class VI Public Elementary School No. 2 Sedo, Demak and experiment 2 using the Mind Mapping learning model at Public Elementary School No. 2 Cabean, Demak the results of the average similarity test was not the same or not identical (differently significant), this is based on the obtained significance value of learning outcomes of 0.000 <0.05, so it can be concluded that the two classes (experiment 1 and experiment 2), after being treated with the jigsaw learning model and Mind Mapping have unequal averages. or not identical (significantly different).

Statistical data was needed after it was known that the average value of the experimental class 1 and experimental class 2 after being given treatment was not the same or significantly different, then a different test or t-test was carried out. Based on the output of Pair 1, the value of Sig is obtained. (2-tailed) obtained 0.000 < 0.05, or t-count 16,428 > t-table 1.97783, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 1 and post-test experimental class 1. Thus, it can be concluded that there is an effect of the jigsaw learning model on the science learning outcomes of the sixth-grade solar system material at Public Elementary School No. 2 Sedo Demak. The effect given is 26.22.

In addition to the normality test, homogeneity test, average similarity test, and difference test (t), the researchers also conveyed the gain index as a supporting test to determine the magnitude of the increase in student learning outcomes in ex-experimental class 1 and experimental class 2. Based on the gain index the increase in results There were 19 students in the experimental class 1 in the high category, 11 students in the medium category, and 0 students in the low category.

Thus, it can be concluded that the application of the jigsaw learning model influences student learning outcomes in science learning material caring for living things in class VI Public Elementary School No. 2 Sedo, Demak District.

The results of this study are in line with the research of Subiyantari, Muslim, & Rahmadyanti (2019) that there is an effect of the jigsaw-type cooperative learning model on science learning outcomes. Likewise, with the research of Kamaruddin & Yusoff (2019), the results showed that there was a significant difference indicating that the application of the Jigsaw Cooperative learning model and concrete media had a more positive effect on students' science learning outcomes compared to the learning model. conventional.

The results of this study indicate the theory that jigsaw is a type of cooperative learning that encourages students to be active and help each other in mastering the material to achieve maximum achievement. In its application, students are formed in groups, each group consisting of a team of experts according to the questions prepared by the teacher, a maximum of five questions according to the number of expert teams Ifa (2013).

The jigsaw model of cooperative learning is a cooperative learning model that focuses on student group work in the form of small groups, as stated by Chatila & Al Husseiny (2017), that this jigsaw model of cooperative learning is a cooperative learning model where students learn in small groups that consist of four to six people heterogeneously and students work together in a positive and responsible interdependence independently.

In this jigsaw learning model students have many opportunities to express opinions, manage the information obtained, and can improve communication skills, group members are responsible for the success of the group and the completeness of the material being studied, and can convey to the group (Casey & MacPhail, 2018).

4.2 The Effect of Mind Mapping Learning Model on Science Learning Outcomes of Grade VI Students in Elementary Schools

This second discussion is whether there is an effect of the Mind Mapping learning model on improving student learning outcomes on solar system material in class VI Public Elementary School No. 2 Cabean, Demak District. To get these answers, a test is carried out before being given a treatment called pre-test experiment 2 and after being given treatment using a Mind Mapping learning model called post-test experiment 2

Based on the research data, it is known that in the pretest of the second experimental class, namely class VI Public Elementary School No. 2 Cabean, Demak got a minimum score of 46.67 while the maximum value was 86.67 and the mean or average was 63.21. The standard deviation of 9.67367 in the post-test test of experimental class 2 had an average. of 84.44, the standard deviation of 8.47359, the minimum value of 73.33, and the maximum value of 100.

The assessment data after treatment, namely learning using the Mind Mapping approach at Public Elementary School No. 2 Cabean Demak, was then analyzed using the normality test, this was done to determine whether the data were normally distributed or not. If the data is normally distributed, the next analysis will use parametric statistics. From the normality test data, the pre-test value of student learning outcomes was obtained with a significance value of the experimental class 1 of 0.131 > 0.05 and a post-test significance value of 0.563 > 0.05. So it can be concluded that the data of the pre-test and post-test scores of students' learning outcomes from experimental class 2 are normally distributed and can then be used for analysis with parametric statistics

If the normality data has been obtained, then what is done is the similarity test of two variances or the homogeneity test. Based on the results of the analysis of the homogeneity test of the posttest value of the learning outcomes of students in the experimental class and the control class using the test of homogeneity of variances, the significance value of learning outcomes was 0.209 > 0.05, so it can be concluded that the two sample classes (experimental and control classes) have the same or homogeneous variance.

The next data needed is data to find out whether the two sample classes have the same average or not, so the average similarity test is carried out. From the data from the analysis of the average similarity test in the pre-test or the test before being given treatment between the experimental class control class 2, the significance value of learning outcomes was 0.913 > 0.05, so it can be concluded that the two classes (experimental and control) have the same average value or the initial ability of the experimental class students is not better than the control class.

However, after being given treatment, namely the experimental class 1 using the jigsaw learning model in class VI Public Elementary School No. 2 Sedo, Demak and experiment 2 using the Mind Mapping learning model at Public Elementary School No. 2 Cabean, the average similarity test results were not the same or not identical (significantly different), this is based on the obtained significance value of learning outcomes of 0.000 <0.05, so it can be concluded that the two classes (experiment 1 and experiment 2), after being treated with jigsaw learning models and Mind Mapping have unequal averages or not. identical (significantly different).

Statistical data was needed after it was known that the average value of the experimental class 1 and experimental class 2 after being given treatment was not the same or significantly different, then a different test or t-test was carried out. Based on the output of Pair 1, the value of Sig is obtained. (2-tailed) obtained 0.000 < 0.05, or t-count 8.609 > t-table 1.97783, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 2 and post-test experimental class 2. Thus, it can be concluded that there is an influence of the Mind Mapping learning model on the material science learning outcomes class VI solar system Public Elementary School No. 2 Cabean, Demak. The effect given is 21.23.

In addition to the normality test, homogeneity test, average similarity test, and difference test (t), the researchers also conveyed the gain index as a supporting test to determine the magnitude of the increase in student learning outcomes in ex-experimental class 1 and experimental class 2. Based on the gain index the increase in results There were 7 students

in experimental class 2, which included in the high category, 15 students in the medium category, and 5 students in the low category.

Thus, it can be concluded that the application of the Mind Mapping learning model has an influence on student learning outcomes in science learning material for the solar system class VI Public Elementary School No. 2 Cabean, Demak District. The results of the study are relevant to the research of Utari (2021) that there is a significant difference in social studies learning outcomes between groups of students who study using a jigsaw-type cooperative learning model with the aid of Mind Mapping and groups of students who learn using, conventional class V learning. This is obtained from the results of the t-test calculation, which is 5.69, meanwhile, the t-tab (with db=47 and a significance level of 5%) is 2.021. This means, that t-hit is greater than t-tab (t-hit > t-tab), so H0 is rejected and H1 is accepted. From the average (X), it is known that (X) the experimental group is 22.34 and (X) the control group is 17.13. This means that (X) experiment > (X) control. Thus, the jigsaw-type cooperative learning model assisted by Mind Mapping affects students' social studies learning outcomes.

In line with the research results of Rosyidah (2015) showed that the student's activity in learning cycle I reached an average of 77.00 with a completeness percentage of 56%, increasing in cycle II the average to 98.87 with a 100% completeness percentage. student learning outcomes showed that in the cycle the average student was 67.00 with the percentage of classical completeness reaching 40% or 10 students completed and 15 students did not complete increased in cycle II with an average of 77.88 student classical completeness percentage reached 88% or 22 students completed and 3 students did not complete in learning.

Mind mapping is a way of developing thinking activities in all directions, capturing various thoughts from various angles. Mind Mapping develops divergent thinking and creative thinking. Mind Mapping which we often call concept maps is a very powerful organizational thinking tool that is also the easiest way to put information into the brain and retrieve that information when needed (Polat & Aydın, 2020). They argue Mind Map can help for many things such as planning, communicating, being more creative, solving problems, focusing attention, compiling and explaining thoughts, remembering well, learning faster and more efficiently, and practicing whole images.

In terms of time Mind Mapping can also make efficient use of time in studying information. This is mainly because this method can provide a comprehensive picture of a matter, in a shorter time. In other words, Mind Mapping can cut learning time by changing time-consuming linear note-taking patterns into effective notes that can be directly understood by individuals (Suherman et al., 2021).

4.3 Differences in The Level of Influence of Jigsaw Learning Models and Mind Mapping on Science Learning Outcomes for Sixth Grade Students in Elementary School

This discussion focuses on the differences in the effect of the jigsaw learning model in class VI Public Elementary School No. 2 Sedo, Demak with the Mind Mapping learning model as an experimental group 2 class VI Public Elementary School No. 2 Cabean on improving science learning outcomes for the Solar System.

Based on the posttest results in the experimental group 1 solar system material, sixth-grade students at Public Elementary School No. 2 Sedo, Demak, it is known that the mean or average value of students is 90.22 while the posttest results in the experimental group 2 solar system materials, grade VI students at Public Elementary School No. 2 Cabean get a mean value of 84.44. This shows that there is a difference in the effect of using the jigsaw learning model in experiment 1 with the Mind Mapping learning model in experiment 2 of 5.78. Thus, the hypothesis ha is accepted that there is a difference in influence between the experimental class 1 and the experimental class 2 classically

Then it is also supported by the results of the test of the average similarity of the data on the value of student learning outcomes after learning in the experimental class 1 and experimental class 2 using one-way ANOVA, the significance value of learning outcomes is 0.000 < 0.05, so it can be concluded it was concluded that the two classes (experiment 1 and experiment 2) had unequal or not identical (significantly different) averages.

This means that there are differences in student abilities after learning with a different model between experimental group 1 at Public Elementary School No. 2 Sedo, Demak, and experimental group 2 at Public Elementary School No. 2 Cabean, Demak. When the two groups experience differences in ability, then there is a difference in ability or difference between the two groups.

While the difference in the effect between the pre-test and post-test of each experimental group based on the output of Pair 1 obtained the value of Sig. (2-tailed) obtained 0.000 < 0.05, or t-count 16,428 > t-table 1.977783, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 1 and post-test experimental class 1. Thus, it can be concluded that there is an effect of the jigsaw learning model on the science learning outcomes of the sixth-grade solar system material at Public Elementary School No. 2 Sedo, Demak. The influence of the jigsaw learning model on the science learning outcomes of the sixth-grade solar system at Public Elementary School No. 2 Sedo Demak is 26.22.

Based on the output of Pair 2 obtained the value of Sig. (2-tailed) obtained 0.000 < 0.05 or t-count 8.609 > t-table 1.977783, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 2 and post-test experimental class 2. Thus, it can be concluded that there is an influence of the Mind Mapping learning model on the science learning outcomes of the sixth-grade solar system at Public Elementary School

No. 2 Cabean, Demak. The effect of the difference in Mind Mapping learning models on the science learning outcomes for the sixth-grade solar system at Public Elementary School No. 2 Cabean, Demak is 21.23.

The difference in influence can also be seen from the gain index results in experimental class 1 at Public Elementary School No. 2 Sedo, Demak there are 19 students in the high category, 11 students in the medium category, and 0 students in the low category. While the gain index for increasing science learning outcomes for the solar system material experimental class 2 at Public Elementary School No. 2 Cabean, Demak which is included in the high category is 7 in the medium category as many as 15 students and those included in the low category are 5 students. Based on the discussion above, it can be concluded that there is a difference in the effect of the jigsaw type learning model and Mind Mapping on improving science learning outcomes for the solar system material in class VI Public Elementary School No. 2 Sedo, Demak, and Public Elementary School No. 2 Cabean, Demak and it can be seen that experimental class 1 uses the model Jigswa learning improves learning outcomes more than the experimental class 2 which uses the Mind Mapping learning model.

Improving learning outcomes by using the Jigsaw learning model is indeed in line with the characteristics of the learning outcomes themselves that learning outcomes are the result of an interaction between the act of learning and the act of teaching (Aftika & Utomo, 2022). One of the learning outcomes is cognitive learning outcomes. The results of this study are learning outcomes seen from intellectual abilities related to knowledge. In line with what Shi et al. (2020) state, cognitive learning outcomes are a description of the level of mastery of students on the subjects they take or mastery of students on something in learning activities in the form of knowledge or theory that involves knowledge and development, skills intellectual property which includes recall or acknowledgment of facts, procedural patterns, and concepts in the development of student's intellectual abilities and skills. This means that cognitive learning outcomes can be improved with a jigsaw model that involves the active participation of students

Jigsaw cooperative learning is one of the types of cooperative learning that encourages students to be active and help each other in mastering the subject matter to achieve maximum achievement (Sulastri & Rochintaniawati, 2009). Meanwhile, according to Hakim & Sakti (2019) jigsaw is a cooperative learning model designed to increase students' sense of responsibility towards their learning and also the learning of others" from this opinion it can be concluded that this jigsaw type cooperative learning model is a learning model that focuses on students to work together in groups to achieve learning achievement.

Kurniawan, Sukarni, & Hoyi (2021) state that the jigsaw-type learning model has the following characteristics a) Students work in groups cooperatively to complete the learning material, and b) groups are formed from students who have high, medium, and low abilities, c) whenever possible, group members come from different races, cultures, ethnicities, genders, d) rewards are more oriented towards groups than to individuals.

The results of this study are also in line with Fadliyani et al. (2018) that this jigsaw learning model can significantly improve student learning outcomes, students are also more active, can work well in groups, and have a passion for learning. Compared with students who are taught with conventional learning. Meanwhile, according to Sudrajat, Iasha, & Femayati (2018) this jigsaw type of learning even though the teacher still controls the rules, it is no longer the center of class activities, but the students are the center of class activities from the above opinion it can be concluded that the jigsaw type of learning model is a learning model that can be used in the learning process and students can be active in it compared to teachers who are the center of learning such as conventional models.

5. Conclusion

Based on the explanation in chapter four in the research entitled the effect of the jigsaw type cooperative learning model and Mind Mapping on science learning outcomes in grade VI students in elementary schools as follows:

There is an effect of the jigsaw cooperative learning model on the science learning outcomes of sixth graders in elementary school, this is based on the Pair 2 output on the paired samples test with the value of Sig. (2-tailed) obtained 0.000 < 0.05, or t-count 16,428 > t-table 1.97783, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 1 and post-test experimental class 1. Thus, it can be concluded that there is an effect of the jigsaw type learning model on the science learning outcomes of sixth grade students of Public Elementary School No. 2 Sedo, Demak District.

There is an influence of the Mind Mapping learning model on the science learning outcomes of fourth grade students in elementary school, this is based on the Pair 2 output on the paired samples test, the value of Sig is obtained. (2-tailed) obtained 0.000 < 0.05 or t-count 8.609 > t-table 1.68957, it can be concluded that there is a difference in the average student learning outcomes for the pre-test experimental class 2 and post-test experimental class 2. Thus, it can be concluded that there is an effect of the maind mapping learning model on science learning outcomes for class VI Public Elementary School No. 2 Cabean, Demak District.

There is a difference in the effect of the jigsaw and Mind Mapping cooperative learning models on the science learning outcomes of sixth graders in elementary schools based on the paired samples test where the effect of the jigsaw learning model on learning outcomes is 26.22 and the influence of the Mind Mapping learning model is 21.23. also the results of the N-Gain test obtained a mean value of the results of posttest experiment 1 of 90.22 and posttest of experiment 2 of 84.44. In conclusion, the jigsaw cooperative learning model is more effective than the Mind Mapping learning model.

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Conflict of Interest
The authors declare no conflicts of interest.

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