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# Optimizing Student Learning Outcomes Through the Jigsaw Type Cooperative Learning Model Assisted by Mind Mapping Media

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***ABSTRAK***

*Rendahnya hasil belajar IPA dikarenakan dalam proses pembelajaran IPA saat ini masih menerapkan metode pengajaran yang berpusat pada guru sebagai pemberi materi. Pada proses pembelajaran cenderung menggunakan metode ceramah yang hanya menuntut peserta didik mempelajari IPA dengan menghafalkan konsep, teori, dan hukum. Penelitian ini bertujuan untuk menganalisis pengaruh model pembelajaran kooperatif tipe Jigsaw berbantuan media Mind mapping terhadap hasil belajar IPA siswa kelas IV. Penelitian ini termasuk penelitian eksperimen semu (quasi eksperimen) dengan rancangan penelitian nonequivalent post-test only control group design. Populasi penelitian ini adalah seluruh siswa kelas IV yang berjumlah 167 siswa. Sampel penelitian ini diambil dengan teknik random sampling atau teknik undian. Data yang dianalisis dalam penelitian ini adalah hasil belajar IPA siswa yang metode pengumpulan data hasil belajar menggunakan metode tes dengan prangkat tes pilihan ganda. Teknik analisis data dalam penelitian ini menggunakan teknik analisis statistik deskriptif dan uji prasyarat analisis (uji t). Hasil perhitungan rata-rata (mean) hasil belajar IPA siswa kelompok eksperimen dengan kriteria sangat tinggi, sedangkan nilai rata-rata (mean) siswa pada kelompok kontrol dengan kategori tinggi. Dengan demikian, dapat disimpulkan bahwa terdapat pengaruh yang signifikan model pembelajaran kooperatif tipe Jigsaw berbantuan media Mind mapping terhadap hasil belajar IPA siswa kelas IV.*

**ABSTRACT**

The low learning outcomes of science are due to the current science learning process, which still applies teacher-centered teaching methods as a material provider. The learning process uses the lecture method, which only requires students to learn science by memorizing concepts, theories, and laws. This study aims to analyze the effect of the Jigsaw-type cooperative learning model assisted by Mind mapping media on science learning outcomes of grade IV students. This study included quasi-experimental research with a research design of a non-equivalent post-test-only control group design. The population of this study was all fourth-grade students, totalling 167 students. The sample of this study was taken using a random sampling technique or a lottery technique. The data analyzed in this study were the science learning outcomes of students whose learning outcomes data collection methods used the test method with multiple choice test sets. Data analysis techniques in this study used descriptive statistical analysis techniques and prerequisite test analysis (t-test). The results of calculating the average (mean) of science learning outcomes of experimental group students with very high criteria, while the average (mean) value of students in the control group with high categories. Thus, the Jigsaw-type cooperative learning model assisted by Mind mapping media significantly affects the science learning outcomes of grade IV students.

## 1. INTRODUCTION

Education is something that is very influential in forming character, attitude and personality in humans. The most fundamental part in building a nation and country is Education (Safitri et al., 2021; Widyastuti, 2021).Education plays a very important role in shaping character, developing knowledge, mentality and creating quality human resources that will later grow and develop that will interact and compete in the era of globalization both as individual beings and as social beings. Superior human

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resources can be seen from the formation of a nation's character. The formation of national character values in elementary schools is currently a major concern in the world of education (Purwanti & Haerudin, 2020; Puspita Ratri & Najicha, 2022).The learning process is an activity that involves teachers and students in which there is interaction to achieve learning goals..In the learning process, teachers and students are two elements that cannot be separated (Abdullah et al., 2023; Lubis, 2021). Current learning activities use the Merdeka curriculum which is centered on essential materials and develops students' abilities gradually or according to their phase so that students can learn more deeply, meaningfully, and interestingly without rushing..The purpose of this teaching is to improve students' literacy and numeracy skills, as well as their knowledge in each subject. The stages or levels of development themselves are learning outcomes that must be achieved by a student, according to the characteristics, potential, and needs of the student (Kharisma, 2020; Musyrifah et al., 2023)

Natural Sciences (IPA) is one of the core subjects of the curriculum in Indonesia, including at the elementary school level. IPA subject matter is a subject matter that plays an important role in everyday life because IPA trains students to think logically, rationally, critically and creatively or scientifically (Budiwati et al., 2023; Sugih et al., 2023).Science education also plays a very important role in shaping the personality and intellectual development of children. Because of the importance of science education in elementary schools, learning that is in accordance with the existing material is very important for students to learn science in a meaningful way. Science learning in elementary schools must provide direct learning experiences through the use and development of scientific process skills and attitudes (Atikasari & Desstya, 2022; Irsan, 2021).Direct learning experience can be obtained by solving problems related to problems in everyday life. Problem solving can encourage students to be more active, construct knowledge so that the expected science learning outcomes are obtained (Mareti & Hadiyanti, 2021; Wati, 2019).The general purpose of science is to help students develop knowledge and understanding of science concepts that are useful and can be applied in everyday life. In the learning process in schools, especially in elementary schools, it is expected to use innovative learning models, various methods and appropriate support so that students are more active, creative and able to work, take responsibility together, help each other solve problems by following the learning process, and what learning objectives are planned can be achieved (Aini, 2024; Nashirotun, 2020).

However, in reality, what happens in elementary schools is that there are still many students who consider science learning difficult and complicated, this can be seen from the results of the 2018 PISA (Program for International Student Assessment) assessment which showed that Indonesia was ranked 70 out of 78 countries participating in the survey with an average achievement of Indonesian students' science abilities reaching 396. This figure is still far below the international average of 590. This shows that Indonesian students have limitations in understanding and applying science concepts and have not been able to apply the science knowledge they have learned in everyday life (Sukatin et al., 2022; Tahmidaten & Krismanto, 2020).The low science learning outcomes are due to the current science learning process still implementing a teaching method that is centered on the teacher as the provider of the material (Mareti & Hadiyanti, 2021; Masithoh, 2022; Wati, 2019).In the learning process, the lecture method tends to be used, which only requires students to learn science by memorizing concepts, theories, and laws. In the learning process, there is a lack of innovation to create situations that encourage students to gain daily experiences through understanding knowledge in the classroom. Whereas at the elementary school level, science education should open up opportunities to foster students' natural curiosity.

After conducting observations of the science learning process, interviews were also conducted with the homeroom teacher of grade IV at Elementary School Cluster I, Tampaksiring District, and several data related to the science learning process were obtained, namely: 1) The learning process in the classroom still uses a teacher-centered model or direct learning model, 2) Teachers find it difficult to determine the appropriate method to increase the active role of all students in the science learning process, 3) In the learning process, group learning is rarely provided and media is rarely used in delivering material, 4) Students are less active and less focused during learning due to students' lack of understanding of the material being studied and students' lack of interest and concentration when participating in science learning, 5) Students do not understand the learning material due to the fairly broad and dense scope of the material, so that it has an impact on students' science learning outcomes being low. Based on the results of observations at Elementary School Cluster I, Tampaksiring District, a number of problems were found during the science learning process. 1) learning is still dominated by the role of teachers who are more active as providers of materials and learning resources, 2) in the learning process rarely provide group learning, 3) during group discussions, smart students are more active while students with average or low abilities do not play an active role in groups, 4) in the learning process, rarely use interesting learning models and media to support the delivery of materials, in the learning process only use media provided by the school in limited quantities, so that students get bored quickly

during the learning process, 5) students are less focused and less active in the learning process, when the teacher asks questions to students only a few students want to answer, there are even some teacher questions that are not answered at all by students, 6) in the process of delivering materials does not start with delivering important concepts of the material to be studied. Many students do not understand the learning material because of misconceptions between what the teacher conveys and what the students understand, so that when questions are given, the questions asked by the teacher and those answered by the students are not related to each other.

To deal with these problems, efforts are needed to improve students' understanding and mastery of science subject matter which will have an impact on student learning outcomes. This problem certainly requires a solution, one way that can be done is to apply a cooperative learning model. The cooperative learning model is a learning model that uses a grouping system that works together with fellow students to solve problems through discussion and group work (Hasanah & Himami, 2021; Silalahi et al., 2024).One of the learning models in question is the Jigsaw type cooperative learning model with the help of Mind mapping. The Jigsaw type cooperative learning model will be more successful in its application if supported by the right learning media (Nashirotun, 2020; Wahyudi et al., 2023).The role of media is very important during the learning process, namely as a tool that can help teachers to more easily convey learning materials. One of the learning media that is suitable to be combined with the Jigsaw learning model in science learning is Mind mapping media (Arikarani & Amirudin, 2021; Syarifa et al., 2024).Mind mapping is a method that is carried out by using the contents of the mind using visual inference and graphic tools to create an impression..Previous research findings stated that the Jigsaw type cooperative learning model using images as the medium has a positive effect on science learning outcomes (Raditya et al., 2023; Rahmawati et al., 2023). Previous research also stated that the application of the Jigsaw type cooperative learning model to fourth grade elementary school students can improve mathematics learning outcomes (Suryaningrum & Winanto, 2023; Syarifa et al., 2024).

The novelty of this research lies in the combination of the Jigsaw cooperative learning model with mind mapping media, which has not been widely applied simultaneously in science learning at the elementary school level. This research provides a new contribution by exploring how the combination of these two approaches can improve students' understanding and learning outcomes. The Jigsaw model, which encourages collaboration between students in solving problems, is strengthened by the use of mind mapping that allows students to organize and integrate information visually and systematically. Thus, this research provides new insights into the effectiveness of integrating cooperative learning models and visual learning media in improving the quality of science education in elementary schools.

## 2. METHOD

This type of research is experimental research. The design of this research is nonequivalent post-test only control group design, which only uses a post-test conducted at the end of the study. In the experimental class, treatment was given in the form of a Jigsaw learning model assisted by Mind mapping media, while in the control class, treatment was not given using the Jigsaw learning model assisted by Mind mapping media. At the end of the meeting in the experimental class and the control class, both were given a post-test (O1 and O2) in the form of an objective test, namely multiple choice. The population of this study was 7 classes with a total of 167 students. To ensure that all seven classes have the same or equivalent abilities, all seven classes were tested for their equality with the ANOVA A test using SPSS. Sampling was determined by random sampling with a lottery technique. a random sampling method where samples are selected based on class not individual, each member of the population or part of the population has an equal opportunity to be selected as a sample member. The data collection method is important in research because the data collection method is a technique or method that can be used by researchers to collect data. Data collection in this study was carried out using the test method. This test method is implemented by distributing a number of tests to determine students' science learning outcomes. In this study, the test will be conducted in the experimental class and the control class called the post-test. The next test is conducted after the class receives different treatments, namely the experimental class using the Jigsaw learning model assisted by Mind Mapping and the control class using a learning model implemented by the teacher systematically. The instrument grid can be seen in Table 1.

**Table 1.** The Science Learning Outcome Test Instrument Grid

| CHAPTER/TOPIC | Initial competencies | Indicator |
|---|---|---|
| CHAPTER 3 The Influence of Surrounding Forces, Topic A: The effect of force on objects, Topic B: magnets, a magical object, Topic C: elastic objects, Topic D: why don't we float in the air | Identifying the various styles involved in everyday life | Determine style and its influence on objects in everyday life.<br>Determine examples of friction in everyday life.<br>Analyzing the effect of friction in an object.<br>Determining objects – things that can attracted by a magnet.<br>Determining the benefits magnetic force in daily life – day.<br>Analyzing about magnetic force and its properties.<br>Determining the force of gravity in everyday life.<br>Analyze the effect of gravitational force on an object.<br>Determine the benefits of spring force in daily activities.<br>Comparing the differences between different types of styles. |
| CHAPTER 4 Changing Forms of Energy. Topic A. Energy Transformations around us. Topic C. Energy in motion. | | Determining the changes in the form of kinetic energy into sound in everyday life.<br>Determining changes forms of electrical energy in everyday life.<br>analyze changes forms of electrical energy in everyday life.<br>Determine the types of kinetic energy. |

## 3. RESULT AND DISCUSSION

### Result

The data collected in the study of science learning outcomes of students who were taught using the Jigsaw learning model assisted by Mind mapping media and those who were not taught using the Jigsaw learning model assisted by Mind mapping media. The learning outcomes measured were in the cognitive domain obtained from the post-test after holding 6 meetings in each group of students in the experimental and control classes. The post-test was conducted by giving 30 objective questions (multiple choices) that had been validated. The number of students whose science learning outcomes were analyzed in the experimental group was 25 students and, in the control group was 15 students. The description of the results of the study of students' science learning outcomes data explains the mean, median, mode, variance, and standard deviation. The results of the data description can be seen in Table 2.

**Table 2.** The Description of Science Learning Outcome Data

| Statistical Data | Experimental Group | Control Group |
|---|---|---|
| Mean | 22.64 | 18.2 |
| Median | 23.2 | 17.37 |
| Mode | 23.77 | 15 |
| Variance | 8.15 | 19.02 |
| Standard Deviation | 2.85 | 4.36 |
| Maximum Score | 26 | 25 |
| Minimum Score | 15 | 13 |
| Span | 12 | 13 |

Science learning outcome data for the group of students who were taught using the jigsaw cooperative learning model assisted by Mind Mapping media obtained through a post-test on 25 students

showed that the highest score was 26 and the lowest score was 15. The frequency distribution of science learning outcome data for students in the experimental group is presented in Table 3.

**Table 3.** The Frequency Distribution of Science Learning Outcome Data for Students in the Experimental Group

| Interval | Midpoint (x) | Frequency absolute | Frequency Relative (%) | Fk |
|---|---|---|---|---|
| 15-16 | 15.5 | 1 | 4 | 1 |
| 17-18 | 17.5 | 1 | 4 | 2 |
| 19-20 | 19.5 | 4 | 16 | 6 |
| 21-22 | 21.5 | 3 | 12 | 9 |
| 23-24 | 23.5 | 10 | 40 | 19 |
| 25-26 | 25.5 | 6 | 24 | 25 |
| **Amount** | | **25** | **100%** | **62** |

Based on Table 3, the frequency of the highest science learning outcomes data for students in the experimental group is in the range of grades 23-24 with an absolute frequency of 10, while the lowest frequency is in the range of scores from 15-16 with an absolute frequency of 1. The average learning outcomes of students in the experimental group are between 21-22 with an absolute frequency of 3. This states that the average science learning outcome data is at a relative frequency of 12%, so it can be seen that 24% of students get learning outcomes below average, and 64% of students get results above average. Thus, the learning outcomes of students in the experimental group are mostly above average. The science learning outcome data for students in the experimental group are presented in the form of a polygon diagram as follows.

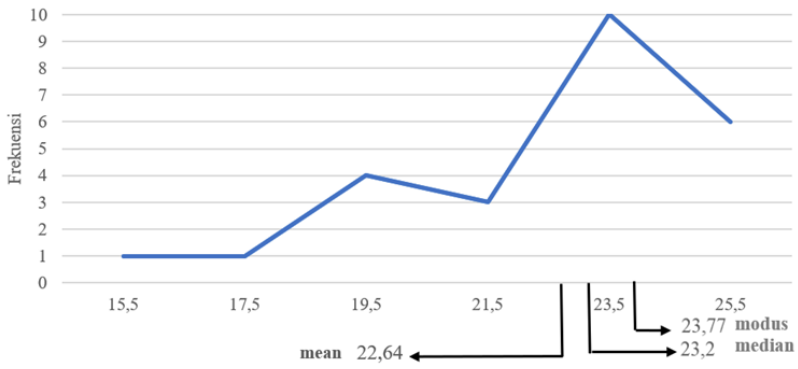


**Figure 1.** The Polygon Graph of Post-Test Data Results of Students' Science Learning Outcomes in the Experimental Group

Based on Figure 1, it is known that the mode is greater than the median and the median is greater than the mean (Mo>Md>M). Thus, the curve above is a negative squint curve which means that most of the science learning outcome scores tend to be high.

Science learning outcome data for the group of students who were not taught using the jigsaw cooperative learning model assisted by Mind Mapping media obtained through a post-test on 15 students showed that the highest score was 25 and the lowest score was 13. The frequency distribution of science learning outcome data for students in the Control group is presented in Table 4.

**Table 4.** The Frequency Distribution of Science Learning Outcome Data for Control Group Students

| Interval | Midpoint | Absolute frequency | Relative frequency | Fk |
|---|---|---|---|---|
| 13-15 | 14 | 5 | 33.34 | 5 |
| 16-18 | 17 | 4 | 26.67 | 9 |
| 19-21 | 20 | 1 | 6.66 | 10 |
| 22-24 | 23 | 4 | 26.67 | 14 |
| 25-27 | 26 | 1 | 6.66 | 15 |
| **Amount** | | **15** | **100%** | **53** |

Based on Table 4, the frequency of science learning outcomes data for students in the control group is highest in the range of grades 13-15 with an absolute frequency of 5, while the lowest frequency is in the range of scores from 19-21 with an absolute frequency of 1. The average learning outcomes of students in the control group are between 19-21 with an absolute frequency of 1. This states that the average science learning outcome data is at a relative frequency of 6.66%, so it can be seen that 60.1% of students get learning outcomes below average, and 33.33% of students get results above average. Thus, the learning outcomes of students in the experimental science group are mostly below average. The science learning outcome data for students in the control group are presented in Figure 2.

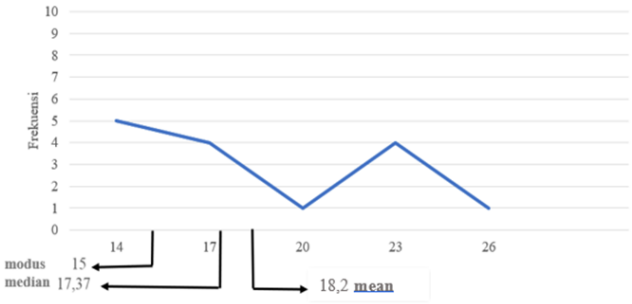


**Figure 2.** The Polygon Graph of Post-Test Data Results of Students' Science Learning Outcomes in the Control Group

Based on Figure 2, it is known that the mode is greater than the median and the median is greater than the mean (Mo<Md<M). Thus, the curve above is a positive squint curve which means that most of the science learning outcome scores tend to be low. Based on the analysis carried out using the Chi-Square formula, a recapitulation of the results of the normality test of the science learning outcome data for the experimental group and the control group was obtained Table 5.

**Table 5.** The Recapitulation of the Results of the Normality Test of Science Learning Outcome Data

| No | Result Data Group Study | $X_2$ count | $X_2$ table with the level significance 5% | Status |
|---|---|---|---|---|
| 1 | Experimental Group | 4.717 | 9.488 | Normal |
| 2 | Control group | 4.54 | 5.591 | Normal |

Based on Table 5, calculation using Chi-Square formula, obtained the result of $X_2$ count of experimental group is 4.717 and $X_2$ Table with significance level of 5% and dk = is 9.488. This means that $X_2$ count is smaller than $X_2$ Table ($X_2$ count <$X_2$ Table) so that the post-test data of experimental group is normally distributed. Then, for the post-test data of control group, obtained $X_2$ count of experimental group is 4.54 and $X_2$ Table with significance level of 5% and dk = is 5.591. This means that $X_2$ count is smaller than $X_2$ Table ($X_2$ count <$X_2$ Table) so that the post-test data of control group is normally distributed.

The homogeneity of variance of science learning outcome data (post-test) of students in the experimental and control classes was analyzed using the F-Test with homogeneous data criteria if $F_{count} < F_{Table}$. There is an Fcount of 2.33, while $F_{Table}$ is 4.10 (df1=1, df2=38, with a significance level of 5%). This means that the $F_{count}$ value < $F_{Table}$ so that it can be concluded that the post-test data of students in the experimental and control groups have homogeneous variance.

Based on the data assumption test, namely the data normality test and the variance homogeneity test, it was obtained that the distribution of science learning outcomes data for students in the experimental group and the control group was normally distributed and had homogeneous variance. Therefore, it can be continued by testing the research hypothesis ($H_1$) and the null hypothesis ($H_0$). Hypothesis testing was carried out using the independent sample t-test (uncorrelated) with the pooled variance formula. The recapitulation of the results of the t-test calculations between the experimental group and the control group is presented in Table 6.

**Table 6.** The Recapitulation of t-Test Calculation Results

| Group | N | $\bar{X}$ | S2 | count | $t_{table}$ with levels significance 5% |
|---|---|---|---|---|---|
| Experiment | 25 | 22.64 | 8.15 | 3.92 | 2.024 |
| control | 15 | 18.2 | 19.02 | | |

Based on Table 6, the results of the t-test calculation obtained a t count of 3.92. While the t table with degrees of freedom dk = 38 at a significance level of 5% is 2.024. This means that the $t_{count}$ is greater than the $t_{table}$ ($t_{count} > t_{table}$) so that $H_0$ is rejected and $H_1$ is accepted. Thus, it can be concluded that there is a significant influence of the Jigsaw type cooperative learning model assisted by Mind mapping media on the science learning outcomes of grade IV elementary school students in Cluster I, Tampaksiring District, 2023/2024 academic year.

**Discussion**

This study refers to the theory of constructivism. Constructivism means that the formation of human knowledge is based on the experiences that have been passed. The aspects studied are learning using the Jigsaw model assisted by Mind mapping media with learning without using the Jigsaw model assisted by Mind mapping media on students' science learning outcomes. The results of the analysis show that there is a significant influence of the Jigsaw learning model assisted by Mind mapping media on students' science learning outcomes. This study is based on students' science learning outcome scores and t-test results.

The group of students who were taught using the Jigsaw type cooperative learning model assisted by Mind mapping media got an average science learning outcome score of 22.64 which is included in the very high category, while the group of students who were not taught using the Jigsaw type cooperative learning model assisted by Mind mapping media got an average science learning outcome score of 18.2 which is included in the high category. The difference in learning outcomes between the experimental group and the control group was caused by the difference in treatment of each step of the learning process and the discussion process carried out by students during learning..The steps of the jigsaw type cooperative learning model assisted by Mind Mapping media are able to involve all students to participate actively and critically in the learning process so that the jigsaw type cooperative learning model assisted by Mind Mapping has a positive effect on students' science learning outcomes..

This is evidenced by the number of students who achieved the KKTP score after implementing the jigsaw cooperative learning model with the help of mind mapping media. After participating in learning with this model, the number of students who achieved the KKTP was greater than when the document was first recorded. At the beginning of the document recording, the number of students who achieved the KKTP was 9 students out of 25 students, but after implementing the Jigsaw cooperative learning model assisted by Mind mapping media. The number of students who achieved the KKTP was 16 students out of 25 students. Therefore, it can be seen that the implementation of the jigsaw cooperative learning model assisted by Mind mapping media has a positive impact on students' science learning outcomes so that student learning outcomes increase. The learning process with the jigsaw cooperative learning model assisted by Mind mapping media emphasizes student activities through the following steps: Delivering objectives and motivating students, presenting information, Group or original/basic group, expert group, Expert team returns to the original group, Evaluation, Awarding.

The first stage of the jigsaw cooperative learning model is to convey the objectives and motivate students. At this stage, the teacher conveys the learning objectives to be achieved in learning and motivates students so that students are active in following the learning process. If students are active in following learning activities, both students actively discuss, actively ask the teacher, this can improve student learning outcomes (Ertin et al., 2021; Fariyani, 2019).Previous findings state that learning motivation is a drive from within and outside the student to have the desire to learn without any coercion so that changes in behavior can occur to achieve the desired goals (Dinda Aulia Rahmi et al., 2023; Kharisma, 2020).If the students' desire to learn is very great, then their level of activity in learning will also be great, this can improve students' learning outcomes (Ansya, 2023; Sofiana et al., 2023).

The second stage is the presentation of information. At this stage, the teacher presents information to students by presenting various facts, experiences that are directly related to the subject matter. Students are given problems related to the material being studied (Febriani et al., 2023; Hendro et al., 2021).At this stage, students listen to facts and experiences related to the material and problems given by the teacher and students are able to solve the problems. This activity has provided students with experience related to cognitive learning outcome indicators, namely analyzing and analyzing..Previous findings state that by giving problems and the responsibility to solve them and explain them to other students, each student will be motivated to learn more deeply so that their mastery of the concept of the subject matter becomes better. This can affect student learning outcomes (Nurasia et al., 2023; Sulistiyono, 2022).

The third stage is the division of groups or original/basic groups. At this stage, students are grouped into original/basic groups with members of 4 to 6 people with heterogeneous academic abilities.

Each group member is given a different problem or topic to study. The fourth stage is the division of expert groups. At this stage, the teacher asks students who get the same topic or problem to discuss in expert groups. Students together with the expert group work on the problems given by the teacher. At this stage, it is related to the cognitive learning outcome indicator, namely analyzing. Students solve the problems given by discussing with friends in their expert group. With the discussion of expert groups, it can encourage students to practice analyzing the problems given and finding solutions to solve the problems. This is in line with previous research which states that through information/knowledge sharing activities in group work, a positive reciprocal relationship can be created between students. Direct interaction in a positive reciprocal relationship can affect learning outcomes (Heriwan & Taufina, 2020; Lubis, 2021).

The fifth stage is the expert team returns to the original group. At this stage the teacher directs students to return to the original/basic group. Students in the original group explain the results of the discussion when in the expert group. At this stage students write down the results of the discussion together with the expert group in the form of mind mapping. Through the creation of Mind mapping, students not only learn to explore the knowledge they have in themselves, students can also be creative by adding interesting pictures and colors to the mind mapping..In the Jigsaw cooperative learning model assisted by Mind Mapping, students actively discuss in their home groups and expert groups, making it easier for students to understand the subject matter. Previous research findings stated that students are actively involved in implementing the Jigsaw cooperative learning model. Learning using Mind Mapping makes learning more enjoyable which will later help students understand and remember the concepts of the material that has been studied. This can affect student learning outcomes (Saputra et al., 2021; Suhada et al., 2020).

The sixth stage is evaluation. At this stage, students are given a test by the teacher to measure students' knowledge of the material being studied. When the test is given, the students look calm when working on the evaluation test, this indicates that students can work on the questions well so that later it can affect students' learning outcomes (Maslikah, 2023; Nomor et al., 2022).The seventh stage is giving awards. At this stage, the teacher gives awards to the best group in making Mind mapping and conducting presentations. Awards can be in the form of applause by all students and additional marks. This phase can increase student motivation in learning. Giving awards to students in the learning process as one of the requirements for achieving student learning outcomes. The provision of rewards can encourage students to learn, which then has implications for learning outcomes. This shows that there is an influence of the application of awards on improving student learning outcomes. The seven phases of the jigsaw cooperative learning model have a positive influence on learning where each step has advantages or superiorities so that it can later improve students' science learning outcomes (Rosyid & Wahyuni, 2021; Wardany & Rigianti, 2023).

The group of students who were taught with the Jigsaw cooperative learning model assisted by Mind mapping media (experimental group) showed superior learning outcomes compared to learning using the previous learning model. This is because the learning process in the Jigsaw cooperative learning model is more student-centered, able to increase student interest in learning and able to stimulate and motivate students to learn and foster a sense of student cooperation. All students become actively involved in learning, not only dominated by smart students. Mind mapping can train students to read, take notes, listen to explanations from other students and teachers, and communicate their thoughts, ideas, and knowledge on a piece of paper. In this way, students understand the learning material well and have stronger knowledge of the material that has been learned. Students' understanding of a subject matter affects their learning outcomes, especially in science subjects.

In the control group, learning was carried out without using the Jigsaw cooperative learning model assisted by Mind Mapping media. The low learning outcomes of students in the control group were caused by students being taught using the learning model that is usually given by teachers in class. Learning in this model can create a one-way learning atmosphere, or the teacher only plays an active role and students only listen to the teacher. Teachers tend to use lecture and question and answer methods during learning, causing students to quickly get bored and lose interest in learning. This will certainly affect students' understanding of learning and affect student learning outcomes. Therefore, it can be seen that the methods used by teachers in the control group are less effective in learning. This results in low student science learning outcomes.

Based on the findings on the group of students who were taught with the jigsaw type cooperative learning model assisted by Mind mapping media and the group of students who were not taught with the jigsaw type cooperative learning model assisted by Mind mapping media, it is known that student learning outcomes are better or higher when using the jigsaw type cooperative learning model assisted by mind mapping media. Previous findings showed that there was a significant difference in science learning

outcomes between the group of students who used learning using the Jigsaw type cooperative learning model assisted by picture media and the group of students who took part in learning not using the Jigsaw type cooperative learning model assisted by picture media in grade V elementary school students (Handayani et al., 2021; Masithoh, 2022; Wati, 2019).

This study has advantages, namely the use of mind mapping as a medium can stimulate students' cognitive activity by visualizing the relationship between science concepts, thereby strengthening their understanding. The Jigsaw model encourages collaboration between students in solving problems and understanding the material, increasing positive social interactions in the classroom. The implication is that by involving students in an active and collaborative learning process, this study can increase students' intrinsic motivation towards science lessons. Students may feel more involved and motivated to learn because they have more control over their learning process. This study also has limitations, namely, the results of the study may not be directly applicable to all contexts or student populations. Variations in student background, school curriculum, or learning conditions can affect the generalization of results.

## 4. CONCLUSION

This study states that there is a significant influence of the Jigsaw type cooperative learning model assisted by Mind mapping media on the science learning outcomes of grade IV elementary school students in Cluster I, Tampaksiring District in the 2023/2024 academic year. The average science learning outcomes of the group of students who participated in learning with the Jigsaw type cooperative model assisted by Mind mapping media (experimental group) were in the Very high category). Meanwhile, the average science learning outcomes of the group of students who did not participate in learning with the Jigsaw model assisted by Mind mapping media (control group) were in the High category. This means that the average science learning outcomes of the group of students who participated in learning using the Jigsaw type cooperative learning model assisted by Mind mapping media were greater than those of the group of students who did not participate in learning using the Jigsaw learning model assisted by Mind mapping media.

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