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## Literature Study: Effect of Jigsaw Assisted with Mind Map on Students Learning Competencies

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### ABSTRACT

This article review examines the effect of applying the jigsaw cooperative learning model assisted with mind map recitation on students' learning competencies. The method used is a systematic review by reviewing articles that are relevant to the author's research. The data used is obtained from relevant journals that are relevant to the problem the authors discuss. Data is taken from databases such as SINTA, Google Scholar, and other relevant journal websites. The variables used in this study are the type of jigsaw cooperative learning model (independent variable) and the students' learning competency (dependent variable). Starting from elementary school level, junior high school, high school, and college can also feel the positive influence of applying this type of cooperative learning model jigsaw. Because of the positive influence of applying this type of jigsaw cooperative learning model, it is expected that the teacher will apply the material that is both theoretical and practical. This type of jigsaw cooperative learning method can improve student learning outcomes and activeness so that problems that occur in the learning process can be overcome.

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**Keywords:** Jigsaw, Recitation, Mind Map

## INTRODUCTION

Education is essentially a process of forming a complete human being to develop all the potential that exists in him. This is stated in the Law of the Republic of Indonesia concerning the National Education System number 20 of 2003 article 1, which states that: Education is a conscious and planned effort to create a learning atmosphere and learning process to develop their potential to have spiritual strength actively. Self-control, personality, intelligence, noble character, and skills needed by itself, society, nation, and state.

With education, it is expected to be able to create changes in the mindset and abilities of students and be able to increase their potential. In order to improve the quality of education and the quality of education itself, it is necessary to make various efforts, one of which is to implement the 2013 curriculum. In its implementation, the 2013 curriculum is implemented based on a scientific approach. With the 2013 curriculum, it is hoped that students will have much better knowledge, attitudes, and skills competencies. The 2013 curriculum also requires students to be more active, creative and innovative, and productive. With the achievement of the objectives of the 2013 curriculum, it is hoped that students will be able to face various problems, obstacles, and challenges in their time and enter a better future. In contrast to the previous curriculum, the 2013 curriculum is very concerned with attitude knowledge because knowledge without a good attitude is of no use. Therefore, with the demand for attitude competence in the 2013 curriculum, it is hoped that the nation's character will be well developed.

Explicitly character education is a mandate of Law No. 20 of 2003 concerning the national education system, which emphasizes that: national education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming to develop the potential of students to become human beings of faith. And devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become a good citizen (Aeni, 2014).

The facts found in schools, the learning process is still teacher-centered, while most students still look passive and only rely on the teacher's explanation. The inactivity of these students is evidenced by the results of the questionnaires that have been distributed and filled out by students on October 5, 2019, at the UNP Laboratory Development High School. Based on the analysis of the results of observations with questionnaires that have been distributed, it was revealed that as many as 73.58% of students stated that teachers still use the lecture method. This lecture method makes students passive, less creative, causing low curiosity.

It is known that teachers have difficulty in choosing a learning model that can motivate students to be more active, creative, and innovative in the learning process. The learning model in the field that is very often applied by teachers is Discovery learning. The methods often used are the lecture method, question and answer, discussion, and recitation (homework). Often, the lecture method applied can be observed from learning that is generally teacher-centered. Students only accept what the teacher conveys; this is what becomes a monotonous benchmark or guideline for students; they assume that the teacher is the only source of lesson information. So that during the discussion, it was also seen that students did not participate because their knowledge and sources of knowledge were limited. Besides that, their curiosity was also very low, as evidenced by the frequent asking the teacher when completing group assignments, they were dominant in asking questions rather than having to find answers on their own. Not a few of them also stated that the group assignments they did were very boring because they thought that they only copied the material in the teaching materials without having to master and study the material again.

The problem, which is then obtained from the results of observations of these students, is that the teacher uses monotonous homework. Based on the results of the questionnaire

analysis that has been distributed, it was found that as many as 82% of students stated that they felt bored when the teacher gave homework in the form of notes which for them was very tiring and boring, coupled with the demands of the 2013 curriculum to hold extracurricular activities that made students use their time. Longer time in school, so students feel overwhelmed and bored with homework in the form of notes. If you try to use homework in a more varied and interesting form, it will likely make students more enthusiastic about doing homework. Homework that can be applied to overcome student boredom, for example, can be in the form of a mind map. This homework is deliberately given by the teacher to increase their study hours at home, dividing the time to open their books outside the school environment. Giving homework (recitation) and helping students learn more outside school hours also helps teachers deliver a lot of subject matter in a short time at school. If the school does not apply this recitation method, it is feared that students will be lazy to repeat lessons and study outside of school. With the application of giving homework (recitation) in the form of a mind map, it is hoped that students will be more active and diligent in learning to improve student learning outcomes. In addition to learning outcomes, students' creativity will also be channeled through the provision of homework (recitation) in the form of this mind map.

A mind map is a form of a note that is not monotonous because it combines the work functions of the brain simultaneously and is interrelated with each other. This will balance the work of the two brains. The brain can receive information in the form of images, symbols, images, music, and others related to the function of the right brain (Olivia, 2014).

Based on the results of observations with questionnaires and interviews with Biology teachers in class XI of the UNP Laboratory Development High School on October 5, 2019. The 2013 curriculum learning began in July 2018. This means that teachers are still in the adaptation stage in learning – implementation of the 2013 curriculum. In the learning process, teachers tend to use lecture, discussion, recitation, and question and answer methods. In addition, the teacher has never applied a jigsaw-type cooperative learning model assisted by recitation in the form of a mind map.

The low learning outcomes of class XI students in the UNP Laboratory Development High School in biology can be seen from the teacher's assessment at the end of the learning process, such as mid-semester exam scores, which are still much below the KKM. The learning outcomes of students in class XI of the UNP Laboratory Development High School in biology subjects in the odd semester of the 2019/2020 school year are presented in the table below.

Table 1. Middle semester exam values for biology subject class XI SMA laboratory development UNP Odd Semester 2019/2020 Academic Year.

No.	Class	Number of Students	Average value
1	XI MIA 1	26	55,65
2	XI MIA 2	27	59,78

(Source: Biology Teacher at UNP Laboratory Development High School).

Based on the table above, the average mid-semester exam in biology class XI MIA SMA Development Laboratory UNP has not reached the KKM that has been set, which is 78. The number of problems that arise in the field when conducting observations on students and interviews with Biology teachers in SMA Development UNP laboratories, among others, students are less active in learning, less interested in homework given by the teacher, and low student learning outcomes. Efforts to overcome these problems are to use learning models that can improve the creative abilities of students.

They are learning models that can improve learning outcomes and student activity through a student-centered learning process, namely by applying the cooperative learning model. Cooperative learning arises from the fact that students will find and understand

relatively difficult concepts more easily if they work together and discuss with their peers. Each student has the same roles and responsibilities; besides that, the interaction between students will also be well established, and the teacher will only interact with the group when needed. One of the cooperative learning models that can be used is the jigsaw cooperative learning model. Jigsaw cooperative learning is one of the cooperative and flexible learning models. In jigsaw learning, students are divided into groups whose members have heterogeneous characteristics. Each student is responsible for studying the assigned topic and teaching his group members so that they can interact and help each other (Setyaningsih, 2017: 295).

Based on the problems that have been described, the researchers are interested in conducting research on the learning process with the title "the Effect of the Jigsaw Type of Cooperative Learning Model Assisted with Mind Map Recitation on Students Learning Competency."

## METHODS

This research was carried out using the method of literacy studies or literature review. This research method is carried out by conducting a study of several works of literature such as scientific journals, theories, and other relevant findings.

## RESULTS AND DISCUSSION

Knowledge competence is a learning outcome related to the ability to think, acquire knowledge, and process data or knowledge obtained. Knowledge competence can be measured from the intellectual potential of students in the learning process, namely the ability to know, understand, apply, analyze, synthesize, and evaluate. Assessment of students' knowledge can be done in writing and orally. This knowledge assessment is used to see how far the knowledge and how deep the students' understanding of the knowledge taught by the teacher is during the learning process.

Based on the results of the study of literature on several scientific articles relevant to the author's research regarding the application of the jigsaw type cooperative learning model in the learning process at school, the authors found that most of the jigsaw cooperative learning model implementation had a positive influence on student learning outcomes. As evidenced by the article (Mariza, 2014) published in the Journal of Economics and Economic Education Vol.2 No. 2 entitled "The Differences in Economics Learning Outcomes Using the Jigsaw Cooperative Method and Conventional Methods for Class X Students of SMAN 6 Padang". Based on the data analysis that has been carried out on the economic learning outcomes of students using the cooperative jigsaw method and the conventional lecture method at SMAN 6 Padang, there are differences. This difference can be seen from the average value of the experimental class 81.31, while the control class has an average value of 72.87. Z-test on student learning outcomes obtained Z count 3.508 and Z table 1.960 at a significant level of 0.05 based on the results of the calculation  $Z \text{ count} > Z \text{ table}$ , then  $H_0$  is rejected. Thus, it can be concluded that there is a significant difference between the learning outcomes of the experimental class students and the control class students' learning outcomes, namely the experimental class using the jigsaw cooperative method is higher than the learning outcomes of the control class students using the conventional method.

The positive influence given by the application of the jigsaw type cooperative learning model to the knowledge competence of students can also be seen in research (Amirpada, 2012) published in the Journal of Education Publications Volume II No. 3. entitled "Improving Student Learning Outcomes Through the Application of the Jigsaw Type Discussion Method

in Social Studies Lessons at SMP Negeri 2 Parepare". The results of the research obtained in this article are that students at this stage are progressing; namely, the achievements achieved in this learning prove that the ability of students to receive lessons has increased, the absorption of students towards subject matter begins to change, quickly and easily remembers. Analysis of learning outcomes data proves that if students have sufficient opportunities to discover, read and conduct experiments or observe natural phenomena directly through group discussion activities, learning is much more meaningful than when students are treated to scientific concepts continuously.

The knowledge competence of students will also increase if they are given recitations (home assignments), such as the research conducted by Erniwati in the Scientific Journal of Lens Physics Education entitled "The Effect of Using the Recitation Method in Improving Activities and Learning Outcomes of Physics in Class VII MTS Nunggi Students." Based on the results of data analysis using the t-test formula that t count is 2,793 consulted at t table at a significance level of 5%, which is 2,074, then  $t \text{ count } (2.793) > t \text{ table } (2.074)$  so that the alternative hypothesis ( $H_a$ ) is accepted. The null hypothesis ( $H_0$ ) is rejected, it can be concluded that the use of the recitation method in improving physics learning outcomes in class VII MTS Nunggi students has a positive effect or has a good impact on increasing the competence of students' abilities.

Homework is applied by the teacher with the aim that students have the knowledge they brought before carrying out learning at school. This homework can be varied by the teacher, for example, by applying a recitation in the form of a mind map which can later reduce the boredom of students in learning. Giving recitations in the form of mind maps is believed to be able to improve student learning outcomes, as written in Rescha's 2018 article entitled "The Effect of Giving Homework in the form of Mind Mapping before Think Pair Share (TPS) Cooperative Learning on Biology Learning Outcomes of Class VIII SMPN 7 Padang " Although in this article what is applied is a think pair share (TPS) cooperative learning model, but the author pays more attention to the homework given in the form of mind mapping.

Based on the results of the final test data analysis, it was found that the average biology learning outcomes of students in the two sample classes, the average value of students in the experimental class increased from 64.10 to 82 while the control class from 63.50 to 76.69. The average value of the experimental class is higher than the control class. The two sample classes applied the think pair share (TPS) cooperative learning model. The difference in treatment between the two sample classes was the giving of homework in the form of mind mapping given to the experimental class only. Giving homework in the form of mind mapping helps students prepare themselves with prior knowledge before taking part in learning at school. Based on the data obtained, it can be concluded that giving homework in the form of mind mapping before thinking pair share (TPS) cooperative learning has a positive effect on the biology learning outcomes of eighth-grade students of SMP Negeri 7 Padang.

Based on the data from several articles above, it can be concluded that there is an increase in the knowledge competence of students after the implementation of the recitation-based jigsaw cooperative learning model in the form of a mind map. This model is very helpful for students in learning and understanding concepts to achieve learning objectives. This jigsaw type of cooperative learning model is appropriate for the material in the form of a written narrative. This model is most suitable for use in lessons such as social studies, literature, science, and various related fields whose learning objectives are to acquire concepts. In addition to having an influence on knowledge competence, the application of the jigsaw-type cooperative learning model also has an influence on the attitude competence of students. Attitude competence is a very important component in building the character of students who are the forerunners of national leaders. High knowledge with an attitude that is not useful, even a good attitude but lack of knowledge is also not balanced, and it will be better if students

are considered and guided in the formation of their character, especially in the 2013 curriculum, which attaches great importance to character education which aims to build a virtuous and noble personality. Unlike the previous curriculum, the 2013 curriculum requires students to be more creative, independent, cooperative, tolerant, and responsible. This aspect can be seen in the learning process, meaning that here the teacher has a very important role. In addition to teaching and providing knowledge, the teacher must also educate the character of the students. Education of the character of these students can be facilitated by applying the jigsaw type of cooperative learning model. This learning model really requires students to be active and must have a high social spirit in working with the group, which in this learning model does not only work with one group but later each student will have two groups. In the same way as cooperation, an attitude of responsibility is also very much needed in the application of this model. Later students will be required to master the material given to them and explain it to their friends. Therefore, this jigsaw type cooperative learning model is believed to have a positive influence on the development of students' attitude competencies, also supported by several articles from relevant research entitled "Using the Jigsaw Method with Media Assistance to Improve Cooperation Skills and Social Studies Learning Outcomes" by Nunung Sri Rochaningsih and Muhsinatun Siasah Masruri in 2015 published in the Journal of Social Studies Education Volume 2, No 1. Based on the data from the article, it can be seen that there was an increase in students' cooperative skills after the implementation of the jigsaw type cooperative learning model. This model is very helpful for students in working together to achieve learning objectives. In addition, the application of this model can also reduce the saturation and boredom of students in learning.

In an article written by Purnamasari *et al.*, entitled "Application of Lesson Study-Based Jigsaw Cooperative Learning to Improve PGSD Student Collaborative Activities in Mathematics Education Course I." The application of lesson study-based jigsaw cooperative learning is also able to increase student collaborative activities in group work. This can be seen from the activities during learning. The data in the study showed that in cycles 1 and 2, the interaction during the discussion was only 75% and 50%. While in cycles 3 and 4, it has increased to 100%. All students are involved in understanding the handouts given by the lecturer. The team of experts also seriously and tried to exert all their abilities in explaining their respective handouts to their friends in the initial group. The essence of collaborative learning is a cooperation between two or more students, solving problems together, and having goals to be achieved. This shows that collaborative activity is a very complex skill and very important to master.

In addition, students will also feel helped by the cooperation implemented by the teacher because it can lighten the burden of the lessons they carry. With the application of this jigsaw type of cooperative learning model, it is proven that students and students are able to improve and shape the attitude competencies that exist in themselves. The formation of this attitude competence is also balanced with the knowledge competence that exists in them. The competence of students' attitudes is not only seen from the ability to work together but can also be seen from honesty, discipline, and the attitude of responsibility shown by these students. With the application of this jigsaw type of cooperative learning model, we can see how students work together, communicate, be honest, disciplined, and take responsibility for what these students do.

In addition to the competence of knowledge and competence of attitude that is a concern in the implementation of the 2013 curriculum, it is also the competence of skills. Assessment of the competence of students' skills is carried out to measure the ability of students to apply the knowledge they have acquired in the learning process. Skill competency assessment can be carried out using various techniques, including practical assessment, product assessment,

project assessment, and portfolio assessment. The skill assessment technique used is selected according to the characteristics of KD in KI-4.

Assessment of skills can be seen during learning, then the learning model applied will also affect the skills of students. The skills of these students can be seen individually or in groups. Learning carried out in groups will later affect the skills of students, one of the learning models that is believed to be able to improve the competence of students' skills is the application of the jigsaw type cooperative learning model. This is evidenced by the research contained in the relevant article entitled "Application of the Jigsaw Type Cooperative Learning Model with Practical Activities in the Laboratory to Improve Student Learning Outcomes in Class VII Motion Materials at SMP Negeri (Public Junior High School) 2 Menganti" which was carried out by Agustin and Budiningarti . Practical activities in the laboratory are carried out so that students can conduct experiments directly in the laboratory without bringing experimental equipment into the classroom. In addition, so that students do not get bored in receiving lessons that are so difficult that they do more practical work such as physics lessons. Thus the time required to apply the jigsaw type cooperative learning model with practical activities in the laboratory does not take too long. From the research data, it is known that the learning outcomes of students have increased from the results of the initial test. So that the application of the jigsaw type cooperative learning model with practical activities in the laboratory at SMPN 2 Menganti Gresik can be categorized as very good. This is because in the application of the jigsaw type cooperative learning model, all students are directed to be actively involved in practical activities in the laboratory which will support them in forming meaningful understanding and activities on the material being taught. The active involvement of students in practicum can also be interpreted as a form of applying the knowledge they have gained during learning.

In addition to the elementary, junior high and high school levels, the application of the jigsaw type of cooperative learning model is also effectively implemented in universities and is able to improve student skills. As written in the Research Journal of Mathematics and Science Education entitled "The Effect of Practicum-Based Jigsaw Cooperative Strategy Application on Process Skills and Biology Learning Outcomes of Students in Low Plant Botany Courses" by Maria Paulin Sari Dewi and Florentina Y. Sepe. The results obtained indicate that the application of the practical-based jigsaw cooperative learning model can improve students' process skills. This can be seen based on the score of process skills obtained by the group of students who were taught using a practicum-based jigsaw cooperative strategy, which was higher, namely 25 students who scored between 81-100 which were in the very good category, while the score of process skills obtained by the group of students those taught using conventional practicum-based learning strategies are lower with a score of 19 students between 60-80 who are in the good category, and 6 students who have process skills scores between 40-59 in the fairly good category. At the end of the study, a questionnaire was also distributed to determine student responses to the learning activities that had been carried out using a practicum-based jigsaw-type cooperative learning model. The data obtained from the distribution of questionnaires showed that the learning activities in the Low Plant Botany course in the class taught with the jigsaw type cooperative learning model based on practicum were more fun, easy to follow, and made students aware to learn better.

In an article entitled "Improving Students' Communication Skills through the Jigsaw Type Cooperative Learning Model" by Marfuah in 2017 stated that during the application of this jigsaw type cooperative learning model each expert group arranged the turn of the presentation of its members in such a way that all members of the expert group had the same opportunity. in expressing ideas, refuting, or answering questions. Students in other groups also do not hesitate to ask questions for things that have not been understood and to confirm their understanding. The distribution of material in the form of reasoning questions and

expert group presentations in the form of power points is quite effective in optimizing students' communication skills in classroom learning. Thus, it can be seen that the jigsaw type of cooperative learning model in addition to increasing the activity of students in honing their communication skills, is also able to increase cooperation, and cohesiveness in groups, and can foster a sense of responsibility in students. This is because each student will determine the success of his group in understanding any material that affects the achievement of learning outcomes.

Competencies of students in learning are formulated in core competencies, measured in basic competencies, the size is seen in learning indicators, actualized in learning objectives and students who implement them. Competence of students who are divided into competence in knowledge, attitudes, and skills should ideally be obtained by students in a balanced way. The balance of the formation of these three competencies is one of the responsibilities of the teacher in teaching and educating students.

## CONCLUSION

The review of articles obtained from the Indonesian journal Sinta and the Google Scholar journal found the fact that the application of the jigsaw type cooperative learning model assisted by recitation in the form of a mind map had a positive influence on the competence of knowledge, attitudes and skills of students. Due to the positive influence of the application of the jigsaw type cooperative learning model assisted by recitation in the form of a mind map, it is hoped that the teacher will be able to apply it to material that is both theoretical and practical.

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