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Differences of Student's Motivation and Biology Learning Outcomes Through Jigsaw II Learning Model and NHT Learning Model

Zuan Puri Winanti [1*], Mei Widya Amalia [2]
[1] Institut Agama Islam Negeri Kediri, Indonesia
[2] Institut Agama Islam Negeri Kediri, Indonesia

***Correspondence: E-mail:** zuanpuriwinanti@gmail.com

Abstract: The aims of this study are: (1) to find out whether there are differences in the motivation to learn Biology of students who are taught through Jigsaw II and NHT learning models and to find out whether there are differences in learning outcomes of Biology students who are taught through Jigsaw II and NHT learning models at senior high school of SMA Negeri 1 Tumpang, Indonesia. This study used a quasi-experimental method with a comparative design. The sample in this study were students of class X-2 who were taught using the Jigsaw II learning model and class X-3 students who were taught using the NHT learning model. Analysis of the data used to determine differences in student motivation, namely Anova and to determine differences in student cognitive, affective, and psychomotor learning outcomes, namely Anacova. Based on the results of data analysis, it was found that there was no difference between the biology learning motivation of students who were taught through Jisgsaw II and NHT learning models. In addition, it was found that there was no difference between cognitive learning outcomes, affective learning outcomes, and psychomotor learning outcomes for Biology students who were taught through Jigsaw II and NHT learning models. Thus, it can be concluded that Jigsaw II learning model and NHT learning model have no variation and have good similarities for students' self-development potential.

Keywords: jigsaw II, numbered heads together, NHT, learning motivation, learning outcomes

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INTRODUCTION

In an effort to change behavior, encouragement from oneself and others is important, therefore students must always be motivated to learn (Sanaie *et al.*, 2019). If there is no motivation from the students themselves, then learning cannot run well. According to Uno (2010), the motivation to learn is an encouragement from oneself or not in students who are learning to modify character. In motivation there is a motivation that activates, runs, conveys, and holds attitudes, and learning personality traits (Dimyati & Mudjiono, 2013). According to Winkle (2004), motivation namely all psychological initiators from individual students who foster learning activities, support the passage of learning activities and give goals to these learning activities to get what they want.From the views of some of these experts, high motivation is needed in learning activities (Kurnia, Supriyono and Pangestika, 2021) . When students have great motivation in themselves to learn, the learning outcomes will also achieve what the students want.

The learning model can be used to get the effort used to manage student motivation. Two ways of learning that have been tested have the potential to encourage students' motivation to learn, namely the Jigsaw and Numbered Heads Together (NHT) learning model (Uwakwe, N and Ogunji, 2018; Imron, 2020). Jigsaw learning model is one of several types of cooperative learning designed for students to work in groups to understand something. In an effort to achieve learning objectives, there are two groups, namely the original group and the experts in the Jigsaw learning model (Fathurrohman, 2015). In addition, through the Jigsaw learning model, students get used to interacting with other students and also solving a problem together between one student and another (Saputra *et al.*, 2019). In the NHT learning model, here students will issue their ideas and then they will consider which one is more appropriate, will build more cooperation, practice to issue ideas, accept other people's opinions, and in the form of discussion will find exchanges and differences of opinion. Therefore students will interpret and generalize facts to make conclusions to become knowledge or concept formation, then students are expected to be more active in understanding concepts (Santyasa, 2007).

The Jigsaw and NHT learning models in several schools have been used as research. The sample test that was successfully carried out by Wdarta (2020) proved that the application of cooperative learning using the Jigsaw learning model could strengthen the learning outlook and students' motivation to learn. The results of the study were 10.472%

there was an increase in good classical learning, from 60.002% in the first cycle to 70.474% in the second cycle. The increase in the percentage of learning outcomes (cognitive) in the first cycle to the second cycle increased by 24%, from 62% in the first cycle, it increased to 86% in the second cycle. Likewise, the research conducted by Wibawa & Suarjana (2019), motivation and learning outcomes can be increased using the Jigsaw model of cooperative learning (Subiyantari, Muslim and Rahmadyanti, 2019). The results showed that learning motivation increased from an average of 58.57% in the first cycle to 69.99% in the second cycle. The percentage of 70.45% obtained from the test results in the first cycle and 86.05% in the second cycle. Research conducted by Wibawa & Suarjana (2019), obtained the results that the application of cooperative learning model of NHT can increase students' motivation and learning outcomes. Students' learning motivation in the first cycle was 63.19% and increased in the second cycle to 75.72%. Learning outcomes in the first cycle of 73.53% increased when the second cycle produced 85.29%. In addition, based on Alfiani's research (2017), it is concluded that the increase in students' motivation and learning outcomes can also use the application of the NHT learning model, which was previously 60.5% of students' motivation to learn to 74.5% in cycle II. And the outcomes became 80% in the second cycle which was previously only 60% in the first cycle.

There are several reasons why using the Jigsaw cooperative model, namely the Jigsaw model has the advantage that it makes the experts have a unique source of information, the only one from the owner of the information, therefore learning is easy for students to learn, not boring when taught, the Jigsaw model can be combined with other learning and the results are also effective (Hertiavi, Langlang, & Khanafiyah, 2010). In addition, this learning can increase students' responsibilities both for themselves and for others. In group learning, students are expected to be able to help group members who have not been able to understand the concept in order to understand the concept. Jigsaw is designed to rely on friends in quotes for group dependence and responsibility and not be too attached to one's own responsibility.

Improving academic mastery and influencing students' mindsets is the goal of the NHT cooperative learning model. This method forms students so that they can express their ideas and discuss with their groups which concept is better. In addition, this method can encourage students to develop a spirit of student collaboration. The NHT learning model can stipulate that all students can be involved during learning and each group member has individual responsibility for group discussions. The NHT model includes students to review the concepts contained in a lesson and measure students' insight into the lesson, making it as interesting as

possible so that students can learn happily (Lagur, Makur, & Ramda, 2018). From the arguments above, being able to increase students' motivation and learning outcomes is the hope of the Jigsaw and NHT learning models.

In SMA Negeri 1 Tumpang, Indonesia, the results of an interview with one of the biology subject teachers, it was found that the teacher carried out learning that tended to be teacher centered. Students are less active during learning and teachers are more dominant in learning, the talk method is often used during learning. In learning to use the talk method as a result, students listen more and often students do not have any questions to ask the teacher again. It can cause students to be less responsive during learning and tend to be inactive. Therefore, it can be seen that student motivation has not been managed properly.

Until now, the research used in the Jigsaw and NHT learning models is mostly in the form of investigating classroom actions which are intended to increase students' motivation and learning outcomes. The Jigsaw and NHT learning models have never been implemented in Tumpang Public High School and learning is done by group work. Until now, researchers have not studied the variations of student learning motivation and learning outcomes with the Jigsaw and NHT learning models. This should be done in order to know the difference in the level of motivation and student learning outcomes so that it can be taken into consideration in applying the two learning models in the classroom.

Based on this, the researchers then conducted research with the aims: (1) to find out whether there were differences in students' motivation to learn Biology taught through the Jigsaw II and NHT learning models at SMA Negeri 1 Tumpang, Indonesia, (2) to find out whether there were differences in student biology learning outcomes who was taught through Jigsaw II and NHT learning at SMA Negeri 1 Tumpang, Indonesia.

METHOD

This type of research is comparative using a quasi-experimental approach. The investigation estimate was developed using a two-sample comparative design (Sugiyono, 2008). This design was used to see the differences in motivation and learning outcomes of biology through the Jigsaw II learning model with students who were given the NHT learning model at SMA Negeri 1 Tumpang, Indonesia. When this design is described, it will be seen in (**Figure 1**)

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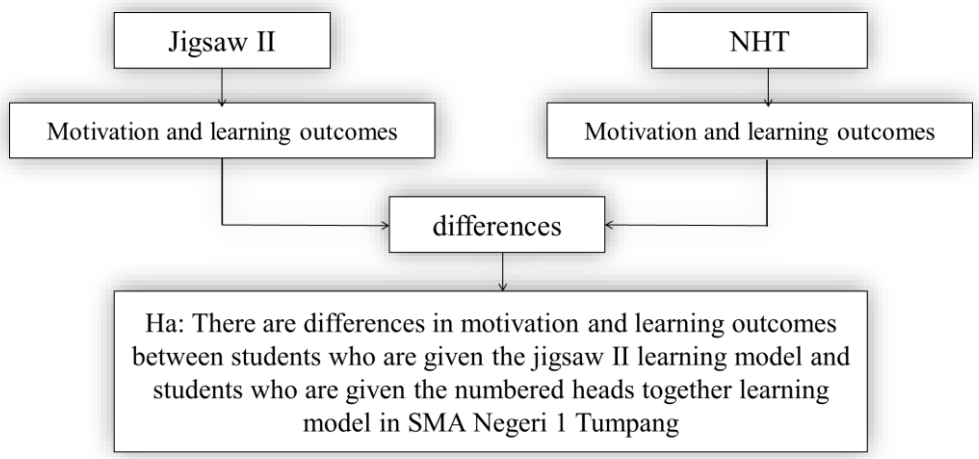

Figure 1. Research design

The research design is a pre-test post-test design. In the design of this study, observations of the subject were carried out before the treatment which was called the pre-test. After the treatment was carried out, observations were made on the experimental subject which was called the post-test. The difference score between pre-test and post-test is assumed to be the effect of treatment.

This quasi-experimental research was carried out in class X-2 and X-3 of SMA Negeri 1 Tumpang and this research was carried out from April to July 2019. The implementation of research activities was carried out in May 2019.

Student learning motivation observation sheet is used to measure learning motivation during the learning process. The observation sheet used to measure students' learning motivation consists of 4 aspects, namely attention, relevance, confidence, and satisfaction. The grids and rubrics for assessing students' learning motivation are in **Table 1**.

Table 1. Learning motivation assessment grid

No.	Indicator	Descriptor
1.	Attention	a. Students' attention to the teacher's explanation b. Students' attention to the explanation of friends in the group c. Attention to group assignments
2.	Relevance	a. Relate the material to the curiosity of students by asking questions
3.	Confidence	a. Confident in expressing opinions in group discussions b. Confident in helping unbiased group mates
4.	Satisfication	a. Satisfaction every time you take lessons b. Satisfaction with learning outcomes

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(Adapted from Gamalie, 2006)

Students' cognitive abilities are implemented through the above instrument. The instrument was used to measure the improvement of student learning outcomes by giving a pre-test, giving treatment, and post-test after treatment in the Jigsaw II class and the NHT class. Cognitive learning outcomes test instrument is a multiple choice. The pre-test and post-test questions are the same for the Jigsaw II class and the NHT class. The grid of students' cognitive learning outcomes tests is shown in **Table 2** below.

Table 2. Grid of students' cognitive learning outcomes

Material	Cognitive Area	Indicator
Pollution and environmental conservation	C1	Describes human activities that can cause environmental pollution.
	C2	Describe the definition of environmental pollution and its types and how to overcome them.
	C3	Distinguishing an environmental condition has been polluted or not.
	C4	Analyzing the factors/cause of water, air, soil, and noise pollution and their consequences and how to overcome them.
	C6	Make proposals for human resources when dealing with pollution and environmental damage.
Types of waste and recycling of waste	C1	Describe the definition of organic waste and inorganic waste.
	C2	Classify waste by type.
	C3	Record the types of organic waste and inorganic waste that can be used without and through the recycling process.
	C6	Make a proposal for the manufacture of recycled goods from waste/waste.

Like the cognitive learning outcomes test, the test is also used to assess the improvement of students' affective learning outcomes, namely by giving a pre-test before giving treatment and a post-test after treatment in the Jigsaw II class and the NHT class. The grid for the test of students' affective learning outcomes is in **Table 3**.

Table 3. Grid of students' affective learning outcomes

Material	Component Attitude	Indicator
Environmental	Cognition	Statement of beliefs about human efforts in

pollution and environmental preservation		preventing and overcoming environmental pollution problems
	Affection	Opinions about human efforts in preventing and overcoming environmental pollution problems.
	Konasi	Statement on behavioral tendencies related to human efforts in preventing and overcoming environmental pollution problems.
Types of waste and waste recycling	Cognition	Statements of beliefs about waste utilization and recycling
	Affection	Opinions about types of waste and waste recycling
	Konasi	Statement on behavioral trends related to human efforts to utilize and recycle waste

Like the affective learning outcomes test, this test is also used to assess the improvement of students' psychomotor learning outcomes by giving a pre-test before giving treatment and a post-test after treatment in the Jigsaw II class and the NHT class. The answer choice categories on the psychomotor learning outcomes test have their respective weights, namely the always answer choice category (SL) is given a value of 5, the category of frequent answer choices (S) is given a value of 4, the category of occasional answer choices (K) is given a value of 3, category The answer choice seldom (J) is given a value of 2, and the category of answer choices never (TP) is given a value of 1. The following grids for student psychomotor learning outcomes tests are listed in **Table 4.**

Table 4. Grid of students' psychomotor learning outcomes test

Material	Psychomotor Component	Indicator
Types of waste and recycling of waste	Reducing	Statements about reducing the capacity to generate waste or waste elsewhere
	Reusing	A statement about reuse "as is" using waste or waste again
	Recycling	Statements about making new things from trash and waste
	Repair	Statement of efforts to repair for the sake of the environment
	Replace	Statements regarding the search for alternative materials that are more environmentally friendly.
	Composting	A statement regarding the activity of composting household organic waste.

For data on student learning motivation, a significant difference in the mean value was then tested which was intended to determine the difference in the increase in motivation for

learning biology in students who used the Jigsaw or NHT learning method using One-Way Anova analysis. Meanwhile, for the data on students' cognitive, affective, and psychomotor learning outcomes, a hypothesis test was then carried out using analysis of covariance (Anacova) to determine the differences in the increase in cognitive, affective, and psychomotor learning outcomes between students using the Jigsaw II learning model and the NHT learning model.

The criteria for acceptance of the first research hypothesis are as follows: (1) If F is calculated > F table (α = 0.05) or sig < α (0.05) then the hypothesis from the analysis is accepted, which means that there are differences in students' motivation to learn Biology using the Jigsaw II learning model and NHT learning; (2) If F is calculated < F table (α = 0.05) or sig > α (0.05) then the hypothesis from the analysis is not accepted, which means that there is no difference in motivation to learn Biology between students who use the Jigsaw II learning model and the learning model NHT.

The criteria for acceptance of the second research hypothesis are as follows: (1) If F is calculated > F table (α = 0.05) or sig < α (0.05) then the hypothesis from the analysis is accepted, which means that there are differences in Biology learning outcomes for students who use the Jigsaw II learning model and the NHT learning model; (2) If F is calculated < F table (α = 0.05) or sig > α (0.05) then the hypothesis from the analysis is not accepted, which means there is no difference in Biology learning outcomes in students who use Jigsaw II learning methods or NHT learning.

FINDING AND DISCUSSION

Finding

Learning Implementation

Data collection was carried out from May 5, 2011 to May 26, 2011 with the subjects analyzed by class X-2 and X-3 students of SMA N 1 Tumpang with a total of 70 students, 32 students in class X-2 and 38 students in class X-3. . Of the 70 people, only 54 students were used in the research test, 27 students in class X-2 and 27 students in class X-3, because they had complete data for the research test.

The results of observing the implementation of the learning process by the teacher at the first meeting in Jigsaw II class, there are 2 activities that have not been carried out by the teacher. There are only 20 of the 22 indicators that appear, so that the implementation of

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learning by teachers is only 90%. At the next meeting all indicators have appeared so that the implementation of learning by the teacher has reached 100%.

Student Biology Learning Motivation with Jigsaw II Learning Model and NHT Learning Model

Data on students' learning motivation in both Jigsaw II and NHT classes were obtained from observations of students' learning motivation during class. Learning motivation data does not use the initial value (pre-test) but only the final score. **Table 5** contains a summary of student learning motivation data in Jigsaw II and NHT classes.

Table 5. Differences in students' motivation to learn biology using the Jigsaw and NHT learning models

Statistics	Jigsaw II Class	Criteria	NHT Class	Criteria
Mean	90.93	Very High	90.67	Very High
Standar Deviation	4.506		5.561	
Highest Score	97	Very High	100	Very High
Lowest Score	78	High	81	High
Range	19		19	

According to **Table 5**, it can be found that the mean value of motivation for the Jigsaw II class is 90.93 with a standard deviation of 4.506, while the average motivation for the NHT class is 90.67 with a standard deviation of 5.561. Based on the mean value of learning motivation for Jigsaw II and NHT classes, it can be seen that learning motivation in Jigsaw II class is higher than that of NHT class, although the difference is very small, namely 0.26. According to these data, it was found that students in Jigsaw II and NHT classes had a very high motivation to learn.

Student Biology Learning Outcomes with the Jigsaw II learning model and the NHT learning model

Cognitive Learning Outcomes

Cognitive learning outcomes data were obtained through cognitive learning outcomes tests which were presented before the Jigsaw II and NHT learning (pre-test) and after learning (post-test) were applied. The minimum completeness criteria for cognitive learning outcomes is 75. **Table 6** is a summary of students' cognitive learning outcomes data before treatment obtained by giving pre-tests to students using the Jigsaw II learning model and the NHT learning model.

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Table 6. Comparison of cognitive learning outcomes before the Jigsaw II and NHT learning models were applied

Class	Number of Students	Mean	Criteria	Minimum Value	Maximum Value	Standard Deviation	Completeness (%)
Jigsaw II	27	79.67	Good	60	93	10.134	66.66
NHT	27	76.48	Good	30	93	14.110	62.96

According to **Table 6**, it can be found that the mean pre-test value for the Jigsaw II class is 79.67 with a standard deviation of 10.134 and completeness reaches 66.66%, while the mean pre-test value for the NHT class is 76.48 with a standard deviation of 14.110 and completeness reaches 62.96. %. From the summary of the data on the pre-test scores for cognitive learning outcomes, it was found that the completeness in the Jigsaw II class was higher than the NHT class although the difference in mastery was only 3.7%. The minimum value in the Jigsaw II class is also higher than the minimum value in the NHT class. Meanwhile, the maximum value between Jigsaw II and NHT classes is the same.

After the Jigsaw II and NHT learning models were carried out, a post-test was conducted. **Table 7** is a summary of the data on students' cognitive learning outcomes after the treatment was obtained through the steps of presenting the post-test to students in both Jigsaw II and NHT classes.

Table 7. Comparison of cognitive learning outcomes after the application of the Jigsaw II and NHT learning models

Class	Number of Students	Mean	Criteria	Minimum Value	Maximum Value	Standard Deviation	Completeness (%)
Jigsaw II	27	86.96	Very good	73	100	6.117	92.59
NHT	27	88.59	Very good	73	97	6.222	96.29

According to **Table 7**, it can be found that the mean post-test for Jigsaw II class is 86.96 with a standard deviation of 6.117 and completeness reaches 92.59%, while NHT class is 88.59 with a standard deviation of 6.222 and completeness reaches 96.29%. From the post-test data on students' cognitive learning outcomes, it is known that there is an increase in cognitive learning outcomes both in the Jigsaw II class and also in the NHT class. In the Jigsaw II class there was an increase in completeness of 25.92% and in the NHT class there

was an increase in completeness of 33.33%. The minimum value for both classes is the same while the maximum value in the Jigsaw II class is higher than the NHT class.

Affective Learning Outcomes

Affective learning o*utcomes* data were obtained through affective learning o*utcomes* tests which were presented before the Jigsaw II and NHT learning models (pre-test) and after the learning (post-test) was applied. **Table 8** is a summary of the data on students' initial affective learning outcomes before the treatment was given, obtained through the way of presenting a pre-test to students using the Jigsaw II learning model or NHT learning model.

Table 8. Comparison of affective learning outcomes before applying the Jigsaw II and NHT learning models

Class	Number of Students	Mean	Criteria	Minimum Value	Maximum Value	Standard Deviation	Completeness (%)
Jigsaw II	27	85.44	Good	73	98	5.056	96.29
NHT	27	86.00	Good	79	96	3.793	100

According to **Table 8**, it can be found that the mean pre-test value for the Jigsaw II class is 85.44 with a standard deviation of 5.056 and completeness reaches 96.29%, while the mean pre-test value for the NHT class is 86.00 with a standard deviation of 3.793 and completeness reaches 100%. While Table 9 is a summary table of students' cognitive learning outcomes after the treatment was given, obtained by presenting post-tests to students in both Jigsaw II and NHT classes.

Psychomotor Learning Outcomes

While **Table 9** is a summary table of the data on student psycho-motor learning outcomes after the treatment was given, obtained through the way of presenting the post-test to students in both Jigsaw II and NHT classes.

Table 9. Comparison of psychomotor learning outcomes after the application of the Jigsaw II and NHT learning models

Class	Number of Students	Mean	Criteria	Minimum Value	Maximum Value	Standard Deviation	Completeness (%)
Jigsaw II	27	84.52	Good	62	99	10.327	85.18

NHT	27	84.37	Good	57	98	11.959	81.48

According to **Table 9**, it can be found that the mean post-test value for the Jigsaw II class is 84.52 with a standard deviation of 10.327 and completeness reaches 85.18%. In addition, the mean post-test value for the NHT class is 84.37 with a standard deviation of 11.959 and completeness reaches 81.48%. From the post-test data on student psychomotor learning outcomes, it is known that there is an increase in psychomotor learning outcomes both in the Jigsaw II class and also in the NHT class. In the Jigsaw and NHT classes there was an increase in completeness of 44.44%.

Discussion

Student Learning Motivation Hypothesis Test

Based on the results of the analysis through the One-Way Anova test, it can be seen that the significance value is 0.851 > 0.05 (sig > α), therefore Hi is not accepted and Ho is accepted. This shows that there is no difference in learning motivation between students who use the Jigsaw II learning model and the NHT learning model at SMA Negeri 1 Tumpang.

Hypothesis Testing Student Cognitive Learning Outcomes

Based on the outcomes of hypothesis testing through analysis of covariance (Anacova) it can be seen that the significance value is 0.677 > 0.05 (sig > α) or based on F count < F table (F 1.105(0.05)) = 0.175 < 3.94, then Hi is not accepted and Ho is accepted . This shows that there is no difference in cognitive learning outcomes between students who use the Jigsaw II learning method or NHT learning at SMA Negeri 1 Tumpang.

There is no difference in the increase in cognitive learning outcomes between students who use Jigsaw II learning model and the NHT learning model due to several factors, including the quality of the cognitive learning outcomes test instrument used for this analysis is still not good. Based on the results of the difficulty level test and the differentiating power of the number of questions using the post-test scores of the Jigsaw II and NHT class students, most of the questions belong to the easy category and have poor discriminating power. While the questions that have a moderate level of difficulty and have a fairly good difference power are only 2 questions. The results of the test of the level of difficulty and discriminating power of the items indicate that the cognitive learning outcomes test used has not been able to stimulate students to increase their efforts to solve them and distinguish between students who are above average and below average. According to Arikunto (2008), questions in the easy

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category do not stimulate the brain to try to think more then questions that tend to be difficult will result in students not being appetizing and students giving up hope and not working on the questions. Appropriate questions are questions that smart students can solve. The quality of the cognitive learning outcomes test is not good because before the test was used in this study it was not tested first.

In addition to the above factors, while working on the cognitive learning outcomes test, students did not seriously read each statement item and there were some students who only saw their friends' answers and thought that the test scores were not included in the assessment used by the Biology subject teacher who taught the two classes.

In addition, the Jigsaw learning model can also increase students' responsibility for themselves and the group. In Jigsaw, students also teach their group mates who do not understand the lesson being taught. All abilities possessed by students in learning can be optimized because all presentations actively involve students, both mentally and physically (Susilo, 2005 in Sulistiani 2008).

Hypothesis Testing Student Affective Learning Outcomes

Based on the test results through analysis of covariance (Anacova) it can be seen that the significance value is 0.879 > 0.05 (sig > α) or based on F count < F table (F 1.105(0.05)) = 0.023 < 3.94 then Hi is not accepted and Ho is accepted. This shows that there are similarities in affective learning outcomes between students who use the Jigsaw II learning model and NHT learning model at SMA Negeri 1 Tumpang, Indonesia.

There is no difference in the increase in affective learning outcomes in students with the Jigsaw and NHT learning models. caused by several factors, among others, during the affective learning outcomes test, students did not seriously read each statement item and there were some students who only saw the answers of their friends and students considered that the test scores for affective learning outcomes were not included in the report card scores so they were not serious in working (Afshan Naz Quazi, 2021).

Winkel (2004) states that people who have certain attitudes are more likely to agree or not to a goal according to the consideration of that goal as useful or valuable for him or vice versa. Students who see that learning is something that is beneficial to them will have a positive attitude. On the other hand, students who view it all as something useless will have a negative attitude. Positive or negative attitudes are able to generate spontaneous judgments through feelings and play a role as affective aspects in attitude learning. This judgment

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without much reflection can be strengthened by finding a variety of rational reasons that support judgment through feelings. The results of this reflection become a cognitive aspect in managing attitudes and forming attitudes that are increasingly embedded in students' minds.

In addition to these factors, the insignificant difference in affective learning outcomes between students in Jigsaw II and NHT classes is because this learning model both involves students actively in cultivating knowledge, attitudes, and skills in an open and democratic atmosphere, teaching students to believe in their own abilities and train students to develop social skills and social sensitivity (Ertin, Bunga and Galis, 2021).

Hypothesis Testing of Student Psychomotor Learning Outcomes

Based on the results of hypothesis testing using covariance analysis (Anacova) it can be seen that the significance value is 0.747 > 0.05 (sig > α) or based on F count < F table (F 1.105(0.05)) = 0.104 < 3.94 then Hi is not accepted and Ho received. This shows that there is no difference in psychomotor learning outcomes for students who use the Jigsaw II learning model and the NHT learning model at SMA Negeri 1 Tumpang, Indonesia.

The absence of this difference can be due to many factors, including first while working on the psychomotor learning outcome test, students do not seriously read each statement item and there are some students who only see their friends' answers. Second, students assume that these psychomotor scores are not included in the report cards so that they are not serious in doing their work. Third, while answering the test, students' psychomotor learning outcomes do not return questions to themselves and finally when answering the test students tend to use logic so that it does not match their actual situation.

In addition, the difference in psychomotor learning outcomes is not significant between students in class Jigsaw II and NHT because the Jigsaw II learning model and the NHT learning model are two ways of learning that are both included in cooperative learning (’Aiin, Kusmayadi and Usodo, 2017; Pakhrurrozi, Sujadi and Pramudya, 2017). Based on the analysis by means of a meta-analysis conducted by Johnson and Johnson (1984) in Nurhadi, et al. (2004) show that there are various advantages of cooperative learning, including developing genuine joy, enabling students to learn from each other's attitudes, information skills, social behavior, and views, increasing mutual trust in fellow human beings, increasing intrinsic learning motivation, and improving attitudes positive towards learning and learning experiences.

CONCLUSION

Based on the results and discussion, it can be concluded that there is no difference between the students' motivation to learn biology taught through the Jisgsaw II and NHT learning models at SMA Negeri 1 Tumpang. In addition, there is no difference between cognitive learning outcomes, affective learning outcomes, and psychomotor learning outcomes for Biology students who are taught through the Jisgsaw II and NHT learning models at SMA Negeri 1 Tumpang, Indonesia. Thus, the Jigsaw II learning model and the NHT learning model do not have variations and have good similarities for students' self-development potential.

REFERENCES

Aiin, Q., Kusmayadi, T.A. & Usodo, B. (2017). The Efectiviness of Numbered Heads Together With Guide Discovery and Jingsaw II With Guide Discovery Learning Viewed From Adversity Quotient. *Education and Language International Conference Proceedings Center for International Language Development of Unissula*, 655–664.

Afshan, N. Q. (2021). NHT: a Potential Intervention to Improve Students' Cognition and Performance in Bio-Sciences. *i-manager's Journal on Educational Psychology,* 14(3), 41. doi:10.26634/jpsy.14.3.17644.

Alfiani, A. (2017). Penerapan Model Pembelajaran NHT-TGT untuk Meningkatkan Motivasi dan Pemahaman Materi Matematika SMA. *Jurnal Riset Pendidikan Matematika,* 4(1). https://doi.org/10.21831/jrpm.v4i1.13100

Arikunto, S. (2008). *Manajemen Pengajaran Secara Manusiawi*. Jakarta: Rineka Cipta.

Dimyati, D., & Mudjiono, M. (2013). *Belajar dan Pembelajaran*. Jakarta: Rineka Cipta.

Ertin, L.K.N., Bunga, Y.N. & Galis, R. (2021). Pengaruh Model Pembelajaran Kooperatif Tipe Numbered Head Together (NHT) dan Jigsaw Terhadap Keaktifan dan Hasil Belajar Kognitif Siswa pada Materi Keanekaragaman Hayati Kelas X SMAN 2 Maumere. *Spizaetus: Jurnal Biologi dan Pendidikan Biologi,* 2(3), 9. doi:10.55241/spibio.v2i3.38.

Fathurrohman, M. (2015). *Model-model Pembelajaran*. Yogyakarta: Ar-Ruzz.

Hertiavi, M., Langlang, H., & Khanafiyah, S. (2010). Penerapan Model Pembelajaran Kooperatif Tipe Jigsaw untuk Meningkatkan Kemampuan Pemecahan Masalah Siswa SMP. *Jurnal Pendidikan Fisika Indonesia,* 6(1). https://doi.org/10.15294/jpfi.v6i1.1104

Imron, A. (2020). The Effect of Cooperative Learning Approach Application Toward Students' Learning Outcome. 374–382. doi:10.2991/assehr.k.200218.059.

Kurnia, K., Supriyono, S. & Pangestika, R.R. (2021). Improvement Student Learning Achievement Using The Integration of The NHT Model With Jigsaw on Geometry Topic. *MUDARRISA: Jurnal Kajian Pendidikan Islam,* 13(1), 91–107. doi:10.18326/mdr.v13i1.91-107.

Lagur, D., Makur, A., & Ramda, A. (2018). Pengaruh Model Pembelajaran Kooperatif Tipe Numbered Head Together Terhadap Kemampuan Komunikasi Matematis. *Mosharafa: Jurnal Pendidikan Matematika,* 7(3). https://doi.org/10.31980/mosharafa.v7i3.160

Pakhrurrozi, I., Sujadi, I. & Pramudya, I. (2017). Effectiveness of Jigsaw-Flash Learning Model in Geometry Material. *International Journal of Science and Applied Science: Conference Series,* 2(1), 190. doi:10.20961/ijsascs.v2i1.16708.

Sanaie, N. et al. (2019). Comparing The Effect of Lecture and Jigsaw Teaching Strategies on The Nursing Students' Self-Regulated Learning and Academic Motivation: A Quasi-Experimental Study. *Nurse Education Today,* 79, 35–40. doi:10.1016/j.nedt.2019.05.022.

Santyasa, I. (2007). *Model-model Pembelajaran Inovatif*. Denpasar: Universitas Pendidikan Ganesha.

Saputra, M.D. et al. (2019). Developing Critical-Thinking Skills Through The Collaboration of Jigsaw Model With Problem-Based Learning Model. *International Journal of Instruction,* 12(1), 1077–1094. doi:10.29333/iji.2019.12169a.

Subiyantari, A.R., Muslim, S. & Rahmadyanti, E. (2019). Effectiveness of Jigsaw Cooperative Learning Models In Lessons of the Basics of Building Construction on Students Learning 'Outcomes Viewed From Critical Thinking Skills. *International Journal for Educational and Vocational Studies,* 1(7), 691–696. doi:10.29103/ijevs.v1i7.1653.

Sugiyono, S. (2008). *Metode Penelitian Kualitatif, Kuantitatif, dan R&D*. Bandung: Alfabeta.

Uno, H. (2013). *Teori Motivasi dan Pengukurannya*. Jakarta: Bumi Aksara.

Uwakwe, R.C., N, C.A. & Ogunji, C. V. (2018). Effect of Jigsaw and Number Heads Together on Students. *East African Researcher,* 7(1), 67–78.

Wdarta, G. (2020). Penerapan Model Pembelajaran Kooperatif Tipe Jigsaw untuk Meningkatkan Motivasi dan Hasil Belajar. *International Journal of Educational Development,* 1(2). https://doi.org/10.5281/zenodo.4003775

Wibawa, I., & Suarjana, I. (2019). Pengaruh Model Pembelajaran Jigsaw dan Motivasi Belajar Terhadap Hasil Belajar Pendidikan Kewarganegaraan. *Jurnal Ilmiah Sekolah Dasar,* 3(2). https://dx.doi.org/10.23887/jisd.v3i1.17665

Winkle, W. (2004). *Psikologi Pendidikan dan Evaluasi Belajar*. Jakarta: PT Gramedia Pustaka Utama.