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The Effect Of The Jigsaw Type Cooperative Learning Model on Student Learning Outcomes in Review of Student Learning Motivation in Grade IX

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Abstract

The purpose of this study is to determine how the influence of the Jigsaw Type Cooperative Learning Model on Student Learning Outcomes is reviewed from the learning motivation of class IX students at UPTD SMP N 2 Pematangsiantar. The type of research used is Pre-Experiment Design on class IX-2 as the subject in the study and the author uses a quantitative approach. The design used by the researcher is One-Shot Case Study. Based on the results of data analysis and discussion, it can be concluded that there is a positive and significant influence in the use of the Jigsaw Type Cooperative Learning Model on the Learning Outcomes of class IX students at UPTD SMP N 2 Pematangsiantar in the 2025/2026 Academic Year. The positive influence is shown through the regression equation where Y = 43.050 + 1.168 where the value of b = 1.168. The influence is shown through the T-test with Thitung > Ttabel (1.866 > 1.701) or (sig.) < 0.05 (0.000 < 0.05) then Ho is rejected and Ha is accepted which means there is a positive and significant influence of the Jigsaw Type Cooperative Learning Model on Student Learning Outcomes on the material of Quadratic Equations and Functions. The contribution of variable X (Jigsaw Type Cooperative Learning Model) to variable Y (Student Learning Outcomes) is 73.9%.

Keywords : Learning Model, Jigsaw Type Cooperative, Problem Solving Ability, Learning Outcomes, Learning Motivation, Quadratic Equations and Functions

INTRODUCTION

In general, education is a conscious and planned effort to facilitate the learning and teaching process so that students can actively develop their potential. According to the Big Indonesian Dictionary (KBBI), education is a process of changing attitudes or groups of people in an effort to mature humans through teaching and training efforts. Meanwhile, according to Constitution No. 20 of 2003, education is a conscious effort to create a learning atmosphere and learning process so that students can actively develop their potential to

have spiritual strength, religiousness, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation and state. With this, the government requires a curriculum as a foundation for improving education. The curriculum is a plan of content, objectives, and learning materials used as a guideline for organizing learning activities, especially in mathematics learning (Kenedi, Eliyasni, & Fransyaigu, 2019).

Mathematics is a science that can equip students to have the ability to reason, think logically, critically, systematically, carefully, and be objective and open in facing problems. According to James and James (Astalini et al., 2021) stated that mathematics is the science of logic regarding the shape, composition, quantity, and concepts that are related to each other in large numbers which are divided into three fields, namely algebra, analysis, and geometry. The fact that makes mathematics a discipline is because mathematics is taught at all levels of education starting from elementary school, middle school, high school, and college. Mathematics can also be used as a science in all aspects of life because mathematics provides high skills.

According to Cornelius in Abdulrahman (Sulfemi & Kamalia, 2020) the reasons why it is necessary to study mathematics include; (1) clear means of thinking and logical, (2) a means to solve problems in everyday life, (3) a means to recognize patterns of relationships of generalization of experience, (4) a means to develop creativity, and (5) a means to increase awareness of cultural development. Solving a problem in the form of sentences, tables, graphs, and story problems is the task of mathematics. The National Council of Teachers of Mathematics (NCTM) in 2000 determined five objectives of learning mathematics, namely: (1) learning to communicate, (2) learning to reason, (3) learning to solve problems, (4) learning to connect ideas, (5) and creating a positive attitude. Of the five objectives of learning mathematics above, namely: (1) learning to communicate, (2) learning to reason, (3) learning to solve problems, (4) learning to connect ideas, (5) and creating a positive attitude , the focus in this article is the learning outcomes reviewed from the perspective of students' motivation to learn mathematics.

According to Susanto (Shakerian, Khoshgoftar, Rezayof, & Amadi, 2020) that learning outcomes are the abilities obtained by students during learning activities. The abilities obtained relate to knowledge, understanding, and work that can be done by students, in general, learning outcomes are statements that describe the knowledge, attitudes, and skills that students have after taking certain lessons. Because the success or failure of learning outcomes from a lesson can be measured from the results of the value or score obtained by students in completing questions given by the teacher. From the learning outcomes that have been explained above, there are several indicators in learning outcomes (Sudjana) that can be seen from three domains (Cognitive, affective, and psychomotor), including: (1) knowledge, (2) attitudes, and (3) skills. With the existence of learning outcome indicators, we can know the extent of a student's abilities (D. S. Putra, 2014).

For students to achieve optimal learning outcomes, motivation is necessary. According to Hull (Dharmadewi & Suwarmayanti, 2020) motivation is the drive to fulfill or satisfy needs in order to stay alive. This drive drives a person's attention, feelings, and behavior. Good motivation in learning will show good results. In other words, with diligent effort, especially based on... Motivation. Students who are engaged in learning will pay attention to the lesson, read the material to understand it, and use supportive learning strategies. Furthermore, they will demonstrate intense engagement in the learning activity, exhibit a strong sense of curiosity, seek out relevant materials to understand a topic, and complete assigned tasks.

The results and evaluation of PISA (Fatirani, 2022) indicate that there has been no significant improvement in quality from 2000 to 2022, as indicated by the scores obtained throughout 2000-2022. As many as 18% of students are proficient in mathematics, and information is unavailable for the other 82%. This necessitates identification of the factors influencing student learning outcomes in schools. From there, steps will be formulated to improve students' mathematics learning outcomes by teachers at schools.

Apart from that, the researcher conducted observations while conducting PPL activities at the UPTD of SMP Negeri 2 Pematangsiantar, which showed that students' mathematics learning outcomes were still relatively low and there was a lack of student motivation in participating in learning (Sumardin, 2021). Apart from that , That, Many students still don't focus when the teacher explains the lesson. Similarly, students lack the courage to provide opportunities to deliver material if they still don't understand it. The following are student achievement results obtained when the teacher gave several questions related to Quadratic Equations and Functions at the UPTD SMP Negeri 2 Pematangsiantar.

From the results of the students' scores or grades above, we can see that many students still get unsatisfactory results according to the learning outcome indicators, namely:

1. Knowledge , where students seek information on a problem.
2. Attitude , student response before solving a problem .
3. Skills , where students show how to solve a problem.

The scores obtained from the 30 students they got, approximately 17% of the 30 students were able to meet the indicators and 83% of the 30 students did not meet the indicators. The low achievement of mathematics learning outcomes is caused by several factors, one of which causes students' unsatisfactory mathematics learning outcomes is the lack of motivation to learn mathematics. This also occurs in learning by teachers who have not been able to activate students' enthusiasm for learning so that students are reluctant to ask the teacher if they do not understand the material (Harefa et al., 2022)

Based on the results I learned during my internship at the UPTD of SMP Negeri 2 Pematangsiantar, the teaching methods used so far have been conventional, which has led to a lack of motivation in learning mathematics, making it difficult for students to achieve

results in solving the problems given. Without motivation to learn, students will not achieve high levels of achievement in achieving their goals.

In order for students' learning motivation to achieve students' mathematics learning outcomes in solving problems according to the learning outcome indicators above, students need a learning model to support students' learning motivation so that students' mathematics learning outcomes are easily achieved. A learning model is a plan or a pattern used as a guideline in planning learning, one of which is by using a *Cooperative learning model* that emphasizes teamwork. Asyirint (2010) said that "Cooperative Learning is *a good* learning model used for mathematics learning". *Cooperative Learning* emphasizes teamwork as a form of motivation and enthusiasm for learning the goal of achieving students' mathematics learning outcomes together in solve the questions given by the teacher. Therefore, one way to solve the above problem, which is a path to the above factors, is to use the *Jigsaw Type Cooperative Learning Model* (Wanti, Wati, Kamal, & Afrinaldi, 2023).

Jigsaw learning model is a cooperative learning model in which students learn in small groups consisting of 4-6 people homogeneously. Students are required to work together in a positive interdependence and be responsible independently. (Rusdyi & Isman M. Nur, 2021)stated several steps in the *jigsaw cooperative learning model* , including: (1) conveying objectives and motivating students, (2) presenting information, (3) organizing students into study groups, (4) guiding study and work groups, (5) evaluating, and (6) giving awards. According to Lie (2008), the *jigsaw learning model* is a cooperative learning system that provides opportunities for students to work together with other students in structured tasks. In this *jigsaw learning model* , it is also necessary to take a teacher approach to students so that students do not easily experience boredom. Therefore, each student must be responsible for understanding a learning material and combining understanding with other groups to form a complex understanding.

In learning, students' learning perceptions are crucial to the learning process . Student perceptions are students' perspectives or understanding of the material or information they receive during the learning process. Student perceptions also demonstrate how students understand and respond to the learning material that has been transferred through the learning process. A good and correct perception or understanding of the material enables students to understand the lesson and builds their learning motivation, thus making it easier to achieve mathematics learning outcomes (Alkaromi, 2022).

This is in accordance with the results of research conducted by Yudi Hanggara that there is an influence of the *Jigsaw Type Cooperative Learning Model* on students' mathematics learning outcomes as viewed from the learning motivation of students at SMP Negeri 50 in class VII in the 2015/2016 academic year, and the results of his research also proves that the results of learning mathematics using the *jigsaw cooperative learning model* are much better than using the conventional learning model (Lubis, 2021).

The low mathematics learning outcomes reviewed from the perspective of students' learning motivation as reviewed by previous researchers, the researcher is interested in conducting further research using the title " The Effect of ***the Jigsaw Type Cooperative*** **Learning Model on Students' Mathematics Learning Outcomes Reviewed from the Learning Motivation of Class IX Students at UPTD SMP Negeri 2 Pematangsiantar** "

RESEARCH METHODS

The approach in this research is a quantitative approach. According to Sugiyono (MIKRAYANTI, 2020) quantitative research methods can be interpreted as research methods based on the philosophy of positivism, used to research specific populations or samples, data collection using research instruments, quantitative/statistical data analysis, with the aim of testing predetermined hypotheses. Quantitative research has three characteristics in the field: research from beginning to end is consistent, so there will be similarities in the title of the research report. Developing problems that have been previously discovered. And problems will be different when in the field because they have been confirmed by the reality found (Nurwulandari and Darwin, 2020).

This research will be conducted using a one *-shot case study design* , with one experimental class as the subject. In the experimental group, a treatment will be applied, including the implementation of a *jigsaw cooperative learning model* , which is considered successful. Following the treatment, a post-test evaluation will be conducted, and conclusions will be drawn from the results (I. B. P. A. Putra, Pujani, & Juniartina, 2018).

This research was conducted at UPTD SMP Negeri 2 Pematangsiantar. The research will be conducted in the Odd Semester of the 2025/2026 Academic Year. The reason this research was conducted at UPTD SMP Negeri 2 Pematangsiantar, because there has not been any previous research conducted at the school using the title **" The Effect of** *the Jigsaw* Type Cooperative Learning Model on Students' Mathematics Learning Outcomes Reviewed from the Learning Motivation of Class IX Students of UPTD SMP Negeri 2 Pematangsiantar on the Material of Quadratic Equations and Functions **"** . This research will last for approximately 1 month.

Population is the entirety of the research subjects. According to Sugiyono (Hamna & BK, 2022) population is a generalization area consisting of objects/subjects that have certain qualities and characteristics that are applied by researchers to be studied and then conclusions are drawn. The population of this study was all ninth-grade students of UPTD SMP Negeri 2 Pematangsiantar in the 2025/2026 academic year, consisting of 12 classes with a total of 1,000 students. The following table 3.1 presents the distribution of the number of students.

A sample is a part of the population studied in a study and the results will be considered to be a description of the original population, but not the population itself. According to Sugiyono (in R Simamora, 2023) a sample is part of the number and

characteristics possessed by a population. The sample used in this study was 30 students of class IX-2 at the UPTD of SMP Negeri 2 Pematangsiantar in the 2025/2026 academic year. From all students of class VII of UPTD SMP Negeri 2 Pematangsiantar, one class was selected as a sample. The selection of this research sample was based on an understanding between the mathematics teacher and the researcher, taking into account student learning outcomes for one semester and also adjusting the research period (Herawati & Irwandi, 2019).

According to Sugiyono (Nirwana, 2020) data analysis is the process of studying and synthesizing data obtained from interviews, field notes, and documents, organizing data into categories, and breaking data into units, synthesizing them, arranging them into patterns, selecting what is important and what needs to be studied, and drawing conclusions in a way that can be understood by oneself and others.

Data analysis techniques aim to answer all problem formulations or test hypotheses that have been formed in the proposal (Sumarni & Wardani, 2019).

RESULTS AND DISCUSSION

Description and Research Results

Data Description

The research was conducted at UPTD SMP N 2 Pematangsiantar, Pematangsiantar City, North Sumatra Province. This research was conducted on October 3, 2025 to October 14, 2025 in the 2025/2026 academic year. The purpose of this study was to see the Effect of the *Jigsaw Type Cooperative Learning Model* on Students' Mathematics Learning Outcomes Reviewed from Student Learning Motivation on the material of Quadratic Equations and Functions by using one sample, namely Class IX-2 consisting of 30 students (Yudha, Evayenny, & Herzamzam, 2021).

When conducting the research, learning was carried out in 4 meetings, where in the first and second meetings the treatment was carried out, in the third meeting the questionnaire was carried out and in the fourth meeting the students' mathematical reasoning ability test was carried out. Before conducting the research, the researcher first conducted a validation test of the research instrument, this validation was carried out to obtain an instrument that met valid criteria. The instruments tested were a test of students' mathematical reasoning ability and a questionnaire to lecturers and mathematics teachers as validators, namely Mr. Dr. Gayus Simarmata, M.Pd as a Mathematics Lecturer at HKBP Nomensen University Pematangsiantar and Mrs. Ginariwaty Situmorang, S.Pd as a Mathematics teacher at UPTD SMP Negeri 2 Pematangsiantar. The following are the results of the validator of the students' mathematical reasoning ability test and the questionnaire.

Research Description

The purpose of this study was to determine whether there is an influence of the Jigsaw Type Cooperative Learning Model on students' mathematics learning outcomes as viewed from students' learning motivation on the material of Quadratic Equations and Functions of Grade IX at UPTD SMP Negeri 2 Pematangsiantar in the 2025/2026 academic year. The data in this study are data on students' mathematics learning outcomes as viewed from students' learning motivation.

The Mathematics material taught in this study is Quadratic Equations and Functions, then class IX-5 was used as a sample to be treated using the Jigsaw Type Cooperative learning model on the Quadratic Equation and Function material. After being given the treatment and the Jigsaw Type Cooperative Learning Model, a questionnaire was given to implement the strategy that would be filled in by the students. In this study, researchers obtained data from the results of the Reasoning ability test and the results of the questionnaire conducted in Class IX-3. The test given was in the form of questions after implementing the Jigsaw Type Cooperative learning model while the questionnaire was given to see whether the students implemented the Jigsaw Type Cooperative learning model well. The results of this test and questionnaire were used to determine whether the Jigsaw Type Cooperative learning model had an effect on learning outcomes reviewed from students' learning motivation on the Quadratic Equation and Function material. The instruments used in this study were learning outcomes consisting of 5 multiple-choice questions and a strategy implementation questionnaire for students consisting of 20 statements (Dasor, 2019). The researcher conducted a trial on students by giving them 5 multiple-choice questions and a questionnaire on the implementation of the Jigsaw Cooperative Learning Model, which would be used to collect data and samples. After the trial was conducted, the next step was to collect data on student learning outcomes using the questions tested and the questionnaire scores on the implementation of the Jigsaw Cooperative Learning Model.

Hypothesis Testing

Simple Linear Regression Test

The strength of the relationship between the independent variable (X) and the dependent variable (Y) and the direction of the relationship between the independent variable (X) and the dependent variable (Y) is measured using a simple linear regression test.

Table 1. Simple Linear Regression Test Using SPSS

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	43,050	5,740		7,499	,000
	Test	1,438	1,348	,198	1, 8 66	,295

a. Dependent Variable: Questionnaire

EXCEL

	Coefficients	*Standard Error*	*t Stat*
Intercept	43.05	5.740486436	7,499364
X Variable 1	1.4375	1.348062018	1, 8 66346

Based on the table above, *the constant obtained* is 4 3 , 050 while the regression coefficient value is 1 , 438. The simple regression equation can be written as follows:

Y = 4 3 , 050 + 1 , 438X

Information:

Y = Student learning outcomes

X = Score of implementation of the Jigsaw Type Cooperative Learning Model

So, it can be translated:

1. The constant 4 3 , 050 means that if students do not implement the Jigsaw Type Cooperative Learning Model (Variable X = 0) then the learning outcome value (Y) is 4 3 , 050.
2. The regression coefficient value of 1.438 means that for every additional 1 score for implementing the Jigsaw Type Cooperative Learning Model, student learning outcomes will increase by 1.438 .
3. The value of b > 0, then there is a positive influence of variable (X) on variable (Y)

From the explanation above, it can be concluded that the Jigsaw Type Cooperative Model has a positive influence on student learning outcomes.

Regression Significance Test (t-Test)

The regression coefficient was tested using the t-test, this test was carried out to determine the significance of the influence of the independent variable (X) on the dependent variable (Y) with the assumption that other variables are constant. Based on table 4.17, the significance value for the influence of variable X on variable Y was 0.000 <0.05. Given n = 30, then *df* = n – k = 30 – 2 = 28 with *df* 28, then obtained t_{tabel}= 1.701. So that the value of 1.866> 1.701 was obtained. Based on the significance value and the value t_{hitung}, there is a positive and significant influence on the jigsaw type cooperative learning model on student learning outcomes (Rachmasagita & Pahlevi, 2019).

Coefficient of Determination

The coefficient of determination is a coefficient that states the percentage of the influence of variable X on variable Y. Based on table 4.18, the correlation value/level of relationship between variables (R) is 0.739, while the coefficient of determination (R square) is 0.739, so the percentage of the coefficient of determination is written as follows:

KP = 0.739 x 100%

KP = 73.9%

So the coefficient of determination shows that the positive and significant influence of the *Jigsaw Type Cooperative Learning Model* on student learning outcomes is 73.9%.

Discussion

The discussion in this study was carried out at the UPTD of SMP Negeri 3 Pematangsiantar involving class IX-2 as the class that will be given the treatment of the jigsaw type cooperative learning model and class IX-5 students as the trial class for the student perception questionnaire instrument and the student learning outcome test. After the trial of the test and questionnaire instrument conducted in class IX-5, then the validity, reliability, difficulty level, and question discrimination tests were conducted. Based on the trial of the student perception questionnaire and test questions that had been conducted with the number of trial students N = 32 and a significance level of 5%, t $_{table}$ = 0.355 was obtained. The strategy from the results of the validation test calculation on the student perception questionnaire and the learning outcome test, 20 student perception questionnaires were given and 5 test questions had a value $r_{hitung} > r_{tabel}$so that it could be concluded that the 20 student perception questionnaires on the model and 5 test questions were declared valid (Sumini, Fuadi, & Fauziati, 2022).

After the trial results were completed, the researcher then provided treatment using the jigsaw type cooperative learning model to the class that became the sample class in this study, namely class IX-2 with the number of students N = 30 and a significance level of 0.05 (5%) and obtained a t $_{table}$ of 0.361. After that, data collection was carried out using a reliability test for decision-making criteria in the *Cronbach's Alpha technique* where the value $r_{hitung} > r_{tabel}$, then the questionnaire instrument and test questions are said to be reliable. From the results of the reliability test that has been carried out, *the Cronbach's Alpha value* for the questionnaire instrument was 0.913. Because 0.913> 0.361, it can be concluded that this questionnaire instrument is reliable. While the results of the reliability test of the question instrument obtained a *Cronbach's Alpha value* of . Because 0.812> 0.361, it can be concluded that this test question instrument is reliable (Asnawi, M. Ikhsan, & Hajidin, 2020). Furthermore, in the calculation of the difficulty level test, it shows that questions number 1 to number 5 criteria have an easy level of difficulty. Then, the discriminating power shows that 3 questions have good discriminating power and 2 questions have sufficient discriminating power.

There are normality tests and linearity tests as prerequisites for conducting a hypothesis test. The normality test in this study uses the *Kolmogorov Smirnov model* using the SPSS 24 program with the criteria of a sig. value > 0.05 of 0.220 > 0.05, so the questionnaire data on the jigsaw type cooperative learning model is normally distributed. While the significant results of the test questions are 0.070 > 0.05, so the test question data is normally distributed.

After conducting the normality test, the researcher then conducted a linearity test. In this linearity test using SPSS 24, the significant result obtained in *the Deviation From Linearity row* was 0.783 > 0.05, meaning there is a linear relationship between the independent variable (X) and the dependent variable (Y). Therefore, it can be concluded that there is a linear relationship between the Jigsaw Type Cooperative Learning Model and Student Learning Outcomes (Fajuri, 2019).

Furthermore, the researcher conducted a hypothesis test consisting of a simple linear regression test, a regression significance test (t-test), and a coefficient of determination. Based on the simple linear regression test, the regression equation Y = 40.050 + 1.438X was obtained, meaning that for every 1 additional score of the student's Perception questionnaire on the jigsaw type cooperative learning model, the student's learning outcomes increased by 1.438 and the b value > 0, so there is a positive influence of variable (X) on variable (Y).

Furthermore, with the t-test, the magnitude of the influence of the Problem Based Learning learning model on students' reasoning abilities can be seen from the value t_{hitung}= 1.886 with a significant rate of 0.05 (FADHILAH, 2018). It is known that n = 30 then df = n - k = 30 - 2 = 28. The provision value $t_{tabel}$is 1.701, when compared with t_{hitung}then $t_{hitung} > t_{tabel}$it is 1.886 > 1.701 so it can be concluded that H_o it is rejected and H_a accepted which means "There is a positive and significant influence on the jigsaw type cooperative learning model on the learning outcomes of class IX students at UPTD SMP Negeri 2 Pematangsiantar in the 2025/2026 Academic Year" (Arfiany, 2021).

The last one is by conducting a determination coefficient test, namely the value of the correlation/level of relationship between variables (R) which is 0.697, while for the determination coefficient value (R square) of 0.739, so that the contribution of variable X to variable Y in the Quadratic Equation and Function material is 73.9%. With the conclusion $r_{hitung} > r_{tabel}$that H_o it is rejected and $H_a$which means there is a positive and significant influence between the Jigsaw Type Cooperative Learning Model on Student Learning Outcomes which is reviewed from the Learning Motivation of Class IX Students at UPTD SMP Negeri 2 Pematangsiantar

CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that there is a positive and significant influence between the Jigsaw Type Cooperative Learning Model on the Learning Outcomes of Grade IX Students at UPTD SMP Negeri 2 Pematangsiantar in

the 2025/2026 academic year. The positive influence is shown through the regression equation Y = 43.050 + 1.438X where the b value = 0.168. The influence is through the t-test, namely t_count>t_table, so H_o is rejected and H_a is accepted, which means there is a positive and significant influence between the Jigsaw Type Cooperative Learning Model on Student Learning Outcomes Reviewed from Learning Motivation on the Material of Quadratic Equations and Functions. The contribution of variable X to variable Y is 73.9%.

Suggestion

By understanding the impact of the Jigsaw Cooperative Learning Model on Student Learning Outcomes, teachers are expected to have learning strategies that best suit the expected student characteristics in order to create a more active, effective, and efficient learning process. Therefore, the selection of the Jigsaw Cooperative Learning Model can be used as an alternative in the learning process in the classroom.

By understanding how the Jigsaw Cooperative Learning Model influences student learning outcomes, it is hoped that students will expand their collection of problems, from the simplest to the most varied. Determine effective and efficient learning methods, and encourage students to actively participate in learning activities to ensure a smooth learning process.

For future researchers who wish to conduct the same research, it is recommended to develop this research by preparing other material presentations and optimizing time to improve student learning outcomes, especially in student learning motivation.

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