

Opportunities and Challenges of Implementing a Jigsaw Type Cooperative Learning Model on Two Variable Linear Equation System Material

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ABSTRACT

This study aims to describe the opportunities and challenges of implementing Jigsaw-type cooperative learning on the material of Two Variable Linear Equation Systems. The subjects of this study were all 27 grade VIII students of Yedam Abepura Junior High School. Data collection techniques use data triangulation, namely by observation techniques, student worksheet data and interviews. The results of this study showed that the opportunity to apply Jigsaw-type cooperative learning to the material of the two-variable linear equation system received a positive response from all students, enthusiastic and enthusiastic students in doing tests on worksheets based on observations. The implementation process went well and smoothly and was completed on time. For satisfaction, teachers and students are quite satisfied with the results obtained. The challenge in implementing this Jigsaw type cooperative learning model is that there are differences in students' basic academic abilities or in other words, students' basic abilities, especially Mathematics learning, vary so that when learning the Jigsaw model cooperative model, students who do not understand need to get extra explanations with additional long time compared to students who already have a good academic ability foundation finish faster and wait queue of friends who have not moved from another group during explaining the material. Then the odd number of students also causes difficulty dividing in groups evenly.

Keywords:

Opportunities and Challenges;
Implementing Jigsaw, Cooperative Learning Model.

INTRODUCTION

Mathematics is a compulsory subject that plays a crucial role in everyday life, making it an essential part of the education curriculum at all levels, particularly in Indonesia. Based on Nasution (2022), Mathematics is general knowledge that underlies the development of modern technology and various disciplines in advancing the thinking power of all and studying something logically, creatively, and systematically (Nasution et al., 2022). In the learning process at school, in fact, Mathematics is a subject that is less liked and feared by most students (Kamsurya et al., 2022). One of the reasons Mathematics is less liked and feared by students is that Mathematics is considered complicated and difficult to understand by students (Studi et al., 2020). One of the reasons Mathematics is less preferred is because it is complicated and difficult for students to understand (Kurnia et al., 2022). Therefore, students' understanding of Mathematics must be improved again (Sadewo & Purnasari, 2021).

In increasing the understanding of students, teachers have a very important role in the learning process. Teachers need to make a number of efforts, including by using learning models that are in accordance with student characteristics and that make students interested in learning and enthusiastic in receiving lessons (Nirtha et al., 2023; Taleb et al., 2018). Based on Permendiknas No. 22 of 2006, namely

regarding the objectives of learning Mathematics at the elementary / junior high school / MTs, SMA / MA, and SMK / MAK levels 1) Have the ability to understand mathematical concepts, explain the relationship between mathematical concepts and apply concepts or explain the relationship between mathematical concepts and apply concepts or algorithms efficiently, flexibly, accurately, and precisely in solving problems; 2) use reasoning patterns of nature from mathematics, perform manipulations, compile proofs or explain mathematical statements; 3) Solve mathematical problems related to the ability to solve problems, compile mathematical solving models, and provide appropriate solutions: 4) communicate ideas with diagrams, tables, symbols, or other media to clarify situations or problems; 5) Have an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention, and interest in learning mathematics as well as a tenacious and confident attitude in problem solving.

Thus, teachers need to realize learning objectives based on the regulation of the Minister of National Education No. 22 of 2006 and teachers must indeed be able to create a pleasant atmosphere so that students have interest and pleasure in learning, especially learning Mathematics (Lase, 2019; Nirtha & Sulasmono, 2020; Warsihna & Ramdani, 2020) Conversely, if the teacher is not able to create fun learning, then students will not be interested in learning mathematics and have an impact on the remaining abilities so that students will not develop their potential optimally in learning. Because good learning is the learning that can make the students having an interesting, motivation and spirit to get knowledge more and more (Herminayu & Sulasmono, 2020; Mawardi, 2018; Sulaeman, 2018; Zaini et al., 2020).

At present, there have been many development of learning models that can be applied by teachers in teaching mathematics, one of which is the cooperative learning model. According to Rahayu 2023, cooperative learning is a learning model in which students learn and cooperate cooperatively in small groups of four to six people with a heterogeneous group structure because this learning model emphasizes the ability of students to be responsible, respect, exchange ideas, and help each other in learning a material. Based on Nugroho 2019, cooperative learning has advantages including students with varied academic abilities can greatly benefit from cooperation between group members, so that students with low learning outcomes can improve their learning outcomes and students with high learning outcomes can share their knowledge (Nugroho & Wardani, 2019).

There are several types of cooperative learning that can be applied in the mathematics learning process, including Jigsaw type cooperative learning. The Jigsaw type can provide students to cooperate and be responsible in solving a problem (Napitupuluh et al., 2021) In addition, according to Putri (2024), the Jigsaw type can also increase the activeness of students in learning because they will be divided into heterogeneous small groups and then divided into origin groups and expert groups (Putri et al., 2024). Then they will alternately give and share knowledge. this type of learning which does not require expensive costs to apply and is easy to apply both for junior high school and high school levels or in other words it is very suitable for high school children and Jigsaw type as well as learning that is able to make students active (Thomas & Setiaji, 2014).

The Jigsaw type cooperative learning model is suitable to be applied to material that is not mutually prerequisite, one of which is the mathematical material of

the two-variable linear equation system (SPLDV). The material of the two-variable linear equation system is the material taught in class VIII.

Based on the initial observations of researchers at YPK Hedam junior high school, mathematics is a subject that is considered difficult for grade VIII students, and the learning that occurs is teacher-centered learning. Thus, mathematics learning on the material of the two-variable linear equation system is still low, even based on an initial interview with one of the teachers of grade VIII mathematics subjects of YPK Hedam private junior high school explained that students are less or even not active in learning, besides that they are less motivated in learning so that the absorption of mathematics learning is still low as a result when learning mathematics students mostly play and interfere with each other one with another when given a math problem. This has an impact on the ineffectiveness of learning, so that students are unable to solve problems in learning and are not active in asking questions or asking things that are poorly understood. Therefore, it is very necessary to conduct research on the implementation of Jigsaw-type learning model on two-variable linear equation system material so that students can be motivated and active in learning mathematics.

METHOD

This research method uses qualitative descriptive methods. Nurmalasari & Erdiantoro (2020), descriptive qualitative is a research method used to find knowledge in research at a certain period of time (Nurmalasari & Erdiantoro, 2020). With the data retrieval method is data triangulation. According to Liang & Dedi (2023) data triangulation and data collection are carried out from three different types of data (Liang & Irawan, 2023). Then these data are analyzed until the data is saturated. The subjects of this study were all 27 grade VIII students of Yedam Abepura Junior High School. However, at the time this model was applied, there were only 24 students present. Data collection techniques use data triangulation, namely by observation techniques, student worksheet data and interviews. Observation activities are carried out before and after the implementation of the learning model. Then the conservation data is collected. Then the second data in the form of student worksheet results is taken after the implementation of the Jigsaw type cooperative learning model is completed. Finally, interviews are conducted before and after the implementation of learning is carried out and the data from the interview are collected along with other data to be managed. So that data from observations, student worksheets and interview data are presented as clearly as possible.

RESULTS AND DISCUSSION

The results of this study are based on interviews with Mathematics subject teachers and three students. The results are as follows, the results of an interview with YPK junior high school mathematics teacher Hedam Abepura *"after using the Jigsaw-type cooperative learning model, I noticed a difference in the children's attitudes. Children become more enthusiastic and active in learning. Also, I saw that they wanted to find out answers about the material of two-variable linear equations that had been studied even though before they were a bit lazy when learning mathematics. In the future I will use this model and other models also in learning"*.

Table 1 Observation Results of Jigsaw Type Cooperative Learning Implementation

Group	Activeness	Collaborate	Understanding
1	Very active	Very good	Understand
2	Active	Good	Understand enough
3	Very active	Very good	Understand
4	Very active	Very good	Very understanding
5	Active	Very good	Understand
6	Very active	Very good	Understand enough

Based on the results of the observation table, there are six groups, each group contains 4 students. This is because there are 3 students unable to attend class. So that the number of students at the time of learning amounted to 24 students. The assessment category at the time of implementation of the Jigsaw type cooperative learning model consists of student activity, cooperation and understanding. When students have been divided into six groups and begin to sit in their respective original groups, teachers begin to assess using assessment rubrics. In the activeness category, there are four groups that are very active, namely groups 1, 3, 4 and 6. While 2 of them got active categories, namely groups 2 and 5. This is because there are 3 students who actively speak in their respective groups so that one child in groups 2 and 5 is not active or does not speak at all so that they get an active score. Then in the cooperation category, almost all groups, namely groups 1, 3, 4, 5, and 6 got a very good category in cooperation and one group got a good category in terms of cooperation. This is because students in group 2 do not move regularly as ordered by the teacher so that some move first to the expert group and some still stay in other groups so that cooperation gets a good score. In the comprehension category, students get a very understanding category, there is 1 group and only get an understanding category there are three groups and there are two groups get a sufficient understanding category. Whether or not students understand is assessed based on teacher crosschecks when they return to the expert group. And group 4 got the category of very understanding because all students were able to answer oral questions from the teacher correctly and precisely without help from friends and teachers. In groups 1, 3, and 5 managed to answer the teacher's questions correctly and precisely, but there was still one member who was left behind in answering and got the help of friends so that they got the category of understanding. While in groups 2 and 6 still get help from friends and also from teachers in answering crosscheck questions from teachers. So that groups 2 and 6 get the category of quite understanding. Overall, it can be said that the implementation of the Jigsaw type in learning received a positive response from students and based on the observation table this model is also able to make students active and cooperate well in learning. For understanding, the average student also understands the material being studied. The following is a table of the division of students into their respective groups.

Table 2 Division Group Origin

Division Group 1	Division Group 2	Division Group 3
NYR	TTDJ	JT
HSS	IFF	ZER
BFW	ES	DMR
MMI	RY	JFK
Division Group 4	Division Group 5	Division Group 6
DNAO	NS	ALMK
AEA	AKW	FTB
AK	AW	WK
ESM	YO	YIO

Each student who has been distributed into the group has received material on a two-variable linear equation system, namely elimination, substitution and graphing. The even number of students makes it easier for teachers to divide them into groups.

Furthermore, the data on the results of student performance sheets will be shown in the table as follows:

Table 3 The Recapitulation Score Result of Student Individual Test

No	Student	Score	No	Student	Score
1	NYR	85	13	DNAO	75
2	HSS	90	14	AEA	80
3	BFW	75	15	AK	75
4	MMI	70	16	ESM	70
5	TTDJ	75	17	NS	70
6	IFF	75	18	AKW	75
7	ES	50	19	AW	55
8	RY	75	20	YO	70
9	JT	95	21	ALMK	45
10	ZER	80	22	FTB	70
11	DMK	85	23	WK	70
12	JFK	70	24	YIO	75
AVERAGE					70

Based on data from the recapitulation of students' individual scores, the average individual students' Mathematics scores are 70. The number 70 has met the minimum completeness criteria score standards for mathematics subjects at YPK Hedam Abepura school. Thus, this model does have a good opportunity to be applied in learning the two-variable equation system because it makes students active and enthusiastic in learning. In addition, it is very suitable to be applied to students with academic ability characteristics that vary from students with low academic ability to high academic ability. This is quite beneficial for students with low academic ability because they can learn and spur their enthusiasm to learn and be active in their groups. The number of students present is 24 people or an even number making this model easy to apply because students are divided into the same number of groups.

Based on Arta's research (2021), Jigasaw is able to improve student learning outcomes. And it is proven that YPK Hedam Abepura junior high school students are able to pass the minimum completeness criteria. In addition, Jigsaw can also be used on heterogeneous class students (ARTA, 2021). Cooperative learning can be used effectively if there are groups of 4-6 people in a group. If the students of SMP

YPK Hedam Abepura are present all odd numbers of 27 people, then this model is difficult to implement. So that the number of 24 students present can facilitate the application of this Jigsaw-type cooperative learning model. in line with research by Putri et al, (2024) which states that the number of students in participating in this type of Jigsaw learning should be four to six people in one group and contain heterogeneous student backgrounds(Putri et al., 2024). Thus, an odd number of students can be a challenge in Jigsaw learning and vice versa an even number of students can help facilitate the implementation of Jigsaw-type cooperative model learning(Asda, 2022). Based on the results of interviews with HSS students stated that *"I am very satisfied with today's learning because I have never had this kind of learning before. I also see my friends are very happy"*. Dan wawancara berikutnya dengan siswa yang mendapat nilai standar ESM *"I am satisfied with this Mathematics learning. I am happy and group friends, other groups are also happy because it is exciting. The teacher gave us clear instructions so that we would not get confused in doing the commands. Hopefully in the future we can continue to learn fun."*. and finally the results of interviews with students with grades that have not passed the AW standard *"My feelings are not satisfied but I am happy and excited to learn today. Because it is different from the usual day. May it continue like this. I didn't pass because there were still wrong answers on the test"*. Based on the results of interviews with none of these students, the average student answered that they were satisfied with the Jigsaw type of cooperative learning and they were happy and enthusiastic in learning. Even AW students who have not passed the standard also hope that learning can continue to be fun as experienced when implementing Jigsaw-type learning in learning two-variable equation system material that has been undertaken.

CONCLUSION

Based on the discussion above, then a conclusion can be made that Jigsaw-type cooperative learning goes well and smoothly. The implementation process went well and smoothly and was completed on time. For satisfaction, teachers and students are quite satisfied with the results obtained. Although there were students who had not passed the subject, as many as 3 students out of 24 students who attended and 21 people passed the minimum graduation criteria standards. The challenge in implementing this Jigsaw type cooperative learning model is that there are differences in students' basic academic abilities or in other words, students' basic abilities, especially Mathematics learning, vary so that when learning the Jigsaw model cooperative model, students who do not understand need to get extra explanations with additional long time compared to students who already have a good academic ability foundation finish faster and wait queue of friends who have not moved from another group during explaining the material. Then the odd number of students also causes difficulty dividing in groups evenly.

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