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Students' Mathematical Representation Ability in Cooperative Learning Type of Reciprocal Peer Tutoring from Learning Style

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Abstract

This study aims to analyze whether the Cooperative Learning type of Reciprocal Peer Tutoring (RPT) is effective in enhancing students' mathematical representation abilities, whether it is more effective than PBL in enhancing students' mathematical representation abilities, how learning styles influence students' mathematical representation abilities in Cooperative Learning type of RPT, and to describe the ability of mathematical representation in terms of learning styles in Cooperative Learning type of RPT. The research method used was a mixed method, and the design used was sequential explanatory. The sampling technique used was random sampling by class. The results showed that: (1) the ability of mathematical representation in the Cooperative Learning type of RPT achieved classical completeness; (2) the average mathematical representation ability in the Cooperative Learning type of RPT was higher than that of PBL; (3) the proportion of completeness of mathematical representation ability in Cooperative Learning type of RPT was higher than that of the PBL class, indicating that Cooperative Learning type of RPT is more effective in enhancing mathematical representation abilities; and (4) there is a positive influence of learning styles on students' mathematical representation ability in Cooperative Learning type of RPT. Subjects with visual learning styles are able to fulfill visual and verbal indicators and tend to be able to fulfill symbolic indicators. Subjects with auditory learning styles tend to be able to fulfill visual and symbolic indicators but tend to be less able to fulfill verbal indicators. Subjects with kinaesthetic learning styles are able to meet visual indicators.

1. Introduction

Learning is basically an educational effort to help students carry out learning activities. According to Kuswadi, learning is a complex process and involves various interrelated aspects (Burhanuddin, 2017). These aspects include aspects of approach in learning, aspects of strategies and tactics in learning, aspects of models and techniques in learning, and aspects of learning procedures. All these aspects must be considered by the teacher in order to achieve the learning objectives. The learning objective in question is the realization of the efficiency and effectiveness of smooth learning activities carried out by children or students in he educational process.

In accordance with Government Regulation No. 19 of 2005 concerning National Education Standards in he second part, shows that every level of education, whether primary, secondary or higher education, is required to include mathematics learning as one of its subjects. Because mathematics is not only the science of numbers but mathematics is also a science that underlies all aspects of life (Purwati, Sessu, and Jusra, 2018). Most of the considerations in life that will be taken are carried out through a logical thinking process to consider cause and effect, profit and loss, and estimates of what will happen. The purpose of learning

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mathematics in Indonesia implies that mathematical abilities include: (1) problem solving abilities; (2) ability to argue (reasoning); (3) ability to communicate (communication); (4) ability to make connections; dan (5) ability to represent (Allen et al., 2020).

Based on these mathematical abilities, one of the abilities that can help improve and develop students' abilities in logical thinking is the ability of mathematical representation. However, in a study according to Graciella and Suwangsih (2016) stated that the initial data showed that the students' mathematical representation ability was still relatively low with the passing category only obtained 9 students (23.7%), while 29 students (76.3%) stated that they had not yet passed. Meanwhile, based on the result of the Education an Culture in 2019, the percentage of students who answered correctly on Statistics and Opportunity material at MTs Taqwal Ilah Semarang only reached 51.28%, at the city or district level percentage reached 72.79% and the level of the national percentage reached 56.42%. So it can be interpreted that students who answered correctly on Statistics and Opportunity at MTs Taqwal Ilah Semarang were still less than the average percentage for the city or district level and the national level.

Vergnaud (in Fadillah 2011) states that representation is an important element in the theory of teaching and learning mathematics. Representation can be interpreted as the ability to present something that are owned. Representation skills help students to express mathematical ideas or ideas into various representations (Mandur, Sadra, and Suparta, 2013). So that representation skills are needed by students to understand mathematical concepts and develop their understanding of mathematics.

The ability of representation will continue to grow if the teacher always creates mathematics learning activities that are able to train students to communicate using a variety of representations from an early age and actively participate in expressing their ideas. Learning mathematics in schools has two subjects, namely teachers and students. According to (Toshev, 2014), teachers and students can both have rich mathematical understandings and attend to mathematics in deep and connected ways.

The capacity of students to receive and understand mathematics learning material is different for each individual. Because basically students have different ways of learning or learning style to accept and understanding learning materials. De Poter & Hernacki have distinguished learning styles into three major groups as cited by Bintartik, Yuniawatika, and Untari (2018), namely visual learning style, auditory learning style, and kinesthetics learning style. Students learning styles are the important factor since they provide certain effects to the efforts in improving students learning performance (Bintartik, Yuniawatika, and Untari, 2018). In accordance with research result (Khoeron, Sumarna, and Permana 2016) which states that learning style has an influence of 52% on student learning achievement and the remaining 48% influenced by other factors.

The teacher acts as a facilitator, demonstrator, class manager, motivator, and students can play an active role in learning engagement. Students of friends in the school environment ideally act as partners for other students in the process of achieving educational programs (Usman, 2013). This shows that the existence of friends is very important for other students. Peers become figures who are considered to be a place to talk to each other and problems solving. According to (Hidayati 2015), students will be happier and feel free to ask their own friends rather than having to ask the teacher.

Based on this statement, an appropriate learning model is needed to improve mathematical representation skills by utilizing the role of peers based on their learning style. (Fantuzzo et al., 1989) suggested that RPT was design to facilitate and maximize the benefits of mutual assistance by providing students with a structured format for dyadic, peer tutoring.

The stages in Cooperative Learning type of Reciprocal Peer Tutoring consist of 7 stages, namely: (1) selecting students who will become tutors; (2) delivering learning objectives motivation and materials; (3) grouping students in group discussions; (4) presenting the result of the work; (5) clarifying the problem; (6) summarizing the material studied; and (7) evaluation. In Cooperative Learning type of Reciprocal Peer Tutoring students are not only used as objects of learning but become subjects of learning by inviting students to become tutors or learning resources and a place to ask questions for their friends. In Cooperative Learning type of Reciprocal Peer Tutoring, students are not only used as objects of learning but become subjects of learning by inviting students to become tutors or learning resources and a place to ask questions for their friends. Students who become tutors do repetition and re-explain the material to other friends so that they become more understanding in each material presented. According to Vygotsy's theory which states place when students work in the zone of proximal development (the difference between what a child can do independently and what the child achieves if he or she gets help and guidance from adults or when collaborating with more competent peers) (Budiningsih, 2003).

The objectives of this research were: (1) to find out whether Cooperative Learning type of Reciprocal Peer Tutoring is effective on students' mathematical representation abilities; (2) find out whether Cooperative Learning type of Reciprocal Peer Tutoring is more effective than Problem Based Learning on students' mathematical representation abilities; (3) find out whether there is an influence of learning stye on students' mathematical representation ability in Cooperative Learning type of Reciprocal Peer Tutoring; and (4) describe the students' mathematical representation ability in Cooperative Learning type of Reciprocal Peer Tutoring in terms of students' learning styles. The hypotheses used in this study include: (1) students' mathematical representation abilities in Cooperative Learning type of Reciprocal Peer Tutoring achieve classical completeness; (2) the average mathematical representation ability of students in Cooperative Learning type of Reciprocal Peer Tutoring is higher than the average mathematical representation of students in Problem Based Learning; (3) the proportion of students' mathematical representation completeness in Cooperative Learning type of Reciprocal Peer Tutoring is higher than the proportion of students' mathematical representation in Problem Based Learning; and (4) there is an effect of learning style on students' mathematical representation ability in Cooperative Learning type of Reciprocal Peer Tutoring.

2. Methods

This research used mixed methods. Mix methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms of research (Creswell 2009). According to Yudhanegara and Lestari (2015), mixed methods research is a procedure for collecting, analysing, and combining quantitative and qualitative research. In preparing this research proposal, it is necessary to determine in advance the order of qualitative, quantitative, or vice versa quantitative, qualitative or in other forms (Sukestiyarno 2021). The research design used in this study is a sequential explanatory design. (Sukestiyarno 2021) states that sequential explanatory (sequence of proof) is characterized by the use of sequentially combined methods, namely the first order uses quantitative methods and the second uses qualitative methods. The population in this study was class VIII MTs Taqwal Ilah Semarang in the 2021/2022 academic year. The sampling technique used in this study was class randomization. Class VIII A was given the treatment of Cooperative Learning type of Reciprocal Peer Tutoring as the experimental class and class VIII B was given the treatment of Problem Based Learning as the control class.

Table 1. Indicator of Mathematical Representation Ability.

Code	KRM Indicator	Description
A	Visual	(1) Representing data or information from representation to a diagram, graph, or table.
		(2) Using visual representations to solve problems.
B	Verbal	Answer questions using words or written text.
C	Symbolic	(1) Create mathematical equations or models from other representations given.
		(2) Problem solving by involving mathematical expressions.

The instruments used in this study consisted of test instruments for mathematical representation abilities, questionnaires for classifying learning styles, and interview tools. The test instrument was used to measure the ability of mathematical representation for the experimental and control classes which had previously been tested in class VIII C as the test class. The learning style classification questionnaire was given to the experimental class t classify the experimental class students into visual learning styles, auditory learning styles, and kinaesthetic learning styles. The interview kit consisted of an interview guide that was

used to reveal students' mathematical representational abilities in more depth and to facilitate the interview process and a voice recorder to avoid missing data during the interview. The indicators used to measure students' mathematical representation abilities in this study are presented in Table 1.

The data obtained in this study were the result of the mathematical representation ability test, the result of a questionnaire for classifying learning styles, and the result of interviews. The results of the mathematical representation ability test and the result of the questionnaire scores for classifying learning styles as quantitative data for hypothesis testing with quantitative data analysis include normality test, homogeneity test, classical completeness test, average difference test, proportion difference test, and simple regression test. Based on the results of the questionnaire on the classification of learning styles, two research subjects were selected for each learning style classification, namely two subjects with visual learning styles, two subjects with auditory learning styles, and two subjects with kinaesthetic learning styles. Subject selection was carried out using purposive sampling technique for further interviews. Interviews were conducted to strengthen quantitative data related to students' mathematical representation abilities. Researchers determine the subject by considering the classification of student learning styles and student test results if the student can provide more information. The test results and interview results of research subjects were used to describe students' mathematical representation abilities in terms of learning styles in Cooperative Learning type of Reciprocal Peer Tutoring.

3. Results & Discussions

3.1. Data Analysis Preliminary Mathematical Ability

Initial data analysis of mathematical ability was carried out to determine whether the experimental class and control class had the same initial conditions before being given treatment. The data analysed is UTS data for the even semester of the 2021/2022 academic year for class VIII A and class VIII B. the initial data analysis of mathematical ability used includes normality test, homogeneity test, and average difference test.

Based on calculations using IBM SPSS Statistics 25 for the Kolmogorov Smirnov test and Levene's test, the results obtained successively that the initial data of mathematical ability are normally distributed and have homogeneous variance so that a T-Test can be performed to the test the average difference. The T-Test was carried out using the Independent-Samples T-Test, with IBM SPSS Statistics 25 it wa found that there was no difference in average between the initial data values of the experimental class and control class students' mathematical abilities.

3.2. Final Data Analysis Mathematical Representation Ability

Mathematical representation ability data in the form of quantitative data which is the result of written tests in the experimental class and control class. Based on IBM SPSS Statistics 25 calculations related to the normality test for each experimental class and control class mathematical representation test results using the Shapiro Wilk test, it was found that the data for each class was normally distributed. The calculation of the normality test with IBM SPSS Statistics 25 on the combined test results of the experimental class and the control class using the Kolmogorov Smirnov test also shows that the data is normally distributed. For the homogeneity test using IBM SPSS Statistics 25 on the test results of the experimental class and the control class using the Levene's test, it was found that the data on mathematical representation of the two classes had the same variance.

3.2.1 Effectiveness

Cooperative Learning type of Reciprocal Peer Tutoring is effective on students' mathematical representation abilities if the achievement of students' mathematical representation abilities reaches classical mastery.

Hypothesis 1 test is related to the classical completeness test for cooperative classes with the type of Reciprocal Peer Tutoring, with the following hypothesis.

$H_0: \pi \leq 0.745$ (the proportion of the experimental class's mathematical representation ability has not reached classical completeness)

$H_1: \pi > 0.745$ (the proportion of the experimental class's mathematical representation ability reaches classical completeness)

The test criteria is to reject H_0 if $z_{count} \geq z_{table}$ with probability $\left(\frac{1}{2} - \alpha\right)$ and $\alpha = 0.05$. Based on the calculations of Ms. Excel obtained $z_{count} = 1.76$ and $z_{table} = 1.645$, because $z_{count} = 1.76 > z_{table} = 1.645$ so H_0 is rejected, meaning that the percentage of students in the class experimental class who scored ≥ 70 had achieved classical completeness. Thus, Cooperative Learning type of Reciprocal Peer Tutoring is effective on the mathematical representation ability of eight grade students at MTs Taqwal Ilah Semarang.

3.2.2 More Effective

Cooperative Learning type of Reciprocal Peer Tutoring is more effective than Problem Based Learning on students' mathematical representation abilities if: (1) the average mathematical representation ability of students in Cooperative Learning type of Reciprocal Peer Tutoring is higher than the average achievement of students' mathematical representation abilities in learning Problem Based Learning; and (2) the proportion of students' mathematical representation completeness in Cooperative Learning type of Reciprocal Peer Tutoring is higher tha the proportion of students' mathematical representation mastery in Problem Based Learning.

Hypothesis 2 test is related to the average mathematical representation ability of Cooperative Learning type of Reciprocal Peer Tutoring and students in Problem Based Learning class, with the following hypothesis.

H_0: $\mu_1 \leq \mu_2$ (the average mathematical representation ability of the class experimental class students is not higher than the control class)

H_1: $\mu_1 > \mu_2$ (the average mathematical representation ability of the experimental class students is higher than the control class)

The test criteria accept H_0 if $-t_{table} < t_{count} < t_{table}$ and reject H_0 if it has another value. Degrees of freedom $(dk) = (n_1 - n_2 - 2)$ and degrees of probability $(1-\propto)$. Based on these calculations obtained $t_{count} = 1.76$ and $t_{table} = 1.68$. Because $t_{count} = 1.76 > t_{table} = 1.68$, consequently H_0 rejected. So the average mathematical representation ability of Cooperative Learning type of Reciprocal Peer Tutoring is higher than the average mathematical representation ability of students in Problem Based Learning.

Hypothesis 3 test is related to the difference in the proportion of mathematical representation abilities of students in Cooperative Learning type of Reciprocal Peer Tutoring class and the Problem Based Learning class, with the following hypothesis.

H_0: $\pi_1 \leq \pi_2$ (the proportion of students' mathematical representation completeness in the cooperative class with the type of Reciprocal Peer Tutoring is not higher than the students in the Problem Based Learning class)

H_0: $\pi_1 > \pi_2$ (the proportion of students' mathematical representation completeness in he cooperative class with the type of Reciprocal Peer Tutoring is higher thanthe students in the Problem Based Learning)

The test criteria reject H_0 if $z \geq z_{0,5-\alpha}$ with a significance $\alpha = 5\%$. Based on calculations using Ms. Excel obtained $z_{count} = 1.95$ and $z_{table} = 0.9744$, because $z_{count} = 1.95 > z_{table} = 0.9744$. As a result, H_0 is rejected. This means that the proportion of students' mathematical representation completeness in the Cooperative Learning type of Reciprocal Peer Tutoring is higher than the proportion of completeness in the mathematical representation abilities of the Problem Based Learning class.

Based on the results of the mathematical representation ability test, the average value of the experimental class with the Cooperative Learning type of Reciprocal Peer Tutoring was 76.54 while the average value of the control class with Problem Based Learning was 71.3. Statistically there is a significant difference between the average Cooperative Learning type of Reciprocal Peer Tutoring and Problem Based Learning class. This is in accordance with the research hypothesis which says that the average mathematical representation ability of students with Cooperative Learning type of Reciprocal Peer Tutoring is higher than the average mathematical representation ability of students with Problem Based Learning. In line with research Alawiyah (2017) which says that the average value of students' mathematical representation skills using peer tutors is higher than the average value of mathematical representation abilities using the lecture method.

Based on the difference in proportion test, the results obtained that the proportion of mathematical representation completeness of students in the Cooperative Learning type of Reciprocal Peer Tutoring is higher than the proportion of completeness in the mathematical representation of students in the Problem Based Learning class. Based on the results of the Cooperative Learning type of Reciprocal Peer Tutoring,

90,9% of students obtained a score of ≥ 70, so that students in the Cooperative Learning type of Reciprocal Peer Tutoring have achieved classical mastery. Meanwhile, in this study the results showed that the Problem Based Learning class had not achieved classical completeness.

The constraint factor that causes the difference in average and proportion is due to several factors, namely the condition of the classroom environment. Cooperative Learning type of Reciprocal Peer Tutoring has a conducive classroom atmosphere. This is because the hours of mathematics lessons are no cut off with rest hours, so that students' self-preparation and concentration in receiving mathematics learning are more optimal. Astuti, Susilo, and Sari (2018) revealed that students who concentrate, have readiness, attention in the learning process well will make it easy for students to absorb and understand the subject matter presented by the teacher so that it has an impact on better learning outcomes. This makes learning more effective.

Cooperative Learning type of Reciprocal Peer Tutoring has a group discussion stage consisting of 1 tutor in it. The selection of tutors is based on students who have more abilities than other students. This is because the tutor is responsible for repetition and re-explaining the material to other friends so that they become more understanding in each material presented. According to Hidayati (2015), students will be happier and feel free to ask their own friends rather than having to ask the teacher. This is in line with Vygotsky's theory which reveals that students are able to complete tasks and solve problems when receiving help from more competent peers (Budiningsih, n.d. 2003).

3.2.3 Influence Test

The effect test in this study uses simple linear regression analysis which aims to determine whether there is a significant influence of learning style on students' mathematical representation abilities in Cooperative Learning type of Reciprocal Peer Tutoring.

Hypothesis 4 test related to simple linear regression test consisted of linear regression test, regression significance test, coefficient of determination, and linear regression model. The full explanation is as follows.

a) Regression Linearity Test

Regression linearity test is used to determine whether the variable x (learning style) and variable y (mathematical representation ability) form a linear line or not and test whether the linear model that has been taken really fits the situation or not. The hypothesis used is as follows.

H_0: $\beta = 0$ (the equation formed is not linear, meaning that there is no significant relationship between learning style and mathematical representation ability)

H_1: $\beta \neq 0$ (the equation formed is linear, meaning that there is a significant relationship between learning style and mathematical representation ability)

The test criteria reject H_0 if the significance value of Linearity in the ANOVA table is $< 5\%$. Based on calculations using IBM SPSS Statistics 25 the value of $sig. = 0.005 < 0.05$ was obtained. Then H_0 is rejected, meaning that the equation or regression model formed is linear. So it can be said that learning styles have a linear relationship to students' mathematical representation abilities.

b) Regression Significance Test

The regression significance test is used to determine whether the regression model or equation used is meaningful or not. The hypothesis used is as follows.

H_0 : $\beta = 0$ linear regression equation is meaningless, meaning $b = 0$)

H_1 : $\beta \neq 0$ (linear regression equation means, meaning $b \neq 0$)

The test criteria reject H_0 if the value of $sig.$ in the ANOVA table < 0.05. Based on the calculation using IBM SPSS Statistics 25 the value of $sig. = 0.003 < 0.05$ was obtained. So that H_0 rejected. That is, the simple linear regression equation means.

c) Coefficient of Determination

The coefficient of the determination is used to measure the degree of relationship between the variable x (learning style) to the variable y (mathematical representation ability). The hypothesis used is as follows.

H_0 : there is no significant relationship between learning style and mathematical representation ability.

H_1 : there is a significant relationship between learning style with mathematical representation ability.

The test criteria reject H_0 if $r_{count} > r_{table}$ with $\alpha = 5\%$. Correlation coefficient r_{count} is obtained from the R value in the model summary. The results of calculations using IBM SPSS Statistic 25 obtained $r_{count} = 0.596$ and $r_{table} = 0.422$ so that $r_{count} = 0.596 > r_{table} = 0.422$ then H_0 is rejected. That is,

there is a relationship between learning styles and students' mathematical representation abilities. The coefficient of determination obtained $r^2 = 0.355 = 35.5\%$.

d) Linear Regression Model

Based on calculations using IBM SPSS Statistics 25, the average mathematical representation ability is influenced by learning style by 35.5% through the regression equation $\hat{Y} = 39.951 + 0.429\,X$, while the remaining 64.5% is influenced by other factors. If $X = 1$ (learning style is 1) then the $\hat{Y}$ (students' mathematical representation ability) will increase by 0.429 units. That is, the regression equation shows that the average score of students' mathematical representation abilities increased by 0.429 for an increase in 1 learning syle scores, the students' mathematical representation ability will also increase.

This is line with the results of research Ludji Bire, Geradus, and Bire (2014) which says that learning styles can affect students achievement. Likewise, according to Khoeron, Sumarna, and Permana (2016) learning style is one of the factors in students that affect student achievement.

3.3. Description of Students' Mathematical Representation Ability (MRA) Viewed from Learning Style

Experimental class with Cooperative Learning type of Reciprocal Peer Tutoring were then given a questionnaire on the classification of learning styles to be classified into visual learning styles, auditory learning styles, and kinaesthetic learning styles. After the learning style data is collected, calculations and groupings are carried out using the learning style classification rules. Based on the results of the learning style questionnaire in the experimental class, it was obtained 5 students with visual learning styles, 8 students with auditory learning styles, and 9 students with kinaesthetic learning styles.

Students who were selected as subjects in this study are presented in Table 2 as follows.

Table 2. Research Subject

Learning Style	Student Code	Questionnaire Score	MRA Score
Visual	E-12 (V-1)	111	98
	E-1 (V-2)	100	84
Auditory	E-6 (A-1)	72	84
	E-19 (A-2)	98	87
Kinaesthetic	E-15 (K-1)	78	75
	E-22 (K-2)	102	95

The results of the analysis of mathematical representation abilities in terms of learning styles in Cooperative Learning type of Reciprocal Peer Tutoring are in Table 3 as follows.

Table 3. Mathematical Representation Ability Viewed from Learning Style.

MRA Indicator	Learning Style		
	Visual	Auditory	Kinaesthetic
1	√	√(−)	√
2	√	√	√
3	√	√(−)	−
4	√(−)	−	√(−)
5	√	−	√

Description:

√ : able to fulfill

√(−) : enough to fulfill

− : unable to fulfill

3.3.1 Mathematical Representation Ability Subjects with Visual Learning Style

Subjects with visual learning styles are able to fulfil all indicators of mathematical representation ability, namely indicators A, B, and C. based on observations during the learning styles always pay attention when the teacher explains learning objectives, giving motivation, and materials. This is because students with a

visual learning style will see something or imagine what is being discussed so that it is easier to accept and understand it (Wahyuni 2017).

In visual representation, students are able to make frequency distribution tables and bar charts, solve problems based on known visual representations, work steps, and correct calculations. This is in line with Ludji Bire, Geradus, and Bire (2014) which says that the provision of information through pictures or diagrams is one of the stimuli in the visual learning style in response to receiving information, so that students with visual learning styles are easier to understand the material through pictures or diagram.

In verbal representation skills, students with visual learning styles have almost the same achievement as visual representation abilities. This is because students with visual learning styles are able to write mathematical sentences correctly and based on the results of interviews students can explain the reasons for doing it correctly, namely proving the class leader's statement is wrong.

In symbolic representation, students with visual learning style prefer to present the results of their discussions in front of other students and tend to easily absorb learning through the teacher's teaching in a symbolic direction, such as when giving examples of questions, practice questions, and tests (Sinaga, Hartoyo, and Hamdani 2016). This is in accordance with the characteristics of the visual learning style, which prefers to do demonstrations rather than give speeches (Khoeron, Sumarna, and Permana 2016).

3.3.2 Mathematical Representation Ability with Auditory Learning Style

Subjects with auditory learning styles tend to be able to fulfill indicators A and B and are less able to fulfil indicators C. Based on observations during the learning process, students with auditory learning styles often express their opinions and ask questions. According to (Wahyuni 2017) students with auditory learning styles tend to be good speakers and learn easily by discussing them with others. Students with auditory learning styles need an atmosphere that can optimize their hearing ability. The implies that the verbal representation ability in the auditory learning style will be maximally formed compared to other representation abilities.

In the visual representation ability, it is found that students with auditory learning styles tend to be able to make frequency distribution tables and bar charts, but not precise. Likewise, at the time of the interview, he was able to answer and explain the problem solving in accordance with the right steps. However, the explanation is less coherent and seems convoluted. So that researchers should be able to direct questions more easily in order to obtain clear answers.

Meanwhile, on the ability of symbolic representation, it was found that students with auditory learning styles were less able to solve problems with complete steps. Students with an auditory learning style cannot optimally absorb learning through teaching that is carried out by the teacher in a symbolic direction, such as when giving examples of questions, practice questions, and tests. Because it emphasizes more on visual activities, so students with auditory learning style find it difficult to accept learning (Sinaga, Hartoyo, and Hamdani 2016). In accordance with the characteristics of auditory learning style according to Khoeron, Sumarna, and Permana (2016) that is having problems with jobs that involve visualization.

3.3.3 Mathematical Representation Ability with Kinaesthetic Learning Style

Subjects with kinaesthetic learning styles are only able to fulfil indicator A and tend to be able fulfil indicator C. this is because students with kinaesthetic learning styles learn through manipulation and practice (Khoeron, Sumarna, and Permana 2016). In other words, students with a kinaesthetic learning style prefer learning with direct involvement, namely by handling, moving, touching, and feeling or experiencing themselves so that it implies that the ability of symbolic representation in the kinaesthetic learning style will be formed optimally.

The symbolic representation ability obtained by students with kinaesthetic learning styles tends to be able to make work steps but the calculations are not precise and tend to be able to make mathematical models according to the problem. In visual representation skills, students with kinaesthetic learning styles are able to solve problems with the right steps, are able to make frequency distribution tables, and bar charts correctly, but are less able o make conclusions.

The ability of verbal representation is obtained that students with kinaesthetic learning styles are unable to prove the class leader's statement which is wrong and unable to write conclusions. At the time of the interview, students with kinaesthetic learning style were not able to explain the solution in a coherent and correct manner, there were several incorrect solutions because the formula applied was not appropriate. Students with kinaesthetic learning style only work according to what the teacher has taught, without

knowing the meaning of each answer he writes (Sinaga, Hartoyo, and Hamdani 2016). This resulted in the rest with the kinaesthetic learning style unable to fulfil the indicators of verbal representation ability.

4. Conclusion

Based on the discussion conducted by the researchers, the following conclusions were obtained. Students' mathematical representation ability in Cooperative Learning type of Reciprocal Peer Tutoring achieves classical completeness, so that this learning is effective on mathematical representation abilities. The average mathematical representation ability of students in Cooperative Learning type of Reciprocal Peer Tutoring is higher than average mathematical representation ability of students in Problem Based Learning and the proportion of completeness of students' mathematical representation abilities in Cooperative Learning type of Reciprocal Peer Tutoring is higher than the proportion of completeness students' mathematical representation abilities in Problem Based Learning, so that Cooperative Learning type of Reciprocal Peer Tutoring is more effective than Problem Based Learning.

There is a positive influence of learning style on students' mathematical representation ability in Cooperative Learning type of Reciprocal Peer Tutoring, which is 35,5% of students' mathematical representation ability is influenced by learning style and 64,5% is influenced by other factors. The description of the analysis of students' mathematical representation abilities based on the classification of learning styles (visual, auditory, and kinaesthetic) is obtained as follows: (a) Students with visual learning styles tend to fulfil the three indicators of mathematical representation ability, namely: (1) visual, which is able to present data or information from a representation to a diagram, graph, or table representation and use visual representations to solve problems; (2) verbal, namely answering questions using words or written text; and (3) symbolic, namely making mathematical equations or models from other representations given and solving problems by involving mathematical expressions; (b) Students with auditory learning styles have tendency to fulfil two indicators, namely: (1) visual because they are quite able to use visual representations to solve problems but are less able to present data or information from representation to a diagram, graph, or table representation; (2) verbal because they are quite able to answer questions using words or written text but are incomplete; and (c) Students with kinaesthetic learning styles tend to be able to fulfill two indicators namely: (1) visual because they are able to present data or information from a representation to a diagram, graph, or table representation and use visual representations to solve problems; (2) symbolic indicators because they are quite capable of solve problems involving mathematical expressions but are less able to create mathematical equations or mathematical model of another given representation.

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