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The analysis of mathematical connections ability reviewed from student's curiosity in themed problem based learning

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Abstract

The purpose of this study was to determine the types of errors and causes of student errors in terms of the Newman procedure in solving open-ended questions on geometry and to determine the quality of learning using the contextual-based Treffinger model and achieving classical completeness. This research is a mix methods research. The design used in quantitative research is the Pre-Experimental Design with the type of One-Shot Case Study Design.The population in this study was 8th grade of JHS Muhammadiyah 8 Semarang with a sample of 8th U_1 grade. Six students were selected as research subject. The data were taken by observation, interview, test and analyzed by using classical and descriptive qualitative learning mastery test. The results showed that an error in understanding the problem was carried out by one subject in the medium group and all subjects in the lower group, a transformation error was carried out by one subject in each group, an error in processing ability was carried out by all subjects in the upper group and one subject in the medium or medium group, then writing errors were made by all subjects in the upper group and one subject in the medium group. The cause of misunderstanding the problem is that students do not understand the problems listed on the questions. The cause of the transformation error is that students do not know the strategy used. The cause of processing ability errors is that students cannot determine the calculation correctly. Writing errors were caused by students not being careful in writing answers. The quality of learning in the contextual-based Treffinger model and the students' ability to solve open-ended questions on geometry using the contextual-based Treffinger model achieve classical learning completeness.

1. Introduction

Mathematics is a subject that is given at all levels of education. According to Permendikbud number 58 of 2014, where the aim of learning mathematics is that students understand mathematical concepts, explain the interrelationships of concepts and apply concepts or algorithms flexibly, accurately, efficiently, and precisely in problem solving. From the above quotation it appears that mathematical connections are part of the objectives of mathematics learning which are quite important in mathematics learning. Therefore, students are expected to have adequate mathematical connection skills.

Facts show the results of learning mathematics in Indonesia is not optimal. One of the junior high schools in Indonesia, especially in the city of Semarang is JHS 20 Semarang. Based on the results of the national exam in 2016/2017, JHS 20 Semarang ranked 27th out of 45 state junior high schools in Semarang. The average national math test results are 59.81. According to the National Standards Board Education, the results of the national examination in junior high school 2016/2017 absorption ability students of JHS 20 Semarang related to solving problems in number material is 58.99%, while of the overall abilities tested in the junior high school mathematics UN test, the students' absorbency showed an average of 61.25%. This shows that there is still a lack of students' ability to solve problems related to

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numbers because the absorptive capacity is still below the average absorption capacity of students. In line with the results of research by Aspuri et al. (2019) which states that students' mathematical connection ability in solving story problems is still low. This is evident from the percentage of mathematical connection ability of each indicator. In addition, the test results show that the mathematical connection difficulties of students have not been able to use all the information from problems in the story problem, have not been able to make a mathematical model of the problems raised in the problem, so there is an error in connecting concepts and procedures.

According to Ruspiani as referred to by Romli (2016), the ability of mathematical connections is the ability to link mathematical concepts both between topics in mathematics itself or to link mathematical concepts with concepts in other fields. According to Saminanto & Kartono, mathematical connection ability is the ability to connect concepts between mathematics and connect mathematical concepts with non-mathematical concepts (Setyaningsih et al., 2016). Meanwhile, according to Rohendi as referred to by Setyaningsih et al. (2016) mathematical connection skills are included in higher order thinking skills. This is the reason why mathematical connection skills should be developed for students. If students are able to associate mathematical ideas, their mathematical understanding deepens and lasts longer because they are able to see the connections between mathematical ideas, between mathematical topics, and experiences of daily life.

According to Sumarmo as referred to by Setyaningsih et al. (2016) there are six indicators of the ability of mathematical connections between others: (1) searching for and understanding the relationship of various representations of concepts and procedures; (2) understanding the relationship between mathematical topics; (3) applying mathematics in other fields or in everyday life; (4) understand the equivalent representation of a concept; (5) looking for relations between one procedure and another in equivalent representations; and (6) applying the mathematical relationships between mathematics and between mathematical topics and topics outside mathematics. According to Ainurruzqiyah et al. as quoted by Prasetyo et al. (2017) students are said to have mathematical connection skills if they meet three indicators, namely: (1) connections between topics; (2) connections with other fields of science; (3) connection with real life. Mousley as referred by Prasetyo et al. (2017) describes indicators of mathematical connection ability, namely: (1) establishing a connection between new information and knowledge directly; (2) establishing connections between mathematical concepts; and (3) establishing connections with everyday experiences.

Indicators of mathematical connection ability used in this study are as follows: (1) applying mathematics in other fields of science; (2) applying mathematics in everyday life; and (3) applying the mathematical relationships between mathematics.

In addition to students' abilities in the aspect of mathematical connections, another important aspect that is the focus of attention in mathematics learning is the attitude or character of students. According to the Director General of Higher Education (2013), character education is a planned effort to make students know, care and internalize values so that students behave as human beings consisting of religious, honest, tolerance, discipline, hard work, creative, independent, democratic, curiosity, national spirit, love of the motherland, respect for achievement, friendship and communication, love for peace, love to read, care for the environment, care for the social, and responsibility (Arifin, 2012). Curiosity is one of the characters that needs to be developed. Meanwhile, the facts found in the field when PPL researchers, the curiosity of students of JHS 20 Semarang is not optimal. This can be seen by the fact that there are still students who are ignorant of mathematics learning, tend to wait for the work of other students who work on the blackboard, students are less active in learning mathematics, and there is no student initiative working on problems outside the assignment given by the teacher.

The fact about students' curiosity is still not optimal and the ability of students' mathematical connections in solving mathematical problems that are not optimal becomes a problem for students of JHS 20 Semarang. The ability of mathematical connections becomes very important because it will help the mastery of understanding concepts and help solve problem solving tasks through the interconnectedness of mathematical concepts and between mathematical concepts with concepts in other disciplines (Latif et al., 2016). This mathematical connection ability will help students in developing mathematical models that also illustrate the interrelationship of the concept of a given problem or situation.

Therefore, an effort is needed to improve students 'mathematical connection skills and students' curiosity. One such effort is to apply a learning model that makes students accustomed to solving problems in learning mathematics. Problem Based Learning Model is a cooperative type learning model that uses projects / activities as a medium that is characterized by real problems as a context for students learning (Shoimin, 2014). Problem based learning is learning that uses real problems (authentic) that are not structured and are open as a context for students to develop problem solving skills and critical thinking as well as building new knowledge (Geni & Hidayah, 2017). According to Kurniasih (2012), critical thinking is one of the high-level thinking that is important to be mastered by students. Therefore, Problem Based Learning is suitable. According to Sanjaya (2011), one of the advantages of PBL is that it makes it easier for students to master the concepts learned to solve real-world problems.

In solving math problems, some students tend to give up because they think that mathematics is a difficult subject. Mathematics learning should be able to encourage and familiarize students in an effort to improve students' mathematical connection abilities. Therefore we need a learning that interests students to participate in learning. Thematic learning is one of the recommended learning alternatives in the 2013 curriculum contained in Permendikbud number 22 of 2016. In Permendikbud number 22 of 2016, the selection of integrated thematic and / or thematic approaches and / or learning that produces work based on problem solving is adjusted to the characteristics of competency and education levels. Thematic approach is an approach that departs from a particular theme / topic and then is elaborated from various aspects or viewed from various perspectives of subjects commonly taught at school. The theme knits the meaning of various basic concepts so that students do not learn the basic concepts partially. Thus learning gives full meaning to students as reflected in the various themes available. Thematic approaches are provided with the intention of uniting curriculum content in whole unit units so as to make learning full of values, meaning, and easily understood by students (Rusman, 2015). This approach can be applied in one subject so that it can be applied to mathematics. Thematic learning is integrated learning that is designed based on certain themes (Hajj, 2015). Themed learning will make students driven to one topic, so students are more focused on the material being taught.

According to Istikomah et al. (2017) Themed PBL is PBL learning that is designed using themes. The theme is the main thoughts or ideas that are the subject of conversation. The application of the theme makes students more focused on one discussion so that they better understand the material presented. Learning with themes has a very important role in increasing students' attention, learning activities, and understanding of the material being studied (Yahya, 2015). According to Min et al. (2012) the use of themes in learning to create an active, interesting and meaningful learning. In line with this statement, the results of Abrantes, Julie, and Kaiser-Messmer's research are referred to by Handal et al. (2004), students' interest in the classroom atmosphere and subject matter can be increased by providing certain themes in accordance with the context in learning. Therefore, giving a theme encourages the imagination and attractiveness of students to the problems in the material being studied.

Mathematical connection skills and student curiosity that are not optimal need to be studied in mathematics learning. This research was conducted to analyze the ability of mathematical connections in terms of students' curiosity in themed PBL at JHS 20 Semarang.

The formulation of the problem in this study are (1) whether the students' mathematical connection ability in themed PBL achieves learning completeness, (2) whether the students' mathematical connection ability in Themed PBL is better than the students' mathematical connection ability in PBL, and (3) whether the average curiosity of students in Themed PBL more than the average curiosity of students in PBL, (4) whether students 'curiosity affects the ability of students' mathematical connections, (5) how to describe the ability of mathematical connections in Themed PBL in terms of student curiosity. The purpose of this study was to (1) test the ability of students' mathematical connections in Themed PBL to achieve mastery learning, (2) test the ability of students' mathematical connections in Themed PBL better than students' mathematical connection abilities in PBL, and (3) test the average student curiosity in Themed PBL more than the average student curiosity in PBL, (4) testing students' curiosity affect the ability of students' mathematical connections, and (5) describing the ability of students' mathematical connections in Themed PBL in terms of student curiosity.

The hypotheses in this study are (1) the ability of student' mathematical connections with themed Problem Based Learning (PBL) in JHS 20 Semarang achieving mastery learning, (2) the ability of students' mathematical connections with themed Problem Based Learning (PBL) better than connection

abilities student mathematics with Problem Based Learning (PBL), (3) student curiosity influences students' mathematical connection abilities, and (4) average student curiosity in Themed PBL more than the average student curiosity in PBL.

2. Method

This study uses quantitative methods assisted with interviews with true experimental design in the form of posttest-only control design. An overview of research designs can be seen in the following Table 1.

Table 1. Posttest-Only Control Design

Group	Treatment	Posttest
Eksperimen	X	O_1
Kontrol	K	O_2

Information:
O_1 : Test the students' ability mathematical connection in themed PBL
O_2 : Test the students' ability mathematical connection in PBL
X : Learning to use model themed PBL
K : Learning to use model themed PBL

The population in this study were students of the eight grade students, which consisted of eight classes. In this study used two sample groups namely the control group using Problem Based Learning, namely students of class VIII H and the experimental group using Themed Problem Based Learning is students of class VIII F.

To analyze the ability of mathematical connections in terms of curiosity, students fill in the questionnaire of curiosity and tests of mathematical connection skills. From the results of tests and questionnaires, researchers determine the subjects to be interviewed. The subject of the interview will be chosen by 6 students with extreme conditions, namely 2 students with high curiosity, 2 students with moderate curiosity and 2 students with low curiosity.

Before learning is carried out, researchers compile complete learning tools and supporting instruments. Learning is carried out 4 times in the experimental group (themed PBL) and the control group (PBL) with march pattern material. Data collection techniques used were questionnaires, tests, student work resultd and interviews. Quantitative data analysis techniques used are (1) data analysis of even semester report card grades in the form of tests of normality, homogeneity, and similarity of two averages, (2) data analysis of mathematical connection ability tests in the form of normality tests, homogeneity tests, hypothesis testing 1 using the z test (proportion test) in themed Problem Based Learning, hypothesis test 2 uses t test to test the similarity of two average mathematical connection abilities of students in themed Problem Based Learning and z test to test the similarity of two proportions in Problem Based Learning learning themed, hypothesis 3 test used regression and correlation tests to determine the effect of students' curiosity on the ability of mathematical connections, and hypothesis test 4 used the t test (average test) of student curiosity.

Data from interviews and mathematics connection ability tests are presented to describe the ability of students 'mathematical connections based on indicators of students' mathematical connection abilities in the form of a description. Conclusions are drawn from the results of interviews and tests of students 'mathematical connection abilities based on students' curiosity.

3. Result and Discussion

3.1. Data Analysis of Final Exam

The data of the experimental group and the control group obtained from the score of final exam at even semester when they were grade VII. Analysis of final exam data in the form of tests of normality, homogenity, and similarity of two averages. The normality test using the Kolmogorov Smirnov test and the significance level of 5% shows that the data come from normally distributed populations. Homogeneity test using Levene test shows that the data is homogeneous. The similarity test of two

averages using One Way Anova shows that the data have the same averages. The results of the data meet the prerequisites for selecting the sample group.

3.2. Result of Data Analysis of Students' Mathematics Connection Ability Tests

The first hypothesis is carried out to test the ability of students' mathematical connection abilities in PBL Themed learning to achieve mastery learning conducted using the z test. Calculation results show that $z_{count} = 1{,}925 > -z_{0{,}45} = -1{,}64$. Test criteria are rejected H_0 if $z_{count} \leq -z_{0{,}5-\alpha}$ with $z_{0{,}5-\alpha}$ obtained from the standard normal distribution table using apportunities $(0{,}5 - \alpha)$ and $\alpha = 5\%$. So, H_0 accepted or the mathematical connection ability of students in class VIII number pattern material in learning Problem Based Learning Themed achieving classical completeness criteria.

The second hypothesis test is carried out by using the similarity test of two averages and the similarity test of two proportions. The data used are the results of tests of students' mathematical connection ability in themed Proble Based Learning. The calculation results for the two average similarity tests are $t_{count} = 1{,}935 > t_{1-\alpha} = 1{,}67$ and the results of calculations for the similarity test of two proportions are $z_{count} = 2{,}031 > z_{0{,}5-\alpha} = 1{,}64$. The criteria for testing the similarity of two averages is reject H_0 if $t \geq t_{1-\alpha}$ with $\alpha = 5\% \; and \; dk = n_1 + n_2 - 2$. So, H_0 rejected or the average mathematics connection ability of students of class VIII material number patterns in Themed Problem Based Learning more than the average ability of mathematical connections of students of class VIII material number patterns in Problem Based Learning. The criteria for testing the similarity of two proportions is reject H_0 if $z_{count} \geq z_{0{,}5-\alpha}$ with $z_{0{,}5-\alpha}$ obtained from the standard normal distribution table using opportunities $(0{,}5 - \alpha)$ and $\alpha = 5\%$. So, H_0 rejected or the proportion of students who have finished learning in class using themed Problem Based Learning more than the proportion of students who have finished learning in class using Problem Based Learning. From the results of the two average similarity test and the similarity of two proportions, it can be concluded that the mathematical connection ability of class VIII students in the number pattern material in Themed Problem Based Learning is better than the mathematics connection ability of class VIII students in the number pattern material in Problem Based Learning.

The third hypothesis test is done by using regression and correlation tests to determine the effect of student curiosity on the ability of mathematical connections. Through calculations, it can be concluded that students' curiosity has a positive effect on the ability of mathematical connections. Student's mathematical connection ability test scores are influenced by students' curiosity as much as 51,1% through equations $\hat{Y} = 17{,}216 + 0{,}841\, X$.

Test the fourth hypothesis using the similarity test of two averages. The calculation results for the two average similarity tests are $t_{count} = 3{,}261 > t_{1-\alpha} = 1{,}67$. The criteria for testing the similarity of two averages is reject H_0 if $t \geq t_{1-\alpha}$ with $\alpha = 5\% \; and \; dk = n_1 + n_2 - 2$. So, H_0 rejected or the average curiosity of students of class VIII material number patterns in Problem Based Learning Themed more than the average curiosity of students of class VIII material number patterns in Problem Based Learning.

3.3. Discussion: Mathematical Connection Ability in Problem Based Learning Themed Achieving Learning Completeness

Based on the results of the study obtained an average mathematical connection ability test scores on Problem Based Learning themed more than or equal to 61.8. The results of this study also showed that the proportion of students on the mathematical connection ability test on Themed Problem Based Learning achieving classical completeness at least 75% of students who took the test scored more than or equal to 61.8, precisely around 88.89% of students.

That is because the themed Problem Based Learning model guides students to obtain meaningful learning. Themes make students more focused on learning material because it suits life in the real world.

Problem Based Learning Themed there is a syntax or steps of learning, namely (1) student orientation to the problem; (2) organizing students; (3) guiding individual and group investigations; (4) develops and presents the work; and (5) analyze and evaluate the problem solving process. In the first stage, students are given a problem found in the worksheet. Next students group to answer the problem. In the learning process takes place the teacher acts as a facilitator by directing students in the problem solving process. Then students gather information to develop a problem solving plan. The next stage students present the results of problem solving in LKS themed according to their respective group discussions. In the final

step, students and teachers jointly evaluate the problem solving process carried out and analyze what has been learned. Based on this explanation, Themed Problem Based Learning trains students in active learning through problem solving processes, interacts through group discussion activities, and learns to use the experience or knowledge they have to gain new knowledge. This is in accordance with the learning theory proposed by Piaget as quoted by Rifa'i & Anni (2012), there are three main principles in learning, namely (1) active learning; (2) learning through interaction; and (3) learning through one's own experience. Therefore, the themed Problem Based Learning model emphasizes the activeness of students in finding and solving problems to gain new knowledge through discussion.

3.4. Discussion: Students 'Mathematical Connection Ability in Themed Problem Based Learning Better than Students' Mathematical Connection Ability in Problem Based Learning

Based on the results of the study, the average mathematical connection ability of students in class VIII number pattern material in the Themed Problem Based Learning model better than the mathematical connection ability of students in class VIII number pattern material in the Problem Based Learning model. That is because the average mathematical connection ability of students in class VIII number pattern material in the Themed Problem Based Learning model more than the average mathematical connection ability of class VIII students in number pattern material in the Problem Based Learning model. The average test score of students in the experimental group was 75.61 while the average test scores of students in the control group was 69.75. In addition, the proportion of students who have finished learning in class using Themed Problem Based Learning is more than the proportion of students who have finished learning in class using Problem Based Learning. Many students who completed the experimental group were 32 students or 88.89%, while many students who completed the control group were 25 students or 69.4%. Problem Based Learning Themed focus students on one particular theme so students can imagine in accordance with real life without many branches of problems. Students are more interested in learning so that it is easy to process information and no difficulty in solving problems. This is in accordance with research conducted by Istikomah, et al (2017) that themed Problem Based Learning displays every problem in learning mathematics has certain themes, so students are able to imagine events in accordance with themes in everyday life and can be applied in life daily.

Learning using PBL Themed can improve students' mathematical connection skills. This is consistent with Rohendi's opinion as quoted by Setyaningsih et al. (2016) which states that mathematical connection skills are included in higher order thinking skills. This opinion is reinforced by Padmavathy (2013) that the application of Problem Based Learning in mathematics learning can create students who are able to think creatively, make critical decisions and solve problems. In addition, Problem Based Learning has the effect of increasing activeness, motivation, interest, and involvement of student participation in learning.

3.5. Discussion: Students' Curiosity Has Positive Influence on Mathematical Connection Ability

Students' mathematical connection ability is influenced by several factors, including student curiosity. As in the third hypothesis test, the results show that there is an influence between curiosity on students' mathematical connection abilities. The calculation results show that the mathematical connection ability of students 51.1% is influenced by students' curiosity attitudes while 48.9% is influenced by other factors. While the relationship between mathematical connections with student curiosity is 0.715. Student curiosity affects the ability of students' mathematical connections because students who have high curiosity are more sensitive in observing various phenomena or events around them, so students will learn more. This is in accordance with the opinion of Belecina & Ocampo (2016) that mathematical curiosity and epistemological beliefs are significantly related to mathematics performance and both also significantly influence mathematics performance. This implies that someone with high curiosity will have a high mathematical performance as well. But on the contrary, if someone has a low curiosity will impact on low mathematical performance as well.

3.6. Discussion: Average Curiosity of Students in Themed Problem Based Learning More Than Average Curiosity of Students in Problem Based Learning

Based on the fourth hypothesis test obtained that the average curiosity of students in class VIII material number patterns in Themed Problem Based Learning more than the average curiosity of students in class VIII material number patterns in Problem Based Learning. In Themed Problem Based Learning students'

interest in learning will be higher. That is because the theme makes learning more interesting, so students are more enthusiastic in participating in learning. This is in accordance with what was stated by Saputro, et al (2017) which shows that the theme gives an imagination of problems that encourage students' interest in solving problems.

3.7. Discussion: Description of Mathematical Connection Ability in Themed Problem Based Learning Based on Student Curiosity

The ability of mathematical connections in this study is based on three indicators, namely applying mathematics in other fields of study, applying mathematics in everyday life, and applying mathematical relationships between mathematics. In this study, it was found that the average value of the mathematics connection ability test for students with high, medium and low curiosity levels were 87.5; 76.38; and 64.33. So it can be said that students with a high level of curiosity have a higher average mathematical connection ability test than students with moderate or low levels of curiosity. The results showed that the KE-02 and KE-20 subjects both could meet the three indicators of the ability of mathematical connections, namely applying mathematics in other fields of science, applying mathematics in daily life, and applying mathematical relationships between mathematics. So it can be said that students in high curiosity groups have high mathematical connection skills. In learning, students from the high curiosity group can average understand the material being taught and can apply in solving problems of number patterns that have never been encountered before. When learning is ongoing students in this group are active in small and classical group discussions, disciplined in working and collecting assignments, brave in expressing opinions or questions, and able to participate in all learning activities well. The attitudes and behaviors of students with high curiosity are estimated to be one of the factors that cause students to have good mathematical connection skills by achieving the three indicators of mathematical connection ability that have been described previously. This is because students with high curiosity have the willingness to study deeper and wider, always asking questions when confused to understand the material presented, taking the initiative to learn something new, and students with high curiosity are also able to show participation in learning in class.

The results showed that the KE-08 and KE-22 subjects, both of them could meet the three indicators of mathematical connection ability but with deficiencies. Both subjects can understand the problem well, solve the problem well because they have mastered the material but are not careful enough to do the calculations, and can conclude the solution well. So it can be said that students in the curiosity group have moderate mathematical connection skills. This is in line with the results of testing hypothesis 3 in this study which concluded that student curiosity has a positive effect on students' mathematical connection abilities. In learning, students from middle curiosity can understand the material being taught and can apply in solving problems of number patterns that have never been encountered before. When learning is ongoing students in this group are only active in small group discussions, in classical group discussions are not active, occasionally late in collecting assignments, and do not dare to express opinions or questions in front of the class, as well as being able to follow all learning activities properly. The attitudes and behaviors of students with middle curiosity are thought to be one of the factors that cause students to have good mathematical connection skills by achieving the three indicators of mathematical connection ability that have been described previously although there are still some that are not thorough.

The results showed that the KE-12 and KE-21 subjects could both meet the three indicators of mathematical connection ability but with deficiencies. Both subjects can understand the problem but are incomplete or inaccurate, can solve the problem but are less able to master the material and are not careful in doing calculations, and cannot even conclude the solution properly. So it can be said that students in the low curiosity group have low mathematical connection skills. This is in line with the results of testing hypothesis 3 in this study which concluded that student curiosity has a positive effect on students' mathematical connection abilities. In learning, students from low curiosity groups need a long time to understand the material being taught and are confused to apply the material in solving problem patterns of numbers that have never been encountered before so need guidance from the teacher. In addition, students in this group are not active in small or classical group discussions because they tend not to pay attention to the teacher's explanations and are busy chatting with friends, often late in collecting assignments, have not dared to express opinions or questions, and as a whole have not been able to follow all learning activities well. The attitudes and behaviors of students with low curiosity are thought to be one of the

factors that cause students to have a fairly good mathematical connection ability with information on the achievement of the mathematical connection ability indicators described previously.

Based on the results during the research process, there are several obstacles in conducting research. The obstacles encountered when implementing Themed PBL is the difficulty of loading students to adapt to learning that has never been applied in class. Students are accustomed to getting material by the lecture method and are rarely interspersed with discussion activities. Formulas are usually given instantly, so students simply memorize and do not understand the meaning of each component of the formula.

In addition, another obstacle is the type of problem they are not used to working on. Students are not accustomed to using the words known, asked and answered. So, students are less skilled to identify the problem first. Then in writing formulas and symbols that are still not quite right there is usually no confirmation of correct writing from the teacher. So, students do not know where lies writing errors and how to write correctly. This happens repeatedly so that students become accustomed to writing symbols and formulas that are not appropriate.

In addition to the obstacles encountered, in learning also found some uniqueness. Where found incomplete answers on the answer sheet, but when conducted interviews were able to answer smoothly and precisely. That is because students do not utilize their time maximally. But there are also answers in the answer sheet are correct but at the time of the interview were not able to explain properly. That is because seeing the answer from his friend.

4. Conclusion

The conclusions of this study are as follows. (1) The mathematical connection ability of the eighth grade students of material number patterns in Themed Problem Based Learning achieves mastery learning. (2) The ability of students in class VIII mathematics connection material number patterns on Themed Problem Based Learning is better than the ability of students in class VIII math connection material number patterns in Problem Based Learning. (3) Students' curiosity has a positive effect on the ability of students in class VIII mathematics connection material number patterns on Themed Problem Based Learning. (4) The average curiosity of students in class VIII material number patterns in Themed Problem Based Learning is more than the average curiosity of students in class VIII material number patterns in Problem Based Learning. (5) Description of the ability of mathematical connections in terms of curiosity of students in class VIII number pattern material on Themed Problem Based Learning, namely a) students with high curiosity can apply mathematics in everyday life very well because they have a desire to interact, get to know , and understand something that is around students, can apply mathematics in other fields of science appropriately, and can apply relationships between mathematical mathematics well because it is active during the learning process, b) students with middle curiosity can apply mathematics in everyday life well but must be more careful again, be able to apply mathematics in other fields of science appropriately, and be able to apply relationships between mathematical mathematics well because they pay attention when learning, c) students with low curiosity can apply mathematics in everyday life well but it is incomplete because there are not written what is known and asked, can apply mathematics in other fields of science but is incomplete, and can apply the relationship between mathematical mathematics with good but there are some who do not remember the formula that must be used due to not paying attention when learning.

Based on these conclusions, suggestions can be given as follows. (1) Mathematics teacher at SMP Negeri 20 Semarang to apply the Themed Problem Based Learning in training students' curiosity and the ability of students' mathematics connections in class VIII for number pattern material. (2) Mathematics teacher of SMP Negeri 20 Semarang to familiarize students with more practice exercises to develop mathematical connection skills and students' curiosity. (3) Mathematics teacher at SMP Negeri 20 Semarang to get students active in learning and discussion in order to develop students' curiosity.

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