



Student's Mathematical Connection Reviewed from Learning Motivation in Advance Organizer Learning Assisted by Schoology

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Abstract

The research aims to determine if advanced Organizer learning is effective with the ability of the student's mathematical connection and describing the mathematical connection ability of students reviewed from the motivation to learn at Advanced Organizer Learning Assisted schoology. The research method used is mixed method with sequential explanatory design. The research population is class IX Junior High School 33 Semarang, while the sample is IX C class as the research class. Samples were taken using the random sampling cluster technique. Subjects of the study were taken using purposive sampling techniques, so obtained six research subjects were selected based on the category of motivational learning. Methods of collecting data using observations, tests, polls, and interviews. The results showed that (1) the proportion of the students' mathematical connection ability to the study of Schoology advanced Organizer is achieving the classical, average mathematical connection ability of students in Advance Organizer learning With the help of schoology reaching the Minimum Submission Criteria (MSC), and the mathematical connection ability of students after receiving Advance Organizer learningassisted schoology increased by 0.8. The results showed that Advance Organizer learning assisted schoology effectively on the ability of student mathematical connection. (2) Subjects with high learning motivation tend to meet all mathematical connection indicators. Subjects with motivational learning are likely to meet two of the three mathematical connection indicators. Subjects with low learning motivation tend to meet one of three mathematical connection indicators.

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1. Introduction

Mathematics is a universal science underlying the development of modern technology, having a role in various disciplines and advancing the human mind (Dharma et al., 2019). Mathematical mastery is certainly not separated from the mathematical purpose itself. According to the NCTM (2000) formulating mathematics learning objectives includes learning to communicate, learning to reason, learning to solve problems, learning to relate ideas, and learning to represent ideas. Based on the above objectives, the ability to associate concepts in mathematics or mathematical connection is one of the ability students must have. In accordance with the opinion Pujiastuti et al. (2018) that problem-solving capabilities and mathematical connection capabilities are the main focus that students must master.

According to Sumarni (2016) with the mathematical connection ability while studying the concept of mathematics, students can relate concepts that have been learned as basic knowledge to understand the new concepts presented by the teacher, So that students have no trouble learning mathematics. Besides the linkage between concepts in mathematics, the mathematical connection are closely related to topics beyond mathematics. Putri & Santosa (2015) said that the association makes mathematics learning more

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meaningful because students can see the real problems presented in the learning and able to solve the problem relevant mathematical concepts.

Prastiwi et al. (2014) said that by having the mathematical connection ability, students will be able to see that mathematics is a science that inter-topic is interconnected and useful in learning other lessons and in life. As is conveyed by Prasetyo et al. (2017) when students are able to associate topics in mathematics, his mathematical understanding is increasingly deep and enduring because it is able to see the linkages between mathematical topics and the experience of everyday life.

The importance of mathematical connection ability mastered by students makes teachers need to strive for the mastery of the mathematical connection ability of students achieving optimal results. The effort that teachers can do is one by providing a learning model that fits the needs of the students.

Advance Organizer is a meaningful learning model developed by David Ausebel and can be classified as a deductive method (Rahmawati & Rachmawati, 2015). According to Monhanty (2016), Advance Organizer is a means to strengthen cognitive structures and improve students' recall of information. The memory here does not necessarily memorize the information only, but the students are encouraged to relate knowledge that will be studied with the knowledge learned (Ni, Rohadi, & Alfana, 2016).

Monhanty (2016) said that the purpose of this learning model was to explain, integrate and interact with materials in the learning tasks used in previous learning materials. The stages of the model are advance organizer presentation, Learning task presentation (learning material), and cognitive strengthening. On cognitive strengthening testers are learning material relationships with existing ideas to produce active learning.

The creation of an active learning atmosphere will add motivation to students' learning. The motivation to learn students in following learners is very influential in what they are learning. This view is very precise because motivation is a condition in students who influence his readiness in continuing learning activities (Prastiwi et al., 2014). It is also supported by Agustin et al statement (2014), that motivation will arise when students feel comfortable during learning, so this motivation can encourage students to follow all learning activities.

According to Gettinger and Walter quoted from Durksen et al. (2017) motivation is the intention or desire of the students to act. In line with this, Mulyaningsih (2014) States that motivational learning is an encouragement or willingness for a person to conduct learning activities in order to optimize their learning achievements. It is clear that the motivation to learn greatly affects learning achievement, as conveyed by Sopyyev et al. (2013) that the motivation to learn positively affects learning achievement. So the better the motivation to learn students then the better the learning achievements will be achieved. It has been delivered that students' motivation will grow when they are active in the classroom and one of the learning models that will make the students active is Advance Organizer. So it can be said that the Advance Organizer model is effective in developing the learning motivation of students (Monhanty, 2016).

Information technology that develops in various circles one of the social media. Social Media that has been widely utilized for educational development one of them is Schoology. According to Nicolas Brog and Jeff O'hara in Azmi et al. (2018), it is said that Schoology is considered able to support the education of children. The main concept of using Schoology or often categorized as e-learning is here as a distribution facility for learning materials, exams, practice quizzes, and assessments (Winarti et al., 2019). Moreover, according to Ni et al. (2016), with the use of student information technology is given the opportunity to learn by conducting digital research. So that students are not saturated with learning using the Whiteboard only.

Judging by the results of the Junior High School Nasional Exam year 2018/2019 lesson that the mathematical connection ability in Junior High School 33 Semarang is not optimal. Based on the national test result data by the Ministry of Education and Culture year 2018/2019, the average value of the results of the mathematics national exam of Junior High School 33 Semarang is 56.58. Although at the national level is above average, the figure is still relatively low compared to the average national exam results of mathematics in Semarang is 62.79. In addition, absorption of students on the number material is still less optimal because from the percentage of material mastery new number reaches 54.25% at school level and 39.71% at national level. According to Fadhillah et al. (2019) Not usually students working on mathematical connection make students difficulty in understanding and solving questions based on

mathematical connection. This shows the less optimal development of mathematical connection capabilities of students.

Based on an interview with one of the mathematics teachers in the school, it is known that the students' mathematical connection ability are relatively low and the motivation to learn is still lacking because students are more likely to learn only when in school. So it can be said that the motivation to learn students to hone the mathematical connection ability is also lacking, seeing the low acquisition of the average national exam scores on mathematical subjects. The problem is to affect the mathematical value of students who are still less than the Minimum Submission Criteria (MSC). Based on the background description above, more research is needed on mathematical connection reviewed from the motivation to learn in the Advance Organizer learning assisted Schoology.

The purpose of this research (1) is to know whether the learning of Advance Organizer is assisted by Schoology is effective against the mathematical connection ability of students, and (2) describing the mathematical connection ability of students reviewed from learning motivation to Advance Organizer learning assisted Schoology.

2. Methods

The method of study used is a combination method (mixed method). The mixed research method is a research method that combines or combines quantitative methods and qualitative methods to be used jointly in a research activity, so that the data obtained is more comprehensive, valid, reliable, and objective (Sugiyono, 2016:404).

The type of mixed method used in this study is sequential explanatory design. The sequential blend method of explanatory is a combination research method that combines quantitative and qualitative research methods, in which the first phase of the study is done by the method of Cuntative and in the second phase is done by qualitative method (Cresswel, 2016:299). The results of the quantitative research phase confirm the type of participants to be selected intentionally for qualitative research and the types of questions that participants will ask.

The quantitative research design used in this study was the One Group Pretest-Posttest Design. In this design there is a group that is given treatment. Before being given treatment, the group was given Pretests first. Thus the results of treatment can be known more accurately because it can be compared to the condition before being given treatment (Sugiyono, 2016:112). Systematic design of this research can be seen as follows.

The population used in this study was grade IX students of Junior High School 33 Semarang Year lesson 2019/2020. The population retrieval in this study in consideration of (1) students got material based on the same curriculum, (2) Students who become research objects sit at the same class level, and (3) student placements are not based on ranking.

Sampling on this study was determined by the random sampling cluster technique. This technique divides the population into multiple groups or clusters, then retrievals the cluster from the population is randomly generated (Sugiyono, 2016:121). The selected samples of the 8 classes are IX C class as the research class.

After sampling, the subject selection is performed using the purposive sampling technique. According to Sugiyono (2016:300), purposive sampling is a data source sampling technique with particular consideration. The subject chosen for qualitative research is six people from the study class who had previously been given a motivational learning questionnaire. Students are grouped by the category of motivational learning so they will be gained with the category of high, medium, and low learning motivation. Of each of the motivational categories learn each of the two students by considering the mathematical connection ability of students. The ability of a student's mathematical connection can be seen from the score each student has earned at the time of Posttest.

Quantitative research is used to determine if advanced Organizer learning is effective with the help of student's mathematical connection ability. As for the effective learning criteria is the classifications of 75%, the average class reaches the Minimum Submission Criteria (MSC) of 71, and there is an increase in the mathematical connection ability of students after receiving learning. This quantitative Data is obtained through the mathematical Connection ability test, which is pretests and posttest. The quantitative data

analysis in this study used three Tests, i.e. one-party proportion test, average achievement test, and average different test continued gain is normalized.

The quality research is used to describe the mathematical connection ability students reviewed from the motivation to learn the learning of Advance Organizer with Schoology. Qualitative Data obtained from interviews with research subjects regarding the results of a mathematical connection posttest work.

3. Results & Discussion

Before Pretests and posttest data was used to test the hypotheses the data first tested its distribution to determine the statistics to be used. Test the normality of the mathematical connection ability test value students aim to find out if the data is distribution is normal. If the data is normal distribution then the statistics used are parametric statistics. The test was conducted using a Chi-squared test.

To test the normality on pretests data, the hypothesis testing criteria is to accept H_0 if the value is $\chi^2 < \chi^2_{(1-\alpha)(k-1)}$ with $\alpha = 5\%$ and $dk = k - 3$. Based on the calculation result, $\chi^2 = 4,755$ for pretests value data and $\chi^2_{(1-\alpha)(k-1)} = 7,815$. Obviously $4,755 < 7,815$, so H_0 accepted. Thus, the Pretests value data is the mathematical connection ability of research class students with normal distribution.

As for test the normality on posttest data, the hypothesis testing criteria is to accept H_0 if the value is $\chi^2 < \chi^2_{(1-\alpha)(k-1)}$ with $\alpha = 5\%$ and $dk = k - 3$. Based on the calculation result, $\chi^2 = 5,471$ for the posttest value data, and $\chi^2_{(1-\alpha)(k-1)} = 7,815$. Obviously $5,471 < 7,815$, so H_0 accepted. So, posttest value data of mathematical connection ability students of the research class with normal distribution.

3.1. Mathematical Connection Ability

3.1.1. Hypothesis Test 1

The 1 hypothesis test is the one-party proportion test used to gauge whether the students' mathematical connection ability in Schoology Advance Organizer Learning achieved a classic 75% in accordance with the designated the Minimum Submission Criteria (MSC), 71. Calculations are carried out using Microsoft excel. Result of calculations obtained $z_{count} = 2,4333$ and $z_{0,5-\alpha} = -1,6400$ with $\alpha = 5\%$. Obviously $2,4333 > 1,6400$, so H_0 rejected. Thus, the proportion of the students' mathematical connection ability to the learning of the Schoology Advance Organizer has achieved the classical survival.

3.1.2. Hypothesis Test 2

The 2 hypothesis test is the average achievement test used to determine whether the average student mathematical connection ability in the research class reaches the Minimum Submission Criteria (MSC) of 71. Calculations are carried out using Microsoft excel. The result of the calculation is obtained $t_{count} = 7,4433$ and $t_{1-\alpha} = 2,0420$ with $dk = (n - 1)$ dan $\alpha = 5\%$. Obviously $7,4433 > 2,0420$, so H_0 rejected. So, the average students' mathematical connection ability on Advance Organizer learning with Schoology has reached the Minimum Submission Criteria (MSC).

3.1.3. Hypothesis Test 3

The 3 hypothesis test is a test of average difference that is used to determine whether there is an increase in the mathematical connection ability of students before and after receiving Advance Organizer learning assisted by schoology. Calculations are carried out using Microsoft excel. Result of calculations obtained $t_{count} = 38,9542$ and $t_{1-0,5\alpha} = 2,0000$ with $dk = n_1 + n_2 - 2$ and $\alpha = 5\%$. Obviously $38,9542 > 2,0000$, so H_0 rejected. So, the mathematical connection ability of students after receiving Advance Organizer learning assisted schoology has improved. Therefore, further calculation of the gain is normalized. Based on the calculation, the students' mathematical connection ability increased by 0.8. Based on the normalized gain criteria is known that increasing the ability of students' mathematical connection is high.

3.2. Grouping Motivational Learning

Grouping students based on the category of motivation to learn in this research using a poll consisting of 30 items with four likert scales that students must choose according to their respective conditions. The

poll was adopted from Priyatun Research (2016) which has been validated by experts. The awarding of a poll was held on 27 August 2019 to 31 students of the research class. Once all the items are filled, a scoring is performed against the student's questionnaire and the determination of the boundaries of each category of motivational learning. Based on the calculations obtained on average of 85.16 and standard deviation of 6.93 so that the boundaries of each motivation category study can be seen in table 1.

Table 1. Motivation Learning Category Limits

Interval	Motivation Learning Category
$X \geq 92,09$	High
$78,23 < X < 92,09$	Medium
$X \leq 78,23$	Low

Based on the pre-determined boundaries obtained by class IX C student grouping available in table 2.

Table 2. Student Motivation Learning Category Data

Category	Students	Percentage
High	6	19%
Medium	18	58%
Low	7	23%
Total	31	100%

The subject selection of the study is based on the results of grouping student motivation and posttest value data. Based on some of these considerations the six selected subjects were then interviewed on 25 and 27 September 2019 outside of the learning hours, the selected subject can be seen in table 3.

Table 3. Data Subject Research

Motivation Learning Category	Students Code
High	E-04
	E-31
Medium	E-09
	E-15
Low	E-06
	E-07

3.3. Description Of Mathematical Connection Students Reviewed From Learning Motivation

Each research subject as previously known will be outlined in its mathematical connection capabilities by describing the students' ability to master each mathematical connection indicator. The mathematical connection ability indicators in this study include: (1) Recognizing and utilizing relationships between ideas in mathematics. This can be known from the problems that contain indicator 1 which is to write a formula or formula in a mathematical concept found in the numbers 1, 2, 3, and 4; (2) Understand how ideas in mathematics are interconnected and underlying one another to produce a coherent integrity. This indicator can be known from the problems that contain the indicator 2 is to use one concept and other concepts to solve the mathematical problems found in the numbers 1, 2, 3, and 4; (3) Recognizing and implementing mathematics in the form of contexts outside of mathematics, this can be noted from the problems containing the 3 indicators that illustrate the problem of the mathematical context with the mathematical language, found in the Number 2 and 4.

3.3.1. Student's Mathematical Connection Reviewed from High Learning Motivation

Based on the results of the interview, it can be concluded that the subjects with high learning motivation tend to be able to meet the indicator 1 that recognizes and utilizes relationships between ideas in mathematics. Subjects with high learning motivation tend to write the mathematical formula used to solve a problem. Subjects with high learning motivation tend to be able to meet the 2 indicators, namely understanding how the ideas in mathematics are interconnected and underlying one another to produce a coherent completeness. Subjects with high learning motivation tend to complete problem-solving stages

with sequential and provide simple answers. Subjects with high-learning motivation tend to be able to meet the 3 indicators of recognizing and implementing mathematics in the form of contexts outside of mathematics. Subjects with high learning motivation tend to illustrate the problem into the mathematical language and conclude the answers to mathematical calculations. Based on these results, it can be concluded that the subjects with high learning motivation tend to meet all mathematical connection indicators, i.e. 1, 2, and 3 indicators.

3.3.2. Student's Mathematical Connection Reviewed from Medium Learning Motivation

Based on the results of the interview, it can be concluded that the subjects with motivational learning are likely to be able to meet the indicator 1 that recognizes and utilizes relationships between ideas in mathematics. Subjects with motivational learning are prone to difficulty writing the Pythagoras formula and the speed difference in the problem. Subjects tend to struggle in declaring a Pythagoras formula. Subjects with motivational learning are likely to be able to meet the indicator 2 which is to understand how ideas in mathematics are interconnected and underlying one another to produce a coherent completeness. Subjects with motivational learning are likely to complete troubleshooting stages with sequential but give less simple answers. Subjects tend to have difficulty explaining the multiplication of root shapes used in problem solving stages. Subjects with motivational learning are less likely to be able to meet the 3 indicators of recognizing and implementing mathematics in the form of contexts outside of mathematics. Subjects with motivational learning are prone to difficulty depicting or illustrating the problem into the language of mathematics and the difficulty of concluding answers from mathematical calculations. Based on these results, it can be concluded that subjects with motivational learning are likely to meet two indicators of three mathematical connection indicators, which are indicators 1 and 2.

3.3.3. Student's Mathematical Connection Reviewed from Low Learning Motivation

Based on the results of the study, it can be concluded that subjects with low motivation are less likely to be able to meet indicator 1 that recognizes and utilizes relationships between ideas in mathematics. Subjects with low learning motivation tend not to write down the speed difference in problems. Subjects tend to have difficulty declaring a Pythagoras formula and a new comparison by substituted a mathematical kinetic energy formula. Subjects with low learning motivation tend to be able to meet the 2 indicators, namely understanding how the ideas in mathematics are interconnected and underlying one another to produce a coherent completeness. Subjects with low learning motivation tend to complete problem solving stages with less sequential and provide less simple answers. Subjects tend to have difficulty rationalizing a fraction of the root shape and do not complete the calculation around the triangle by applying the summation operation of the root form. Subjects tend to have difficulty explaining the summation of the roots used in the troubleshooting stages. Subjects with low learning motivation are less likely to be able to meet the 3 indicators of recognizing and implementing mathematics in the form of contexts outside of mathematics. Subjects with low learning motivation tend to have difficulty describing or illustrating the problem into the mathematical language and not concluding the answers from mathematical calculations. Based on these results, it can be concluded that subjects with low motivation are likely to meet one indicator of three mathematical connection indicators, which is the indicator 2.

4. Conclusion

Based on the results and the discussion is derived that learning advanced Organizer assisted schoology effective against the mathematical connection ability of students. This is based on some of the following information: (1) The mathematical connection ability of students on learning Advanced Organizer Schoology has reached the classical survival of 75% in accordance with the prescribed Minimum Submission Criteria (MSC), namely 71; (2) The average mathematical connection ability of students on Advance Organizer learning is assisted schoology has reached the Minimum Submission Criteria (MSC) of 71; and (3) there is an increase in the mathematical connection ability that are relatively high in students after receiving the Advance Organizer learning with the aid of schoology, namely 0.8.

In addition to the description of the mathematical connection ability the subject is reviewed from the motivation learned obtained results as follows. (1) Subjects with high motivation for learning have a tendency to meet all mathematical connection indicators, namely recognizing and utilizing relationships

between ideas in mathematics, understanding how the ideas in mathematics are interconnected and underlying each other to produce a coherent completeness, and recognize and apply mathematics in the form of contexts beyond mathematics. (2) The subject with motivational learning is having a tendency to fulfill two of the three mathematical connection indicators, namely recognizing and utilizing relationships between ideas in mathematics, and understanding how ideas in Mathematics is interconnected and underlies one another to produce a coherent completeness. (3) The subject with low learning motivation has a tendency to fulfill one of the three mathematical connection indicators, namely understanding how ideas in mathematics are interconnected and underlying one another to produce a Coherent integrity.

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