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# Mathematical Connections Ability Based on Personality Types in Conceptual Understanding Procedures Model

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**Abstract**

The purposes of this study are to (1) identify learning quality in Conceptual Understanding Procedures (CUPs) model (2) obtain mathematical connections ability based on artisan, guardian, idealist and rational personality types. This research is mixed method concurrent embedded design with qualitative research as the primary method. The type of this research is a quasi-experimental research with one group pretest-posttest design. The subjects in this research consist of 8 students XI RPL grade in SMK N 1 Kabupaten Semarang. Learning quality is assessed from the planning, implementation and evaluation stage. The result of this research shows that CUPs model in good criteria. Mathematical connection ability the artisan personality type reaches several indicators of mathematics connection, but they lack ability in using mathematical operation and can't apply the concept and procedure relationship which have been given to the new situation. Mathematical connection ability the guardian personality type reaches several indicators of mathematical connections but they are less conscientious in their calculations. Mathematical connection ability of the idealist personality type reaches all indicators of mathematics connections. Mathematical connection ability of the rational personality type reaches all indicators of mathematics connections.



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## INTRODUCTION

Mathematics is a structured and systematic science, in which mathematical concepts are structured hierarchically, structurally, logically, and systematically from the simplest concept to the most complex concept (Suherman et al., 2003). This means that math is not just logic, but the concepts and principles in mathematics are related to each other. Achievement a complete understanding of students are required have to ability of mathematics connections to avoid mistakes in understanding a concept (misconception).

Mastery of mathematics subjects for students of SMK / MAK function to form the competence of skill program (BSNP, 2006). The ability of connection to be one of the objectives of mathematics subjects (BSNP, 2006), namely that learners have the ability to understand the concept of Mathematics, explaining the interconnection between concepts and apply the concept or algorithm, flexibly, accurately, efficiently and appropriately in problem solving.

American Education Reaches Out (AERO, 2011) mentions that students will develop mathematical connections solving problems in which the problem requires a mathematical understanding as a whole. In addition, mathematics is also related to other disciplines and allows flexibility to approach a problem from within and outside mathematics. Materials for SMK class XI is closely related to daily life, related to other mathematical topics as well as related to other sciences. For example, the application of incomplete geometry series in everyday life is to find the length of the ball path until stop. Connection with other disciplines is to seek a single interest rate and compound interest in banking. Connection with other mathematical concepts for example is the matter of determining the sum of the nth terms if the quadratic equation $x^2 - 6x + 8 = 0$ has the $x_1$ and $x_2$ roots with $x_1 < x_2$. If $x_1$ ,$x_2$, $\frac{x_1 \times x_2}{2}$ form a sequence of geometries.

The connection indicators according to AERO (2011) all students in grades K-12 will be able to: (1) link new concepts with previous concepts; (2) identifying the relationship between each content; (3) using the possibility to solve problems in various ways in mathematics; (4) recognize and use mathematics in contexts outside mathematics.

The components of the mathematical connection ability are linking the interconnections of mathematics, relating mathematics to other sciences and relating mathematics to everyday life. Based on the above description, indicator of mathematical connection ability in this study refers to AERO exposure (2011) with some development by the researcher.

Saminanto and Kartono's research (2015) shows the ability of connections between one topic and the topic that is as much as 55%. While the ability of mathematical connection with other lessons is only 40%. The lowest connection capability is on the ability of math connection with daily life. The result is only 2%, so it can be concluded the ability of students' mathematical connections is still low.

Observation of the author in SMK N 1 Pabelan Kab. Semarang, many productive teaching teachers complain about the weakness of the ability to apply calculations related to productive skills. Many basic concepts of mathematics are less controlled by students. Lack of such basic concepts can hamper to achieve optimal learning objectives. The concept of mathematics is necessary in relation to other lessons. One of the productive subjects for the Rekayasa Perangkat Lunak (RPL) which involves the calculation and the concept of mathematics is a digital technique. Students must be able to convert decimal numbers to binary numbers. Productive subjects for the Teknik Sepeda Motor (TSM) which involves the calculations and concepts of mathematics are the basic machines, cylinder heads and electricity. In this productive maple many comparative applications on wheel calculations.

Based on previous research and observation of the author in SMK N 1 Pabelan indicates that students' mathematical connection ability is still relatively low. The results of this

study can be used as a reference in the selection of learning models in accordance with students so that they can learn optimally. A learning model may correspond to one student, but may be incompatible with another student (Pertiwi et al., 2015). This is because each student is a unique person and has different characteristics. One such characteristic is personality. Pervin et al. (2000) states personality is a characteristic of a person that causes the emergence of consistency of feelings, thoughts and behaviors. Kun et al. (2010) which states that the tendency of student personality patterns is one factor that will affect the ability of students' mathematical connections.

Keirsey and Bates (1984) classified the personality type into 4 namely guardian, artisan, rational, and idealist. Students with guardian types like teachers who clearly articulate material and precise instructions. Students with artisan types like a lot of demonstrations, discussions, presentations, because this type can show its ability. Students with rational type love science, mathematics, and philosophy, so it is possible to succeed in the field of interest. The most preferred mode of learning of rational type is experimentation, discovery through exploration, and complex problem solving. Students with idealistic types like to finish assignments personally and can view issues from different perspectives.

Based on student personality differences, teachers can provide the best model of learning to improve the ability of mathematical connections. One such learning model is CUPs. The CUPs learning model aims to help improve conceptual understanding (Mahmudah et al., 2015; Gummah et al., 2014). Conceptual understanding is also important, so that concepts already accepted by learners can last a long time (Anisa et al., 2013).

The CUPs model was developed using a constructivism approach, a learning model based on the belief that learners can build their own understanding of the concept by extending or modifying the experience of the learners. CUPs learning model is a model of learning where the students embedded how to make conclusions on the material being studied. Prastiwi et al (2014) states that CUPs is a learning model designed to foster the understanding of students in finding difficult concepts. The CUPs learning model emphasizes the importance of an individual's active role and responsibility for achieving shared understanding by the group (Hidayati and Sinulingga, 2015).

In the application of the CUPs learning model, learners are divided into small groups. Each group consists of three learners (triplet), but group divisions can adjust the number of students in the classroom. The CUPs model is built on three phases, (1) individual phases; (2) the group working phase; and (3) percentage phase. The three main phases of CUPs learning above, are used by researchers as scenarios to carry out the learning process on core activities. CUPs learning steps are expected to guide learners to understand new concepts, so that the ability of mathematical connections increases.

Based on the previous description, the formulation of research problems as follows: (1) how does the quality of learning on CUPs model improve the ability of mathematical connections of SMK students class XI ?; (2) how is the mathematical connection ability of student of SMK class XI with artisan personality type ?; (3) how is the mathematical connection ability of students of SMK class XI with guardian personality type ?; (4) how is the ability of mathematical connections of students of SMK class XI with idealist personality type ?; and (5) how is the ability of mathematical connections of students of SMK class XI with rational personality type?

## METHODS

This research is mixed method concurrent embedded design with qualitative research as the primary method. The type of this research is a quasi-experimental research with one group pretest-posttest design. The subjects in this research consist of 8 students XI RPL grade in SMK N 1 Kabupaten Semarang.

The research was conducted at SMK N 1 Pabelan Kab. Semarang in class XI with

learning model of CUPs on sequence and material. The study time was selected in the odd semester of the academic year 2016/2017. In the quantitative study selected one class sample. In qualitative research subject in research taken by purposive sampling technique where the taking is done with consideration and certain purpose (Sugiyono, 2013). The subjects for this study were one class students, consisting of guardian, artisan, rational and idealist students.

The quality of learning in this study includes planning, implementation and evaluation stage. Learning is said to be of quality if the result of device validation and learning instrument, the result of observation of the implementation and the result of the student's response to the learning on the minimum criteria is good. The determination of learning quality of CUPs model based on the achievement of learning mastery includes the average test of individual mastery and classical completeness, as well as the average mathematical connection ability of students after subjected to CUPs learning is better than the average mathematical connection ability before subject to CUPs learning.

The ability of a mathematical connection is analyzed descriptively based on the document of the test result and the interview with the student representative. The validity of the data using the source triangulation technique is the student representative interview. Qualitative data analysis follows the concept of Miles & Huberman (in Sugiyono, 2013) including data reduction, data presentation and conclusion drawing.

## RESULT AND DISCUSSION

The personality types questionnaire respondents consisted of 28 students. The detail of personality types questionnaire is presented in Table 1.

**Table 1.** Distribution of Personality Types

| Personality type | quantity | Percentage (%) |
|---|---|---|
| *Artisan* | 3 | 10.71 |
| *Idealist* | 16 | 57.14 |
| *Guardian* | 3 | 10.71 |
| *Rational* | 5 | 17.86 |
| *Artisan & Rational* | 1 | 3.57 |
| Total | 28 | 100 |

Results of quality study of learning with CUPs model implemented in class XI RPL SMK N 1 Pabelan, Kab. Semarang. The planning stage of each validator's assessment of learning tools can be seen in table 2 below.

**Table 2.** Assessment Results of Learning Devices

| Learning Media | Mean | Criteria |
|---|---|---|
| Syllabus | 3.93 | Good |
| Lesson plan | 4.06 | Excellent |
| Teaching supplement | 4.00 | Good |
| Student worksheet | 3.92 | Good |
| TKKM | 4.04 | Excellent |

Stage of learning implementation is said in a good quality if the results of observations on the quality of learning and the implementation of learning at least in a good criteria. Implementation of learning done as much as 5 times. The results of the assessment on the quality of learning models of CUPs are presented in Table 3

**Table 3.** Observation Results of Learning Quality

| Quality | Mean | Criteria |
|---|---|---|
| Firs meeting | 3.50 | Good |
| Second meeting | 3.68 | Good |
| Third meeting | 3.77 | Good |
| Forth meeting | 3.95 | Good |
| Fifth meeting | 4.23 | Excellent |

Based on the result of observation of the quality of learning in Table 3, the average score

is 3.83 so it can be concluded that the quality criteria of learning model CUPs is good. The results of the assessment of the implementation of the CUPs model learning are presented in Table 4.

**Table 4.** Observation Results of Implementation of Learning

| Implementation | Mean | Criteria |
|---|---|---|
| Firs meeting | 3.47 | Good |
| Second meeting | 3.65 | Good |
| Third meeting | 3.82 | Good |
| Forth meeting | 4.00 | Good |
| Fifth meeting | 4.18 | Good |

Based on observation result of the implementation of learning in Table 4 the average score is 3.82 so it can be concluded that the criteria of instructional learning model CUPs is good.

Third stage is the evaluation stage. Evaluation stage involves giving student response questionnaire to learning model of CUPs that have been done and analysis of test result of mathematical connection ability of students, students who respond positively to learning achieve more than or equal to 70%. This indicates that the majority of students assess the learning that has been well implemented.

The next stage of evaluation is analysis of students' mathematical connection test. Before making an analysis on final data, normality test is completed toward final data, it obtains significance value = 0.200 = 20%> 5%, therefore it is know that final data is from normal distributed population. Based on classical completeness test, it is obtained $z_{calculated}$ = 2.227 which is more than $z_{table}$ = 1.96, with significance level at 5%, hence $H_0$ is rejected. It means that the completeness proportion of mathematical connections ability of students in experimental class applying CUPs learning model accomplishes established classical passing grade, whereas students who accomplish minimum completeness are more than 70%.

The result of differentiation mean test on students' mathematical connections ability is $t_{calculated}$ = 29.043. The value of $t_{table}$ for $\alpha = 5\%$ and $df = 27$ is 1.703, therefore $H_0$ is rejected. Hence, it can be concluded that the mean of student's mathematical connection ability after given learning with the CUPs model is better than before given the learning with the CUPs model.

The calculation of the gain is used to determine the improvement of students' mathematical connection ability after given the CUPs model learning. Based on the result of gain calculation is known that in classical increase of students' mathematical connection ability. The results of classical gain calculation on students' mathematical connection capability are listed in table 5.

**Tabel 5.** Results of Gain Calculation on Students' Mathematical Connection Ability

| Pretes | Postes | $(g)$ | Gain |
|---|---|---|---|
| 26 | 82 | $(g) = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}} = \frac{82 - 26}{100 - 26} = 0.76$ | High |

Based on calculations in table 5 Obtained (g) = 0.76. This shows that the value (g) lies in the range 0.7 <(g) ≤1. So the optimized gain goes in high criteria. The conclusion obtained that students' mathematical connection ability on CUPs model increased with high criteria.

Results of data analysis from TKKM and interviews with artisan, guardian, idealist and rational subjects showed that the mathematical connection ability of each subject varies, depending on the student's personality trends. This is in accordance with the opinion of Pang Kun, Song Naiqing and Li Mingzhen (2010) which states that the tendency of student personality patterns is one factor that will affect the ability of students' mathematical connections.

The ability of students' mathematical connections in terms of artisan personality types is as follows. In connection Indicators linking the interconnections of mathematics, Subject A1 and Subject A2 are able to write the relationship between the concepts of geometry series with the

equation of quadratic equations. Able to apply relationships between concepts of geometric series with the equations of quadratic equations, but not yet able to use using factoring, pacing, multiplication, division and sum operations.

In connection indicators associate mathematics with other sciences, Subject A1 and Subject A2 can write down the conceptual relationship involved in the matter of finding a strong current with the concept of arithmetic sequence. Subject A1 and Subject A2 can write down the concept relationship involved in the matter of finding the speed of wheel spin on the machine tool with the concept of sequence geometry. But the subject A1 and A2 have not been able to apply the conceptual relationships and procedures that have been given to the new situation of finding the percentage of temperature drop to measure the current strength of the given problem. Subjects A1 and A2 are less able to apply the conceptual relationships and procedures that have been given to new situation that is looking for wheel speed rotation on machine tool with the concept of sequence geometry. Subject A1 and A2 encountered an error using the calculation procedure.

The connection indicator relates mathematics to daily life. Subjects A1 and A2 can identify math problems in everyday life. Subject A1 can apply math problems in everyday life that is looking for the cost of making all the stairs. However subject A2 encountered a miscalculation on the total cost. Subject A1 can apply math problems in everyday life that is looking for the number of geometric series not to rise and the number of geometric series not down. Subject A1 immediately searches the length of the total path regardless of the up and down trajectory.

The students' mathematical connection ability with the artisan personality type writes the conceptual relationship but the artisan type has not been able to apply the conceptual relationships and procedures that have been given to new situations. Type artisan able to associate mathematics with other science and able to relate mathematics with everyday life. The ability of a student's mathematical connection to the artisan personality type identifies and applies math problems in everyday life, but is less meticulous in calculations. The results are consestent with Prasetyo et al. (2017) arguing that the participants of the artisan personality type have connection capabilities that control one to two indicators of the four indicators formulated. The subject of artisan type mastered the mathematical communication 1, 2, 3, and 4, but less mastered the mathematical communication 5 and 6 (Pertiwi et al., 2014).

The ability of students' mathematical connections in terms of guardian personality types is as follows. In connection Indicators linking the interconnections of mathematics, Subjects G1 and G2 are able to write relationships between concepts of geometry series with the equation of quadratic equations. Subjects G1 and G2 are able to apply the relationships between geometric series concepts with the equation of quadratic equations and are able to use using factoring operations, powers, multiplications, divisions and sums.

In connection Indicators associate mathematics with other sciences, Subject G1 and G2 are able to write the conceptual relationship involved in the matter of finding a strong current with the concept of arithmetic sequence and geometry sequence. Subject G1 can apply the conceptual relationships and procedures that have been given to a new situation that is looking for a percentage of temperature drop to measure the current strength on the given problem. But the subject of G2 is less precise in its calculation operations. Subject of G1 and G2 are able to apply the conceptual relationships and procedures that have been given to the new situation of finding the speed of wheel spin on machine tools with the concept of geometry sequence.

In connection Indicators associate mathematics with everyday life, Subject G1 and G2 are able to identify math problems in everyday life. Subjects G1 and G2 can write mathematics in everyday life. But the subject of

G1 and G2 has not been able to apply math problems in everyday life.

The ability of students' mathematical connections with guardian personality types is able to link the interconnections of mathematics. The ability of students' mathematical connections with guardian personality types is able to relate mathematics to other sciences, but is less conscientious in their calculations. The mathematical connection ability of students with guardian personality types identifies and writes mathematical problems in everyday life, but has not been able to apply math problems in everyday life. The results are consestent with Pertiwi et al. (2014) arguing that subject type guardian mastered mathematical communication 1, 2, 3, 4, and 5, but less mastering of mathematical communication 6.

The ability of students' mathematical connections in terms of idealist personality types is as follows. In connection Indicators linking the interconnections of mathematics, Subject I1 and Subject I2 are able to write the relationships between geometric series concepts with the equation of quadratic equations. Subjects I1 and I2 are able to apply the relationships between geometric series concepts with the equation of quadratic equations, and are able to use using factoring operations, powers, multiplication, division and addition.

In connection indicators associate mathematics with other sciences, Subject I1 and Subject I2 are able to write the conceptual relationship involved in the matter of finding a strong current with the concept of arithmetic sequence. Subject I1 and Subject I2 able to write the relationship of the concept involved in the matter of finding the speed of rotation of the wheel on the machine tool with the concept of sequence geometry. As well as the subjects I1 and I2 can apply the conceptual relationships and procedures that have been given to a new situation that is looking for a percentage of temperature drop to measure the current strength on the given problem. In addition, subjects I1 and I2 are able to apply the conceptual relationships and procedures that have been given to the new situation of finding the speed of wheel spin on machine tools with the concept of geometric sequence.

The ability of students' mathematical connections with idealistic personality types has been able to relate the interconnection of mathematics, has been able to relate mathematics with other sciences and has been able to relate mathematics with everyday life. The results are consestent with Prasetyo et al. (2017) arguing that most students with idealistic personality types tend to have high levels of mathematical connections. The idealist type subject has excellent conceptual understanding ability (Purwaningsih et al., 2017). The idealist subject is able to understand the concepts of indicators 1, 2, 3, 4, 5, 6, and 7.

In connection indicators associate mathematics with everyday life, Subjects I1 and I2 are able to identify math problems in everyday life as well as apply math problems in everyday life that is looking for the cost of making all the stairs. Subjects I1 and I2 are able to apply math problems in everyday life that is to find the number of geometric series not to rise and the number of geometric series not to fall.

The students' mathematical connection ability in terms of rational personality type is as follows. In connection Indicators linking the interconnections of mathematics, Subject R1 and Subject R2 are able to write the relationship between the concept of geometry series with the equation of quadratic equations. Subjects R1 and R2 are able to apply the relationships between geometric series concepts with the equation of quadratic equations, and can use using factoring operations, powers, multiplication, division and addition.

In connection indicators associate mathematics with other sciences, Subject R1 and Subject R2 can write the conceptual relationship involved in the matter of finding a strong current with the concept of arithmetic sequence. Subject R1 and Subject R2 able to write the relationship of the concept involved in the matter of finding the speed of rotation of the wheel on the machine tool with the concept of sequence geometry. As well as the subject of R1 and R2 can apply the conceptual relationships and

procedures that have been given to the new situation of finding the percentage of temperature drop to measure the current strength of the given problem. In addition the subject of R1 and R2 can apply the concept and procedure relationships that have been given to new situation that is looking for speed of wheel rotation in machine tool with the concept of sequence geometry.

In connection indicators associate mathematics with everyday life, Subjects R1 and R2 are able to identify math problems in everyday life as well as apply math problems in everyday life that is looking for the cost of making all the stairs. Subjects R1 and R2 can apply math problems in everyday life that is looking for the number of geometric series not to rise and the number of geometric series not to drop.

The ability of students' mathematical connection with rational personality type has been able to relate the interconnection of mathematics, has been able to relate mathematics with other sciences and has been able to relate mathematics with everyday life. The results are consestent with Wiyaya et al. (2016) arguing that rational students in the aspect of fluency, flexibility, authenticity and elaboration tend to be very good and in general rational meets the four aspects of the ability to think creatively mathematically. The rational subject is able to understand all indicators of mathematical communication ability (Pertiwi et al., 2014).

## CONCLUSIONS

Based on the analysis and discussion, it can be drawn several conclusions: (1) The result of this research shows that CUPs model is in a good criteria; (2) Students with artistic personality types achieve some indicators of mathematical connection ability, but they lack ability in using mathematical operations and can't apply the conceptual relationships and procedures that have been given to a new situation. (3) Students with guardian personality types have already achieved some indicators of mathematical connection capabilities but less conscientious in their calculations. (4) Students with idealistic personality types have reached all indicators of mathematical connection ability. (5) Students with rational personality type have reached all indicators of mathematical connection ability.

## SUGGESTION

Based on the above conclusion, it is given several suggestions as follow. (1) learning CUPs model in terms of student personality type can improve the ability of mathematical connection, therefore it is highly recommended that this learning model can be applied in teaching and learning process; (2) Student response to learning model of CUPs in good criterion, it is suggested for students to choose effective way of learning and according to their personality so as to improve mathematical connection ability; and (3) The results show that students with artisan and guardian personality types are only able to achieve several indicators of mathematical connections, to enrich the review it's suggested to examine specifically for students with artisan and guardian personality types.

## REFERENCES

AERO (American Education Reaches Out). (2011). Mathematics Curriculum Framework K-8 Srandars And Performance Indicators. American: AERO

Anisa, D. N., Masykuri, M., & Yamtinah, S. (2013). Pengaruh model pembelajaran POE (Predict, Observe, and Explanation) dan sikap ilmiah terhadap prestasi belajar siswa pada materi asam, basa dan garam kelas VII semester 1 SMP N 1 Jaten tahun pelajaran 2012/2013. Jurnal Pendidikan Kimia, 2(2), 16-23.

BSNP. (2006). Standar Isi, Standar Kompetensi dan Kompetensi Dasar SMK/MAK. Jakarta: BSNP.

Gummah, S., Surya, S.A., & Hardariyanti. "Penerapan Model Pembelajaran

Kooperatif Teknik Conceptual Understanding Precedures Untuk Meningkatkan Hasil Belajar dan Aktivitas Siswa". Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA Prisma Sains. 2(2): 1-7.

Hidayati, F., & Sinulingga, K. (2015). Pengaruh Model Pembelajaran Conceptual Understanding Procedures (Cups) Terhadap Hasil Belajar Siswa Pada Materi Pokok Listrik Dinamis Di Kelas X Semester II SMA Negeri 1 Binjai TP 2014/2015. INPAFI (Inovasi Pembelajaran Fisika), 3(4): 59-66.

Keirsey, D. & Bates, M. (1984). Please Understand Me. California: Promotheus Nemesis Book Company.

Kun, P., Naiqing, S., Mingzhen, L. (2010). A Study on the Relationship between Temperament and Mathematics Academic Achievement. China: Chinese Industry Publishers.

Mahmudah, A., Sutarni, S., & Rejeki, S. (2015). Ekperimentasi Metode Conceptual Understanding Procedures dan Mind Mapping Ditinjau dari Gaya Belajar. Jurnal Varidika: Varia Pendidikan, 27(1): 33-42.

Pertiwi, A.D., Masrukan, & Susilo, B.E. (2015). Analysis of Mathematical Communication Ability Through 4K Model Based On 7 th Graders' Personality Types. International Journal of Education and Research. 3 (7): 343-352

Pervin, L.A., D. Cervovne, & O.P. John. (2010). Psikologi Kepribadian: Teori dan Penelitian (Edisi 9). Translated by Anwar, A.K. Jakarta: Prenada Media Group.

Prasetyo, A., Dwidayati, N.K., & Junaedi, I. (2017). "Kemampuan Koneksi dan Disposisi Matematis Siswa Ditinjau dari Tipe Kepribadian Keirsey Pada Pembelajaran Matematika Model Eleciting Activities". Unnes Journal of Mathematics Education Research. 6(2): 190-197.

Prastiwi, I., Soedjoko, E., & Mulyono, M. (2014). Efektivitas Pembelajaran Conceptual Understanding Procedures Untuk Meningkatkan Kemampuan Siswa Pada Aspek Koneksi Matematika. Jurnal Kreano. 5(1): 41-47.

Purwaningsih, K., Zaenuri, & Hidayah, I. (2017). "Analisis Kemampuan Pemahaman Konsep dalam Pembelajaran Contextual Teaching Learning Materi Segiempat Ditinjau dari Tipe Kepribadian Peserta Didik". Unnes Journal of Mathematics Education Research. 6(1): 142-151.

Saminanto dan Kartono. (2015). Analysis Of Mathematical Connection Ability In Linear Equation With One Variable Based On Connectivity Theory. International Journal of Education and Research. 3 (4): 259-270

Sugiyono. (2013). Metode Penelitian Kuantitatif, Kualitatif, dan Kombinasi (Mixed Methods). Bandung: Alfabeta.

Suherman, E. dkk. 2003. Common Textbook; Strategi Pembelajaran Matematika Kontemporer. Bandung: JICA, Universitas Pendidikan Indonesia.

Wijaya, L., Rochmad, & Agoestanto, A. (2016). "Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP Kelas VII Ditinjau dari Tipe Kepribadian". Unnes Journal of Mathematics Education Research. 5(2): 84-91.