UJMER 8 (2) (2019) 173 - 179

Unnes Journal of Mathematics Education Research

http://journal.unnes.ac.id/sju/index.php/ujmer

Students' Mathematical Connection Ability and Self Regulated Learning on MiC Learning with Recitation and Peer Assessment Based on Semarang Culture

Vita Nur Millaty ✉ **, Kartono, Nur Karomah Dwidayati**

Universitas Negeri Semarang, Indonesia

Article Info

Article History:
Received 15 September 2018
Accepted: 04 January 2019
Published: 23 December 2019

Keywords:
Mathematical Connection, Self Regulated Learning, MiC, Recitation, Peer Assessment

Abstract

This research was aimed (1) to know the effectiveness of MiC learning with recitation and peer assessment based on Semarang Culture to students' mathematical connection ability and (2) to analyze students' mathematical connection ability and self regulated learning. This study was a mixed method research with a sequential explanatory design. The population was 7th grade students of SMP N 32 Semarang academic year 2017/2018. The subjects was selected based on the students' initial matehamtical ability which is categorized as upper, middle and lower group students. Data was collecting by questionnaire, observation, test, and interview. The result showed that (1) MiC learning with recitation and peer assessment based on Semarang Culture is effective on students' mathematical connection ability, (2) students in the upper group category can connect between topics in mathematics, connect mathematical concepts with other diciplines, connect mathematics with daily life well and have a high level of self regulated learning, students in the middle group category can connect mathematical concepts with other diciplines and connect mathematics with daily life well and have a moderate level of self regulated learning, and for students in lower group category can connect mathematical concepts to other diciplines well and have a low level of self regulated learning.

✉Correspondence:
Jalan Kelud Utara III, Semarang Indonesia
E-mail: vitamillaty@gmail.com

p-ISSN 2252-6455
e-ISSN 2502-4507

INTRODUCTION

Mathematics is a universal science that is learned at every level of education and very important to learn in daily life. Mathematical connection ability is one of the important skill to be mastered by students. According to Mousley (2004) and Linto, Elniati, & Rizal (2012), students have an important mathematical connection ability to develop students' mathematical understanding.

Mathematical connection ability is the ability of students to connect between mathematical topics, connect mathematics with other disciplines, and connect mathematics with daily life (Siregar & Surya, 2017). According to Azizah, Mariani, & Rochmad (2012), the ability of students to connect between mathematical concepts can generate a wider and deeper understanding.

Based on observations on 7th grade students of SMP Negeri 32 Semarang in answering the questions of social arithmetic material, showed that students' mathematical connection ability were still low. According Sulistyaningsih (2012), the low mathematical connection ability will affects the quality of student learning that became resulting in poor performance of students in school.

One of the factors that causes the students' low mathematical connection ability is because the learning process that has been done so far has not been meaningful so the forgetting process occurs faster. In addition, students also experience difficulties when solving more complex problems. They need to use concepts that have been studied and interconnected to solve the problem.

One of method that teachers can do to improve students' mathematical connection skills is by using MiC learning. MiC (Mathematics in Context) consists of mathematical tasks and questions designed to stimulate mathematical thinking and to promote discussion among students (Fasha, 2017). The importance of MiC learning is that students can learn mathematics in any context, which makes students not bored to learn mathematics so that the motivation to learn mathematics can grow (Meyer, 2001). MiC learning can be initiated by presenting material concepts from the environment and daily life which are then directed to the actual concept of the lesson, so that students can understand the benefits of the material they are learning and its relation to daily life.

Another factor that can improve students' mathematical connection ability is the selection of teaching methods in the classroom. In this research the learning method that used is the recitation method. According to Djamarah (2010), the recitation method is a way of presenting materials where the teacher gives certain tasks so that students carry out learning activities. Based on the results from research of Sodikin & Hartatiana (2015) states that the recitation method can maximize understanding of students' mathematical concepts.

Mathematics and culture are two things that are closely related (Hardiarti, 2017). By relating local culture to mathematics learning, learning will be more meaningful and students will be more motivated in solving problems given to them, hopefully they can improve their mathematical connection skills. In this research, the local culture associated with mathematics learning is the Semarang Culture.

The success of student learning is not only determined by the selection of appropriate learning but also from students' self regulated learning (Kurniawati, Junaedi, & Mariani, 2015). According to Sundayana (2016), students' self regulated learning can affect the level of students' mathematical abilities. The higher level of students' self regulated learning, the higher the students' mathematical abilities and vice versa. Therefore, self regulated learning must be possessed by every student.

According to Utomo (2011), to assess the success of learning process, an assessment is needed that can be used to monitor the entire process and aspects of learning related to the formation of these competencies. One of assessment method of learning outcomes used in this research is peer assessment. According to Majdoddin (2010) peer assessment is a method of assessment where students are asked to provide information about the performance of their friends. While according to Noonan (2005) peer assessment is an alternative form of assessment that involves individual decisions on the giving of the value of his friends who contribute to a process or

project. It is expected that with peer assessment, students can learn to criticize and learn more from the results of their friends' work.

Based on that, it is very necessary to do research on Students' Mathematical Connection Ability and Self Regulated Learning on MiC Learning with Recitation and Peer Assessment Based on Semarang Culture. The purpose of this study was (1) to know the effectiveness of MiC learning with recitation and peer assessment based on Semarang Culture to students' mathematical connection ability, and (2) to analyze students' mathematical connection ability and self regulated learning.

METHOD

This research is a combination of qualitative and quantitative research (mix method). This study uses an explanatory sequential design where quantitative methods are implemented first and more dominate in the design of this study. The population of this study is 7th grade students of SMP N 32 Semarang academic year 2017/2018. From the population a sample of 2 classes was taken. The experimental class is class VII G and the control class is class VII C. Subject taking is done by selecting 6 students based on the students' initial mathematical connection abilities consisting of 2 upper group students, 2 middle group students, and 2 lower group students.

Data collection techniques that used consist of questionnaire, observation, test, and interview. The quantitative data was started from items analysis, the prerequisite test, test of hypothesis that consist of average test, proportion test, and t test. Qualitative data were analyzed by qualitative descriptive method that refers to Miles and Huberman in Sugiyono (2015), such as data reduction, data presentation, and drawing conclusions or verification.

RESULT AND DISCUSSION

The normality test of the initial data shows that the data comes from a normal distributed population, while the homogeneity test also shows that the data has the same variance, and the average similarity test shows that there is no difference in the average of the two classes. The test results of students' mathematical connection ability are presented in Table 1.

Table 1. Recapitulation of Mathematical Connection Ability Results

No	Description	Experiment Class	Control Class
1	Average	81.60	76.91
2	The highest Score	97.50	92.50
3	The lowest Score	63.75	60.00
4	Standard deviation	7.92	8.64
	Students who complete	32	20
	Students who didn't complete	4	16

The effectiveness of learning is determined based on the results of the calculation of the average test, proportion test, and t test. In the calculation of the average test, proportion test and t test, the significant level or α used is 0.05. The average test is used to determine the average mathematical connection ability of students achieving the minimum completeness criteria or not. The result of the average test showed $t = 4{,}99 > 1{,}69 = t_{(1-\alpha)(n-1)}$, it means the average mathematical connection ability of students in the class using MiC learning with recitation and peer assessment based on Semarang Culture achieved the minimum completeness criteria.

The proportion test aims to determine the proportion of students who reach the minimum completeness criteria at least 75% of the number of students in the class or not. The proportion test results showed $z = 1{,}87 \geq 1{,}64 = z_{(0{,}5-\alpha)}$, it means the proportion of students using MiC learning with recitation and peer assessment based on Semarang Culture that reaches the minimum completeness criteria has exceeded 75%.

The t test aims to determine whether the mathematical connection ability of students using MiC learning with recitation and peer assessment based on Semarang Culture is better than students'

mathematical connection ability using conventional learning. The t test results show that $t = 2{,}40 > 1{,}67 = t_{\text{table}}$, it means that the average mathematical connection ability of students using MiC learning with recitation and peer assessment based on Semarang Culture is more than the average mathematical connection ability of students with conventional learning.

Based on the results, it shows that MiC learning with recitation and peer assessment based on Semarang Culture are effective on students' mathematical connection ability. This is because MiC learning with recitation and peer assessment based on Semarang Culture begins learning with problems that exist in the student environment so that students have embedded experiences that are commonly encountered by students in their daily lives and make it easier for students to solve ability problems mathematical connection.

MiC learning with recitation and peer assessment based on Semarang Culture is effective on students' mathematical connection ability in line with the research conducted by Nanang (2018) which states that the mathematical abilities of students who get MiC learning are better than conventional learning. In addition, research conducted by Chan (Fasha, 2017) shows that learning with a discussion model using the MiC approach is better than learning using other methods.

Discussion of students' mathematical connection ability is in the form of descriptions of student work results and interview results. Indicators of mathematical connection ability in this study are (1) connecting between topics in mathematics, (2) connecting mathematical concepts with other disciplines, and (3) connecting mathematics with everyday life (NCTM, 2000).

The results showed that generally students in the upper group category could meet the three indicators of mathematical connection ability well, such as connecting between topics in mathematics, connecting mathematical concepts with other disciplines, and connecting mathematics with daily life. Students in the upper group categories completed all questions with clear and coherent solutions because they have a good understanding of the material, so that when the students is given a problem, they can understand well what method or concept is used to solve the problem given.

Students in the middle group category can fulfill two indicators of mathematical connection ability, such as connecting mathematical concepts with other disciplines and connecting mathematics with daily life. This is in accordance with the study of Widarti (2013) which states that students who have mathematical connection ability are fulfilling approximately 75% of mathematical connection indicators. The problem often faced by students in the middle group in solving problems is a problem of accuracy in carrying out calculations. Students in this group want to work quickly so that in some questions they are less careful in answering questions and do not write things that are known and asked from the questions.

Students in the lower group category can meet an indicator of mathematical connection ability, that connecting mathematical concepts with other disciplines. Some questions cannot be solved properly by students in the lower group and do not write down things that are known or asked from the questions. Students in the lower groups tend to have difficulty understanding the questions in the form of stories. The mistakes of the lower group students in answering the test questions of mathematical connection ability because of the lack of understanding of the concepts they used to solve the problem. In addition there are questions that are done only until the initial step is not to find the final answer to the problem. It is because students do not understand the questions given so they do not know how to do the problem. The wrong learning strategy also affects the acquisition of value. They worked too long on the initial number questions so that the final number questions were very limited.

The discussion of self regulated learning is in the form of a description of the results of self regulated learning questionnaire and the results of interviews. Self regulated learning in this study includes 8 indicators, such as (1) learning initiatives, (2) diagnosing learning needs, (3) setting learning goals/ targets, (4) seeing difficulties as challenges, (5) utilizing and searching for relevant sources, (6)

choosing, implementing learning strategies, (7) evaluating learning processes and outcomes, and (8) self-concept/ self-ability (Hendriana, Rohaeti, & Sumarmo 2017)

Recapitulation of the results of the calculation of the self regulated learning score on the chosen subject can be seen in Table 2.

Table 2 Recapitulation of Students' Self Regulated Learning

Subject	Self Regulated Learning Score	Criteria
U1	0.83	High
U2	0.79	High
M1	0.68	Moderate
M2	0.7	Moderate
L1	0.49	Low
L2	0.48	Low

Based on Table 2, generally students in the upper group category have a high level of self regulated learning. The first subject in the upper group obtained the highest self regulated learning score in the class, which was 0,83, while the second subject was in the upper group having a self regulated learning score of 0,79. This is because students with good connection skills tend to have good mathematical understanding so that when faced with a mathematical problem, the student will work on the problem with his own abilities. Students in the upper group often help friends who have difficulty learning mathematics. They feel very satisfied when they can solve math problems and feel happy when discussing with friends.

Students in the middle group category have a moderate level of self regulated learning. The first subject in the middle group obtained a self regulated learning score of 0,68 while the second subject in the middle group obtained a higher self regulated learning score of 0,7. Students in the middle group tried to work on mathematical questions to see the mastery of the material they had learned. In addition, they usually repeat the material that has been studied and check the answers or tasks to be collected in advance.

Students in the lower group category have a low level of self regulated learning. Based on the results of the self regulated learning questionnaire, the first subject in the lower group obtained a self regulated learning score of 0,49 while the second subject in the lower group obtained a lower self regulated learning score of 0,48. Students in the lower groups usually use group discussions to ask questions or mathematical problems that have not been understood by other smarter friends.

The results of this research are supported by previous research, from Ningsih (2016), Lestari, Dwijanto, & Hendikawati (2016), Faroh, Sukestiyarno, & Junaedi (2014) which state that self regulated learning has a positive influence on students' mathematical abilities. According to Qohar (2011), between students' mathematical connection ability and the self regulated learning there are significant associations. Students with high self regulated learning, mathematical connection ability tend to be high or moderate, while students with moderate self regulated learning, mathematical connection ability tend to be moderate, and students with low self regulated learning, mathematical connection ability tend to be moderate or low.

CONCLUSION

Based on the results and discussion, the following conclusions are obtained. MiC learning with recitation and peer assessment based on Semarang culture was effective on students' mathematical connection ability. Students in the upper group category can connect between topics in mathematics, connect mathematical concepts with other disciplines, and connect mathematics with daily life well and have a high level of self regulated learning. Students in the middle group can connect mathematical concepts with other disciplines and connect mathematics with daily life well and have a moderate level of self regulated learning. Students in the lower category can connect mathematical concepts with other disciplines well and have a low level of self regulated learning.

Success in developing students' mathematical connection ability is supported by learning that can

provide opportunities for students to connect mathematical material to daily life. MiC learning with recitation and peer assessment based on Semarang culture can be an alternative learning for teachers in mathematics learning to improve students' mathematical connection ability. Self regulated learning affects students' ability to solve mathematical connection problems. Teachers should design learning that can create students' self regulated learning such as providing structured assignments that encourage students to prepare themselves before learning.

ACKNOWLEDGEMENT

The author would like to thank Mr. Al Bekti Wisnu Tomo, M.M. as the headmaster of SMP N 32 Semarang, Ms. Murtini, S.Pd. as a mathematics teacher at SMP N 32 Semarang, as well as grade VII C, VII D, and VII G students of SMP N 32 Semarang.

REFERENCES

Azizah, L., Mariani, S., & Rochmad. 2012. "Pengembangan Perangkat Pembelajaran Model CORE Bernuansa Konstruktivistik untuk Meningkatkan Kemampuan Koneksi Matematis". *Unnes Journal of Mathematic Education Research*, 2(1): 100-105.

Djamarah, S. & Zain, A. 2010. *Strategi Belajar Mengajar*. Jakarta: Rineka Cipta.

Faroh, N., Sukestiyarno, & Junaedi, I. 2014. "Model Missouri Mathematics Project Terpadu dengan TIK untuk Meningkatkan Pemecahan Masalah dan Kemandirian Belajar". *Unnes Journal of Mathematic Education Research*, 3(2): 98-103.

Fasha. 2017. "Pembelajaran Matematika Dengan Pendekatan *Mathematics In Context* Pada Kemampuan Dan Keterampilan Berpikir Kreatif". *JES-MAT*. 3(1):87-94.

Hardiarti, S. 2017. "Etnomatematika: Aplikasi Bangun Datar Segiempat pada Candi Muaro Jambi". *Aksioma*, 8(2): 100-110.

Hendriana, H., Rohaeti, E.E., & Sumarmo, U. 2017. *Hard Skills dan Soft Skills Matematik Siswa*. Bandung: PT Refika Aditama.

Kurniawati, M., Junaedi, I, & Mariani, S. 2015. "Analisis Karakteristik Berpikir Geometri dan Kemandirian Belajar dalam Pembelajaran Fase Van Hiele Berbantuan *Geometres Sketchpad*". *Unnes Journal of Mathematic Education Research*, 4(2): 102-107.

Lestari, P.D., Dwijanto, & Hendikawati, P. 2016. "Keefektifan Model Problem Based Learning dengan Pendekatan Saintifik terhadap Kemampuan Pemecahan Masalah dan Kemandirian Belajar Peserta Didik Kelas VII". *Unnes Journal of Mathematics Education*, 5(2): 146-153.

Linto, R.L., Elniati, S., & Rizal, Y. 2012. "Kemampuan Koneksi Matematis dan Metode Pembelajaran Quantum Teaching dengan Peta Pikiran". *Jurnal Pendidikan Matematika*, 1(1): 83-87.

Maenda, H.I.A.S. & Sulaiman, R. 2017. "Profil Kemampuan Koneksi Matematika dalam Memecahkan Soal Matematika Open-Ended Ditinjau dari Kemampuan Matematika". *Jurnal Ilmiah Pendidikan Matematika*, 2(6): 43-49.

Majdoddin, K. 2010. "Peer Assessment: An alternative to traditionaltesting". *Jurnal Tehran*, 396-405.

Meyer, M. 2001. *Mathematic in Context*. Wisconsin Center forEducation Research: Education Development Center, Inc

Mousley, J. 2004. "An Aspect of Mathematical Understanding The Nation of Connected Knowing". *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education*, 3: 377-384.

Nanang. 2018. "Kemampuan Pemecahan Masalah Matematik Mahasiswa Melalui Pembelajaran Mathematic in Context". *Jurnal Penelitian Pendidikan dan Pengajaran Matematika*, 4(1):27-34.

NCTM. 2000. *Principles and Standards for School Mathematics*. Reston, Virginia: NCTM.

Ningsih. 2016. "Pengaruh Kemandirian Belajar dan Perhatian Orang Tua terhadap Prestasi Belajar Matematika". *Jurnal Formatif*, 6(1): 73-84.

Noonan, D. 2005. "Peer and Self assessment in High Schools. Practical Assessment, Research and Evaluation". *Electronic journal*, 10(17):1-8.

Qohar, A. 2011. "Asosiasi Antara Koneksi Matematis dan Komunikasi Matematis Serta Kemandirian Belajar Matematika Siswa SMP". *Prosiding Lomba dan Seminar Matematika XIX*, 32-43.

Saminanto & 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.

Siregar, N.D. & Surya, E. 2017. "Analysis of Students' Junior High School Mathematical Connection Ability". *International Journal of Science: Basic and Applied Research*, 33(2): 309-320.

Sodikin & Hartatiana. 2015. "Pengaruh Penerapan Metode Resitasi dengan Pendekatan Keterampilan Proses terhadap Kemampuan Pemahaman Konsep Matematika Siswa pada Pokok Bahasan Persamaan Linier Satu Variabel di Kelas VII Madrasah Tsanawiyah Paradigma Palembang". *Jurnal Pendidikan Matematika JPM RAFA*, 1(1): 77-97.

Sugiman. 2008. "Koneksi Matematik dalam Pembelajaran Matematika di Sekolah Menengah Pertama". *Pythagoras*, 4(1): 56-66.

Sugiyono. 2015. *Metode Penelitian Pendidikan* (*Kuantitatif, Kualitatif, dan R&D*). Bandung: Alfabeta.

Sulistyaningsih, D., Waluya, S.B., & Kartono. 2012. "Model Pembelajaran Kooperatif Tipe CIRC dengan Pendekatan Konstruktivisme untuk Meningkatkan Kemampuan Koneksi Matematik". *Unnes Journal of Mathematic Education Research*, 1(2): 121-127.

Sundayana, R. 2016. "Kaitan Antara Gaya Belajar, Kemandirian Belajar, dan Kemampuan Pemecahan Masalah Siswa SMP dalam Pelajaran Matematika". *Jurnal Mosharafa*, 5(2):75-84.

Utomo, B.T. 2011. "Penerapan Pembelajaran Kolaboratif dengan Asesmen Teman Sejawat pada Mata Pelajaran Matematika SMP". *JP3.* 1(1):52-61.

Widarti, A. 2013. "Kemampuan Koneksi Matematis dalam Menyelesaikan Masalah Kontekstual ditinjau dari Kemampuan Matematis Siswa". *Jurnal STKIP PGRI Jombang*, 1(3): 1-8.