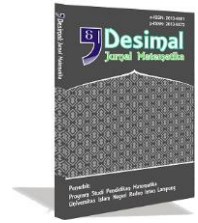




Contents lists available at DJM
DESIMAL: JURNAL MATEMATIKA
p-ISSN: 2613-9073 (print), e-ISSN: 2613-9081 (online), DOI 10.24042/djm
<http://ejournal.radenintan.ac.id/index.php/desimal/index>



Mathematical Connection Ability : Impact of Contextual Teaching And Learning Approaches in Flat Side Space Lesson

Kurnia Kandari *, Luvy Sylviana Zanthu

Ikip Siliwangi Bandung, Indonesia

ARTICLE INFO

Article History

Received : 19-09-2019
Revised : 22-11-2019
Accepted : 02-12-2019
Published : 26-01-2020

Keywords:

mathematical connection;
the Contextual Teaching and Learning;
Geometry Flat Side.

*Correspondence: E-mail:
niakandari11@gmail.com

Doi:
[10.24042/djm.v3i1.4467](https://doi.org/10.24042/djm.v3i1.4467)

ABSTRACT

The purpose of this research is to analyze the students' mathematical connection ability before and after getting Contextual Teaching and Learning. The subjects were the 26 students of class VIII-A at SMI 1 MANIIS, Purwakarta Regency. The research used the descriptive method with the qualitative approach. The data for the analysis were from the test to student consist of 5 questions with 4 different indicators. The results shows that all students have moderate in mathematical connection ability with the overall results of 65.83%. For the results of each indicator, there is one indicator that has not been met, understanding the equivalent representation from one procedure to another one, or from one concept to another concept. So it can be concluded that the mathematical connection ability in terms of the Contextual Teaching and Learning approach has a significant effect.

<http://ejournal.radenintan.ac.id/index.php/desimal/index>

INTRODUCTION

In teaching and learning activities, mathematics is introduced starting from childhood students up to the college level (Yanti, Fauziah, & Friansyah, 2017), because learning mathematics is very important in the world of education and everyday life. Learning mathematics not only understands the concept or procedure, but many things can emerge from the results of the mathematics learning process (Putra, 2017). The improvement of mathematics learning, depend on the ability of mathematical

connections. Connection is a relationship or linkage of several elements. In learning mathematics, these elements include the concepts, principles or procedures (Badjeber, 2017). The ability of mathematical connections is the ability to link concepts, principles or procedures contained with other fields of science and everyday life (Badjeber & Fatimah, 2015). Meanwhile, according to NCTM (Nurfauziah, Adni, & Rohaeti, 2018) if students are able to connect mathematical ideas, their mathematical understanding will deepen and last longer because

students are able to see the relationships between topics in mathematics, with contexts outside mathematics, and with everyday life experiences.

The concepts in learning mathematics are interconnected with each other. When students learn a concept, they need to learn another. This situation is called mathematical connection, the ability of students to connect a concept with other concepts (Kenedi, Helsa, Ariani, Zainil, & Hendri, 2019). In the process of learning mathematics, mathematical connections need to be made at all levels of the class so that students can build a complete knowledge of mathematics (Fatimah, Effendi, & Amam, 2018). Students' mathematical connection skills play an important role in solving problems, so this has a positive impact on students' independent learning (Yaniawati, Indrawan, & Setiawan, 2019). Through mathematical connections, students can develop conceptual understanding to use interconnected mathematical concepts in solving problems (Tasni & Susanti, 2017). The indicators of mathematical connection ability include looking for the relationship of various representations of concepts and procedures, understanding the relationship between mathematical topics, applying mathematics in other fields of study or everyday life, understanding the equivalent representation of a concept, looking for the relationship of one procedure with other procedures in equivalent representation, applying the relationship between mathematical topics and between mathematical topics with topics outside mathematics (Yuliani, Praja, & Noto, 2018).

There are many issues arise in mathematical problem, one of them is the lesson about build a flat-sided space taught at the seventh grade of junior high school even semester. The scope of the lesson includes Beams, Cubes, Pyramid and Prism. The geometrical shape is

important to learn because of it had many applications in everyday life (Indraningtias & Wijaya, 2017). Student competence in understanding the construction of flat side spaces is a prerequisite for students to be competent in understanding the next subsequent lessons (Sari, Amilda, & Syutaridho, 2017). In an effort to improve students' mathematical connection skills, an approach that can facilitate and develop mathematical connection skills is needed. One of them is the Contextual Teaching and Learning (CTL) approach. CTL approach is a learning system based on the philosophy that a learner will be willing and able to absorb the subject lesson by the meaning (Karim, 2017). The CTL approach is a learning concept that helps teacher link subject content with real-world situations and motivates students to make connections between knowledge and its application for their lives as family members, communities, workers and hard work that requires learning (Khamid & Santosa, 2016). The CTL learning approach is a learning approach that emphasizes the process of full student involvement, seems like students work and experience for themselves what they learn by bringing the real world into the classroom (Fadhilaturrahmi, 2017) so that it encourages students to apply it in their lives (Siamy, Farida, & Syazali, 2018). Learning with this method requires students for not just listening and taking notes, but they are encouraged to experience the process directly. Through the experience process, it is hoped that student development will occur in its entirety, which not only develops in cognitive aspects, but also affective and psychomotor (Lestari, Amelia, & Marianingsih, 2017). CTL-based learning according to Sanjaya (Bernard, 2015), involves seven main components of learning, namely constructivism, asking questions, discovering, learning

communities, modeling, reflection and actual assessment.

The essence of CTL learning is transfer of learning, where students learn in life, both skills and expanded knowledge (Khoiriyah, Laili, & Mahmudah, 2018). CTL provides a fresh experience that will stimulate the brain to make new connections to find new goals (Susialita, 2016).

Thus learning in schools is not only focused on providing theoretical abilities, but how to make student learning experiences related to actual problems in their environment (Setyowati & Purba, 2017). Contextual learning can be considered as an approach that shows the natural condition of knowledge. Through relationships inside and outside the classroom, contextual learning approaches make the experience more relevant and meaningful for students who are building the knowledge they will apply in lifelong learning (Surya, Putri, & Mukhtar, 2017).

Based on the explanation above, the writer is interested in studying the Contextual Teaching and Learning approach. Learning objectives achieved are to describe the ability of mathematical connections in terms of the contextual teaching and learning approach to the material Build Flat Side Space.

METHOD

This type of research is a descriptive study using a quantitative approach. Descriptive research aims to describe precisely the nature, circumstances, and

symptoms of an individual or group. (S, Parta, & Rahardjo, 2016). The purpose of this research is to analyze and describe the ability of mathematical connections in terms of the contextual teaching and learning approach to the material Build Flat Side Space. In this research, there are two variables, namely the independent variable and the dependent variable, which become the independent variable, namely the Contextual Teaching and Learning approach and which become the charged variable, the students' mathematical connection ability. This research was conducted at SMP in Purwakarta Regency. The subjects were 26 students of class VIII-B at SMI 1 Maniis. The instrument used an essay consisting of 5 items about mathematical connection capability with 4 different indicators that have been tested for validity, reliability, distinguishing power, and difficulty index. To analyze student answers, researcher assessing the test questions according to the scoring rubric provided.

For scoring student answers, a rubric for assessing students' mathematical connection ability assessments was adopted and modified (Hendriana, Rohaeti, & Sumarmo, 2017). Based on the rubric scoring in Table 1, researchers can determine whether students can meet each of the mathematical connection indicators or not. The data obtained is then adjusted with the scoring rubric, then processed with a percentage for each student's mathematical connection indicator.

Table 1. Scoring Rubric Mathematical Connection Ability

Mathematical Connection Indicator	Student Responses	Score
Apply and connect various concepts of building flat side spaces in other fields of study	<ul style="list-style-type: none"> ● Apply relationships between procedures contained in other fields of study. ● Resolve problems in other fields of study 	5
Linking and connecting mathematical concepts with other concepts	<ul style="list-style-type: none"> ● Linking and connecting between mathematical procedures, understanding the problems presented 	7
Understand the equivalent representation from one procedure to another or from one concept to another	<ul style="list-style-type: none"> ● Identifying the relationship of an equivalent representation of a mathematical concept ● Identify the name of the relationship ● Resolving problems everyday 	8
Link and connect the concept of building a flat side room in everyday life	<ul style="list-style-type: none"> ● Explain and identify the names of mathematical concepts contained in the problems of everyday life 	9

RESULTS AND DISCUSSION

Implementation of learning to build a flat side space with the CTL approach has been running in accordance with the specified learning activities. The following

are the results of a written test of 26 students at SMAN 1Maniis based on the results of the percentage score of each indicator for each item. The percentage is in Table 2.

Table 2. Percentage of mathematical connection capabilities of each indicator

Indicators	Number of question	Percentage of mathematical connection capabilities
● Apply and connect various concepts of building flat side spaces in other fields of study	3	64.62%
● Linking and connecting mathematical concepts with other concepts	2	89.06%
● Understand the equivalent representation from one procedure to another or from one concept to another	1	51.44%
● Understand the equivalent representation from one procedure to another or from one concept to another	5	54.81%
● Link and connect the concept of building a flat side room in everyday life	4	69.23%
Average		65.83%

Based on Table 2, it can be seen that for each indicator has different results and abilities. Can be sorted from highest to lowest.

1) Linking and connecting mathematical concepts with other concepts that is equal to 89.06%;

2) Linking and connecting the concept of building flat side space in daily life that is 69.23%;

3) Applying and connecting various concepts of building flat side spaces in other fields of study, as many as 64.62%.

4) For the results of the indicators understanding the equitable representation from one procedure to another or from one concept to another there are two questions so get a value of 51.44% and 54.81%;

Furthermore, the average percentage results for students' mathematical connection skills in terms of the Contextual Teaching and Learning approach score 65.83%.

This proves that the mathematical connection ability of students at SMPN 1 Maniis is fulfilled. In accordance with Purwanto's opinion that the mathematical connection indicator is said to be fulfilled if the percentage is at least 55% in each

question. For the highest results found in indicator number 2 namely Linking and connecting mathematical concepts with other concepts the percentage is 89.06%. From the results of the indicators on question number 2, students better understand questions related to other concepts to be transformed into mathematical connection abilities. Whereas the lowest indicator is found in questions no. 1 and 5, why is that because students lack understanding of concepts related to images and must relate them to the other. Examples of student questions and answers are found in Figure 1 and Figure 2 (indicators linking and linking mathematical concepts with other concepts).

Examples of questions and answers for indicators Link and connect mathematical concepts with other concepts
Cika has 8 boxes of different sizes. Cika's boxes are cubes. Cika must fill each box with small cubes with the size 1 cm^2 . Cika has filled 3 boxes with small cubes, with boxes 8 = 512, box 7 = 343, box 6 = 216, Complete the number of small cubes needed for the next 5 boxes?

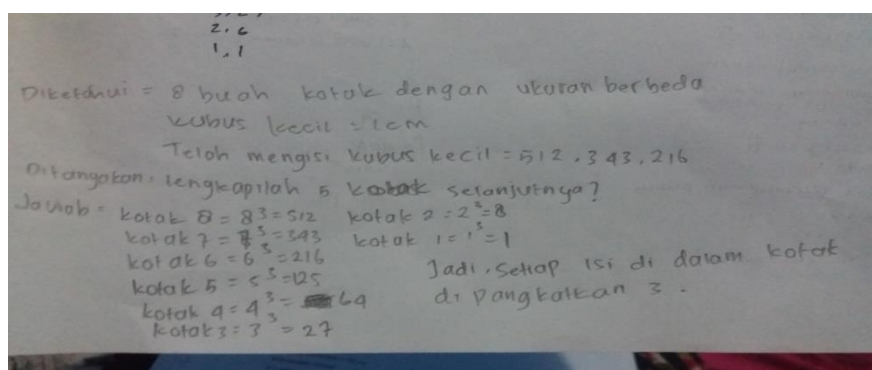


Figure 1. Student response

Examples of questions and answers for indicators understand an equivalent representation from one procedure to another or from one concept to another.

In a Cartesian coordinate the base will be made of a triangular prism which has three points, point coordinates A (6,6) and point B (7, 4). If the distance from point A to B is 2 units, and point B to C is 4 units to the left and point C to A is 3 units. Make a sketch in the printed paper provided and what flat shape is visible?

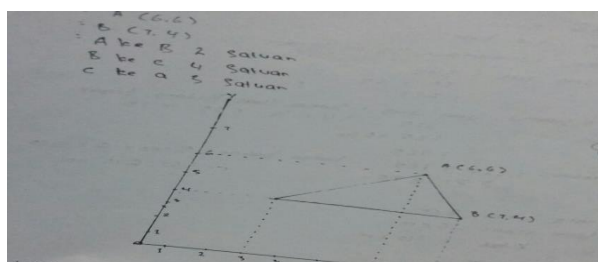


Figure 2. Student responses

From the two answers above clearly seen that students better understand material related to one another without having to have pictures. As for the material that has to make a picture students are still lacking in sketching pictures and questions in the form of stories. This is in line with the results of Uncarno's research (Warih S, Parta, & Rahardjo, 2016) that students have difficulty understanding story problems, because students are not careful in reading and understanding sentence by sentence, about things that are known, asked, and how to solve questions appropriately.

CONCLUSIONS AND SUGGESTIONS

Based on the analysis, it can be concluded that the ability of mathematical connections on the Contextual Teaching and Learning approach is better than learning that uses conventional methods. Students' mathematical connection ability after being applied by the CTL method obtained a percentage above the average of 65.83%.

Future studies that use a contextual teaching learning model must be further investigated at various levels of education and material. In addition, this research will be better if it is complemented by observing other factors which can have different effects on the research results.

REFERENCES

- Badjeber, Rafiq. "Asosiasi Kemampuan Penalaran Matematis Dengan Kemampuan Koneksi Matematis Siswa Smp Dalam Pembelajaran Inkuiri Model Alberta." *Jurnal Penelitian Dan Pembelajaran Matematika* 10, no. 2 (2017). <https://doi.org/10.30870/jppm.v10i2.2030>.
- Badjeber, Rafiq, and Siti Fatimah. "Peningkatan Kemampuan Koneksi Matematis Siswa Smp Melalui Pembelajaran Inkuiri Model Alberta." *Jurnal Pengajaran Matematika Dan Ilmu Pengetahuan Alam* 20, no. 1 (2015). <https://doi.org/10.18269/jpmipa.v20i1.557>.
- Bernard, Martin. "Meningkatkan Kemampuan Komunikasi Dan Penalaran Serta Disposisi Matematik Siswa Smk Dengan Pendekatan Kontekstual Melalui Game Adobe Flash CS 4.0." *Infinity Journal* 4, no. 2 (2015). <https://doi.org/10.22460/infinity.v4i2.84>.
- Diah Ayu Indraningtyas, A, and Riyadi Wijaya. "Pengembangan Perangkat Pembelajaran Berbasis Pendekatan Matematika Realistik Materi Bangun Ruang Sisi Datar Berorientasi Pada Kemampuan Berpikir Kritis Siswa Kelas VIII SMP." *Jurnal Pendidikan Matematika* 6, no. 5 (2017): 24–36. perangkat pembelajaran, pendekatan matematika realistik, kemampuan berpikir kritis Abstract.
- Fadhilaturrahmi. "Peningkatan Hasil Belajar Siswa Pada Materi Jaring-Jaring Balok Dan Kubus Dengan Pendekatan Contextual Teaching And Learning (CTL) Siswa Kelas IV SDN 05 Air Tawar Barat." *Jurnal Basicedu* 1, no. 1 (20197).
- Fatimah, Ai Tusi, Adang Effendi, and Asep Amam. "Koneksi Matematis Pada Konsep Ekonomi (Permintaan Dan Penawaran)." *TEOREMA: Teori Dan Riset Matematika* 2, no. 2 (2018). <https://doi.org/10.25157/teorema.v2i2.1074>.
- Hendriana, Heris, Euis Eti Rohaeti, and Utari Sumarmo. *Hard Skills Dan Soft Skills Matematik Siswa*. Bandung: Refika Aditama, 2017.
- Karim, Abdul. "Analisis Pendekatan Pembelajaran CTL (Contextual Teaching And Learning) Di SMPN 2 Teluk Jambe Timur, Karawang." *Formatif: Jurnal Ilmiah Pendidikan*

- MIPA 7, no. 2 (2017).
<https://doi.org/10.30998/formatif.v7i2.1578>.
- Kenedi, Ary Kiswanto, Yullys Helsa, Yetti Ariani, Melva Zainil, and Sherlyane Hendri. "Mathematical Connection of Elementary School Students to Solve Mathematical Problems." *Journal on Mathematics Education* 10, no. 1 (2019).
<https://doi.org/10.22342/jme.10.1.5416.69-80>.
- Khamid, Abdul, and Rusgianto Heri Santosa. "Keefektifan Pendekatan PBL Dan CTL Ditinjau Dari Komunikasi Matematis Dan Motivasi Belajar Siswa SMP." *PYTHAGORAS: Jurnal Pendidikan Matematika* 11, no. 2 (2016).
<https://doi.org/10.21831/pg.v11i2.10660>.
- Khoiriyah, Binti, Nur Laili, and Masrurotul Mahmudah. "PENDEKATAN CONTEXTUAL TEACHING AND LEARNING (CTL) UNTUK MENINGKATKAN HASIL BELAJAR AKIDAH AKHLAK." *Al-Mudarris: Journal Od Education* 1, no. 2 (2018).
- Lestari, Astri, Evi Amelia, and Pipit Marianingsih. "Pengembangan Lembar Kerja Siswa Berbasis CTL (Contextual Teaching and Learning) Sebagai Bahan Ajar Siswa SMA/MA Kelas XII Subkonsep Kultur in Vitro." *Biosfer: Jurnal Pendidikan Biologi* 10, no. 1 (2018).
<https://doi.org/10.21009/biosferjpb.10-1.5>.
- Nurfauziah, Puji, Nurul Dinda Adni, and Euis Eti Rohaeti. "Analisis Kemampuan Koneksi Matematis Siswa SMP Ditinjau Dari Self-Efficacy Siswa." *Jurnal Pembelajaran Matematika Inovatif* 1, no. 5 (2018).
- Putra, Fredi Ganda. "Eksperimentasi Pendekatan Kontekstual Berbantuan Hands On Activity (HoA) Terhadap Kemampuan Pemecahan Masalah Matematik." *Al-Jabar : Jurnal Pendidikan Matematika* 8, no. 1 (2017).
<https://doi.org/10.24042/ajpm.v8i1.1148>.
- S, Pratiwi Dwi Warih, I Nengah Parta, and Swasono Rahardjo. "Analisis Kemampuan Koneksi Matematis Siswa Kelas VIII Pada Materi Teorema Pythagoras." In *Prosiding Konferensi Nasional Penelitian Matematika Dan Pembelajarannya [KNIP I, 2016]*.
- Sari, Yulia Purnama, Amilda Amilda, and Syutaridho Syutaridho. "Identifikasi Kemampuan Kognitif Siswa Dalam Menyelesaikan Soal-Soal Materi Bangun Ruang Sisi Datar." *Jurnal Pendidikan Matematika RAFA* 3, no. 2 (2017).
<https://doi.org/10.19109/jpmrafa.v3i2.1738>.
- Setyowati, Renny, and Romirio Torang Purba. "Peningkatan Kreativitas Siswa Kelas 4 SD Melalui Model Pembelajaran Contextual Teaching And Learning (CTL)." *Elementary School Jjournal* 7, no. 2 (2017).
- Siamy, Lailatul, Farida Farida, and Muhamad Syazali. "Media Belajar Matematika Berbasis Multimedia Interaktif Dengan Pendekatan Contextual Teaching and Learning." *Desimal: Jurnal Matematika* 1, no. 1 (2018).
<https://doi.org/10.24042/djm.v1i1.1919>.
- Surya, Edy, and FERIA Andriana Putri. "Improving Mathematical Problem-Solving Ability And Self-Confidence of High School Students Through Contextual Learning Model" 8, no. 1 (2017).
- Susialita, T. "The Development of Audio-Visual Student Portfolios (LKS) Contextual Teaching and Learning-Based (CTL) on Sound Chapter of

Science Subject for Deaf Students.”
Jurnal Pendidikan IPA Indonesia 5, no.
2 (2016).
<https://doi.org/10.15294/jpii.v5i2.6734>.

Tasni, Nurfaidah, and Elly Susanti.
“Membangun Koneksi Matematis
Siswa Dalam Pemecahan Masalah
Verbal.” *Beta: Jurnal Tadris
Matematika* 10, no. 1 (2017).

Yaniawati, R. Poppy, Rully Indrawan, and
Gita Setiawan. “Core Model on
Improving Mathematical
Communication and Connection,
Analysis of Students’ Mathematical
Disposition.” *International Journal of
Instruction* 12, no. 4 (2019).
<https://doi.org/10.29333/iji.2019.12441a>.

Yanti, Dwi, Anna Fauziah, and Drajat
Friansah. “Pengaruh Model
Pembelajaran Kontekstual Terhadap
Kemampuan Koneksi Matematika
Siswa Kelas X SMA Negeri 4
Lubuklinggau Tahun Pelajaran
2015/2016.” *Jurnal Pendidikan
Matematika Raflesia* 2, no. 2 (2017).