# The Impact of Contextual Teaching and Learning (CTL) Ability in Understanding Mathematical Concepts

Azes Yudha, Sufianto Sufianto, Boby Engga Putra Damara, Budi Taqwan, Saleh Haji
Mathematics Education Program
University of Bengkulu
Bengkulu, Indonesia
yudhaazes499@gmail.com, Sufiantofathir@yahoo.co.id, bobbyengga32@gmail.com, buditaqwan42@gmail.com, salehhaji@unib.ac.id

*Abstract*—**The purpose of this research was to identify the impact of Contextual Teaching and Learning (CTL) on the ability of understand of mathematical concepts. This study used a qualitative descriptive approach to the type of study is a library research, the data obtained from various sources related to the matters under investigation in the form of books and literature or the results of research and writings related to research the journal is both national and international journals. The results of this study indicate that Contextual Teaching and Learning (CTL) can have an impact on students' understanding of the concept. In order to achieve this, teacher should know and master various ways to teach students with Contextual Teaching and Learning (CTL) that can be used to improve students' ability to understand concepts in mathematics learning. The implication in this research is a collection of results of other people's research or theories underlying the problem that is wanted to be studied.**

*Keywords—Contextual Teaching and Learning (CTL); understand of mathematical concepts*

## I. INTRODUCTION

Mathematics is one of the knowledge learned at every level of education. This is because the math is very necessary and useful in everyday life. Math working to develop the capability of understanding calculate, measure, and solve problems in everyday life. Haji describes the understanding of the concept is very important. Because it can affect the understanding of mathematical objects that others, namely principles and skills [1]. Zulkardi explains that the mathematics courses emphasize the concept. The ability of understanding mathematical concepts supported by the ability of generalization and abstraction [2]. According to Rohana to understand the mathematical concepts necessary generalization and abstraction capabilities high enough [3].

The current reality, the ability of understanding mathematical concepts students are still low. As noted Ruseffendi that there are many students who once studied mathematics, unable to comprehend even the simplest part, many of the concepts are misunderstood [4].

Therefore, it is necessary to improve and increase student understanding of mathematical concepts through the quality of learning that can present the abstract becomes concrete. The learning is Contextual Teaching and Learning (CTL). Contextual Teaching and Learning (CTL) helps teachers to connect between the material and the student's real-world situations and emphasizes students make connections between knowledge and its application in everyday life. Components of Contextual Teaching and Learning (CTL) as follows: 1) Constructivism, 2) Ask, 3) Found, 4) Community learning, 5) Modeling, 6) Reflection, and 7) The actual assessment [5,6].

Some research relevant to Contextual Teaching and Learning (CTL) is Widyaningrum research with the title of the effect of applying a contextual approach to understanding the concept of mathematical ability of students (Studies in class VIII SMPN 3 Batang in the academic year 2012/2013) [7]. Based on the results showed that the average score of understanding of mathematical concepts in a class that uses a contextual approach that is 16.52 with a maximum score of 25 and a minimum score of 8. While in the control class that uses a conventional learning obtained an average score of 12.72 out of a maximum score 23 and a minimum score of 5. Based on the analysis that has been done through the t-test, it is known that the average student's understanding of mathematical concepts in a class that uses a contextual approach is better than average understanding of mathematical concepts in conventional learning at the 5% significance level.

Other than that, Military Academy, which deals with the application of Contextual Teaching and Learning (CTL) in improving the understanding of the mathematical concepts of junior high school [8]. Specifically, these implementations explained that associated with the use of the Contextual Teaching and Learning (CTL) which aims to see how the students' understanding of mathematical concepts can be increased. Overall use of Contextual Teaching and Learning (CTL) to enhance understanding of the concept of students, the principles contained in the Contextual Teaching and Learning (CTL) make students more actively to find and dig up as much information from the knowledge that they have experienced,

from trial props, from sharing experiences with other group members as well as from the teacher. By finding, the planting concept to students progressed very well so that more mathematics learning achievement can be improved.

Likewise, research Mauke related to the effect of Contextual Teaching and Learning (CTL) to the understanding of concepts and problem solving skills. Showed that students who learned using the learning model CTL has a score of understanding of concepts and problem solving skills are higher than students who learn to use conventional learning models [9].

Banowati indicates that the application of the approach Contextual Teaching and Learning (CTL) can increase students' understanding of mathematical concepts [10]. This is evident from: (1) The results of observations of the implementation of mathematics learning in the first cycle amounted to 78.95% (high category) in the second cycle of 89.47% (high category) (2) Results of observation of student activities in the first cycle by 64, 10% (category enough) in the second cycle of 97.44% (high category) (3) Many students are understanding the concept has reached a high of 85.71% category; 4) The percentage of students using mathematical concept understanding based on the indicator increased to the high category (a) restate a draft of 80.95%, (b) Classification of objects according to certain attributes of 80.95%.

Through Contextual Teaching and Learning (CTL), an understanding of mathematical concepts can be developed. According to TT LAM stated that the approach Contextual Teaching and Learning (CTL) can strengthen students' mathematical knowledge before and increase student learning about a new concept to solve some real problems [11]. The problem of this research is how the impact of the approach Contextual Teaching and Learning (CTL) on the ability of students' understanding of mathematical concepts?

## II. METHOD

This study uses library research, the data obtained from various sources related to the matters under investigation, such as books and literature relating to the study either of the journals of national and international journals. Some of the books used in this study are Johnson with the Title of Contextual Teaching and Learning [6]. Besides Sumarno's Book with the title of students' mathematical understanding ability [12]. While international journals are Fadillah et al. [13] with the title The Effect of Application of Contextual Teaching and Learning (CTL) Model-Based on Lesson Study with Mind Mapping Media to Assess Student Learning Outcomes on Chemistry on Colloid Systems and T.T. Lam entitled Contextual Approach in Teaching Mathematics: An Example Using the Sum of Series of Positive Integers [14].

All data collected in the form of primary data and secondary data and analyzed qualitatively. Data are presented descriptively to explain and gather the problems associated with the title of the study. Based on the results of the discussion then be concluded as a response to the problems studied. In this study, the approach Contextual Teaching and Learning (CTL) is used to describe, explain and analyze the ability of understanding the mathematical concept study of the impact of the approach Contextual Teaching and Learning (CTL) on the ability of students' understanding of mathematical concepts.

## III. RESULT AND DISCUSSION

### A. Learning Contextual Teaching and Learning (CTL)

T.T. Lam a context is a 'real' mathematical problem that can be solved by more than one method across different subject disciplines – the methods range from some rather elementary ones to the more sophisticated ones [14]. Meanwhile, Fadillah, et al. stated that Contextual Teaching and Learning (CTL) a conception of teaching and learning that helps teachers connect subject matter content to real world situations and motivate students to make connections between knowledge and its application to everyday life [13].

Each learning approach has the traits or characteristics of each, as well as with learning Contextual Teaching and Learning (CTL). According Widiasworo study Contextual Teaching and Learning (CTL) involves seven major components of effective teaching that is constructivism, frequently asked questions, find, community learning, modeling and actual assessment [15]. Meanwhile, Johnson (2002) states there are eight major components in the learning system Contextual Teaching and Learning (CTL) is to do a meaningful relationship, perform the activities of a significant, learning self-regulated, cooperate, think critically and creatively, parenting or personal students, achieving high standards and using authentic assessment [6]. On the other hand, in a report to the Northwest Regional Educational Laboratory, Owen suggest seven key elements of Contextual Teaching and Learning (CTL) that is meaningful learning, application of knowledge, think critically [16].

Based on the opinions of the above it can be concluded that the Contextual Teaching and Learning (CTL) is a concept of learning where the teacher presents a real-world situation into the classroom and encourage students to make connections between the knowledge possessed by the application in their lives that has seven components Contextual Teaching and Learning (CTL) are: constructivism, find, asking, learning community, modeling, reflection, the actual assessment.

### B. Understanding of Concept

Bell states that concepts are abstract ideas that allow us to group objects into examples and non-examples [17]. According Orlich C Donal, et al., one of the conceptual learning that can be done is to present related examples or facts that will be studied and provide opportunities for students to discover the concepts themselves [18]. While Suherman & Sukjaya formulate indicators that can measure using the usual understanding of such operational verb distinguish words, modify, interpret, define, resolve, generalize, give examples, prove, simplify, and substitute [19].

According to Sanjaya Indicators contained in the understanding of concepts such as will be described, as follows: 1) The ability to explain verbally, 2) The ability to present a mathematical situation into a variety of ways, 3) The ability to classify objects, 4) The ability to apply the

relationship between concepts and procedures, 5) Ability provide examples and sample cons of the concept study was the ability of students to be able to distinguish an example and not an example, 6) Ability to apply concepts of algorithms, and 7) Ability to develop a concept that has been studied is the ability of students assess where the requirement is necessary and where sufficient conditions associated a material concept. Based on these descriptions then, the ability of understanding of the concept is the ability to know, understand and apply the concepts, procedures, principles and mathematical ideas [20].

### C. Learning Impact Contextual Teaching and Learning (CTL) Against Capabilities Concept Training Math Students

Understanding mathematical concepts as follows:

*1) Constructivism to declare re-concept:* With constructivism emphasizing its own understanding of active, creative, and productive based on previous knowledge and of meaningful learning experiences so students can express again what has been communicated to him or restate a concept.

Example question: students are able to redefine the multiplication of three.

3 x 1 = 3

3 x 2 = 3 + 3 = 6

3 x 3 = 3 + 3 + 3 = 9

Using defining multiplication here means learning multiplication student after he was able to restate the multiplication three.

*2) Classify objects fit concept:* That is, students are able to classify certain properties of an object according to its type and properties. Example: Mother bought two pieces of cloth for garments green and yellow. The second piece of fabric, each measuring 12 meters in green and yellow 24 meters. Specify:

- Many ensembles were created, if it's a man alone requires 3 meters and 4 meters of green cloth yellow cloth.
- Many sets of clothes that can be made, if it is for a woman only needs 4 meters and 6 meters of green cloth yellow cloth. To solve problems like these students should be able to categorize by type and its properties.

TABLE I. COMPLETION

| Clothing | Green (m) | Yellow (m) |
|---|---|---|
| Man (x) | 3 | 4 |
| Women (y) | 4 | 6 |
| Total fabric | 12 | 24 |

Here there has been a grouping and finally the students are able to form a mathematical model: 3x + 4y = 12 and 4x + 6y = 24. So that students can solve systems of linear equations using one of the methods mentioned above.

*3) Giving an example and not an example of a concept:* Meaningstudents can distinguish a true example of a material and a sample that is not true of a concept of the material that has been studied. On the subject of logic, students are able to distinguish a sentence that included a statement and not a statement.

Example:

*a) All living things need oxygen to breathe.*

*b) Snake is classified as mammals.*

Answer:

The second sentence above as a statement, as a classified sentence if the sentence is a statement we could be right or wrong answer. If true then the statement is a correct statement, and vice versa if one then the statement is a false statement. So the sentence a statement that is true and phrases b statement is false.

Based on the description above, this paper discussed the The Impact of Study Contextual Teaching and Learning (CTL) Ability of Understand Mathematical Concepts.

## IV. CONCLUSION

Contextual Teaching and Learning (CTL) of a connection between mathematical concepts to solve problems every day. Where in life we find some problems and issues that must be solved or resolved contextually advance, as well as in mathematics. Based on the discussion and relevant research, it can be concluded that learning Contextual Teaching and Learning (CTL) have a significant or strong impact to build students' understanding of the concept.

## ACKNOWLEDGMENT

## REFERENCES

[1] S. Haji, "Meningkatkan Kemampuan Pemecahan Masalah Melalui Pendekatan Matematika Realistik di Kelas 7 SMP N 1 Kotamadya Bengkulu," Jurnal Pendidikan Pengembangan Kurikulum dan Teknologi Pembelajaran, Fakultas FKIP Universitas Mulawarman Samarinda. Kalimatan Timur, 2008.

[2] Zulkardi, Pendidikan Matematika di Indonesia: Beberapa Permasalahan dan Upaya Penyelesaiannya. Palembang: Unsri, 2003.

[3] Rohana, Pengaruh Pembelajaran Berbasis Masalah Terhadap Pemahaman Konsep Mahasiswa FKIP Universitas PGRI. Palembang : Prosiding PGRI, 2011.

[4] E.T. Ruseffendi, Pengantar Kepada Membantu Guru Mengembangkan Kompetensinya Dalam Pengajaran Matematika Untuk Meningkatkan CBSA. Bandung: Tarsito, 2006.

[5] N.Y. Wahyuningtyas, "The Assembling of Contextual Teaching and Learning (CTLl) Model Assisted by Origami Paper Media for Increasing Plane Learning Result in The Fifth Grade of Primary School," International Journal of Elementary Education, pp. 176-179, 2017.

[6] E.B. Johnson, Contextual Teaching and Learning. California: Corwin Press, INC, 2002.

[7] Widyaningrum, "Pengaruh Penerapan Pendekatan Kontekstual Terhadap Kemampuan Pemahaman Konsep Matematis Siswa," Jurnal Pendidikan Matematika, vol. 2, no. 2, 2013.

[8] A.R. Akmil and R.Y. Armiati, "Implementasi CTL Dalam Meningkatkan Pemahaman Konsep Matematika Siswa SMP," Pendidikan Matematika, pp. 24-29, 2012.

[9] M. Mauke, I.W. Sadia, and I W. Suastra, "Pengaruh Model Contextual Teaching and Learning Terhadap Pemahaman Konsep dan Kemampuan Pemecahan Masalah dalam Pembelajaran IPA-Fisika di MTs Negeri Negara," -Journal Program Pascasarjana Universitas Pendidikan Ganesha, 2013.

[10] H. Banowati, "Upaya Meningkatkan Pemahaman Konsep Matematika Melalui Pendekatan Contextual Teaching And Learning (CTL) Pada Siswa Kelas VII B SMP Negeri 4 Banguntapan," Yogyakarta: Universitas PGRI Yogyakarta, 2015.

[11] T. T. LAM, "Contextual approach in teaching mathematics: an example using the sum of series of positive integers," International Journal of Mathematical Education in Science and Technology (IJMEST), National Institute of Education, Nanyang Technological University, Singapore, 2007.

[12] Y.S. Suryono, Pembelajaran kewirausahaan masyarakat. Yogyakarta: Aditya Media, 2013.

[13] A.N.P. Fadillah, "The Effect of Application of Contextual Teaching and Learning (CTL) Model-Based on Lesson Study With Mind Mapping Media to Assess Student Learning Outcomes on Chemistry on Colloid Systems," International Journal of Science and Applied Science, pp. 101-108, 2017.

[14] T.T. LAM, "Contextual Approach in Teaching Mathematics: An Example Using the Sum of Series of Positive Integers," International Journal of Mathematical Education in Science and Technology, pp. 273-282, 2015.

[15] E. Widiasworo, Strategi & Metode Mengajar Siswa Di Luar Kelas (Outdoor Learning) Secara Aktif, Kreatif, Inspiratif, & Komunikatif. Yogyakarta: AR-Ruzz Media, 2017.

[16] T. Owens, Teacher Preparation for Contextual Teaching and Learning a Statewide Consortium Model. Portlend, Oregon; Northwest Regional Educational Library, 2001.

[17] F.H. Bell, Teaching and Learning Mathematics (In Secondary School). IOWA: WnC Brown Comp. Publisher, 1981..

[18] C.D. Orlich, Teaching Strategis : A Guide to Effective Instruction. USA: Houghton Mifflin Company, 2007.

[19] E. Suherman and Y. Sukjaya, Evaluasi Pendidikan Matematika. Bandung:Wijaya Kusumah, 2003.

[20] W. Sanjaya, Strategi Pembelajaran Berorientasi Standar Proses Pendidikan. Jakarta: Kencana Prenada Media group, 2009.