Application Of The Contextual Teaching And Learning Model In Mathematics Learning SPLDV Material

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Abstract. The purpose of this study is to compare the learning outcomes of students who were taught a system of linear equations with two variables using the Contextual Teaching and Learning model versus those who were taught the same material using the Direct Instruction methodology. Class VIII-1, which used the Contextual Teaching and Learning approach, and class VIII-2, which used the Direct Instruction model, were the topics. This study used a Posttest Only Control Group Design and a Quasi-Experimental Method. The sample for this study was drawn from two classes, specifically classes VIII1 and VIII2, each of which included 25 pupils. Both classes were equal and uniform. This data analysis is tested using the t-test with the parameters $t_{count} = 5.020 > t_{table} = 2.059$. H_1 is accepted because H_0 is refused. For instance, the Contextual Teaching and Learning (CTL) methodology can help students learn more effectively utilizing social math tools.

Keywords: Contextual teaching and learning, Linear equation system of two variables, Learning outcomes.

Abstrak. Penelitian ini bertujuan untuk mengetahui perbedaan hasil belajar siswa yang diajarkan dengan model Contextual Teaching and Learning dan hasil belajar siswa yang diajarkan dengan model Direct Instruction pada materi sistem persamaan linear dua variabel. Subjek penelitian yaitu kelas VIII-1 yang menggunakan model Contextual teaching and learning dan kelas VIII-2 yang menggunakan model Direct Instruction. Penelitian ini menggunakan metode eksperimen semu, dengan desain penelitian Posttest Only Control Group Design. Sampel penelitian ini diambil dari 2 kelas yaitu kelas VIII1 yang terdiri dari 25 siswa dan VIII2 yang terdiri dari 25 siswa, kedua kelas tersebut homogen dan sama. Pengujian analisis data ini menggunakan uji t dengan nilai $t_{hitung} = 5,020 >$ nilai $t_{tabel} = 2,059$ maka H_0 ditolak sehingga H_1 di terima. Dengan demikian, hasil belajar dengan model Contextual Teaching and Learning (CTL) dapat meningkatkan hasil belajar siswa pada materi aritmetika sosial.

Kata kunci: Contextual Teaching and Learning, Sistem Persamaan Linear Dua Variabel, Hasil Belajar.

INTRODUCTION

Education is a process of learning for students to understand something and make them become human beings who are critical in thinking. According to Ki Hajar Dewantara "Education is the process of guiding all the natural forces that exist in the children of students, so that they as human beings and as members of society can achieve the highest safety and happiness" (Mangelep, 2017; Masitoh & Cahyani, 2020). In general, education aims to educate and develop the potential within students (Mangelep, 2017; Izza et al., 2020). Every child can have knowledge and creativity, be physically and psychologically healthy, have a nice personality, be independent, and be a responsible member of society with the development of intelligence and self-potential (Mangelep, 2013; Yanti & Syahrani, 2021).

According to Mangelep (2015) and Wahyudi (2012), mathematics is a science that works with ideas (ideas), rules, and relationships that are rationally structured to tie mathematics to abstract notions. Mathematics is a science that studies abstract structures and patterns of relationships in them as well as a tool, as knowledge (for scientists) and as a guide for mindsets and as forming attitudes (Manambing, 2018; Ningsih, 2019). In line with this opinion, According to Permendiknas number 22 from 2006, mathematics must be taught to all children to provide them the skills necessary for logical, analytical, systematic, critical, creative, and cooperative thinking (Purwaningrum, 2016; Sulistyaningsih & Mangelep, 2019). Based on the opinions stated above, mathematics is a lesson arranged in an orderly, logical, tiered manner from the easiest to the most complex.

Based on interviews with the math teacher Mrs. Adela, class VIII SMP Negeri 8 Manado, information was gathered that the low results of students' mathematics learning, especially in the material of the two-variable linear equation system from the results of daily tests, where in one class of 25 students, only 10 students who complete (can reach KKM scores), which means there are still 15 students who have not reached the KKM (Minimum Completeness Criterion) was obtained. This shows that students have yet to be successful in learning mathematics, so students are required to make repairs.

In addition, based on interviews conducted with several students whose grades did not reach the KKM, they explained that they had difficulty solving questions in story form because it took a little time to understand and understand the intent of the story

questions given and had to transfer them to a mathematical model. Besides that, based on the researchers' observations, the learning atmosphere still needed to be more pleasant when the teacher only used the direct learning model; the teacher tended to be more dominant or active in teaching and learning activities. The teacher's learning process is only in the form of assignments, lectures, notes and questions and answers (Mulyadi, 2015; Tiwow et al., 2023). Meanwhile, students in the learning process only act passively; namely, they sit, listen to explanations from the teacher, and take notes but do not understand and understand the learning material delivered by the teacher (Rikin, 2019; Tiwow et al., 2023).

Therefore, choosing learning models is a wise and useful course of action. The Contextual Teaching and Learning model are one of the learning paradigms connected to daily life. According to Firmansyah et al. (2018) and Runtu et al. (2023), contextual teaching and learning is a method for teaching that enables teachers to connect the material they are teaching to actual events or daily life. This encourages students to participate more actively in their learning and develops their critical and creative thinking skills when it comes to solving problems involving the material's linear two-variable equations and applications in the real world.

CTL Model Learning is a teaching and learning exercise that aids instructors in connecting their lessons to actual contexts. Students learn by linking new information with prior knowledge and experience to make connections between it and the material they are presented in class (Kambey & Mangelep, 2019; Hasan, 2021). Students are forced to participate in making connections between their knowledge and the world around them as a result. Constructivism, questioning, inquiry, learning communities, modeling, and authentic assessment are the seven key elements of effective learning that are included in this process (Ilham, 2017; Domu et al., 2023).

The researcher was inspired to undertake a study named Application of the Contextual Teaching and Learning Model in Mathematics Learning Material of Linear Equation System of Two Variables in Class VIII Students of SMP Negeri 8 Manado based on the background of the issue.

METHOD

This research method is quasi-experimental research. This research was conducted at Manado 8 Public Middle School; the implementation time was from 27 October to 09 December 2022, odd semester 2022/2023. All class VIII at SMP Negeri 8 Manado is a population with 2 classes in this study VIII-1 as the experimental class and VIII-2 as the control class.

The Contextual Teaching and Learning model become the treatment variable. At the same time, student learning outcomes are the response variable in the subject matter of a system of linear equations with two variables for class VIII SMP Negeri 8 Manado. The research design used in this study is the posttest-only control group design.

Table 1. Research Design

Group	Treatment	Post-test
E	X	E1
K	Y	K1

Information:

E   : Experimental class.

K   : Control class.

E1   : Final test or post-test for the experimental class.

K1   : Final test or post-test for the Control class.

X   : Learning that applies the CTL model.

Y   : Learning applies the DI model.

Based on Table 1, the design of this study was to provide treatment to the experimental and control classes. The experimental class was given treatment X by applying the Contextual Teaching and Learning (CTL) model. The control class was given treatment Y by applying the Direct Instruction (DI) model. As a condition for conducting research, both classes were given a pretest to determine whether they two classes had the same initial understanding.

The data used in this study are the scores from the post-test results on the material system of two-variable linear equations. The data is obtained from test results using test instruments for feasibility and fulfilling content eligibility. Then the data were analyzed

using descriptive techniques and t-tests. Hypothesis testing using the t-test is carried out if it meets the requirements test, namely the normality and homogeneity tests.

The research instrument used in this study was the initial test (pretest) as a criterion for determining the experimental class and control class, as well as the final test (post-test), namely questions in the form of essays or descriptions on the material of a system of two-variable linear equations (SPLDV), in which the instrument will continue validity test is used to determine the suitability of the instrument that has been made. Learning instruments include Learning Implementation Plans (RPP).

RESULT AND DISCUSSION

The researcher administered a pretest to class VIII, which was made up of two classes, class VIII-1 and class VIII-2, each with a total of 25 pupils, as a prerequisite for the experimental class and control class. Then the data from the pretest results were tested for homogeneity and two average tests to find out whether the two classes were the same and homogeneous.

Table 2. Statistics of Class VIII-1 and VIII-2 Pretest Scores

NO	Statistic Value	Pre-test Score	
		Class VIII-1	Class VIII-2
1.	Total	1175	1090
2.	Minimum Value	29	30
3.	Maximum Value	60	58
4.	Average	47	45,41666
5.	Standard Deviation	9,768145508	8,707401
6.	Variance	95,41666667	75,81844

The average pretest score for class VIII-1 is 47, with a minimum score of 29 and a maximum score of 60, according to Table 2 above. The average pretest score for class VIII-2 is 45.41 whereas the lowest and highest possible scores are 30 and 58, respectively. The two classes are homogeneous and identical, according to the analysis that has been done. provisions for the experimental class and control class by a lottery are also included. Class VIII-2 was chosen as the control class, and Class VIII-1 was chosen as the experimental class.

In this study, the data used were post-test results on a two-variable system of linear equations. With a value range of 0-100.

Table 3. The statistical value of Post-test Experiment Class and Control Class

No.	Statistic	Post-test Value	
		Experiment Class	**Control Class**
1.	Total	2072	1868
2.	Minimum Value	70	60
3.	Maximum Value	90	83
4.	Average	82.88	72.88
5.	Standard Deviation	6.11425	7.535029
6.	Variance	43.02667	56.77666667

Based on Table 3, the average post-test result in the experimental class that applies the CTL model is 82.88, with a minimum value of 70 and a maximum value of 90. Then the average post-test in the control class that applies the DI model is 72.88, with a minimum value of 60 and the maximum value is 83. From the results of testing the hypothesis with a significant level of $\alpha = 0.05$, it is found that t_{count} is 5.020 and t_{table} value is 2.059 because $t_{count} < t_{table}$ rejects H_0. Thus, it can be concluded that the average student learning outcomes applied to the Contextual Teaching and Learning (CTL) model are higher than the average student learning outcomes applied to the Direct Instruction (DI) model in the matter of a system of two-variable linear equations.

The learning outcomes in the experimental class and the control class can be seen based on the findings of research done in classes VIII-1 and VIII-2 of SMP Negeri 8 Manado on the content of the Two-Variable Linear Equation System. It is evident in the experimental class that using the CTL model has a considerable impact on students' ability to learn mathematics.

The findings of the pretest indicate that the beginning ability averages for the two classes are equal. Following the introduction of a learning model to each class, there was an improvement in the score of learning outcomes (post-test table), with the experimental class using the Contextual Teaching and Learning (CTL) model achieving higher post-

test learning outcomes than the control class using the Direct Instruction (DI) model. These findings demonstrate that the Contextual Teaching and Learning (CTL) model can enhance student learning outcomes in the context of a two-variable linear equation system. The CTL model emphasizes student-centered learning, which encourages students to voice their opinions, make learning more meaningful, and become more engaged in their studies.

CONCLUSION

Based on the study's findings, it can be said that class VIII students at SMP Negeri 8 Manado learned more when they used the CTL model in a system of two linear equations than when they did when they used the DI model. For pupils to enjoy learning and to fully comprehend the content being taught, the author recommends that teachers make breakthroughs. Teachers can enhance and apply the CTL model in mathematics instruction through action learning, particularly when teaching students to solve systems of linear equations with two variables. Researchers have also recommended that this research be improved and reviewed to make it more applicable to teaching mathematics.

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