The Effect of The CTL Approach on Student's Creative Thinking Skills and Mathematics Learning Outcomes

Herkun Santoso[1], Sunardi[2], Tri Dyah Prastiti[3]
[1]Universitas Terbuka, [2]Universitas Jember, [3]Universitas Terbuka
e-mail: herkunsanto@gmail.com, sunardi.fkip@unej.ac.id,
tridyahprastiti@ecampus.ut.ac.id

Abstract. The research aims to analyze the effect of the Contextual Teaching and Learning (CTL) approach on creative thinking skills and learning outcomes and to describe the implementation of mathematics learning using the Contextual Teaching and Learning approach for class VI students at SDN 2 Ketapang Banyuwangi on the material Circumference and Area of a Circle. A mixed method was used in this research. The population in this research were all of the sixth-grade students for the 2021/2022 academic year, with a total of 54 students. The samples in this research were 23 students in the control class and 23 students in the experimental class, respectively, where the sampling technique used the Yamane formula. Statistical analysis used comparative analysis (t-test) and the N-gain test. The results showed: 1) the post-test t-test results between the control and experimental classes with a t-value of 4.791 (p-value = 0.000) and the t-test results differed between the post-test and pre-test scores between the control and experimental classes with the t-count value of 5.368 (p-value = 0.000). Both p-values are less than α (0.05), which means that the CTL approach influences students' creative thinking skills. 2) the post-test t-test results between the control and experimental classes with a t-count value of 2.136 (p-value = 0.038), the t-test results are the difference between the post-test and pre-test values between the control and experimental classes with a t-count value of 3.038 (p-value = 0.004). Both p-values are less than α (0.05), which means that the CTL approach has an effect on students Mathematics learning outcomes. Thus, the CTL approach has an effect on creative thinking skills and the mathematics learning outcomes of grade VI students on the circumference and area of a circle.
Keywords: Contextual Teaching and Learning, Creative Thinking Skills, Learning Outcomes

Abstrak. Tujuan penelitian ini adalah untuk menganalisis pengaruh pendekatan pembelajaran kontekstual (CTL) terhadap keterampilan berpikir kreatif dan hasil belajar matematika siswa serta mendeskripsikan pelaksanaan pembelajaran matematika dengan menggunakan pendekatan pembelajaran kontekstual siswa kelas VI SDN 2 Ketapang Banyuwangi pada materi Keliling dan Luas Lingkaran. Metode dalam penelitian ini menggunakan metode campuran antara metode kuantitatif dan kualitatif. Populasi dalam penelitian ini adalah keseluruhan siswa kelas VI tahun pelajaran 2021/2022 sebanyak 54 siswa. Sampel dalam penelitian ini masing-masing 23 siswa di kelas kontrol dan 23 siswa di kelas eksperimen, dimana teknik penentuan sampel menggunakan rumus yamane. Analisis statistik mempergunakan analisis komparasi (uji-t) dan uji N-gain. Hasil penelitian menunjukkan: 1) untuk keterampilan berpikir

kreatif siswa, hasil uji-t posttest antara kelas kontrol dan eksperimen dengan nilai t-hitung sebesar 4,791 (p-value = 0,000) dan hasil uji-t selisih nilai posttest dan pretest antara kelas kontrol dan eksperimen dengan nilai t-hitung sebesar 5,368 (p-value = 0,000). Kedua nilai p-value kurang dari α (0,05), yang berarti bahwa pendekatan CTL berpengaruh terhadap ketrampilan berpikir kreatif siswa. 2) untuk hasil belajar siswa, hasil uji-t posttest antara kelas kontrol dan eksperimen dengan nilai t-hitung sebesar 2,136 (p-value = 0,038), hasil uji-t selisih nilai posttest dan pretest antara kelas kontrol dan kelas eksperimen dengan nilai t-hitung sebesar 3,038 (p-value = 0,004). Kedua nilai p-value kurang dari α (0,05), yang berarti bahwa pendekatan *CTL* berpengaruh terhadap hasil belajar matematika siswa. Dengan demikian pendekatan *CTL* berpengaruh terhadap keterampilan berpikir kreatif dan hasil belajar matematika siswa kelas VI pada materi keliling dan luas lingkaran.
Kata kunci: Hasil Belajar, Keterampilan Berpikir Kreatif, Pendekatan Kontekstual

INTRODUCTION

Emphasis on higher-order thinking skills (HOTS) elements in learning can train higher-order thinking, such as applying, analyzing, evaluating and creating in the context of 21st-century learning. As (Dewanti, Kartowagiran, Jailani, & Retnawati, 2020) stated, in the 21st century, humans will experience rapid changes in the era of globalization, demographic transformation, and increasingly advanced technology, making opportunities to explore new things open. The same is stated (Varod, Alkalai, & Geri, 2019). There are three main groups of 21st-century competencies, namely cognitive competence (knowledge), Intrapersonal competence (work ethic), and interpersonal competence (teamwork).

Facts on the ground, this has not been the main focus of all teachers in elementary schools. The weak implementation of learning that can develop higher-order thinking skills impacts creativity, and student learning outcomes have not been maximized, so learning is needed to train students to be active, creative and innovative that is appropriate and touches the real lives of everyday students. (Dewanti, Kartowagiran, Jailani, & Retnawati, 2020) States that one way to optimize is by building learning that is relevant to students' daily lives

Contextual Teaching and Learning (CTL), known as Contextual Learning, is a learning approach that makes it easier for teachers to connect learning material with reality (Trianingsih, 2016) as well as expose students to problems that must be solved or solved to achieve goals (Dewia & Primayana, 2019). In this learning, students don't just see and take notes. But carry out and experience yourself to develop socialization skills to gain real experience. To be applied in everyday life, the learning process takes place naturally.

Contextual Teaching and Learning can be successful when students actively collaborate on learning. This is a high-level learning activity by combining it with real-life contexts (Selvianiresa and Prabawanto, 2017); (Rahmawati, 2018); (Astuti, 2020) and (Syaifuddin et al., 2021). *CTL* can also motivate students to be involved in the learning process (Sears et al., 2002). At the same time, Rusman (in Trianingsih, 2016) argues that *CTL* essentially facilitates students to have *life skills* from lessons acquired.

Mathematics is an element of a series of subjects that have an important role in education (Sundayana, 2014:2). While Torkidsen, Forbregd, Kaspersen, & Solstad (2023) defines mathematics into four themes: Nature, Requirements, Preferred Features, and Role and Function. As a science, mathematics has special characteristics, namely abstract, logical, consistent, hierarchical, and deductive. This is in line with the statement by Dewanti, Kartowagiran, Jailani, & Retnawati (2020) that mathematics has an abstract object of study, which refers to an agreement, deductive, axiomatic, hierarchical, formal, and consistent with meaningful symbols.

Abstract mathematics is complex, causing it not easy to learn mathematics, so that student's interest in mathematics becomes less. For this reason, a way is needed so that the interest of self-participants arises and students more easily understand mathematics. One of them uses a contextualist approach that refers to constructivism, where teachers provide opportunities for students to discover for themselves the concept of mathematics that is being studied by actively engaging in learning the material (Rusman, 2014:190). But the quality of learning resources also affects (Haataja, Tolvanen, Vilppu, Kallio, & Peltonen, 2023)

Research on *the Contextual Teaching and Learning* approach or contextual learning to creative thinking skills and learning outcomes has been carried out by several researchers. Zaifaro et al. (2018) found that contextual learning improved students' critical thinking skills. Hobri et al. (2018) found that contextual learning affects students' thinking skills.

SDN 2 Ketapang Banyuwangi, which is located near the beach and the Ketapang-Gilimanuk crossing port, on several occasions, some teachers often complain about low learning activities and student learning outcomes, especially in mathematics lessons. While student learning is low in teacher-centered learning activities, some students do not complete tasks that teachers ban during exercises that tend to be textual and learning outcomes are low. Year-End Assessment Results (PAT) Grade VI students in the 2019/2020 academic year averaged a math score of 67.98, with a score of 51.00 as the lowest score and a score of 85.00 as the highest score. Meanwhile, the year-end assessment (PAT) for the 2020/2021 academic year has an average math score of 62.21, with a score of 56.00 as the lowest score and a value of 71.00 as the highest score.

Through initial observations, it was found that Mathematics learning is textual, has not used an approach that touches the real lives of students, students' creative thinking skills are low and mathematics learning outcomes have not been maximized, and students tend not to be actively involved. Such conditions in the field cause several impacts, including 1) Students, who is in grade VI of SDN 2 Ketapang Banyuwangi, cannot identify the meaning of mathematics learning in its application in everyday life; 2) Low creativity makes mathematics learning results not optimal.

Stick to these descriptions, it is important to carry out research on learning that can improve thinking skills and student learning outcomes. Learning with the *Contextual Teaching and Learning* approach is expected to have a positive effect on students' creative thinking skills and mathematical learning outcomes on the perimeter and circle area material in grade VI students of SDN 2 Ketapang Banyuwangi. The purpose of the study is to analyze the influence of the *Contextual Teaching and Learning* approach on creative thinking skills and student learning outcomes by directly observing

cylindrical objects in the school environment, such as wall clock surfaces, bicycle wheels, flower pots surfaces, rattans, arc lines and so on to improve creative thinking skills and mathematics learning outcomes of grade VI students of SD N 2 Ketapang Banyuwangi on the material Circumference and Area of a Circle.

METHOD

The research was conducted in two different classes. One is a control class with a direct learning model, and the other is an experimental class with a Contextual Teaching and Learning (CTL) approach. A mixed method between quantitative methods and qualitative methods was used in this study. Quantitative methods are used to analyze the influence of the Contextual Teaching and Learning approach on creative thinking skills and student learning outcomes, and qualitative methods are used to describe the implementation of the learning process with the Contextual Teaching and Learning approach.

Provision of *pre-tests* at the beginning to measure students' initial abilities in experimental classes and control classes before treatment. Furthermore, the treatment in each class where the control class uses a direct learning model and an experimental class with a *Contextual Teaching and Learning* (CTL) approach. Post-test was given to both classes to measure the influence after *treatment* on creative thinking skills and mathematics learning outcomes of grade VI students of SDN 2 Ketapang Banyuwangi on the circumference and area of the circle.

The population in this study is the entire class VI students of SDN 2 Ketapang Banyuwangi for the 2021/2022 academic year, which are divided into two classes, namely class VI-A, 27 students, and class VI-B 27 students totaling 54 students. The sampling in this study was 23 students each for class VI-A and 23 students for class VI-B using the Yamane formula. Furthermore, a draw was conducted, where the results of the draw obtained by the control class were carried out in class VI-B which uses *direct learning,* and class VI-A as an experimental class using the *Contextual Teaching and Learning (CTL)* approach.

The research instruments used are tests and non-tests. Test instruments are some questions or exercises used to measure the skills of intelligence, talent, or ability possessed by individuals or classes (Arikunto, 2013:193). The non-test instrument is a way of assessing student learning outcomes which are carried out by making observations and without testing students, which includes research instrument validation sheets in the form of tests, lesson plans, LKS, and observation sheets. Validation test using the *Pearson Product Moment* validity test and *Cronbach-Alpha* reliability test (Sugiyono, 2019).

The data analysis used is descriptive analysis and statistical analysis. Descriptive analysis is used to describe pre-test and post-test result data for each dependent variable, while statistical analysis aims to examine the correctness of the hypothesis proposed. Statistical analysis uses comparative analysis (t-test) and the N-gain test.

RESULTS AND DISCUSSION

Based on the results of research at SDN 2 Ketapang Banyuwangi, the results of the trial questions on 12 people with a significant level of 5%, the results of the validity test of the eight questions tested, there were two invalid questions. So, it can be interpreted that the number of valid questions is around 7.5% while the invalid ones are 2.5%. The reliability test obtained an *r-Cronbach Alpha* value of 0.845 which was concluded to have high reliability (0.7-0.9). The results of the differentiating power test obtained differentiating power with three categories, namely less (19.91%), medium (47.16%), and good (50.83%). The results of the difficulty test were obtained in two categories, namely moderate (77.92%) and difficult (22.08%).

The average pre-test, post-test and difference scores as well as the results of independent tests of creative thinking skills scores on all indicators, are presented in the following table.

Table 1. Pre-test, post-test, and difference averages and independent test results
creative thinking skills

Parameters		Indicators			
		Smoothness	Flexibility	Detail ability	Sensitivity
Pre-test (Cycle 1)	Control	65,124	2,739	2,565	2,652
	treatment	62,346	2,217	1,826	2,174
	t-test	0,810	4,062	5,556	3,685
	Significance	0,421	0,000	0,000	0,001
Post-test (Cycle 2)	Control	71,297	1,826	1,739	1,826
	treatment	86,111	2,174	1,739	1,870
	t-test	-4,791	-1,920	0,000	0,209
	Significance	0,000	0,061	1,000	0,835
difference	Control	6,173	2,739	2,522	2,652
	treatment	23,765	2,217	1,826	2,174
	t-test	-5,368	4,062	5,204	3,685
	Significance	0,000	0,000	0,000	0,001
N-gain	Control	29,412	2,273	2,899	10,145
	treatment	45,455	60,870	39,855	49,275

The results of the t-test independent data on the value of creative thinking skills on the fluency indicator between the experimental class and the control class obtained a pre-test value with a t-count value of 0.810 significance value of 0.421. This means that there is no difference in the average difference in value of Cycle 1 creative thinking skills between the experimental class and the control class. In the post-test, it is known that the t-count value is -4.791, with a significance value of 0.000. This can mean that there is an average difference in the value of creative thinking skills between the experimental class and the control class in Cycle 2. A negative sign on the t-count value indicates that the average difference in the value of creative thinking skills in the experimental class is higher than that of the control class. The comparison of the progress of the difference obtained a t-count value of -5.368 with a significance value of 0.000.

This means that there is a difference in the average difference in value of creative thinking skills between the experimental class and the control class. A negative sign on the t-count value indicates that the average difference in the value of creative thinking skills in the experimental class is higher than that of the control class. Creative thinking skills, and fluency indicators based on N-Gain scores, were known in the experimental class to be in the less effective category (45.45%). Meanwhile, the control class is included in the ineffective category (29.41%).

Testing data with independent t-test creative thinking skills on indicators of flexibility between the experimental class and the control class obtained in the pre-test obtained a t-count value of 4.062 with a significance value of 0.000. This means that there is a difference in the average difference in value of creative thinking skills in Cycle 1 between the experimental class and the control class. In the post-test, a t-count value of -1.920 was obtained with a significance value of 0.061. This means that there is no difference in the average difference in value of creative thinking skills between the experimental class and the control class in Cycle 2. A negative sign on the t-count value indicates that the average difference in the value of creative thinking skills in the experimental class is higher than that of the control class. A comparison of the progress of the difference obtained a t-count value of 4.062 with a significance value of 0.000. This means that there is a difference in the average difference in value of creative thinking skills between the experimental class and the control class. Creative thinking skills and flexibility indicators based on N-Gain score values are known in the experimental class to be quite effective (60.87%) and for the control class to be included in the ineffective category (2.27%).

Independent t-test of creative thinking skills on the indicator of detail ability between the experimental class and the control class obtained in the pre-test obtained a t-count value of 5.556 with a significance value of 0.000. This can mean that there is a difference in the average difference in value of creative thinking skills in Cycle 1 between the experimental class and the control class. In the post-test, a t-count value of 0.000 was obtained with a significance value of 1.000. This means that there is no difference in the average difference in value of creative thinking skills between the experimental class and the control class in Cycle 2. A comparison of the progress of the difference obtained a t-count value of 5.204 with a significance value of 0.000. This means that there is a difference in the average difference in value of creative thinking skills between the experimental class and the control class. Creative thinking skills, detailing indicators based on N-Gain score values, it is known that the experimental class (39.85%) is included in the less effective category, and the control class (2.89%) is included in the ineffective category.

Testing data with an independent t-test of creative thinking skills on sensitivity indicators between the experimental class and the control class on the pre-test obtained a t-count value of 3.685 with a significance value of 0.001. This means that there is a difference in the average difference in value of creative thinking skills in Cycle 1 between the experimental class and the control class. In the post-test, a t-count value of 0.209 was obtained with a significance value of 0.835. This means that there is no difference in the average difference in value of creative thinking skills between the experimental class and the control class in Cycle 2. The comparison of the progress of

the difference obtained a t-count value of 3.685 with a significance value of 0.001. This means that there is a difference in the average difference in value of creative thinking skills between the experimental class and the control class. Creative thinking skills, and sensitivity indicators, obtained an average N-Gain score in the experimental class of 49.28%, including the less effective category. Meanwhile, the control class of 10.15% is included in the ineffective category.

The calculation of effectiveness is relative to creative thinking skills obtained a value of 62.1% in the range of 60%-80%, which means that the effectiveness is high compared to without the application of *the Contextual Teaching and Learning* %) is method. While 37.9% is influenced by internal and external factors. This result corroborates the results of research by Garina, A. U. (2016), where the results of the study showed that there was a significant difference in test scores and creativity scores between students who received learning with the CTL model with conventional as seen from the results of the relationship test with the coefficients of the three classes, namely, 0.814; 0.514 and 0.504 > r table 0.361 and 0.367 where all HA is accepted.

The calculation of effectiveness is relative to learning outcomes obtained a value of 62.73% is in the range of 60%-80%, which means that the effectiveness is high compared to without the application of non-Contextual Teaching and Learning methods. While 37.27% is influenced by internal and external factors. In line with the results of previous studies, Fitriani, N. R., Widiyatmoko, A., & Khusniati, M. (2016) Contextual Teaching and Learning (CTL)-based mathematics teaching is effective in improving independent character and learning achievement, this is shown by the character of students becoming more independently developed related to daily financial management in the school environment.

A comparison of creative thinking skills between the control class and the experimental class in Cycle 1 is presented in Figure 1 to Figure 3.
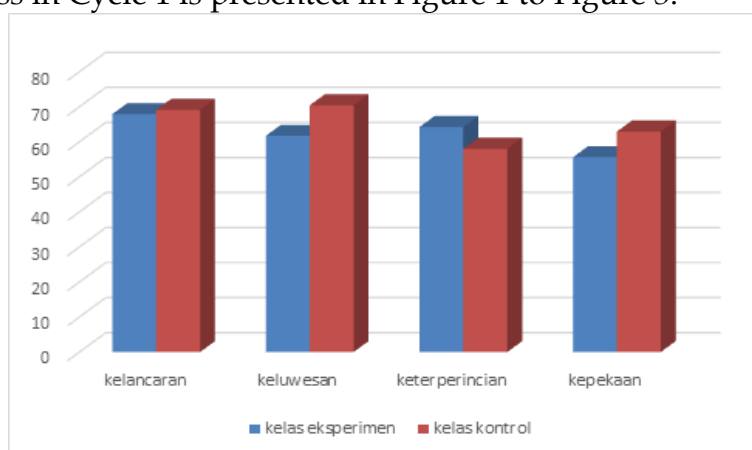

Figure 1.   Comparison of Creative Thinking Skill Level of Experimental and Control Class Students Cycle 1

Based on Figure 1, it is known that a control class smoothness indicator has a percentage of 1.23% higher than experiments, flexibility has a percentage of 8.64% better than the experimental class, experimental class detail ability has a percentage of 6.17%

better than the control class, and the sensitivity of the control class has a precipitation of 7.4% higher than that of the experimental class.
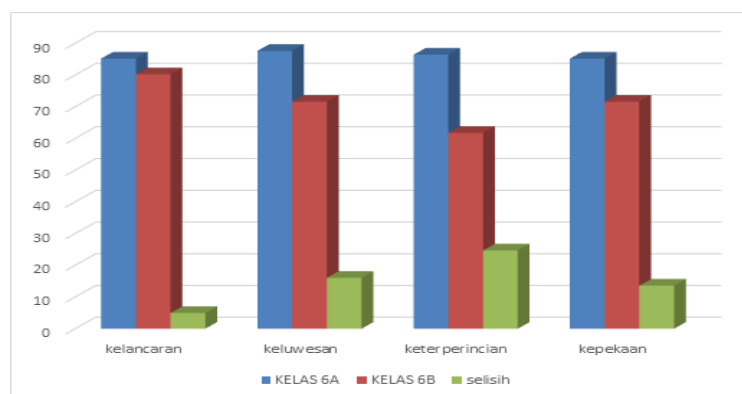

Figure 2.   Comparison of Creative Thinking Skill Levels of Experimental and Control Class Students Cycle 2

Based on Figure 2, it is known that the comparison of cycle 2 learning outcomes based on the fluency indicator of the experimental class has a percentage of 4.98% higher than the control class, flexibility has a percentage of 16.05% higher than the control class, detail-worthiness has a percentage of 24.69% better than the control class, and sensitivity has a concentration of 13.58% higher than the control class.
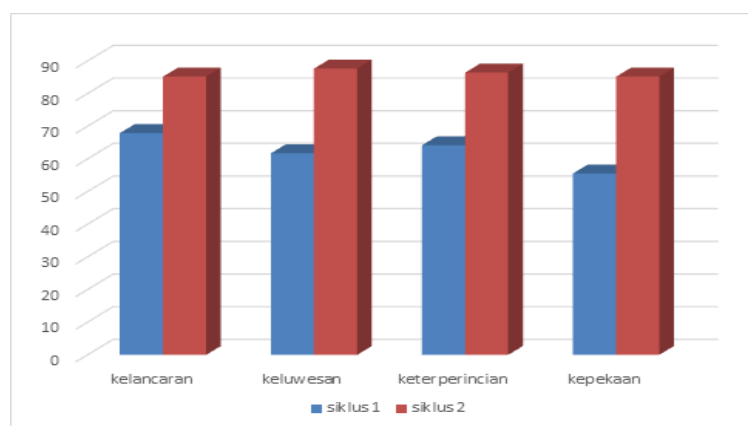

Figure 3.   Comparison of the Results of Cycle 1 and Cycle 2 Creative thinking skills of Experimental Class Students

Based on Figure 3, it is known that the comparison of the results of Cycle 1 and Cycle 2 in the experimental class is that based on the smoothness indicator has a percentage of 17.28%, flexibility has a percentage of 25.93%, detail ability has a percentage of 22.23%, sensitivity has a percentage of 29.63%. This is according to the results of research from Fathul Huda (2016). Science learning based on Contextual Teaching and Learning affects student learning achievement with a calculated t value = 5.08 while the r table at the significance level of 5% is 2.031. In line with Huda, Lailiyah, and Suliyanah (2018) argue that creative thinking is the mental ability to produce something unusual, a new idea, or a combination of old ideas with new ideas.

Table 2. Results of descriptive analysis of learning outcomes

Group	Average	SD	Lowest	Highest
Control	44,81	25,53	15	25
Experiment	56,67	24,79	15	25

The results of the descriptive analysis of each class obtained an average value of the experimental class of 56.67 with a standard deviation of 25.53 and a minimum value of 15. The average value minus the standard deviation of 31.14 (56.67 -25.53) is still greater than the minimum value (15), which shows that the data in the experimental class has a homogeneous variance. The average score of the control class was 44.81, with a standard deviation of 20.02 and a minimum score of 15. The average value minus the standard deviation of 24.79 (44.81 – 20.02) is still greater than the minimum value (15), which shows that the data in the control class has a homogeneous variance. In addition, a normality test was also carried out.

Table 3. Learning outcome normality test results

Group	Z value		Significance	
	Pre-test	Post-test	Pre-test	Pos-test
Control	-0,181	0,759	0,341	0,612
Experiment	1,552	1,027	0,016	0,242

The results of the Kolmogorov-Smirnov normality test on the difference in pre-test values of the Control and Experimental classes obtained Z values of 44.81 (Control) and 56.67 (Experimental), respectively with significance values of 0.016 (Control) and 0.341 (Experimental). Both significance values of each class are greater than α (0.05). This means that both data in each class (Control and Experiment) are spread according to the normal distribution, and subsequent tests can use parametric tests (t-tests).
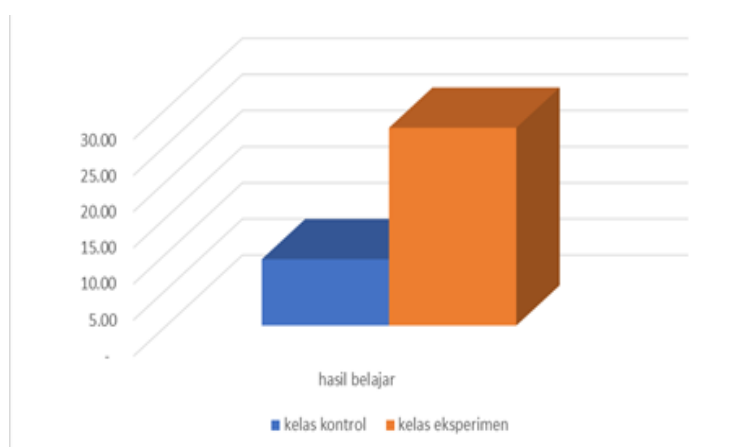

Figure 4.   Comparison of Learning Outcomes Experimental and control classes

Figure 4 shows that based on the difference in the average results of pre-test and posttest in the control and experimental classes has a percentage of 18.19%. This means

that there is a difference in the average difference in student learning outcomes between the experimental class and the control class, which shows that the average difference in student learning outcomes in the experimental class is higher than in the control class. This proves the previous research by Fitriani et al. (2016) which found that the learning outcomes of the experimental group increased with an N-gain value of 0.62 on moderate criteria. The average learning outcome of the experimental group was higher than that of the control group based on t-test calculations with t-count > t-table (5.42 >1.67). The activity of the experimental group also increased with each meeting. CTL-based models are effective for improving student learning outcomes and activities.

Table 4. T-test results of variables of creative thinking skills and learning outcomes

Variable	Control Class	Experimental Class	t-count	Significance
Creative thinking skills	62,350	65,120	-4,791	0,000
Learning outcomes	65,850	72,190	-2,136	0,008

The Contextual Teaching and Learning approach affects creative thinking skills, evidenced by the results of the post-test t-test between the control group and the experiment with a t-count value of 4.791 (p-value = 0.000), other evidence is the t-test results of the difference in post-test and pre-test values between the control and experimental groups with a t-count value of 5.368 (*p-value* = 0.000). Both p-values are less than α (0.05), meaning the *Contextual Teaching and Learning* approach affects creative thinking skills. A negative sign of t-count values indicates that the average value of the experimental group is greater than that of the control group. The results of this study support the results of Marhayati &; Sa'dijah, C. (2018) research, where their investigation it was found that submitting mathematics problems can spur students to think creatively, as evidenced by aspects of fluency, flexibility, and novelty for grade V students at SDN 1 Blimbing Malang to reach good categories. Furthermore, Ghassani et al. (2019) found that mathematics learning with Contextual Teaching and Learning is very effective in improving students' mathematical comprehension skills in terms of student's initial abilities. Analysis of questionnaire data proved that students in the Contextual Teaching and Learning class were primarily positive about mathematics learning.

The Contextual Teaching and Learning approach affects Learning Outcomes, evidenced by the results of the post-test t-test between the control group and the experiment with a t-count value of 2.136 (p-value = 0.038), other evidence is the t-test results of the difference in post-test and pre-test values between the control and experimental groups with a t-count value of 3.038 (p-value = 0.004). Both p-values are less than α (0.05), meaning the *Contextual Teaching and* Learning approach affects Learning Outcomes. A positive sign of the t-count value indicates that the average value of the experimental group is greater than that of the control group. The same thing was conveyed by Djamarah and Zain (2014: 106) that the success of the high teaching and learning process is shown by: the

absorption of one person working in a group who has achieved his goals can achieve a high level of performance, both individually and collectively and the situation in the classroom that arises during learning can be formed through individuals or groups.

CONCLUSION

The Contextual Teaching and Learning approach influence creative thinking skills. This showed that students in the experimental class had better creative thinking skills than students in the control class. Problem detection, data collection for factual evidence, image interpretation, definition, interpretation, prediction of all possible consequences or choices for handling problems, ideas, and conditions, and the ability to summarize conclusions based on selected existing data can be carried out well by students in the experimental class.

The Contextual Teaching and Learning approach influences learning outcomes. These results show that there is a very significant difference between the experimental class and the control class on the learning outcomes of the perimeter material and circle area in grade VI Mathematics subjects so that the learning outcomes of Mathematics can be improved by the learning process using *Contextual Teaching and Learning* (CTL) rather than using direct *learning*.

The interaction between students and teachers is due to students being enthusiastic and actively participating in the learning process of learning on the Perimeter and Wide Circle material of Mathematics subjects using the *Contextual Teaching and Learning* approach in grade VI SDN 2 Ketapang went well with significant results. Understanding the concept and problem-solving given are easier because students help each other, especially friends who have difficulty in group work activities. Teacher and student activities during learning have increased from Cycle I to Cycle II. Implementing learning on the Perimeter and Wide Circle material of grade VI Mathematics subjects using the *Contextual Teaching and Learning* approach can be used to optimize students' abilities toward relevant materials or materials.

Innovative learning should be carried out by teachers, for example, with a *Contextual Teaching and Learning* (CTL) approach in order to create varied learning activities. Motivation and coaching to teachers by the principal to always innovate in the development of more varied learning to improve students' thinking skills and mathematics learning outcomes. The results of this Contextual Teaching and Learning (CTL) approach research should be used as input and comparison material in designing research activities related to learning by advanced researchers because not all lesson content can be applied to the Contextual Teaching and Learning (CTL) approach so that other studies can examine with different material.

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