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Differences in improving learning outcomes and student learning motivation

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ABSTRACT

The Mathematics Learning Grade IV at SD Negeri 1 Syamtalira Bayu has yet to reach the indicators. Ideally, learning mastery occurs when 76% of students score above the Kriteria Ketuntasan Minimal (KKM). This study aims to determine the differences in students' learning outcomes and motivation through teaching using the Contextual Teaching and Learning (CTL) and discovery learning models. This quasi-experimental study involved two Grade IV-B and IV-A classes as the research sample. The research instruments used were tests and a motivation questionnaire. Data analysis was conducted using t-test and N-Gain analysis. Based on the results of the analysis, it was found that students' learning outcomes using the CTL model were higher than those using the discovery learning model. The learning motivation of students in the CTL model class was higher than in the discovery learning model class. Based on the research, the CTL model can improve students' learning outcomes and motivation.

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ABSTRAK

Pembelajaran Matematika di kelas IV di SD Negeri 1 Syamtalira Bayu belum mencapai indikator keberhasilan. Ketuntasan belajar idealnya terjadi apabila 76% dari keseluruhan peserta didik dikatakan tuntas atau mendapatkan nilai di atas KKM. Penelitian ini bertujuan untuk mengetahui perbedaan hasil belajar siswa melalui pengajaran dengan model Contextual Teaching and Learning (CTL) dan model discovery learning. Mengetahui motivasi belajar siswa yang diajarkan dengan model pembelajaran CTL dan model discovery learning. Penelitian ini merupakan penelitian eksperimen semu (quasi eksperiment). Sampel penelitian ini terdiri dari 2 kelas dari siswa kelas IV-B dan IV-A. Instrumen yang digunakan adalah tes dan angket motivasi belajar. Analisis data dilakukan dengan uji statistik uji-t dan N-Gain. Berdasarkan hasil analisis diperoleh hasil belajar siswa dengan model CTL lebih tinggi dari model discovery learning. Motivasi belajar siswa pada kelas model CTL lebih tinggi dari kelas model Discovery Learning. Berdasarkan hasil penelitian, model CTL dapat meningkatkan hasil belajar dan motivasi belajar siswa.

Kata Kunci: *Hasil belajar, motivasi belajar, model CTL, model discovery learning*

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INTRODUCTION

The optimal quality of education will be created if the role of the teacher as a facilitator in the teaching-learning process can be maximized. Every educational goal has two functions, namely 1) describing the final condition to be achieved; 2) providing direction and means for all efforts or processes carried out. It can be understood that educational goals in elementary schools focus on learning outcomes that are achieved at the end of learning (Noor, 2018). Education is an effort to improve the quality of human resources. A person is said to have successfully learned if they can show changes in thinking ability, skills, and attitudes. Changes in learning outcomes can be observed and measured as a result of the learning experience called learning outcomes (Andriani & Rasto, 2019).

A, as one of the subjects in SD/, mathematicsMI, is not only a science of arithmetic but also a support for other sciences. Therefore, mathematics lessons in SD/MI, in addition to providing provisions for students to apply mathematics in everyday life, also allow them to study various sciences at the next level. Mathematics is the central science used to understand other fields of science. In reality, math lessons are often partitioned and taught in several branches. Linking mathematical concepts and linking them with other fields is called connection ability. Several elements, including one, influence student learning outcomes. The way teachers teach, 2) student background, 3) school environment, 4) learning assessment model, and 5) internal and external aspects of students in the delivery of learning techniques (Ismawati, 2020).

Motivation is one of the dynamic aspects that is very important to motivate students in various matters, such as learning. Students who underachieve are often caused by their lack of ability, but rather by a lack of motivation to learn, so they do not try to exert all their abilities. Children who experience dependence on gaming activities will affect learning motivation, reducing study time and time to socialize with their peers (Rahyuni *et al*., 2021). Learning motivation has a vital role in the learning process; for students, learning motivation can foster enthusiasm for learning so that students are encouraged to participate (Arianti, 2018).

The mathematics material learned in the teaching and learning process is abstract, meaning that they have not made contact with real life; the learning they have received from the topic or subject matter is only a ton of learning, not followed by a deep understanding that can be applied in real life at this time. The learning process will be better if the teacher links the learning material with the situation that occurs or the actual situation in society, which can encourage students to connect the knowledge they learn with its application in life (Mayasari, 2022).

Contextual Teaching and Learning (CTL) is a learning concept that helps teachers to link the subject matter with the real-world situation of students and encourages students to make connections between the knowledge they have and its application in their daily lives. The contextual approach to learning is based on the fact that most students cannot connect what they learn with how to use it in real life (Hermino & Arifin, 2020). In the discovery learning model, students are expected to be able to store knowledge longer and deeper in their memory because they find the answers themselves, which will attract more students' attention in the mathematics learning process, especially in flat building material (Umihani *et al*., 2023).

Based on interviews with the fourth-grade teacher of SD Negeri 1 Syamtalira Bayu, it is stated that students have difficulty learning and understanding flat building materials. This is because flat building material uses many formulas that are difficult to remember and quickly forgotten when finding the value of the area and perimeter of a flat shape. Besides that, students are less prepared and less likely to learn, so student learning outcomes in flat building materials are unsatisfactory. Learning outcomes are the abilities or results achieved from the teaching and learning process that students have undergone in a specific period, including cognitive, affective, and psychomotor skills. Developing student learning outcomes can be done

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by teaching learning materials effectively in the teaching and learning process through the use of learning models.

In studying geometry, students need a mature concept to apply geometry skills such as visualizing, recognizing various shapes and spaces, describing drawings, sketching shape drawings, and learning models to understand the material (Muhassanah *et al*., 2014). This can also be seen from previous research on applying the discovery learning model, which can increase student learning motivation and understanding of the concept material of flat buildings (Indahwati, 2023). The CTL learning model influences the learning motivation of elementary school students (Nursehah *et al*., 2021). The difference from previous research is that this study aims to reveal significant differences between the CTL learning model and the discovery learning model in contributing to improving learning outcomes and learning motivation of fourth-grade students of SD Negeri 1 Syamtalira Bayu, North Aceh. This research is helpful to provide new experiences and encourage students to be actively involved in learning. It can increase student motivation and learning outcomes, making math learning more meaningful and valuable.

LITERATURE REVIEW

Learning Outcomes

Learning outcomes are essentially changes in behavior due to the learning process, including cognitive, affective, and psychomotor abilities (Nurrita, 2018). Referring to Bloom's Taxonomy, learning outcomes in the framework of study are achieved through three domains: cognitive, affective, and psychomotor. The cognitive domain, related to intellectual learning outcomes, consists of 6 aspects: knowledge, understanding, application, analysis, synthesis, and assessment. The affective domain is related to attitudes and values. The affective domain includes five ability levels: receiving, answering or reacting, assessing, organizing, and characterizing with a value or value complex. The psychomotor domain includes motor skills, manipulation of objects, and neuromuscular coordination (connecting, observing) (Andriani & Rasto, 2019).

Learning outcomes include cognitive, affective, and psychomotor abilities. Cognitive abilities include 1) Knowledge (memory) the ability to identify and mention information; 2) Comprehension (understanding, explaining, summarizing, example) the ability to explain and understand a concept; 3) Application (applying) an action that must be done or practiced for a desired interest; 4) Analysis (deciphering, determining relationships) attempts to find an explanation or answer to each thing that is obtained; 5) Synthesis (organizing, planning, forming new buildings) products are the ability to create a product and divide small tasks in work; 6) Evaluating (assessing) the ability to combine components to form a new concept or rule. Affective abilities include 1) Receiving is the ability to pay attention to an activity or event; 2) Responding is the ability to respond and participate; 3) Valuing is the ability to accept or reject a specific value or norm; 4) Organization is the activity of gathering people who work together in a guided or controlled manner to achieve specific goals; 5) Characterization is the effort to display good character in positive things. Psychomotor abilities include 1) Initiatory, which involves starting the activity; 2) Pre-routine, which involves preparing for the activity; 3) Routinized, which involves performing the activity; 4) Productive, technical, physical, social, managerial, and intellectual skills (Magdalena *et al*., 2021).

Learning Motivation

Learning motivation is one factor that determines the effectiveness of the learning process. Motivation to learn is an internal and external drive in students who are learning. In general, several indicators support, among others, the desire to succeed, encouragement, needs in learning, hopes and future goals, appreciation in learning, and a conducive learning environment (Novianti *et al*., 2020). Motivation is a

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conscious effort to maintain a person's behavior so that he is encouraged to act to do something to achieve specific results or goals (Julyanti *et al.*, 2021). Motivation will cause a change in human energy. Motivation is the most important thing that must be developed in teaching and learning. Motivation plays a significant role in implementing teaching and learning activities to achieve learning goals (Dauyah & Yulinar, 2018).

Motivation to learn has two influencing factors: intrinsic factors in the form of a desire to succeed and encouragement of learning needs and hopes for goals. Intrinsic motivation contains 1) Adjustment of tasks to interests, 2) planning that is full of variety, 3) feedback on student responses, 4) opportunities for active learner responses, and 5) opportunities for learners to adjust their work tasks. Next are extrinsic factors: rewards, a conducive learning environment, and engaging learning activities. Extrinsic motivation contains 1) task adjustment to interests; 2) planning that is full of variety; 3) student response; 4) active learner opportunities; 5) opportunities for learners to adjust their work assignments; and 6) the existence of engaging activities in learning (Abroto *et al*., 2021).

Model Pembelajaran *Contextual Teaching and Learning* (CTL)

Contextual Teaching and Learning (CTL) is a learning strategy that emphasizes the process of thorough student involvement to find material and connect it with real daily situations, namely the environment, to encourage students to apply it in their lives (Abidin *et al*., 2022). The contextual approach is not just listening and taking notes, but also seeking direct experience. CTL, or contextual learning, is a holistic learning concept where learning materials are associated with the surrounding environment or the context of everyday life, both social, cultural, and personal lives of students so that it will produce meaningful learning and students can have knowledge and skills that can be applied to various problems, by the statement from Shoimin in his book entitled "*Model Pembelajaran Inovatif dalam Kurikulum 2013*".

Implementing the CTL model requires a lesson plan that reflects CTL's concepts and characteristic components. According to the Ministry of National Education, seven components show the characteristics of CTL learning, namely 1) Constructivism; 2) Inquiry; 3) Questioning; 4) Learning Community; 5) Learning Community. Learning Community; 5) Modeling; 6) Reflection; and 7) Authentic Assessment (Nurfidiya *et al*., 2019).

Discovery Learning Model

Discovery learning is a learning model that trains students to learn independently to improve cognitive skills and processes. It involves active participation from students in observing, formulating, classifying, making conjectures, explaining, and drawing conclusions that encourage finding concepts independently in the learning process (Anugraheni *et al*., 2018). In the discovery learning model, students develop knowledge and skills and organize problem-solving methods.

Discovery learning also means a cognitive learning model emphasizing teacher creativity to create learning situations where students actively learn to discover their knowledge (Annisa *et al*., 2023; Moko *et al*., 2022). The syntax of the discovery model is stimulation (providing stimuli), problem statement (statement/problem identification), data collecting (data collection), data processing (data processing), at the data processing stage each student is assigned to be able to process the information that has been collected, either through interviews, observations and so on, verification (proof), and generalization (drawing conclusions/generalizations) (Ruhana *et al*., 2023).

METHODS

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The type of research used is quasi-experimental research. Quasi-experiments provide treatments, outcome measures, and experimental units but do not use random placement (Sutono *et al*., 2020). This type of research aims to see differences in improving student learning outcomes and learning motivation of students taught with the CTL learning model and students taught with the discovery learning model. The samples in this study were fourth-grade students of SD Negeri 1 Syamtalira Bayu, North Aceh, with class IV-a as the experimental class I, with 22 students taught using the CTL learning model, and class IV-b as the experimental class II, with 22 students taught using the discovery learning model. This study was conducted to determine the differences in motivation and student learning outcomes between students taught with the CTL learning model and students taught with the discovery learning model. This study took two random sample classes representative of the population by applying different learning methods as experimental classes.

The research design used in this study is a two-group pretest-posttest. Both classes were treated by applying different learning methods, namely CTL and discovery learning. The first step that must be done is to determine the experimental groups 1 and 2. The second step is to give the same pretest (initial test) to experimental groups 1 and 2, and then give a motivation questionnaire to students to find out the willingness to learn of students. Then, the two experimental class groups were given different treatments, namely CTL and discovery learning models. Then, the two experimental class groups were given different treatments, namely CTL and discovery learning models. After that, both experimental class groups were given a posttest (final test) and the same motivation questionnaire to see differences in motivation and learning outcomes in both classes. Quoting from Riduwan and Sunarto in their book entitled "*Pengantar Statistika Untuk Penelitian Pendidikan, Sosial, Ekonomi, Komunikasi dan Bisnis*," the design of the two-group pretest-posttest experiment in this study can be seen in **Table 1**.

Table 1. Research Design

Class	*Pretest*		Treatment	*Posttest*		Learning Model
IV-A Eksperimen I	T_1	M_1	X_1	T_2	M_2	*CTL*
IV-B Eksperimen II	T_1	M_1	X_2	T_2	M_2	*DL*

Source: Riduwan and Sunarto in the book "Pengantar Statistika Untuk Penelitian Pendidikan, Sosial, Ekonomi, Komunikasi dan bisnis"

Description: T_1 Best Student Learning Outcomes
M_1: Motivation Questionnaire in the first meeting
T_2 Post-test of student learning outcomes
M_2: Motivation Questionnaire at the final meeting
X_1 Treatment with the Contextual Teaching and Learning (CTL) model
X_2 Treatment with the Discovery Learning model

In this study, the quantitative data that will be analyzed are the pretest and posttest results of students' motivation and mathematics learning outcomes. The data from the students' final test results were analyzed to see how the process was carried out by students in completing the motivation test questions and student learning outcomes. The data processing of the research results begins with testing the statistical requirements needed for hypothesis testing, namely the data normality and variance homogeneity tests. The data from the pretest and posttest results were analyzed to determine the difference in improving student learning outcomes. Scores obtained from student test results before and after being treated with the CTL learning model and the discovery learning model were analyzed by comparing student scores obtained from student test results before and after being treated. Quoting Sukarelawan et al. in his book entitled "*N-Gain VS Stacking (Analisis Perubahan, Abilitas Peserta Didik dalam Desain, One Group Pretest-posttest)*", to calculate the gain, the following formula is used:

$$N_{gain}(g) = \frac{skor\ post\ test - skor\ pre\ test}{skor\ ideal - skor\ pre\ test}$$

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The n-gain score obtained from the calculation is then interpreted in **Table 2**.

Table 2. Criteria for n-gain score

Score	Criteria
$0{,}70 \leq g \leq 0{,}7$	High
$0{,}30 \leq g < 0{,}7$	Medium
$0{,}00 < g \leq 0{,}30$	Low
$g = 0{,}00$	There is no increase.
$-1{,}00 \leq g < 0{,}00$	There is a decrease

Source: Sukarelawan et al in the book "N-Gain VS Stacking (Analisis Perubahan, Abilitas Peserta Didik dalam Desain, One Group Pretest-posttest)"

Hypothesis testing uses the independent sample t-test. According to Nuryadi et al. in their book titled Fundamentals of Research Statistics, this test determines the difference in means between two independent populations/data groups that are given different treatments. To see the difference, the results of the t-test calculation will be compared with the t-table. If t-count > t-table, it means significantly different (Ho = rejected); if t-count < t-table, it means not significantly different (Ho = accepted).

Hypothesis 1:
H_0 : $\alpha_1 = \alpha_2$
H_1 :$\alpha_1 \neq \alpha_2$
Description:
α_1 : x

Hypothesis 2:
H_0 : $\alpha_1 = \alpha_2$
H_1 : $\alpha_1 \neq \alpha_2$
Keterangan:
α_1 : The average learning outcomes of students taught using the CTL learning model.
α_2 : The average learning outcomes of students taught using the Discovery Learning model.

RESULTS AND DISCUSSION

Improvement of Learning Outcomes

The cognitive domain learning outcomes test provides information about student abilities before and after the learning process, both in experimental classes I and II. The information is in the form of data on the results of the initial test, final test, normalized gain, and interaction. The cognitive domain learning outcomes ability test was conducted twice, namely the initial test (pretest) and the final test (posttest), with equivalent questions. The initial and final tests were attended by 22 students for each class, so that in data analysis, the subjects of this study were 22 people who took the initial test (pretest) and final test (posttest) in both experimental classes. Experimental class I was taught with the CTL learning model, and experimental class II was taught with the discovery learning model.

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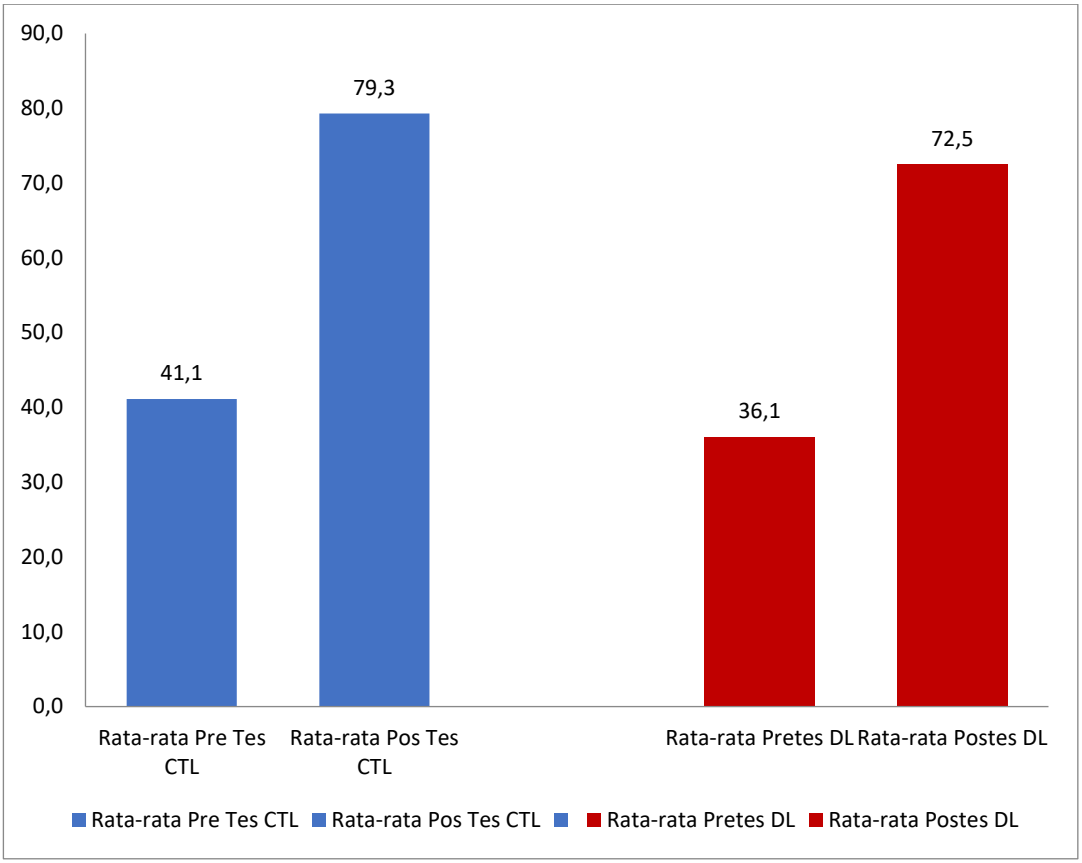

Figure 1. Average Pretest and Posttest Scores of Cognitive Learning Outcomes
Source: Research 2024

Figure 1 shows that the average score of the pretest and posttest of students' learning outcomes ability in the cognitive domain in experimental class group I with the CTL model is 41.1 for the average pretest and 79.3 for the average posttest. The ability of students' learning outcomes in the cognitive domain of experimental class II with the discovery learning model is 36.1 average pretest and 72.9 average posttest. Based on these data, it can be seen that the ability of student learning outcomes in the cognitive domain of experimental class I is better than that in the cognitive domain of experimental class II. The CTL learning model is an effective learning method to improve learning outcomes compared to the direct learning method (Kasmawati *et al*., 2017). The CTL learning model can also affect math learning outcomes in the cognitive domain (Kistian, 2018).

To find out whether the difference in the average score of the initial test and the average score of the final test between the experimental class I and the experimental class II is significant or not, the data is tested using the two-mean difference test, previously having to do a normality test and homogeneity of variance on the pretest and posttest score data of cognitive domain student learning outcomes. This normality test was conducted using the Lilliefors statistical test on both data classes. The output of the calculation of the normality test of pretest data of cognitive domain student learning outcomes in the experimental class and experimental class II can be seen in **Table 3**.

Table 3. Results of the Normality Test of Cognitive Domain Learning Outcomes

Tests of Normality						
	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
***Pretest* CTL**	,157	22	,166	,920	22	,075
***Pretest* DL**	,160	22	,150	,923	22	,086
***Postest* DL**	,164	22	,129	,948	22	,283
***Postest* CTL**	,179	22	,064	,890	22	,019

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Source: Research 2024

The homogeneity test was conducted using the Homogeneity of Variances test (Levene Statistic), intended to test the homogeneity of variances of the two classes of pretest data on cognitive learning outcomes between experimental classes I and II. The results of the homogeneity test calculations for the pretest data on students' cognitive learning outcomes can be seen in **Table 4**.

Table 4. Results of the Homogeneity Test of Variance in Learning Outcomes Ability

Test of Homogeneity of Variances			
Nilai *Pretest*			
Levene Statistic	df1	df2	Sig.
,515	1	42	,477
Test of Homogeneity of Variances			
Nilai *Postest*			
Levene Statistic	df1	df2	Sig.
,613	1	42	,438

Source: Research 2024

Based on the results of the normality and homogeneity test of the posttest scores of the two classes of data on the ability of cognitive domain student learning outcomes, it is stated that the data of the two classes are normally distributed and the variance of the two classes is homogeneous. Furthermore, the statistical analysis of testing the difference in the means of two samples using the t-test was carried out to determine whether the difference in the average posttest score between experimental classes I and II was significant. The calculation process was carried out with the help of SPSS 25, and the output results can be seen in **Table 5**.

Table 5. Posttest T-test Results of Cognitive Domain Learning Outcomes

Independent Samples Test										
		Levene's Test for Equality of Variances		***t-test for Equality of Means***						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
Post-test learning results	*Equal variances assumed*	,613	,438	2,770	42	,004	6,818	3,851	-,954	14,590
	Equal variances not assumed			2,770	41,252	,004	6,818	3,851	-,958	14,594

Source: Research 2024

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Based on the calculation results in **Table 5**, using the t-test at the significance level $\alpha = 0{,}05$ (a two-tailed test, $\frac{1}{2}\ \alpha = 0,\ 025$) obtained a t-statistic of 2,770 with a significance value of 0.084 while the t-table of 2,085. Because $t_{hitung} > t_{tabel}$ (2,770 > 2,085) and significance < 0,05 (0,04< 0,05), so H_0Is rejected. Moreover, H_1 is accepted, which means there is a higher improvement in student learning outcomes taught with the CTL learning model than students taught with the discovery learning model. Therefore, the CTL learning model influences student learning outcomes (Setiawan, 2020).

To compare students' cognitive learning outcomes between those who received learning with the CTL model and those who received learning with the discovery learning model, we calculate the gain of both classes. The data from the normalized gain test can be seen in **Table 6**.

Table 6. Data on the Improvement of Student Learning Outcomes in the Cognitive Domain

Group Group	N-Gain score data				
	$x_{\min}$	x_{maks}	$\bar{X}$	*s*	Kategori
CTL Class	0,10	0,90	0,60	0,20	Sedang
DL Class	0,10	0,70	0,50	0,27	Sedang

Source: Research 2024

Table 6 shows that the minimum score and maximum score of experimental group I data are higher than the minimum score and maximum score of experimental group II data. The standard deviation of the N-Gain score of the cognitive domain student learning outcomes ability of experimental group I is higher than that of experimental group II, meaning that the N-Gain score of the cognitive domain student learning outcomes ability of experimental group I is more spread out than the N-Gain score of the cognitive domain student learning outcomes ability of experimental group II. The mean gain of cognitive domain student learning outcomes ability in experimental class I (0.60) looks higher than the mean gain of cognitive domain student learning outcomes ability in experimental class II (0.50). The standard deviation of the N-Gain score of experimental group I and the N-Gain score of experimental group II are not very different, at 0.6 and 0.5, respectively. Both data points fall into the medium category based on the gain value. The CTL model is the right solution to develop learning that can optimize learning outcomes (Yesya *et al*., 2018). Learning using the CTL model shows a difference in the average student score before and after using the CTL model (Ahrisya *et al*., 2019). The CTL model is a learning model that can actively involve students in learning and stimulate students in developing their opinions to improve student learning outcomes (Manurung, 2020).

Increased Learning Motivation

Student learning motivation questionnaire data is obtained from the administration of a student learning motivation scale, which is composed of 30 statements consisting of 17 positive statements and 13 negative statements. The scale used represents two aspects of student learning motivation, namely, intrinsic motivation and extrinsic motivation. This student learning motivation scale was given to experimental class I and experimental class II at the first meeting of learning and the last meeting of learning. Processing and analyzing student learning motivation at the first and last meetings aims to determine student learning motivation before and after obtaining CTL model learning in experimental class I, and student learning motivation before and after obtaining discovery learning model learning in experimental class II. Based on the data from the first meeting, the lowest score was obtained (X_{min}), highest score (X_{max}), average score $(\underline{X})$Moreover, standard deviations (s) for experimental classes I and II are shown in **Table 7**.

Table 7. Recap of the First and Last Meeting Results on Student Learning Motivation

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Group Group	Ideal Score	The First Meeting				The Last Meeting			
		x_{min}	x_{maks}	$\bar{x}$	SD	x_{min}	x_{maks}	$\bar{x}$	SD
CTL	150	80	105	94,50	6,412	102	130	115,59	6,085
DL		77	107	93,32	7,961	97	122	112,50	6,688

Source: Research 2024

Based on **Table 7**, it can be seen that the minimum score at the first meeting of student learning motivation in experimental group I (80) is higher than that of experimental group II (77), and the maximum score of student learning motivation of experimental group I (105) is lower than the maximum score of student learning motivation of experimental group II (107). At the last meeting, the minimum score of experimental group I (101) was higher than the minimum score of experimental group II (97), and the maximum score of student learning motivation for experimental group I (130) was higher than the maximum score of student learning motivation for experimental group II (122). Furthermore, the statistical analysis of testing the difference in the means of two samples using the t-test was carried out to determine whether the mean score of the motivation questionnaire between experimental class I and experimental class II was significant. To find out if the difference in the average score of the first meeting and the average score of the last meeting between experimental class I and experimental class II is significant or not, the data is tested using the two-mean difference test before having to test the normality and homogeneity of variance on the score data of the first meeting and the last meeting of student learning motivation.

Based on the results of the normality and homogeneity test of the questionnaire scale scores of the two classes of student learning motivation data, it is stated that the data of the two classes are normally distributed and the variance of the two classes is homogeneous. Furthermore, the statistical analysis of testing the difference in the means of two samples using the t-test was carried out to determine whether the mean score of the motivation questionnaire between experimental class I and experimental class II was significant. The calculation process was carried out with the help of SPSS 25, and the output results can be seen in **Table 8**.

Table 8. Results of the T-Test on the Learning Outcomes Motivation Questionnaire Scale

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Last Learning Motivation	Equal variances assumed	,014	,907	2,603	42	,016	3,091	1,928	-,698	.799
	Equal variances not assumed.			2,603	41,630	,016	3,091	1,928	-,698	.800

Source: Research 2024

Based on the calculation results in **Table 8** above, using the t-test at the significance level $\alpha = 0{,}05$ (two-tailed test, 1/2 α =0, 025) t_{hitung} was obtained at 2,603 with a significance value of 0,084 while t_{tabel} was

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2,085. Because $t_{hitung} > t_{tabel}$ (2,603 > 2,085) and significance < 0,05 (0,016< 0,05), so H_0Is rejected. Moreover, H_1 is accepted, meaning there is a difference in the increase in student learning motivation, with students taught using the CTL learning model showing higher motivation than those taught using the discovery learning model. It can be concluded that there is a difference in the average motivation questionnaire scale of student learning outcomes between the experimental group I and the experimental group II. Thus, they have different scale scores.

We calculate the gain of both classes to see the increase in student learning motivation between students who receive learning with the CTL learning model and students who receive learning with the discovery learning model. Descriptive statistics of the N-Gain scores for the experimental group I and experimental group II presented are the lowest N-Gain score (x_{min}), the highest N-Gain score (x_{max}), the average N-Gain ($\underline{x}$) Moreover, Table 9 presents the complete data for the standard deviation of the N-Gain (SD).

Table 9. Recapitulation of Student Learning Motivation N-Gain Score Data

Class	Number of Students (N)	Average		*N-gain*	Category
		The First Meeting	The Last Meeting		
DL	22	93,32	112,5	0,3	Low
CTL	22	94,5	115,59	0,4	Medium

Source: Research 2024

Based on **Table 9** above, it is obtained that the minimum score and maximum score of experimental class I data are lower than the minimum score and maximum score of experimental class II data. The average N-Gain of student learning motivation of experimental group I of 0.3 is lower than that of experimental group II of 0.4. The CTL Learning Model is a learning model that allows students to apply and experience what is being taught, making learning more meaningful and enjoyable, so that it can increase student learning motivation (Nursehah *et al*., 2021). Learning with the CTL model can encourage students to play an active role in learning so that learning is more meaningful and real, as seen in the interaction between the CTL model and student learning motivation in mathematics learning (Harahap, 2021). CTL model learning will take place by linking the content of the material with everyday life so that students make more meaning of learning and provide learning encouragement to students, which will increase student motivation in learning (Zhafirah & Utami, 2019).

CONCLUSION

Based on the data analysis results and discussion stated in this study, several conclusions related to learning are obtained. First, there is a difference in the improvement of student learning outcomes taught with the CTL learning model, which is higher than those taught with the discovery learning model. This can be seen when calculating the normalized N-Gain analysis score of 0,6. H_0 is rejected and H_1It is accepted that there is a difference in the improvement of student learning outcomes taught with CTL learning models, higher than students taught with discovery learning learning models. Second, there is a difference in increasing the learning motivation of students taught with the CTL learning model, which is higher than that of students taught with the discovery learning learning model. This can be seen in the calculation of the normalized N-Gain analysis score of 0,4. H_0 is rejected and H_1It is accepted that there is a difference in the increasing learning motivation of students taught with the CTL learning model compared to students taught with the discovery learning model.

AUTHOR'S NOTE

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The author states that there is no conflict of interest related to the publication of this article. The author asserts that the data and content of the article are free from plagiarism.

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