

Effects of CTL with Simeli on Cognitive Learning Outcomes, and Inter-Intrapersonal Skills

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Abstract

This study aims to analyze the influence of the Contextual Teaching and Learning (CTL) model with Simeli media on cognitive learning outcomes and inter-intrapersonal skills of Grade VI students on science subjects electrical energy materials. The research design used is quantitative quasi-experiment. The population of the research was Grade VI Elementary School students in Jumo District. Sampling technique by purposive sampling, obtained from students as many as 22 from Public Elementary School 1 Jombor, 25 from Public Elementary School Giyono, and 23 from Public Elementary School 1 Kertosari. Research data on cognitive learning outcomes and inter-intrapersonal skills were obtained from tests and observations. Data analysis using Anova test with the help of SPSS 25. The results obtained by an average of cognitive learning outcomes of experimental class I was 92.50, experimental class II was 92.72, and control class was 70.13. The average inter-intrapersonal skills of experimental class I was 82.41, experimental class II was 81.48, and control class was 73.13. These data indicate that the average cognitive learning outcomes and inter-intrapersonal skills of the experimental class are higher than that of the control class. Anova test on cognitive learning outcomes showed $F_{\text{value}} = 116.210$ with a significant value of $0.000 < 0.05$, while the Anova test results on inter-intrapersonal skills showed $F_{\text{value}} = 13.088$ with a significant value of $0.000 < 0.05$. The conclusion of the CTL model with simile media affects improving cognitive learning outcomes, and inter-intrapersonal skills of Grade VI students on science subjects electric energy material.

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INTRODUCTION

To be able to create education as stipulated in Law Number 20 of 2003 concerning the National Education System in Article 1, it is necessary to carry out a quality learning process as mentioned in Government Regulation Number 19 of 2005 Article 19. It means that the learning process is carried out interactively, inspiring, fun, challenging, and motivates students.

The learning process is still far from expectations. Based on the interview result at preliminary study, that the teacher conveys the subject matter only by the lecture method, so the lesson becomes less interesting and boring. The teacher does not use real objects, only uses pictures. The teacher lacks interaction and reinforces to students. The teacher also does not connect subject matter with daily life, so students have difficulty understanding the concept of the subject.

Efforts that teachers can do to overcome these problems are to use models and learning media to make it easier for teachers to transfer information to students, and make it easier for students to understand the subject delivered by the teacher. Especially in the delivery subject of abstract such as electrical energy. Electricity is taught in Elementary School grade VI on natural science subjects, electrical energy materials so that students understand electricity and can use electricity in their daily lives properly. Surya in Susanto, Pradana, and Setiawan (2018) the aim of learning electrical material in elementary schools is to make simple electrical circuits, and explain each component, and to make and draw parallel circuits and series circuits. Electrical material is difficult for students to understand because the electric current cannot be seen but can be felt, so teachers need to use media that can provide a detailed picture of the subject.

One learning model that is suitable for teaching electricity is Contextual Teaching and Learning (CTL). Sanjaya in Nur, and Saputra (2018) that CTL is a learning strategy that emphasizes student involvement to find material learned and connect with real-life so that students

can apply it in life. CTL helps students see meaning in an academic subject that is learned by connecting academic disciplines with the context in their daily lives (Jonhson in Sugiyanto, 2007). The CTL model is suitable to be applied in science learning, since science learning not only memorizes but also requires an understanding and application in daily life (Arafat, 2018). This allows students to be motivated in learning because learning is done naturally, and students can practice it directly (Suharto, 2018).

CTL is expected to make easier for students to understand the subject matter so that it can improve learning outcomes. Arafat (2018); Rahayu, Sugiyarto, and Sunarno (2013) that CTL in science learning can improve learning achievement, learning outcomes (Nur, and Saputra, 2018; Wiyono, and Budhi, 2018; Hakim, Wahyudi, and Verawati, 2018), and activeness (Suharto, 2018). CTL can improve mathematical problem-solving abilities (Nurkhaffah and Mahmudi, 2018; Amir, 2015), critical thinking skills (Amalia and Wilujeng, 2018), ability to understand mathematical concepts (Susanto, 2017), and scientific literacy skills (Fatmala, Sujana, and Maulana, 2017).

Following the rapid development of technology, the selected media is Simeli. Simeli is short for, and the unique name of Livewire Electronic Simulation. Simeli is an electronic simulation software with various components in it. The advantages of simeli are being able to simulate the performance of an electric circuit that made the same as original components and analyzes whether the circuit is functioning well or not. Supported by Haribowo opinion in Sinurat, Simanjuntak, and Simatupang (2018) the use of computer simulations can improve student activities and learning will take place in an innovative, creative, and fun way so that it will be easier to identify problems, and find solutions. Wicaksono, Sarwanto, and Suparmi (2013); Azmi, Hajidin, and Vitoria (2017) that computer animation simulation media can improve learning outcomes, and student character (Sinurat, Simanjuntak, and Simatupang, 2018). Zahara, Yusrizal, and Rahwanto (2015) stated that computer media based on Physics Education

Technology (PHET) simulation can improve learning outcomes, and critical thinking skills.

This study aims to determine and analyze the influence of the CTL model with Simeli media on cognitive learning outcomes, and inter-intrapersonal skills of Grade VI students on science subjects electrical energy materials.

METHODS

The research design used in this study is a quantitative quasi-experiment. The experimental class was given treatment by applying the Contextual Teaching and Learning (CTL) learning model with simeli media. Whereas in the control class, the learning that is usually done by the teacher is using the lecture method and drawing media. Furthermore, the results of the post-test in the experimental and control class were compared to determine the effect of the CTL learning model with simeli media on cognitive learning outcomes, and the inter-intrapersonal skills of Grade VI elementary school students in science subjects electrical energy materials.

The population in this study were all grade VI Elementary School students in Jumo District, Temanggung Regency, which consisted of seventeen schools. Samples were taken by purposive sampling technique, with consideration of the number of students being almost the same, low national examination scores, being in the same sub-district, the curriculum and the material being taught the same, facilities and infrastructure were relatively the same. Samples were obtained by three schools, namely Public Elementary School 1 Jombor by 22 students, and Public Elementary School Giyono by 25 students as the experimental class and Public Elementary School 1 Kertosari by 23 students as the control class.

In this study, there are two variables, namely the independent variable, and the dependent variable as the main data. The independent variable in this study is the CTL learning model with simeli media. The dependent variables in this study are cognitive learning outcomes and inter-intrapersonal skills. The measured interpersonal skills are focused on

aspects of collaboration, caring, and self-confidence. The measured intrapersonal skills are focused on critical thinking skills, creative thinking, and communication, as supporting data in this study, namely observations that contain teacher responses, and the implementation of the learning process using the CTL model with simeli media.

Test and non-test techniques collected the data of this study. The test used is a written test and practice. While the notes were in the form of interviews and observations. The data analysis technique used is the two-way Anova test along with the prerequisite test, namely the normality test using the Kolmogorov-Smirnov test, and homogeneity using the Levene test at the significance level $\alpha = 0.05$.

RESULTS AND DISCUSSION

The cognitive learning outcomes of the experimental class I, II, and control class students were obtained through post-test. Data on cognitive learning outcomes are listed in Table 1.

Table 1. Descriptive Statistics of Cognitive Learning Outcomes

	N	Min	Max	Mean	Std dev.
Experiment I	22	83	100	92.50	6.239
Experiment II	25	85	100	92.72	4.783
Control	23	58	83	70.13	6.635
Valid N (listwise)	22				

Based on Table 1 shows that the average cognitive learning outcomes of experimental class I and II are higher than the control class. This means that there are differences in cognitive learning outcomes between classes given CTL learning with simeli media, and classes with learning that are usually done by the class teacher.

Analysis of student cognitive learning outcomes using the ANOVA test. Previously, a prerequisite test was carried out, namely the normality and homogeneity data test. Data normality test for students' cognitive learning outcomes can be seen in Table 2.

Based on Table 2, the significant value in the three classes is > 0.05 , which means that the learning outcomes of the three classes are

normally distributed. Then the homogeneity test is performed, the results of the homogeneity test of students' cognitive learning outcomes data obtained a significant value of $0.473 > 0.05$. The

two variances are the same, which means that both sample groups are homogeneous. ANOVA test was then performed on students' cognitive learning outcomes as in Table 3.

Table 2. Normality Test of Cognitive Learning Outcomes

	Kolmogorov Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experiment I	.133	22	.200*	.930	22	.120
Experiment II	.155	25	.123	.927	25	.072
Control	.144	23	.200*	.953	23	.330

Table 3. Anova Test of Cognitive Learning Outcomes

	Sum of squares	df	Mean square	F	Sig.
Between groups	7611.703	2	3805.852	116.210	.000
Within groups	2194.240	67	32.750		
Total	9805.943	69			

Based on Table 3, it can be concluded that the average experimental class I and II with different control classes. This supports the research hypothesis that there is an influence of the CTL model with simile media on the cognitive learning outcomes of Grade VI students on natural science subjects in electrical energy.

Interpersonal skills of students are obtained through observation, whereas students' intrapersonal skills are obtained through practice tests. Based on these data obtained descriptive statistics of experimental classes I, II, and control classes in Table 4.

Table 4. Descriptive Statistics of Inter-Intrapersonal Skills

	N	Min	Max	Mean	Std dev.
Experiment I	22	69	93	82.41	6.773
Experiment II	25	60	92	81.48	7.736
Control	23	63	83	73.13	5.546
Valid N(listwise)	22				

Based on Table 4, the results of the inter-intrapersonal skills of experimental class I, and II are higher than the control class. This shows that there are differences in the average inter-intrapersonal skills of students who are taught using CTL with simile media, and the control class taught with learning that is usually done by classroom teachers.

Anova test is then performed to determine the research hypothesis. Before the Anova test, the data prerequisite test is carried out, namely the normality test and homogeneity test.

Normality test results for inter-intrapersonal skills data can be seen in Table 5.

Based on Table 5, the three classes have a significant value > 0.05 , so it can be concluded that the data of the three classes are normally distributed. Homogeneity test results for inter-intrapersonal skills data is $0.343 > 0.05$. This means that both groups of samples are homogeneous, followed by the Anova test. Anova test results for students' inter-intrapersonal skills are shown in Table 6.

Based on Table 6, a significant value of $0.000 < 0.05$ is obtained, so it can be concluded that the average experimental class I and II with different control classes. This supports the research hypothesis that there is an influence of the CTL model with simile media on the inter-intrapersonal skills of Grade VI students in the subject of natural electricity material.

Based on the results of the study note that the cognitive learning outcomes of students in the experimental class increased significantly from an average of 63.86 to 92.61 after the learning process was carried out using the CTL model with simeli media. In the control class, there was only a slight increase in cognitive learning outcomes from an average of 63.43 to 70.13, after the learning that is usually done by the classroom teacher. This is because learning the CTL model with simeli media brings students to be actively involved in new experiences, and directly and related to everyday life. Students more easily understand the material presented by the teacher.

Sabandar in Sarie, Rahayu, and Isnaeni (2016) that one of the benefits of the CTL model is that it helps students understand the concept of learning. Because students learn by connecting the subject with the real world around them. Rahmawati, Subali, and Sarwi (2019) the

application of contextual learning wherein learning subject related to real-life situations around students make students more active in education, with students understanding the material in-depth, cognitive learning outcomes will increase.

Table 5. Normality Test of Inter-Intrapersonal Skills

	Kolmogorov Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experiment I	.171	22	.093	.928	22	.112
Experiment II	.115	25	.200*	.931	25	.092
Control	.120	23	.200*	.965	23	.563

Table 6. Anova Test of Inter-Intrapersonal Skills

	Sum of squares	df	Mean square	F	Sig.
Between groups	1201.776	2	600.888	13.088	.000
Within groups	3076.167	67	45.913		
Total	4277.943	69			

IT media is a new thing for students, so students are enthusiastic to try it. Even when it is successful, students are motivated to try again to make and simulate electrical circuits with different models. Hastuti, Mardikantoro, and Isnaeni (2019) the use of animated film media in learning aims to attract students' attention, and increase learning motivation. Maskuri, Putra, and Sarwi (2016) students appear to be motivated, and eager to follow the lessons seen from the seriousness of completing the task as well as students who excel, and the willingness to cooperate in groups. Kurnianto, Wiyanto, and Haryani (2019) motivation functions as a psychological factor in essential and direct learning.

The CTL model with simeli media also increases inter-intrapersonal skills. When students pay attention to explanations and simulations, students are showing care. Student activities in groups train collaboration skills. Presentation activities in front of the class train students' communication skills and confidence. Pietarinen, Pyhältö, Soini, and Salmela-Aro (2013) create an encouraging and supportive environment to gather learning resources and information, can empower students to approach problem-solving situations with confidence. The activity of making electrical circuits trains critical and creative thinking. It is learning electrical circuit simulation by simeli training

communication skills that are not an anti-IT attitude. Ash'ari in Nurahman, Isnaeni, and Ellianawati (2019) improvement of students' communication skills is influenced by the use of ICTs that provide opportunities and broadens the interaction of teachers and students, to develop communication skills.

Thus it can be concluded that the CTL model with simile media can improve cognitive learning outcomes, and students' inter-intrapersonal skills in the subjects of natural electricity material.

CONCLUSION

Based on the research that has been done, it can be concluded that the CTL model with simile media affects improving cognitive learning outcomes, and students' inter-intrapersonal skills in science subjects electric energy material.

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