The Effect of Contextual Teaching and Learning Model for Primary Students' Achievement in Science Class

Anggi Paura, Lazim, N, Syahrilfuddin, ,Neni Hermita
Primary School Teacher Education Study Program
Department of Education
Riau University
Email: anggiepaura@gmail.com

Abstract: The Contextual Teaching Learning Model (CTL) makes the learning process that emphasizes the process of student involvement in real life everyday. This study aims to determine the differences in students' science learning outcomes using the CTL model. This research method uses Quasi-Nonequivalent Experiment of Pretest-Postest Design Group. This study was conducted on 56 students who each class amounted to 28 students. Based on the results of the study obtained the results of science learning students learn with the CTL model higher increase than those who study with conventional models. It can be seen from the gain index value in the CTL class of 56% which is the medium category, while the gain index value in the conventional class is 32% which is a low category. This shows that the CTL model can improve the learning outcomes of elementary school students in water saving and natural events.

Keywords: Contextual Teaching Learning Model, Students' Science Learning Outcomes.

1. Introduction

Sciense is concerned with hpw to sistematically find out about nature, so science is not only the mstery of a collection of knowledge in the form of fact, concepts or principles but also a inquiry process. Science education is expected to be an aspect for students to learn about themselves and the environment, as well as the prospect of further development in appling it in every day (Artana, 2015:Hadi Putra, 2018).

Natural Sciences is the study of events in nature that are inseparable from everyday life (Samatowa, 2010: 3). Trianto (2007: 90) states that science is knowledge gained through collecting data with experiments, observations, deductions to produce an explanation of a symptom that can be trusted. Science can also be understood based on observations, as well as experiments in nature. So that the beauty of a formulated theory cannot be maintained if it is not in accordance with the results of observations or observations. Facts about the symptoms of objects or nature are investigated and tested repeatedly through experiments (experiments), then based on the results of the experiment it is formulated the scientific information, namely the theory (Aly, Abdullah et al. 2009: 20).

Realizing the importance of science learning for students, it requires optimal involvement of students and teachers in order to achieve a good learning process. One of the benchmarks that students have learned well is if the student can learn what should be learned, so that the desired

learning outcomes indicators can be achieved by students (Trianto 2015: 19). Good learning outcomes are the fruit of a good teaching and learning process because learning outcomes are directly proportional to the teaching and learning process.

Based on observations that have been conducted by researchers in one elementary school, the fact that the learning activities at the school are still teacher-centered. In this case the teacher who plays the main role in the delivery of information or content of the lesson verbally, while students only listen and receive passively. Learning like this only emphasizes students to memorize information / contents of this subject according to Hermita, N. (2017: 2) Teachers who are the main actors of education can play their role as controlling the teaching and learning process. Hermita, N. et al, (2018: 102) states that teachers are the key to the success of the quality of education because it is the spearhead of education where they meet with students regularly and programmed. Based on the problem described in the paragraph above, the researcher tries to apply contextual teaching and learning (CTL) learning models in science learning.

The CTL model is a learning process that emphasizes the process of student involvement to find material that is learned and relate it to real-world situations, thus encouraging students to apply it in their daily lives (Hamruni, 2011: 133; Chairilsyah et al., 2018). According to Johnson (2007: 57) CTL is a system that stimulates the brain to compose patterns that embody meaning. CTL is a teaching system that matches the brain that produces meaning by connecting academic content with the context of students' daily lives. Thus in CTL learning the teacher does not present the concept of science in the form that has been made, but through problem solving activities students are led towards finding their own concept (reinvention).

The purpose of study is to determine the differences in students' science learning outcomes implementing Contextual Teaching Learning Model.

2. Methodology

The method used in the study is quasi experimental nonequivalent control group design. In the experimental class a contextual teaching and learning model is applied while in the control class conventional learning models are applied. This research was carried out in the even semester of 2017/2018 school year in science subjects. Subjects in this study were fifth grade elementary school students. The number of fifth grade students is 28 students, while the number of fifth grade students is 28 students. The determination of the experimental class and the control class was chosen randomly in which the fifth class was chosen as the experimental class and the fifth grade was chosen as the control class. The steps taken in this study are: (1) Initial test, (2) treatment, and (3) Final Test.

3. Result and Discussion

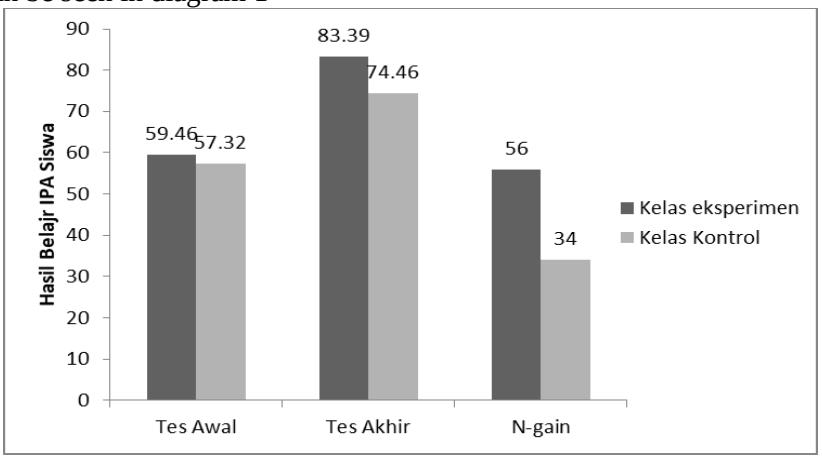
The results of the research obtained consisted of scores of science learning outcomes and activity sheets. Score of science learning outcomes in the form of initial tests (pretest), final test (posttest), and improvement in learning outcomes, while the activity sheet in the form of teacher activity sheets and student activity sheets in learning.

Obtaining the average initial test score, final test, and normalized gain on the experimental class and control class can be seen in Table 1.

Tabel 1 Description of Student Learning Outcomes

Class	Experiment			Control		
	Initial test	Final test	N-gain	Initial test	Final test	N-gain
n (number of students)	28					
Average	59,46	83,39	0,56	57,32	74,46	0,34

The table above shows that with the same number of students there are many differences in the increase in the average experimental class and control class. This shows that the CTL model can improve the learning outcomes of elementary school students. To see a clearer difference in improvement can be seen in diagram 1



Based on the above histogram 4.1 above, we can know that the average value in the experimental class before receiving treatment was 59.46 and after receiving treatment was 83.39, while in the control class 57.32 before receiving treatment, it became 74.46 after receiving treatment. This shows that student learning outcomes of both classes have increased. But the experimental class has a higher increase compared to the control class.

1) Normality test

This data normality test is carried out using the liliefors test. Normality test is used to determine the normality of the initial test score data between the experimental class and the control class, with the formulation of the following hypothesis:

H_o : pretest is normal distribution

H_a : pretest is not normal distribution.

The results of the normality test of experimental class and control class data can be seen in Table 2 below

Test	Class	Sig* (0,161)	Description
Pretest	Experiment	0,114	Normal

	Control	0,085	Normal
Posttest	Experiment	0,110	Normal
	Control	0,120	Normal
N-gain	Experiment	0,059	Normal
	Control	0,118	Normal

Pengujian hipotesis menggunakan taraf signifikan α= 0,05 dan L_{tabel} = 0,161 dengan kriteria jika $L_{maks} \leq L_{tabel}$ maka H_o diterima berarti data berdistribusi normal. Dari tabel 4.2 diatas menunjukkan hasil bahwa tes awal, tes akhir, dan gain yang dinormalisasi berdistribusi normal.

Hypothesis testing uses significant levels α = 0.05 and L_{table} = 0.161 with criteria if $L_{maks} \leq$ L_tabel then H_o is accepted means that the data is normally distributed. From Table 4.2 above shows the results that the initial test, final test, and normalized gain are normally distributed

2) Homogeneity test

Based on the normality test, it is known that the initial test score, the final test, and the N-gain are normally distributed, and then the homogeneity variance test, initial test, final test and N-gain can be carried out in the experimental class and control class. The data homogeneity testing was carried out by F (Fisher) test technique. The formulation of the hypothesis of the final test (posttest) homogeneity testing was as follows

H_o : the variance of the experimental class score and the homogeneous control class

H_a : the variance of the experimental class scores and the control class is not homogeneous

Hypothesis testing using significant levels α = 0.05 and F_{tabel} = 1.88 with criteria, if F_ count ≤ F_{count} then H_0 is accepted means the variance of both classes is homogeneous. The results of the calculation of the data homogeneity of the experimental class and control class can be seen in table 3 below:

Data	F_{count}	F_{table}	Description
Pretest	1,26	1,88	Homogen
Posttest	1,06	1,88	Homogen
N-gain	1,84	1,88	Homogen

Table 3 above shows that the initial test and final test are homogeneous distributed so that it can be continued by t test, but the normalized gain value has a homogeneous distribution, so it must be continued with the t test to determine whether or not there is a significant difference between the experimental class and control class learning outcomes. With the following hypothesis:

H_0: there is no significant difference between experimental class students and dick class students

H_a: there are significant differences between experimental class students and dick class students

Hypothesis testing uses significant levels α = 0.05 and t table = 2.051 with the following criteria:

$-t_{tabel} \leq t_{hitung} \leq t_{tabel}$ so accepting H_o and refusing H_a

$-t_{tabel} \leq t'_{hitung} \leq t_{tabel}$ so accepting H_o and refusing H_a

The results of the t test and t test can be seen in the following Table 4:

Data	Class	Average	DevisiasiStandar	t_{hitung}	t_{tabel}
Pretest	Experiment	59,46	15,59	0,516	2,051
	Control	57,32	17,55		
Posttest	Experiment	83,39	9,032	3,371	
	Control	74,46	8,749		
N-gain	Experiment	0,56	0,186	5,789	
	Control	0,34	0,180		

Based on Table 4 it can be concluded that in the initial test there was no difference between the experimental class and the control class, which means that Ho is accepted and Ha is rejected. Furthermore, in the final test it can be seen that there are significant differences between experimental class students and dick class students, which means that Ho is rejected and Ha is accepted. Then the normalized gain value can be seen that there are significant differences between experimental class students and dick class students, which means that Ho is rejected and Ha is accepted.

Based on the data analysis found several findings and discussion, namely the improvement of learning outcomes of the model applied. The discussion of the results of this study was made based on the analysis and findings in the field accompanied by the data, namely: initial test (pretest), final test (posttest), increased learning outcomes, and the implementation analysis of the CTL learning model by the teacher. The results of the difference test of the average pretest test on the control class and the experimental class conducted in elementary school found that between the experimental class and the control class did not have differences in learning outcomes. Based on the results of the t-test of the experimental class with the control class has t count 0.514 t table 2.0138 seen from the results of the average difference test above students from the experimental class and the control class has the same initial ability, or there is no difference. This is consistent with one of the characteristics of experimental research proposed by Ruseffendi (in Eddy Noviana, 2008) that the equivalence of subjects in different groups needs to exist, so that if there are different results obtained by the group, it is not due to the non-equivalence of groups that, but because of the treatment.

After experiencing the learning process and students are given different treatment in each class. In the experimental class the treatment of the CTL learning model was given, while in the control class the treatment of conventional learning models was given. The provision of different treatments aims to determine the effect of the learning model on improving student learning outcomes. The learning model treatment was carried out in 3 meetings; each meeting consisted of 2 hours of lessons on the material of water conservation and natural events.

All classes are then given different treatment. The contextual teaching and learning model in the experimental class and conventional learning in the control class. The average score of the end of the second class test increased to 83.39 in the experimental class and 74.46 in the control class. From these data it turns out that there is an increase in the experimental class and control class after learning, the average increase in the experimental class is higher than the control class, but not seen in the staatistic test. Based on the posttest t test, the average difference is obtained by t count = 3.371 with t table = 2.051 which means that there is a difference in the

increase in learning outcomes between students who learn by using contextual teaching and learning models with students who learn using conventional learning. This shows that Ho is accepted means there is no significant difference between experimental class students and control class students in the initial test (pretest). Judging from the difference test the experimental class students and control class students have the same initial ability or there is no significant difference in the ability of science learning outcomes before the treatment is given or applied.

In line with the above problems, it takes a science learning model that suits the needs of students so that students are motivated in following the learning process which is a learning model that encourages students to make connections between the knowledge they have in their daily lives and a model that prioritizes cooperation in solving problems to apply knowledge and skills in order to achieve learning goals (Ninda, Beni 2013; Monhas, 2018).

According to Nila (2015) science learning outcomes of students in the experimental class were declared quite successful. From the explanation above it can be seen that the CTL learning model has a better influence in improving students' learning motivation in science subjects on water cycle material when compared to ordinary learning activities. The difference in the mean posttest arises because of the different treatments in terms of the learning model conducted between the experimental group and the control group. RPP for learning with the CTL learning model

The implementation of CTL learning can be seen from the observations. Observation value is the value of the implementation of the learning carried out whether it is done well or not. Based on the results of observation, the implementation of learning in the classroom using the CTL model took place the teacher's activity at the first meeting on water saving material had a percentage of 65% in the sufficient category 90 % good category.
Student activities at each meeting also increased. Based on the results of data analysis of teacher activities in the learning process with the application of CTL learning models affect student activity during the learning process takes place. The more activity that the teacher does, the more student activities will increase which in turn will improve student learning outcomes. Student activity in the experimental class at the first meeting of the learning process can be categorized as very low with a percentage of 45%. This is because students are not yet familiar with the CTL method that is carried out by the teacher so that students are less responsive. At this first meeting students are still difficult to control and are not accustomed to participating in learning activities with the CTL model. Students play more and interfere with friends or other groups using experimental tools and materials. Therefore, the student's observation data will be analyzed so that it will become a reflection material for the next learning meeting. At the second meeting the percentage of student activity increased to 65% with a category that was quite sufficient. Students have started to identify problems and conduct experiments, although there are still some students who still play the tools and materials outside the experiment. At the third meeting the category of student activity was classified as very good with a percentage of 90%. Students are more active than previous meetings, students seem enthusiastic about conducting experiments together and are more confident and able to think critically.

Thus, the hypothesis in the Ho study is rejected and Ha is accepted, namely: There is a significant difference in learning outcomes between elementary school students who obtain learning through the CTL model with students who obtain conventional learning models.

4. Conclusion

Based on the results of the analysis and discussion that has been carried out, it can be concluded that there are differences in the contextual teaching and learning model of the learning outcomes of the SDN 002 Ujung Batu science, which consists of:

1. Increased learning outcomes occur in the experimental class which obtained an initial test average of 59.46 and increased to 83.39 with a gain of 56% in the average final test score classified as moderate. While the control class obtained an average initial test of 57.32 and 74.46 the gain value of 34% of the final test average was low.
2. Percentage of student activity at the first meeting amounted to 45% with very poor category, at the second meeting at 65%, at the third meeting at 90%. The results of the observation sheet of student activity at the first meeting were categorized as lacking because there were deficiencies in implementing the CTL model. Students are still not familiar with the CTL model. This is because students are still influenced by conventional learning models. The teacher tries to arouse the enthusiasm and enthusiasm of students in learning so that the creation of learning is conducive which can then influence the learning outcomes. In the next meeting students are increasingly accustomed to the CTL model and the results of student activities are getting better.

References

Aly, Abdullah dan Eny Rahma, 2009. *Ilmu Alamiah Dasar*. Yang Menerbitkan PT Bumi Aksara: Jakarta.

Chairilsyah, D., Kurnia, R., 2018, *Teacher Assessment to School readiness on the 5-6 Year-old Children in state Kindergarten in Pekanbaru (Motoric physical, Social Emotional, Moral, Language, and Cognitive Aspect)*, Journal of Educational Sciences, 2(**2**), 74-82

Eddy Noviana. 2008. "Penggunaan Teknologi Multimedia Interaktif dalam Pembelajaran Ilmu Pengetahuan Sosial untuk Meningkatkan Pemahaman dan Retensi Siswa (Studi Eksperimen Kuasi di Sekolah Dasar Negeri Kota Pekanbaru)." *Tesistidakdipublikasikan*.Universitas Pendidikan Indonesia. Bandung.

Hadi Putra, 2018. Enhanching Primary Students Science Learning Outcome Utilizing Visual Multimedia

Hamruni. (2011). *Strategi Pembelajaran*. Yogyakarta: Insan Madani

Hermita, N., dkk. 2018. Constructing VMMSCCText for Re-conceptualizing Students' Conception. *Journal of Applied Environmental and Biologica Sciences*.8(3).102-110.(Online).https://www.researchgate.net/publication/323545903_Constructing_VMMSCText_for_Re-conceptualizing_Students%27_Conception. (diakses 10 maret 2018).

Hermita, N., 2017. *Pembelajaran IPA Dengan Model Inkuiri Terbimbing Untuk Meningkatkan Pemahaman Konsep Dan Keterampilan Proses Sains Siswa Sekolah Dasar.* Tesis. JurusanPendidikan IPA SD FKIP UPI. TidakDiterbitkan.

Jhonson.2007.*Contextual Teaching and Learning*. MLC.Bandung

Merdeka Wati, Nila 2015. Pengaruh Penerapan Model Contextual Teaching And Learning Terhadap Motivasi Belajar Ipa Siswa Kelas V Sd Negeri 1 Kebondalem Lor.

Monhas, L.B., 2018, Insight stories: Looking into teacher support in enhancing scientific thinking skills among pre-school students, Journal of Educational Sciences, 2(1), 19-25

Nasrul, Tifa afif Dkk. Pengaruh Model Contextual Teaching And Learning Terhadap Hasil Belajar Ipa Materi Gaya. https://eprints.uns.ac.id/14068/1/2240-2276-1-PB.pdf

Ninda, Beni. 2013. Pengaruh Model Pembelajaran Contextual Teaching And Learning (Ctl) Dan Cooperative Learning Tipe Student Teams Achievement Division (Stad) Terhadap Hasil

Belajar Ipa Ditinjau Dari Motivasi Belajar Siswa Sd Negeri Di Kecamatan Colomadu Tahun Ajaran 2012/2013

Ratna, Mutia 2015. Pengaruh Metode Ctl Dan Kemampuan Berpikir Logis Terhadap Hasil Belajar Ipa Siswa Kelas Iv Sekolah Dasar Negeri 114 Palembang. Mahasiswa S2 Pendidikan Dasar Pascasarjana UNJ .Mutia_ratna@gmail.com

Samatowa.2010. *Bagaimana Pembelajaran IPA di SD*.Jakarta:Depdiknas.

Trianto. 2015. Mendesain model pembelajaran inovatif, progresif, dan kontektual. Jakarta: Prenadamedia Grup.