



THE USE OF REALIA MEDIA-ASSISTED CONTEXTUAL TEACHING AND LEARNING MODEL TO IMPROVE MATHEMATICS LEARNING OUTCOMES ON FRACTIONAL LEARNING MATERIALS IN GRADE IV ELEMENTARY SCHOOL

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PENGGUNAAN MODEL BELAJAR MENGAJAR KONTEKSTUAL BERBANTUAN MEDIA REALIA UNTUK MENINGKATKAN HASIL BELAJAR MATEMATIKA PADA MATERI TERPISAH DI KELAS IV SD

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ABSTRACT

Abstract: This paper discusses the information related to the differences in students' learning outcomes after applying the CTL model assisted by realia media and conventional models on fractional learning material in grade IV elementary school. The research uses a quantitative approach through the application of Quasi Experimental model with experimental methods and Nonequivalent Control Group Design. Class IV Sultan Agung and Class IV Sultan Hasanudin at SDN A Blitar were research samples. The classes are separated into two classes, the experimental class applying the CTL model assisted by realia media and the control class applying conventional models. The pretest and posttest scores in both classes are the analyzed data. SPSS 22 for Windows is used to help analyze data. The results indicate that the average posttest score of the experimental class was 53.6 exceeding the control class average score, which had a value of 29.92. The results, which obtained through data analysis from both classes, are said to be normal and homogeneous. The results, which obtained on the Wilcoxon test in the experimental class of $0.000 < 0.05$, indicate a difference in results before and after treatment using an N-Gain Score at 0.3619. The control class Wilcoxon test results were $0.079 > 0.05$, which imply that there is no difference before and after treatment with an N-Gain Score at 0.0661. The Mann-Whitney test produces significant values at $0.001 < 0.05$, which indicate that learning outcomes through the application of realia media-assisted CTL models are different from conventional models.

Keywords: contextual teaching and learning, conventional, realia media, fractions

Abstrak: Artikel ini membahas informasi terkait perbedaan hasil belajar setelah menerapkan model CTL berbantuan media realia dan model konvensional pada materi pecahan di kelas IV Sekolah Dasar. Penelitian menggunakan pendekatan kuantitatif, melalui penerapan metode eksperimen model Kuasi Eksperimen dan rancangan *Nonequivalent Control Group Design*. Kelas IV Sultan Agung dan Kelas IV Sultan Hasanudin SDN A Blitar menjadi sampel penelitian. Kelas dipisahkan menjadi dua kelas yaitu kelas eksperimen yang memperoleh perlakuan dengan menerapkan model CTL dengan bantuan media realia dan kelas kontrol dengan penerapan model konvensional. Nilai *pretest* dan *posttest* pada kedua kelas tersebut merupakan data yang dianalisis. SPSS 22 for Windows digunakan untuk membantu menganalisis data. Hasil penelitian menunjukkan rata-rata *posttest* kelas eksperimen sebesar 53,6 melebihi kelas kontrol yang memiliki nilai 29,92. Hasil yang diperoleh melalui analisis data dari kedua kelas dikatakan normal dan homogen. Hasil yang diperoleh pada uji *Wilcoxon* pada kelas eksperimen sebesar $0,000 < 0,05$ menunjukkan adanya perbedaan hasil sebelum dan sesudah perlakuan menggunakan skor *N-Gain* sebesar 0,3619. Hasil uji *Wilcoxon* kelas kontrol sebesar $0,079 > 0,05$, yang menunjukkan tidak ada perbedaan sebelum dan sesudah perlakuan, dengan *N-Gain* Score sebesar 0,0661. Uji *Mann-Whitney* menghasilkan nilai signifikan $0,001 < 0,05$ yang menunjukkan bahwa hasil belajar melalui penerapan model CTL berbantuan media realia berbeda dengan model konvensional.

Kata Kunci: pembelajaran dan pengajaran kontekstual, konvensional, media realia, pecahan

CITATION

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INTRODUCTION

The 2013 curriculum is the curriculum used as perfection KTSP curriculum that was previously implemented in Indonesia. The 2013 curriculum incorporates three principles into the learning process in the classroom, namely attitudes, skills and knowledge. Through the existence of the 2013 Curriculum, students are more involved in the learning process, and the teacher is not the main source of learning. Students with the 2013 curriculum system are asked to be active, productive, skilled, have creative abilities, and have high curiosity (Sunarti & Rahmawati, 2014).

In Curriculum 13 several subjects are put together in the form of thematic learning but there is a separation, one of which is learning mathematics in grades 4, 5 and 6 (Endayanti & Rahmawati, 2018). Learning mathematics is a process of developing numeracy skills, determining measurements, deriving, and applying mathematical formulas to solve everyday problems and produce changes in behavior which appear directly or indirectly as a result of practice or experience involved with the environment. The environment and daily life of students in K-13 can be a source of learning directly and connecting learning with real life so that students have meaningful experiences because of the activeness of students (Nuraini, 2019). Learning mathematics in the 2013 Curriculum invites students to have critical thinking. In learning mathematics, the ability of individuals to think critically can be improved by having meaningful classroom learning activities (Azizah et al., 2018).

Teachers need to help students understand material in the form of fractions so that they are used appropriately in everyday life and can be used as a basis for studying further mathematical material (Ariantika, 2018). In the process of learning mathematics using K-13 currently students also experience difficulties in understanding material concepts, are unable to

apply a combination of concepts and skills to solve mathematical problems, and skills analyze and do the questions that have been given. Teachers who still use conventional learning models, learning models that are not suitable, and students' learning motivation that is lacking are factors that cause students to feel a difficulty when learning mathematics. The difficulties experienced by these students have an impact on learning outcomes that cannot meet graduate competency standards (Widyasari et al., 2015).

Teachers can provide assistance to students to overcome their difficulties when learning mathematics through the application of learning models and sources of learning materials that are relevant to everyday life, the surrounding environment, and the stages of their development. Making learning in the classroom more meaningful can be carried out through the application of appropriate learning models and learning media so that they can result in an increase in the results obtained in student learning (Sumantri, 2015). The learning model is a conceptual framework which illustrates systematic techniques for managing the learning process in order to realize the goals in learning.

Based on observations in class IV Sultan Agung and Sultan Hasanudin SDN A Blitar, activities learning begins with greetings, attendance and apperception activities related to the subject matter. The teacher then uses the lecture method to explain the material being studied. The teacher, in explaining, still does not use instructional media in encouraging students' understanding of fractional material. Because of this, students in the class quickly get bored listening to the teacher's explanation, causing a lot of noise, many students do not understand the material, students have difficulty working because they still do not understand the teacher's explanation, and students are not involved in expressing their opinions about fractional material.



According to the results of interviews with grade IV Sultan Agung and Sultan HasanudinSDN A Blitar teachers, 70% of students do not comply *Kriteria Ketuntasan Minimal* (KKM) for mathematics subject material in the form of fractions which has a score of 70. Student learning outcomes under KKM because students study online without direct assistance from the teacher, less fluent in multiplication so that simplifying and changing the shape of fractions has difficulty, and teachers in the class still use conventional learning models and do not use learning media, the impact is that students are less interested in paying attention to the explanation of the material presented.

Efforts that can be carried out in dealing with this problem, the teacher is required to apply the learning model which increases student involvement, interest, and is able to relate the material being studied to everyday life. In the 2013 curriculum, a learning model that can be used and appropriate is the Contextual Teaching and Learning (CTL) learning model (Sumantri, 2015). The CTL learning model is a learning model that uses seven main components in the learning process to make it easier for teachers to relate the material students learn to real-life conditions in their everyday environment. The seven main sections in CTL are constructivism, asking, finding, learning communities, modeling, and actual assessment (Shoimin, 2014).

Students who learn through the application of the CTL learning model can have dynamic and adaptive skills/knowledge that enable them to actively build their own understanding (Shoimin, 2014). The application of the CTL learning model will be maximized if the process is assisted by learning media. Learning media such as realia media that are used will encourage students to form an understanding of a subject being studied. Media realia is media in the form of real objects in the surrounding environment that can be used to help students understand the initial understanding by offering direct experience, allowing students to be active and critical in their knowledge of the material

being studied. Food, animals, and rocks are examples of realia media that can be found in students' daily lives (Sulistiawati, 2020).

According to the statement that has been explained, the researcher chose a quantitative approach to research with an experimental method entitled "Use of Contextual Teaching and Learning Models Assisted by Realia Media to Improve Mathematics Learning Outcomes in Fraction Materials in Class IV of SD". The purpose of this research is to compare the learning outcomes that experimental class students get before and after implementing the CTL model assisted by realia media and the control class before and after applying the conventional model to fractional material in grade IV SD, as well as to compare learning outcomes after applying the CTL model with the help of realia media and conventional models on fraction material in grade IV SD.

THEORITICAL REVIEW

Contextual Teaching and Learning

Learning in schools must be carried out by implementing a learning model that makes it easier for students to be involved and connected to real life situations. The contextual learning model is a learning model that adheres to this issue. The contextual learning model is a learning model that makes it easier for teachers to relate the material students learn to life situations in their daily environment, and encourages students to relate it to their knowledge and use it in everyday life (Rusman, 2017).

The Contextual Teaching and Learning learning model has characteristics. According to (Shoimin, 2014), the characteristics are mutual cooperation, support between individuals or groups, interesting, study with enthusiasm, integrated learning activities, use multiple sources, students are involved, share between individuals, students are critical and teachers have creativity, the classroom environment contains results student work, reporting the results obtained in student learning to parents in the form of student work, experimental results, and student

writing. According to (Al-Tabany, 2017), seven main parts that should be contained in the learning process through the application of the CTL learning model namely: constructivism, asking, finding, learning communities, modeling, reflection, and actual assessment.

Sa'ud (2020) argues that the stages or syntax of the Contextual Teaching and Learning learning model, among others, namely (1) Invitation, where students are invited to express prior knowledge related to the material to be studied. On point this, the teacher can give recommendations in the form of comments regarding the real everyday situations of students and linking problems with students' perspectives; (2) Exploration, the exploration phase allows students to explore and discover concepts by collecting, organizing, and processing data from all the activities planned by the teacher; (3) Explanation and Solution, students can explain solutions based on observations made by strengthening teachers; and (4) Action Taking, the action-taking stage is when students use their knowledge and abilities to make decisions, exchange information and ideas, ask follow-up questions, and provide problem-solving solutions individually or in groups. When all the main components of CTL learning are also carried out, learning is considered to have used the CTL learning syntax (Sumantri, 2015).

Media Realia

Media realia, according to Rusman, is any media or real object that exists in nature and is used alive or preserved. Plants, rocks, animals, objects, water, and the environment are all examples of media realia (Fahri, 2020). In addition, realia media are objects and props that come from outside the classroom and are used for learning activities in the classroom. Realia is considered as a real object that is used to support the learning process as a tool to introduce new concepts that are learned (Puspaardini et al., 2019).

According to Munadi (Lestari & Mustika, 2014) various kinds of realia media

used as learning media among others, that is: (1) *Unmodified real thing* is original and unaltered, except move from the place of origin or origin. Unmodified real thing has sign, such as an object which can be used at normal size and can be identified by its real name. The example is types leaf, different flowers, tables, chairs, and fruit-fruit; (2) Modified real object. Mock ups, miniatures, and cutouts are examples of modified real media; (3) *Specimens* (Sample) is a sample of an object from the same group or category. Specimen unchanged and often seen in the environment. Bottles and cardboard boxes are samples that can function as media for the learning process.

Medium example realia according to Daryanto (Sulistiawati, 2020) among others, that is: (1) Artificial Media which too known as models. The model used in the learning process based on direct or through experience real object. The form and purpose of using the model can be classified according to the way it is made: comparative models such as globes or globes, simple models, disc models, assembled models, full models, dolls, and wayang;

(2) Sample is an example real objects from the real world and various real objects used as examples, as well as unnatural real things and real things made by humans. Herbariums, objects preserved in bottles, and objects preserved in plastic liquids are examples of inanimate samples. Aquariums, insectariums, zoos, experimental gardens, and botanical gardens are examples of living samples. Herbarium, taxidermy, and minerals are examples of non-living samples;

(3) A map that can describe the height of the earth's surface is an embossed map that is physically integrated with the field model. Embossed maps have dimensions of length, width, and depth. Students can easily identify changes in location by looking at the embossed map. (4) Doll is a comparative replica of a human or animal figure. Puppet plays used as learning materials can use media in the form of puppets or puppets;

(5) Math teaching aids are real objects that are created, collected, or arranged for the purpose of teaching or developing mathematical concepts. Examples of math props is food and cut fruits to find fractions material concept.

Changes in the function of knowledge, attitudes, and skills experienced by students are the results of learning from the learning activities carried out by students. According to K. Brahim (Susanto, 2013) the success rate of students when studying a material in class is presented in the form of test scores achieved to determine knowledge of a given subject matter which is the understanding of learning outcomes.

In this research, the types of learning outcomes observed were learning outcomes from the knowledge and skill aspects. The aspect tested to determine the difference in the value of learning outcomes is the result of conceptual understanding (knowledge aspect). Conceptual understanding (knowledge aspect) is the extent to which students obtain, absorb, and understand the material that the teacher provides, or what is read, seen, experienced, and felt as a result of learning through research or observation that has been carried out. Evaluation of products in learning in elementary schools is usually in the form of tests, such as daily tests, semester tests, and general tests (Susanto, 2013).

In addition, the skill aspect is the whole of scientific skills that have a direction that can be used to find a concept or principle or theory, to develop pre-existing concepts or to refute findings. There are six aspects of process skills, which include: observation, classification, measurement, communicating, providing explanations or interpretations of an observation, and conducting experiments.

Assessment to determine cognitive ability is in the form of pretest and posttest tests in the form of essays and skills assessment comes from

observing experimental activities that students do. Students first work on pretest questions before getting treatment through the application of the CTL learning model with help from realia media in the experimental class and conventional learning models in the control class. After getting treatment using the CTL learning model assisted by realia media and conventional learning models, students work on posttest questions to obtain information related to learning outcomes after receiving treatment.

RESEARCH METHODS

The research was conducted at SDN A Blitar which is located in Kepanjenkidul District, Blitar City. The two classes used as subjects in the study were students of class IV Sultan Agung and class IV Sultan Hasanudin. There were 25 students in class IV Sultan Agung and 25 students in class IV Sultan Hasanudin. This research applies a quantitative approach.

The approach used in this research is an experimental method using a Quasi Experimental Design with Nonequivalent Control Group Design. The class in this research was divided into two classes, class IV Sultan Hasanudin which was the control class and class IV Sultan Agung which was the experimental class. The random selection of the experimental class and the control class cannot be carried out in the use of the Nonequivalent Control Group Design (Sugiyono, 2016). The control class will be treated using the conventional model, while the treatment using the Contextual Teaching and Learning model with the help of realia media will be carried out in the experimental class.

Both classes of researchers gave treatment in the form of giving pretest and posttest questions with question indicators in table 1.

Table1. KD and Indicators of Pretest and Posttest Questions

Material	Basic competencies	Indicator	Objective	Question type	Question Type
Fraction Form	3.2 Explain the various forms of fractions (ordinary, mixed, decimal, and percent) and the relationship between them	3.2.1 Determine the correct form of common fractions	Be able to correctly determine common fractions	Description	apply
		3.2.2 Determine mixed fractions correctly	Be able to determine mixed fractions correctly	Description	apply
		3.2.3 Analyzing the form of ordinary fractions correctly	Can analyze the form of ordinary fractions correctly	Description	Analyze
		3.2.4 Analyzing the form of decimal fractions correctly	Can analyze decimal fraction block images with precision	Description	Analyze
		3.2.5 Describe the form of percent correctly	Able to calculate percent form accurately	Description	Understand
		3.2.6 Prove the decimal form of common fractions and percents correctly	Can prove the decimal form of common fractions and percents correctly	Description	Evaluate

The pretest and posttest questions will be used before being validated by the validator. The validity of this study serves as a measure of the level of validity of the instrument used. Instrument validation was carried out by class IV teachers at SDN A Blitar City and PGSD mathematics lecturer at Malang State University. Questions that have been validated by the validator are declared valid after being tested with the Aiken Validity formula.

After the questions were declared valid, a test was conducted on class IV Sultan Hasanudin at SDN A Blitar City to determine the reliability and difficulty level of the items. The degree of consistency between two measurement finding values on the same item, even when using different measurement tools and scales, is determined by reliability. Cronbach's Alpha

reliability test is a test of the reliability of the questions used and the instrument is declared reliable. After that, a level of difficulty test was carried out, a level of difficulty test was carried out to find out if the test instrument given to students was considered too easy or too difficult to do.

The pretest and posttest questions that have been tested and said to be valid and reliable can be used in research. At the beginning of the research, what was done was that both classes were first given an initial ability test in the form of a pretest on material in the form of fractions in the form of essay questions. The activity after the pretest was that both classes were given treatment based on the control class and the experimental class. After receiving the treatment, the two classes that the researcher gave the final

knowledge test were in the form of an essay-based posttest. Quantitative data that is processed is the value data pretest and posttest control class and experimental class.

The SPSS 22 for Windows application is used to help analyze the research data that has been obtained. The normality test is used to assess whether the data is normal or not, the homogeneity test is used to obtain information regarding whether the research data is homogeneous, the Wilcoxon test is used to test differences in learning outcomes before and after treatment to the control class and the experimental class, and the Mann-Whitney test is used in order to carry out tests on differences in the results of posttest and pretest differences between the control class and the experimental class. The N Gain Score test is used to measure the increase in student learning outcomes after the application of the conventional learning model in the control class and the Contextual Teaching and Learning model assisted by realia media in the experimental class.

RESULTS AND DISCUSSION

Learning activities carried out in class IV Sultan Agung as an experimental class are applying the Contextual Teaching and Learning model and in class IV Sultan Hasanudin as a control class by applying conventional learning models. Researchers carried out learning activities in the experimental class and the control class in two meetings with material in the form of fractions in class IV SD. Before the learning activities are carried out, students are given pretest questions at the initial stage which aims to

determine students' initial abilities and are given posttest questions after students have finished participating in learning activities for two meetings.

Learning is carried out over two meetings with the aim that students can learn the material clearly and can understand the material to the fullest. At the first meeting, students carried out learning activities by learning the material in the form of ordinary fractions and mixed fractions. Next, at the second meeting, students carried out learning activities with material in the form of percent fractions and decimal fractions. In the control class, students carry out learning activities by listening to the teacher's explanation, working on practice questions, and working on evaluation questions after the learning activities are finished.

The learning process in the experimental class with the application of the Contextual Teaching and Learning model were assisted by using realia media, students bring realia media in the form of bread, apples, boiled eggs, rice, bananas, candy, rulers, and folding paper. The realia media is useful for helping students understand material in the form of fractions. The first meeting with the material in the form of ordinary fractions and mixed fractions was carried out using realia media in the form of apples, boiled eggs, and bread. The realia media is used by cutting it into the same size with the aim of helping students understand the material in the form of common fractions and mixed fractions. The realia media image used is shown in Figure 1. The following is Figure 1 of the realia media that has been cut to the same size.



Figure 1. Cut Realia Media

According to Figure 1, it can be seen that apples, boiled eggs, and bread are cut in the same number and size. The cut realia media is used to help students understand the material with each student taking one or a number of pieces from the whole so students can state the number of fractions with one or a number of pieces per whole piece.

Besides that, realia media in the form of bananas, candy, boiled eggs, apples are used to

help understand material in the form of decimal fractions. In the activities carried out in learning the material in the form of decimal fractions, students are asked to weigh these objects and change the units from grams to kilograms. Ruler realia media and folding paper are also used in material in the form of decimal fractions, students are asked to measure folded paper that has been cut into different sizes. The following is a picture of the realia media used.

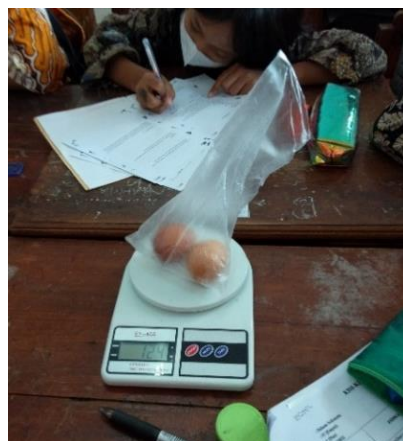


Figure 2. Weighed Media Realia

Based on Figure 2, it can be seen that students are weighing eggs. The numbers obtained on the scales with units of grams will be converted into kilograms by students, then the numbers are found in decimal form, so that students can be assisted in knowing the form of decimal fractions. In the percentage form, students are asked to count candies according to the candy

colors in the jar. The different colored candies in the jar numbered one hundred. These candies include blue candies with a total of 45, pink candies with a total of 30, and black candies with a total of 25. These different colored candies will be used as fractions with a denominator of one hundred because according to the definition percent is hundredths.

After giving the treatment in the control class and the experimental class, data were obtained in the form of pretest and posttest values.

The pretest and posttest value data that have been obtained are presented in the table. Table 2 below shows the pretest and posttest value data.

Table 2. Description of Pretest and Posttest Value Data

	N	Minimum	Maximum	Means	std. Deviation
Pre Test Experiment	25	0	85	29.44	20,678
Experimental Post Test	25	20	90	53.60	23,099
Pre Test Control	25	0	76	23.16	19,287
Post Test Control	25	0	90	29.92	27.118
Valid N (Listwise)	25				

In each experimental class and control class there were 25 students who took part in the pretest and posttest according to table 2. The experimental class had the highest pretest score of 85, while the control class had the highest pretest score of 76. The experimental class got the lowest pretest score with a score of 0, while in the control class got the lowest pretest score with a value of 0. The experimental class mean pretest had a value of 29.44, while the control class got a pretest mean of 23.16.

The highest posttest score achieved by experimental class students is 90 and in the control class is 90. In the experimental class, students get the lowest posttest score with a score of 20, while students in the control class have the lowest posttest score with a value of 0. The

experimental class has a mean posttest score of 53.60, while the control class got a mean posttest value of 29.92. It can be seen clearly that the pretest and posttest results are different between the control class and the experimental class. Pretest data was collected before the treatment that the researcher gave to assess students' initial abilities, and posttest data was collected after the treatment was given to evaluate students' final abilities.

The pretest and posttest values were then tested for normality and homogeneity. To assess the data obtained is normal or vice versa, a test is carried out with a data normality test. Table 3 displays the results obtained in the normality test for pretest and posttest data.

Table 3. Pretest Value Data Normality Test Results

Class	Statistics	Kolmogorov-Smirnova		
		df	Sig.	
Student learning outcomes	Experiment Class Pretest	.169	25	063
	Control Class Pretest	.163	25	087
a. Lilliefors Significance Correction				

According to table 3, pretest data based on test results with the Kolmogorov-Smirnov test in the experimental class got a significance value of 0.063 and in the control class the significance value was 0.087. Based on the significance value

of the two classes, the significance value of each class exceeds 0.05 so that it can be said to be normal. Table 4 below shows the results obtained in the data normality test after being given treatment.

Table 4. Posttest Value Data Normality Test

		Kolmogorov-Smirnova		
	Class	Statistics	df	Sig.
Student learning outcomes	Experiment Class Posttest	.172	25	054
	Control Class Posttest	.169	25	.065

a. Lilliefors Significance Correction

lean on Table 4, the significant value of the posttest data based on the Kolmogorov-Smirnov test results in the experimental class is 0.054 and 0.065 in the control class. According to the significance value of the two classes, each class has a significance value exceeding 0.05 which indicates that the data can be said to be normal.

The test that was carried out next was a homogeneity test on the results obtained from the difference in pretest and posttest values for the

control and experimental classes. The homogeneity test is used as a way to find out the homogeneity of data resulting from learning activities obtained by students in the experimental and control classes. Levene's test serves to analyze the homogeneity test results with a significant level (α) of 5%. Table 5 shows the results obtained in the data homogeneity test for the control and experimental classes using SPSS 22 for Windows.

Table 5. Data Homogeneity Test for Difference in Pretest and Posttest Values of Control Class and Experimental Class

		Levene Statistics	df1	df2	Sig.
GAIN	Based on Means	1,291	1	48	.261
	Based on Median	1,422	1	48	.239
	Based on Median and with adjusted df	1,422	1	46,598	.239
	Based on trimmed mean	1,326	1	48	.255

Table 5 displays the control and experimental class data according to the results obtained in the homogeneity test which has a significance value of 0.261. A significance value exceeding 0.05 indicates that the data is homogeneous.

According to the results obtained in the normality and homogeneity tests on the pretest and posttest data it was found that the data could be considered normal and homogeneous. Next, the hypothesis that has been determined is then tested

using the Wilcoxon test. The use of the Wilcoxon test is because the data found is only 25, even though the data is said to be normal and homogeneous. The Wilcoxon test was used to determine whether there was a change or not in the results obtained through learning activities carried out by students after the conventional learning model was applied to the control class and the Contextual Teaching and Learning model assisted by realia media in the experimental class.

The Wilcoxon test for the control class uses pretest and posttest values to see whether or not there is a difference in effect before and after

applying the conventional model. Table 6 below shows the results of the Wilcoxon test with SPSS 22 for windows.

Table 6. Control Class Wilcoxon Test

	Post Test Control - Pre Test Control
Z	-1.754b
asympt. Sig. (2-tailed)	.079

- a. Wilcoxon Signed Ranks Test
 b. Based on negative ranks.

Table 6 presents the results of testing with the Wilcoxon test, which shows that H_0 is acceptable because it obtains a significance value of 0.079 and exceeds 0.05 which has a 95% confidence level. It can be concluded that there is no difference in values in the control class after using conventional learning models in classroom learning based on the significance value obtained.

The Wilcoxon test was carried out in the experimental class to see whether there was a difference in the increase in learning outcomes before and after the implementation of the Contextual Teaching and Learning model assisted by realia media. Table 7 shows the results of the Wilcoxon test with SPSS 22 for windows.

Table 7. Experimental Class Wilcoxon Test

	Post Test Experiment - Pre Test Experiment
Z	-4.381b
asympt. Sig. (2-tailed)	.000

- a. Wilcoxon Signed Ranks Test
 b. Based on negative ranks.

Table 7 presents the results of the Wilcoxon test with SPSS 22 for Windows, which reveals that 0.05 exceeds the significance value of the test results obtained, namely 0.000 with a 95% confidence level, indicating that H_a is accepted. Based on this significance value, it can be seen clearly that the values obtained through learning outcomes in the experimental class have changed before and after the implementation of the Contextual Teaching and Learning model which is assisted by using realia media.

After running the Wilcoxon test on the pretest and posttest learning outcomes of the

experimental class and control class, then run the Mann-Whitney test. The Mann-Whitney test is used in making a comparison of the difference in increasing learning outcomes between the conventional learning model and the Contextual Teaching and Learning model which is assisted by using realia media in learning mathematics material in the form of fractions. In this study, the Mann-Whitney test used the difference in pretest and posttest values for each experimental class and control class. The results obtained in the Mann-Whitney test using SPSS 22 for Windows are shown in the table below.

Table 8. Mann-Whitney Test Results

	Learning outcomes
Mann-Whitney U	143,500
Wilcoxon W	468,500
Z	-3,288
asyp. Sig. (2-tailed)	001

a. Grouping Variables: Class

Table 8 presents the findings from the Mann-Whitney test with SPSS 22 for Windows, which shows that a significance value of 0.001 is below 0.05 using a 95% confidence level, indicating that H_a is accepted. It can be concluded according to the significance value obtained that in the results of learning mathematics in fractional material there are differences between classes that receive treatment through the application of the

Contextual Teaching Learning model with the help of realia media to students who receive treatment using conventional models.

The N Gain Score test is the next test. N Gain Score is used to test whether the learning model used increases the value or not in the research that has been done. Table 9 below shows the results obtained on the N Gain Score test.

Table 9. N Gain Score Test Results

N-Gain Value	Information	Class	
		Experiment	Control
$g > 0.7$	Tall	3	1
$0.3 \leq g \leq 0.7$	Currently	10	7
$g < 0.3$	Low	12	17
	Average	0.3619	0.0661
	Maximum	0.78	0.85
	Minimum	0.7	-1.50

Table 9 shows the results of the N Gain Score test and shows that in the experimental class, there were 3 students whose pretest and posttest results were included in the category of high scores, 10 students were in the category of medium scores, and 12 students were in the low score category. The average n gain score for the experimental class was 0.3619 which indicated that students' scores increased with moderate significance after using the Contextual Teaching and Learning model which was assisted by using realia media to the results of learning mathematics material in the form of fractions for students in class IV SD.

In the control class, the N Gain Score test showed that there was 1 student who had the results obtained in the pretest and posttest included in the high score improvement category, 7 students in the medium score improvement category, and 17 students in the low score improvement category. The mean N Gain Score achieved by the control class was 0.0661, indicating an increase in student scores with low significance after receiving treatment using conventional learning models for the results of learning mathematics material in the form of fractions for fourth grade elementary school students.



Based on the results of the above data analysis in the control class, there was no increase in posttest scores after using the conventional model, with a significance value of the Wilcoxon Test $0.079 > 0.05$. The test results in this research are in line with previous research which was carried out by (Kistian, 2018) who found no difference between before and after implementing the conventional learning model.

Students in the control class were less involved in learning activities when they were treated with conventional learning models. Students in class just listen to the teacher's explanation, complete practice questions, and final assessment questions that have been given. Practice questions that students have completed individually will be asked in turn to come forward and write down their answers.

The teacher gives a discussion about the material after finishing discussing the practice questions. Students work on evaluation questions after listening to the conclusions from the teacher. Evaluation questions are done independently and discussed together after finishing work.

Based on the findings of the data analysis above in the experimental class, it is clear that there is an effect on increasing posttest scores after applying the Contextual Teaching and Learning model which is assisted by using realia media, using a significance value of the Wilcoxon test of $0.000 < 0.05$. In this study, the experimental class was treated through the application of the Contextual Teaching and Learning model with the help of realia media. The test results in this evaluation are consistent with the findings (Panji & I Dewa Nyoman Sudana, 2019) who found that there were changes before and after the application of the Contextual Teaching and Learning model in the class where the researcher had given this treatment.

Learning in the experimental class by applying syntax according to Sa'ud (2020) begins with the invitation stage. Invitation stages in the experimental class were carried out with the teacher asking questions about the forms of fractions in students' daily lives and asking

students to express their opinions. At this stage of the invitation also pay attention to the components of constructivism and ask questions that are important in contextual learning (Sumantri, 2015). The constructivism component in learning is carried out with students being given the freedom to convey knowledge based on their personal experiences and the questioning component. Students are given the opportunity to ask about their curiosity about the material in the form of fractions being studied.

The second stage is the exploration stage, students in the experimental class carry out experimental activities using realia media to discover the concept of fractional forms. The realia media used at this stage include banana, apples, bread, boiled eggs, candy, rice, folding paper, and rulers. The second stage of learning also applies the discovery component which expects students to gain knowledge also based on discovery, experimentation, and observation (Al-Tabany, 2017). Students in experimental activities are given the freedom to cut and arrange realia media based on instructions and in accordance with the form of fractions independently and write down the results in LKPD. Teachers in exploratory activities help students carry out experimental activities in accordance with predetermined procedures and provide skill assessments.

The third stage is the stage of explanation and solution. In this third stage students were formed into groups and asked to discuss the results of each experiment. After students discuss the results they get, students express their opinions about the form of fractions in groups. The activities carried out in this third stage are in accordance with the components of the learning community, in the learning community students are invited to work together in heterogeneous groups and students exchange opinions regarding the results obtained in learning (Al-Tabany, 2017). The teacher at this stage acts as a provider of reinforcement for the opinions conveyed by students.



The fourth stage is the stage of taking action. Students at this stage of taking action carry out decision-making activities based on the results of the opinions that have been submitted by each group. This stage is included in the modeling component where students who understand the material provide explanations based on the results of experiments or discoveries with realia media and group discussions (Al-Tabany, 2017). The decisions taken will be agreed upon by all students in the class and the teacher provides assistance with reinforcement and then students write them on the LKPD sheet.

Students then work on assessment questions after learning activities that aim to find out the results of learning activities. The work on evaluation questions by students is included in the actual assessment component which has the goal of obtaining information related to the learning development that students get in the learning process that has been carried out (Sumantri, 2015). After finishing working on the evaluation questions, students and the teacher discussed the evaluation questions together. Before the learning activity ends, students are given time to reflect on what they have learned. Students are given the opportunity to explain what they have learned and ask questions related to material that students do not understand.

The experimental class uses the Contextual Teaching and Learning model which is assisted by using realia media involving students in learning activities. Students in learning become active and can express their own opinions. The activeness of students by conducting experiments to understand the material being studied. Through these experimental activities, students gain skill scores.

The highest skill score obtained by experimental class students at the first meeting with material in the form of ordinary fractions and mixed fractions was 91.67 and the lowest score was 66.7. The highest skill score obtained by experimental class students at the second meeting with material in the form of decimal fractions and percent was 91.67 and the lowest score was 66.7.

In the skills assessment observed were the completeness that students brought for experimental activities, the implementation of research activities according to the instructions, and the reports written by students on the LKPD that had been provided.

Students in the experimental class, after doing two learning activities in the form of fractions using the Contextual Teaching and Learning model, were assisted by using realia media to carry out a posttest. According to the results of the analysis, it can also be shown that in the experimental class through the application of the Contextual Teaching and Learning model were assisted by using realia media provides an increase in the value of learning outcomes compared to the conventional model, with a significance value of the Mann-Whitney test of $0.001 < 0.05$. This finding is in line with the findings (Rahmah & Ermawati, 2022) about differences in mathematical results obtained by students who use Contextual Teaching and Learning models and conventional models.

Students with the Contextual Teaching and Learning model are more supported to get concepts about material by experimenting, discussing, and relating it to objects they encounter every day. Students whose class uses a conventional learning model only listen to the teacher's explanation and complete the assignments obtained. Students become less involved and less interested in learning the material. As a result, it can be shown that the experimental class students who received treatment with the application of the Contextual Teaching and Learning model assisted by realia media obtained learning outcomes that exceeded those of the control class students who were given learning treatment by applying conventional models.

CONCLUSIONS AND RECOMMENDATIONS

According to the results of analyzing the data that has been obtained in the test, it can be



concluded that there are differences in learning outcomes in the experimental class after being treated through the application of the Contextual Teaching and Learning model which is assisted by using realia media in the learning process, with a significance Wilcoxon test of $0.000 < 0,05$ which shows that accepting H_a . using the N Gain Score worth 0.3619 then the Contextual Teaching and Learning model which is assisted by using realia media in the experimental class can provide an increase in the results obtained in student learning in the moderate category.

The results obtained in the Wilcoxon test in the control class revealed that applying the conventional learning model did not affect the control class after receiving treatment. Because the Wilcoxon results in the control class were $0.079 > 0.05$ which resulted in rejecting H_a and accepting H_0 . With an N Gain Score of 0.0661, the learning model in the control class improves student learning outcomes in the low category.

According to the test results with the Mann-Whitney test, it obtained a significance value of $0.001 < 0.05$, it can be concluded that the application of the Contextual Teaching and Learning model which is assisted by using realia media provides an increase in learning outcomes that are different from conventional learning models in learning mathematics in the form of class fractions IV SD.

The Contextual Teaching and Learning model with the help of realia media is recommended for teachers to apply to learning mathematics in order to encourage an increase in activity and help students capture ideas using the help of realia media that they often encounter in their surroundings. The Contextual Teaching and Learning model with the help of realia media is also recommended if students have difficulty understanding fractional material due to their limitations in obtaining learning media. So that the CTL model with the help of realia media can be used by teachers in mathematics learning activities such as fraction material in class IV SD.

In addition, researchers who will use the Contextual Teaching and Learning model in

research are also recommended to use research results as research references. Because this research makes researchers make maximum use of the environment around students and helps students understand the material.

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