THE EFFECTIVENESS OF COOPERATIVE LEARNING MODEL TYPE TEAM ASSISTED INDIVIDUALIZATION (TAI) USING CONTEXTUAL TEACHING AND LEARNING (CTL) APPROACH ON MATHEMATICAL PROBLEM SOLVING ABILITY GRADE VIII SMP NEGERI 1 BLADO-BATANG ON THE SUBJECT OF THE CIRCLES

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Abstract

This research aims to analyze whether the cooperative learning model type Team Assisted Individualization (TAI) and Contextual approach to Teaching and Learning (CTL) is more effective than the conventional learning model , in terms of the ability of problem solving math grade VIII SMP Negeri 1 Blado academic year 2015/2016 on the subject of the circle. This research is the research experiments using a pretest post test design with two classes, one class as a class experiment and the other as a control class.

The population of this research is the whole grade VIII SMP Negeri 1 Blado, and the samples are all the students from class as a class experiment VIIIC provided learning by using cooperative approach with the contextual approach type of TAI, and all the students of class VIII E as control classes provided learning by using conventional approaches. Hypothesis testing methods used are independent sample t-test .

Based on the analysis of data obtained conclusions the average gain score grade experiment higher significantly than the average gain score class control. This means that the results showed models of cooperative learning-type Team Assisted Individualization (TAI) and Contextual approach to Teaching and Learning (CTL) is more effective than the conventional learning model in mathematical problem solving ability of JUNIOR HIGH SCHOOL students ' views of student learning outcomes.

Keyword :The Effectiveness, Cooperative Type Team Assisted Individualization (TAI), Contextual Approach To Teaching And Learning (CTL), Problem Solving

INTRODUCTION

Mathematics is one of the subjects that always gets the spotlight from various parties, including students, teachers, parents and various related circles. This is due to less satisfied the achievements of learning math in school. With regard to the existence of the problem, in the process of learning mathematics also found a variety of problems among them, students who are less active, students rarely ask the question at the moment of learning, students who think that math subjects are difficult and many students are lazy during the following lesson.

In addition most teachers still use the conventional learning methods so that learning is just dominated by the teacher alone. This causes the students so less active and tend to get bored at the moment following the instruction. It is therefore in the process of mathematical learning, teachers should choose a variation of strategies, methods, and the appropriate approach, so the math learning objectives can be achieved with either.

Based on Permendiknas number 22 of 2006 about the contents of the Standard (SI) Subjects, the Mathematical Subjects for all primary and secondary education level stated that the goal of mathematical subjects in schools is that students are able to:

understand mathematical concept), explains the inter connectedness between concept and apply concepts or logarithm, is flexible, accurate, efficient, and precise in problem solving.

1. Using reasoning patterns and properties, doing mathematical manipulations in making generalizations, compile evidence, or explain the idea and mathematical statements

2. To solve problems that include the ability to understand the problem, designing a

mathematical model, complete a model, and interpret the solution obtained.

3. Communicates ideas with symbols, tables, diagrams, or other media to clarify the circumstances or issues.

4. Have an attitude to appreciate the usefulness of mathematics in life, i.e. have curiosity, attention, and interest in learning mathematics, as well as a tenacious attitude and confidence in problem solving.

5. A similar thing is also stated by Holmes (in Sri Wardhani, 2010:7) according to Holmes, in essence States that the background reason or someone needs to learn to solve math problems is the existence of facts in the twenty-first century is that people are able to solve the problem of living with a productive, would be able to race against the needs of life, and understand the complex issues related to the global community.]

Based on the opinions expressed above, through mathematical learning activities carried out at various level of education especially in this junior high school level, students are expected to later have a high level of thinking ability.]

With patterns of thinking abilities and skills as it will encourage students ' motivation to work hard in the face of various challenges and able to solve problems in daily life. Based on the results of interviews and discussions with teachers math subjects as well as the observations of the researchers on the process of learning in one of the class VIII SMP Negeri 1 Blado, retrieved some of the problems that is the average value of student learning outcomes is still under standards completeness, Furthermore, in the process of learning math class VIII, teachers are still using methods lectures, teachers still dominate the classroom so that students become less active. One alternative that supposedly can overcome existing problems, namely with the application of the model of learning that prefer on the liveliness of students and provide opportunities to students

to develop its potential. The intended learning method is a method of cooperative learning-type team assisted individualization (TAI) and Contextual approach to Teaching and learning (CTL).

Cooperative learning model is a model of learning designed to develop the ability of academic (academic skills) and social skills (social skills) as well as interpersonal skills. In cooperative learning, discussion and communication developed with a goal to be able to share our abilities, critical thinking learning each other, mutually interconnected funneling deliver opinions, abilities, help each other in mutual learning, assess the capabilities and role of yourself.

Cooperative learning is a learning model that emphasizes small groups. Any student that is in the Group has a different ability levels (high, medium, low) if possible also consists of tribe, race, different cultures. Cooperative learning model prioritizes cooperation to solve a problem in order to achieve learning objectives.

Cooperative learning model is widely used and is of concern and recommended by experts. This is because based on the results of research conducted by Slavin (Rusman 2010:212) States that: (1) the use of cooperative learning can improve student learning and achievement at a time can improve social relations, fostering attitudes of tolerance, and respect for others. (2) Cooperative learning can fulfill the need of students in critical thinking, problem solving, and, integrating knowledge with experience.

To streamline the learning model to be used and for the achievement of learning objectives to the maximum, then it takes the approach that can push towards. The alleged approach suitable to encourage learning, contextual approach. Mathematics is the science that is abstract, so many students have difficulty understanding the meaning of the material studied. By using the contextual approach expected students can associate between the

material studied in the real situation (context), so that they can easily understand the material being studied.

This is in accordance with the opinion expressed by Johnson that the more able learners associate academic lessons in the context of their lives, the more they are going to get from these lessons. Understand the meaning of knowledge and skills will guide on knowledge and skills. According to Slavin (2009:194) cooperative learning model has several types, one of which, namely cooperative learning model type Team Assisted Individualization (TAI). This type combines excellence in cooperative learning and individual learning. Students individually learn material already prepared by the teacher. Individual learning results and then brought into the group to discussed and discussed with members of the group. All members of the group responsible for all the answers as the responsibility together.

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RESEARCH METHODS

The kind of research

The research including quasi experimental research.

PLACE AND SUBJECT OF RESEARCH

The research was carried out in the SMP N 1 Blado, Batang. The subject of Population is the whole JUNIOR HIGH students N 1 Blado Class VIII in 6 classes, while the samples from this study was randomly selected classes.

Prosedur

This Research procedure using design Randomized Control Group Pretest-Post test Design. In this research a group of randomly selected samples (A) of a particular population. The researchers chose two classes, namely class VIIIC and VIIIE class used samples from a population of class VIII consists of 6 classes. Then the samples are grouped into two classes, namely class experiment (VIIIC) and control classes (VIIIE). Second grade class either the next experiments or the classroom control given pretest (O). Cooperative learning experimental classes given Team Assisted Individualization (TAI) and Contextual approach to Teaching And Learning (CTL) (X) in a given period, while the class control given to conventional learning. Then the second class are given posttest (O). After being given the treatment, then examined the impact of research on the subject which appeared as a result of the treatment learning ability of solving. that is the ability of the mathematical problem solving of students. The design pattern is described as follows:

| E | O | X | O |
| K | O | X | O |

Description:

A: Research Subjects are taken randomly

O: tests given at pretest and post test in class experiments or the classroom control

X: Treatment on experimental classes in the form of cooperative learning model of Team Assisted Individualization (TAI) and Contextual approach to Teaching And Learning (CTL) and treatment on the class control in the form of conventional learning.

Data, Instruments, Data collection Techniques and Instruments

Of this research instrument is all about pretest, post test, and RPP. Pretest and post test arranged by class JUNIOR HIGH SCHOOL mathematics materials VIII semester 2 on the subject of the circle. Data collection techniques on this research by providing pretest and post test to students

Technique of Data Analysis before execution of the experiments carried out in advance of the test instrument tested outside the research sample. This is done to find out the feasibility of the instrument tests, the ability of mathematical problem solving of students is to look at the validity, reliability, power and difficulty distinguishing index. Test instrument is done with the following steps.

1. The validity of the Instrument

The validity of the instrument itself consists of the validity of the content and validity of invalid constructs. The validity of the content is done by consult grain question to Professor supervisor validation, whereas the validity of invalid constructs do with instrument to the respondent in accordance with the characteristics of the respondents. According to Guilford (Suherman,2003:112), the interpretation of the values in the table can be categorized rxy here

Table 1

Interpretation of Correlation Value rxy

Value	Information
$0{,}90 \leq r_{xy} \leq 1{,}00$	Very high Correlation
$0{,}70 \leq r_{xy} < 0{,}90$	high Correlation
$0{,}40 \leq r_{xy} < 0{,}70$	quite Correlation
$0{,}20 \leq r_{xy} < 0{,}40$	Low Correlation
$r_{xy} < 0{,}20$	Very low Correlation

2. Reliability Test

A tool evaluation is named reliable if the result does not change when used for different subject.

Table 2

Interpretation of Reliability

Reliability coefficient r11	INFORMATION
$r_{11} \leq 0{,}20$	The very low of degree reliability
$0{,}20 \leq r_{11} < 0{,}40$	The low of degree reliability
$0{,}40 \leq r_{11} < 0{,}70$	The quite of degree reliability
$0{,}70 \leq r_{11} < 0{,}90$	The high degree reliability
$0{,}90 \leq r_{11} \leq 1{,}00$	The very high of degree reliability

3. Test the Power Criterion differentiating

Power of one grain of matter of stating how much ability the question of distinguishing between grain test who knows the answer correctly with test who did not answer the question the (or test who answered incorrectly). In other words, the power of a grain of pollen of distinction reserved the question of grain is the ability to distinguish students who have high capability with low-capable students.

Table 3

Interpretation Power Index Distinctions

Value	Information
$0,70 < DP \leq 1,00$	Very good
$0,40 < DP \leq 0,70$	Good
$0,20 < DP \leq 0,40$	Quite
$0,00 < DP \leq 0,20$	Bad
$DP \leq 0,00$	Very bad

4. Difficulty Index Test

A test is good if it is not too easy and not too difficult. Too easy test does not stimulate testy to attempt to solve it. Instead, the questions too hard can make testy disappointed and break it (Suherman,2003:168-169).

Table 4

Interpretation Difficulty Index

Value	information
$IK = 0,0$	Very good
$0,00 < IK \leq 0,30$	Difficult
$0,30 < IK \leq 0,70$	quite
$0,70 < IK \leq 1,00$	easy
$IK = 1,00$	Very easy

Data analysis technique used is statistical techniques with analysis test-t. prior to the analysis of test-t, first performed a test prerequisite analysis, namely: the test is performed using a normality test of kolmogorov Smirnov test and its homogeneity using Levene test with a significant level of 5%.

RESEARCH RESULTS and DISCUSSION

1. Data Analysis Pretest Result

Cooperative learning-type Team Assisted Individualization (TAI) and Contextual approach to Teaching And Learning (CTL) on a conventional experiments and learning class on the class control the two classes are given the same pretest. The purpose of granting this pretest was to see the capabilities of early second grade before treatment as well as to see the equivalence of the two classes (class a class experiment and control).

To find out the normality of data the value of mathematical problem-solving ability of the students in each group to study pretest used test Kolmogorov-Smirnov (K-S). The zero hypothesis tested: H0: Gaussian data, H1: Gaussian data is not normal. H0 will be accepted if the value significance more than 0.05. Test of normality pretest presented in table 5 below:

Table 5

Pretest Normality test

Class	Significant Level	α	Information
Control	0,902	0,05	Normal
Experiment	0,641	0,05	Normal

In table 5 visible that the value of sig to any group larger than α = 0.05, this means zero hypothesis is accepted. Thus, the data value in the two groups pretest Gaussian. Furthermore, the test of its homogeneity of variance of the population from the data value of the mathematical problem solving ability of students in the learning group based pretest using Levene test. The zero hypothesis tested: H0: = σ1 σ2, σ1 ≠ σ2: H1. The test criteria is if the sig value greater than α = 0.05, then the zero hypothesis is accepted. Summary of the results of the calculation of its homogeneity of variance test populations presented in table 6 below:

Table 6
The test result of homogeneity Pretest Data

Data	Df	Sig	A	Result
Pretest	62	0,290	0,05	Homogen

Table 6 looks that sig is greater than α = 0.05, this means zero hypothesis is accepted. Thus, the variance of the population from the value of mathematical problem-solving ability of

the students in groups based on homogeneous learning pretest. Because both groups of various data and homogeneous Gaussian, then to find out or not the average difference of both groups learning group used data based on test-t. Test results-t can be seen in table 7.

Tabel 7
The results of t-test Pretest Data

	Experiment class	Control class
number of Samples **(n)**	32	32
standard deviation **(s)**	2,03	1,63
Combined standard deviation	1,84	
Average	4,67	3,99
t count	1,47	
t table	1,672	

Based on test-t in table 7, illustrates that the data value of the pretest of the experimental and control classes obtained t_{hitung} of 1.47. The value of t_{tabel} in df = 62 degrees of confidence 95% acquired for 1.672. This shows that the t_{hitung} < t_{tabel}. Thus it can be concluded that there is no difference in treatment given before the mastery or H0 is accepted.

2.The Results of Data Analysis Post test

After administering treatment post test i.e. cooperative learning-type Team Assisted Individualization (TAI) and Contextual approach to Teaching And Learning (CTL) on a conventional experiments and learning class on the class control the two classes are given the same post test. The purpose of granting these post test is to see the capabilities of the end of second grade after being given the treatment as well as to see the equivalence of the two classes (class a class experiment and control).

To find out the normality of data the value of mathematical problem-solving ability of the students in each group to study post test for each

study group used the Kolmogorov - Smirnov test (K - S) . The null hypothesis is tested : H0 : normal distribution of data , H1 : the data distribution is not normal . H0 would be accepted if the significance value greater than 0.05 .

Table 8
Post test Normality Test

Class	Significant Level	α	Information
Control	0,755	0,05	Normal
Experiment	0,853	0,05	Normal

In Table 8 shows that the sig for any group larger than α = 0.05, this means that the null hypothesis is accepted . Thus, the data values in both groups pretest normal distribution.

Next, test the homogeneity of the population variance of the data value of mathematical problem solving ability of students in the post test by group learning by using Levene test . The null hypothesis is tested : H0 : σ1 = σ2 , H1 : σ1 ≠ σ2 . Criteria testing is if significant level is greater than α = 0.05 , the null hypothesis is accepted . Summary results of the calculation of population variance homogeneity test are presented in Table 9 below:

Data	Df	sig	α	Result
Posttest	62	0,929	0,05	Homogen

Table 9
Homogeneity Test Result Data Pretest

In Table 9 shows that the significant level value is greater than α = 0.05, this means that the null hypothesis is accepted. Thus , the population variance of the value of the mathematical problem solving ability of students in the post test based learning homogeneous group .

Due to the two sets of data were normally distributed and homogeneous variance , so to determine the presence or absence of the average difference in the two groups of data based on study group used the t-test . T-test results can be seen in Table 10 .

Table10
The results of t-test *Post test* Data

	Experiment class	Control class
number of Samples **(n)**	32	32
standard deviation **(s)**	1,48	1,43
Combined standard deviation	1,46	
Average	6,5	5,4
t count	3,055	
t table	1,672	

Based on t-test in Table 10 illustrates that the data value post test of the experimental class and gained control tcount 1,774. ttable value at df = 62 at the degree of 95% was obtained for 1.672 . This shows that t > t table. It can be concluded that there is a difference after a given treatment or rejected H0.

3. Analysis of Gain

Gain obtained from the difference between the value of pretest and the value of post test. Because the learning outcomes is the result obtained by the students after learning the learning outcome is that the increase experienced by students. Gain analysis aims to answer the research hypothesis , which is to see whether the learning methods TAI with the experimental class CTL approach is more effective than conventional learning models in the control class . TAI learning approach where CTL (experimental group) is said to be more effective than the conventional model study (control group) when the learning outcomes in the experimental class is higher than the control class.

Table 11
The Result Normality Gain Data

Class	Significant Level	α	Information
Control	0,875	0,05	Normal
Experiment	0,357	0,05	Normal

In Table 11 shows that the sig value for any group larger than α = 0.05 , this means that the null hypothesis is accepted. Thus, the data gains value in both groups of normal distribution.

Next, test the homogeneity of the population variance of the data value of students' mathematical problem solving ability in the data gain based group learning by using Levene test. The null hypothesis is tested : H0 : σ1 = σ2 , H1 : σ1 ≠ σ2 . Criteria testing is if sig is greater than α = 0.05 , the null hypothesis is accepted . Summary results of the calculation of population variance homogeneity test are presented in Table 12 below:

Tabel 12
Homogeneity Test Result Gain Data

Data	Df	sig	α	Result
Pretest	62	0,893	0,05	Homogen

Table 12 shows that the sig value is greater than α = 0.05 , this means that the null hypothesis is accepted. Thus, the population variance of the value of the mathematical problem solving ability of students in learning gain popularity homogeneous group.

Due to the two sets of data were normally distributed and homogeneous variance , so to determine the presence or absence of the average difference in the two groups of data based on study group used the t-test

Based on t-test at 4:14 table, illustrates that the average gain of 0.39 experimental class and control class is 0.26. Obtained tcount 1,925 and t table (0.95) (62) = 1.672 , for t = 1,925 > t table (0.95) (62) = 1.672 . So it can be assumed that H0 rejected, which means the value of mathematical problem solving ability experimental class is higher than the value of mathematical problem solving ability control class.

From the processing gain, it can be concluded that the increase in mathematical problem solving ability of students on the subject of a circle using cooperative learning model Team Assisted Individualization by using Contextual Teaching and Learning is higher than the increase in mathematical problem solving ability using conventional learning models.

CONCLUSIONS AND SUGGESTIONS

CONCLUSIONS

Based on the results of research and discussion it can be concluded as follows:

1. There is a significant difference in students' mathematical problem solving ability between TAI type of cooperative learning model with a contextual approach and conventional learning models in the study of mathematics students in class VIII SMP Negeri 1 Blado on the subject of the circle. This is indicated by the results of the average posttest experimental class of 6.5 and an average yield of 5.4 posttest control class.
2. Learning mathematics with TAI type of cooperative models with contextual approach is more effective than conventional learning model

SUGGESTION

Based on the research put forward some suggestions as follows:

1. Teachers can use cooperative learning model type TAI with a contextual approach as an alternative to make learning mathematics more effectively.
2. Learning with TAI type of cooperative learning model with a contextual approach can be applied to the subject of another so as to improve students' mathematical problem solving ability.

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