Comparison of DRTA and CIRC Learning Models in Class IV Elementary School Science Subjects

Juliana Aningtyas[1,*] Muhardila Fauziah[1]

[1] *Faculty of Teacher Training and Education, Universitas PGRI Yogyakarta, Indonesia*
[*]*Corresponding author. Email: julianaaningtyas51@gmail.com*

ABSTRACT

The purpose of this research is to determine the difference in IPAS learning achievement between the use of the Directed Reading Thinking Activity (DRTA) learning model and Cooperative Integrated Reading and Composition (CIRC) and to ascertain which one is more effective in terms of IPAS learning achievement for fourth-grade students at Kaligatuk Elementary School and Kalipucang Elementary School. The research method used in this study is an experimental research with a Quasi Experimental Design. The population for this research consists of all students at Kaligatuk Elementary School and Kalipucang Elementary School, with a sample of 46 students. Data collection techniques include tests, observations, and interviews. The analysis technique used is quantitative analysis using a statistical approach with the Mann-Whitney test. The research results conclude that there is a difference in IPAS learning achievement between the DRTA and CIRC learning models. The DRTA learning model is more effective than the CIRC learning model, as indicated by the higher average post-test scores in the experimental group compared to the control group. The calculation of the N Gain test results in the DRTA class with a value of 0.57 and the CIRC class with a value of 0.46, leading to the conclusion that the DRTA learning model is more effective for IPAS learning.

Keywords: *Directed Reading Thinking Activity (DRTA), Cooperative Integrated Reading and Composition (CIRC), leraning achievement*

1. INTRODUCTION

Education is one of the ways for a nation to break free from backwardness and ignorance. Education plays a crucial role in life because the quality of education determines a nation's progress [1]. Without education, a nation will not experience any change or advancement [2]. Therefore, education must be prepared as a foundation for future life, and improvements in education delivery are needed to create high-quality human resources [3].

Based on observations and interviews conducted in fourth-grade classes at Kaligatuk Elementary School and Kalipucang Elementary School in Bantul, it is evident that there are still few teachers capable of conducting learning activities that involve students physically, mentally, and socially, as specified in the curriculum. Limited teaching is focused on conventional teaching methods (teacher-centered), leading to passive student involvement. The lack of student participation in class affects their academic achievement. In general, students struggle to understand the extensive IPAS materials, resulting in their grades falling below the Minimum Mastery Criteria (KKM). This is because students' learning activities are insufficient, leading to poor academic performance [4]. Additionally, as previously mentioned, the use of teaching models still relies on conventional methods (teacher-centered), making students less active in the learning process [5]. It is difficult to find comprehensive IPAS student achievement scores above the Minimum Mastery Criteria (KKM) because there is a perception that the IPAS subject is challenging and only meant to be memorized.

Based on interviews with fourth-grade teachers at Kaligatuk Elementary School and Kalipucang

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Elementary School, only a few students have reached the KKM threshold, which is 75. To address this issue, the use of an appropriate teaching model in IPAS learning is essential. The chosen teaching model should offer opportunities for students to actively participate in the learning process [6]. Student engagement will encourage a deeper understanding of the material taught. The right teaching model can enhance student academic achievement.

2. METHOD

This type of research uses quantitative analysis techniques with a Quasi Experimental Design research design using the Nonequivalent Pretest Posttest Design. The research design involves one experimental class and one control class, beginning with an initial test (pretest) administered to both groups, followed by the treatment. The study concludes with a final test (posttest) given to both classes [7].

The population in this research consists of all fourth-grade students at Kaligatuk Elementary School and Kalipucang Elementary School. The sample for this study includes the fourth-grade class at Kaligatuk Elementary School, consisting of 23 students, and the fourth-grade class at Kalipucang Elementary School, also consisting of 23 students. One class is used as the control group, and the other class is used as the experimental group.

Data collection techniques involve both tests and non-tests. The test technique includes multiple-choice pretest and posttest with 20 items and answer alternatives a, b, c, and d. Non-test techniques include observation and interviews [3]. The research instrument used is a test that has been content and construct validated by judgment experts, resulting in a total of 25 valid test items. External validation was conducted by testing the questions on fourth-grade students at Kabregan Elementary School, showing that 20 questions were valid, and 5 questions were not valid. The reliability test results show a coefficient of 0.909, which is greater than 0.70. An instrument is considered reliable if its reliability coefficient is at least 0.70 [8].

Data analysis techniques involve inferential statistics [9]. Before conducting hypothesis testing, prerequisite tests are conducted, including normality testing and homogeneity testing. Normality testing determines whether the data for each variable are normally distributed. Homogeneity testing assesses whether the samples come from populations with homogeneous variances. Hypothesis testing aims to describe significant differences in students' learning achievements between the experimental and control classes in terms of IPAS (Social Sciences) learning and to determine the effectiveness of the DRTA [10] and CIRC teaching models [2]. normally distributed. Homogeneity testing assesses whether the samples come from populations with homogeneous variances. Hypothesis testing aims to describe significant differences in students' learning achievements between the experimental and control classes in terms of IPAS (Social Sciences) learning and to determine the effectiveness of the DRTA [11] and CIRC [12] teaching models.

In this study, hypothesis testing uses non-parametric statistics, specifically the Mann-Whitney U-test, to test descriptive hypotheses if the data are nominal or ordinal and do not meet the normal distribution requirements. This is done to test comparative hypotheses between two independent samples when the data are in ordinal form. To assess the categorization of the effectiveness of the DRTA [13] and CIRC teaching models for students, the N Gain test is used.

3. RESULTS AND DISCUSSION

Analysis of the Normality Test for the Experimental Class and Control Class

a. Pretest Data

Normality test calculations were carried out using the Kolmogorov-Smmirnov normality test. The hypothesis proposed to measure normality is as follows:

H_0: The variance is normally distributed.

H_1: The variance is not normally distributed.

The criteria used to measure normality in this research are H_0 accepted if Sig. > from the specified alpha level of 5% (0.05).

Table 1. Summary Of Pretest Data Normally Test

Class	Significant Value	Explanation
Experimental	0,180	Normally
Control	0,034	Not normally

Based on the calculations using SPSS ver.16 and using the pretest values for the experimental and control groups, if the sig. value > (0.05), then Ho is accepted, which means that the pretest values are normally distributed. Based on the calculations with a 95% confidence level, it appears that the experimental group has a sig. value of 0.180, which means 0.180 > 0.05, so Ho is accepted, indicating that the data is normally distributed. However, for the control group, the sig. value is 0.034, which means 0.034 < 0.05, so Ho is rejected, indicating that the data is not normally distributed. From the above description, it can be concluded that the significance of the pretest values in the experimental and control groups is not normally distributed.

b. Posttest Data

Normality testing is conducted using the Kolmogorov-Smirnov normality test. The hypotheses for measuring normality are as follows:

H_0: The variance is normally distributed.

H_1: The variance is not normally distributed.

The criteria used to measure normality in this research are H_0 accepted if Sig. > the alpha level set at 5% (0.05).

Table 2. Summary of Normality Test for Posttest Data

Class	Significant Value	Explanation
Experimental	0,023	Not normally
Control	0,007	Not normally

Based on the calculations using SPSS ver. 16.0 and using the posttest values for the experimental and control groups, if the sig. value > (0.05), then Ho is accepted, indicating that the posttest values are normally distributed. Based on the normality test with a 95% confidence level, it is evident that the experimental group has a sig. value of 0.023, meaning that the sig. value is < 0.05, so Ho is rejected, indicating that the data is not normally distributed. Similarly, for the control group, the sig. value is 0.007, meaning that the sig. value is < 0.05, so Ho is rejected, indicating that the data is not normally distributed. From the above explanation, it can be concluded that the significance of the posttest values in the experimental and control groups is not normally distributed.

a. Homogeneity Test Analysis

In testing homogeneity, the hypotheses are as follows:

H_0: Variances are equal (homogeneous).

H_1: Variances are not equal (heterogeneous).

Table 3. Homogeneity Test Results

N	Significant Value	Explanation
42	0,556	Homogeneous

Based on the calculation results using a 95% confidence level, the sig. value is 0.556. This means that the sig. value > (0.05), so Ho is accepted, indicating homogeneity. In other words, the variance distribution of both groups comes from a homogeneous population, meaning there is no difference in the variance distribution between the two groups.

Hypothesis Testing Analysis

a. Hypothesis Testing using the Mann-Whitney Test

Hypothesis testing is conducted using the Mann-Whitney test to determine whether there is a difference in IPAS learning achievement between using the DRTA [14] and CIRC [15] teaching models. The data used for this analysis are the posttest scores of the experimental and control groups. The hypotheses are formulated as follows:

H_o : There is no difference in IPAS learning achievement between students who receive IPAS instruction using the DRTA teaching model and students who receive IPAS instruction using the CIRC teaching model.

H_i : There is a difference in IPAS learning achievement between students who receive IPAS instruction using the DRTA teaching model and students who receive IPAS instruction using the CIRC teaching model.

Based on the probability values, with the following conditions:

If the probability > 0,05 then Ho is accepted

If the probability < 0,05 then Ho rejected.

Table 4. Mann-Whitney Test Results

Variabel	Value Z	Significant Value	Explanation
Posttest Value	-2.284	0,022	There is a difference

From the Table 4, it can be observed that the calculated Z value is -2.284 with a significance value of 0.022. Therefore, since 0.022 < 0.05, Ho is rejected, and Hi is accepted. This indicates that "there is a difference in IPAS (Social Sciences) learning achievement between students who receive IPAS instruction using the DRTA teaching model and students who receive IPAS instruction using the CIRC teaching model."

b. Effectiveness Analysis

To facilitate the comparison of scores between the control group and the experimental group, the data is presented in the Table 5.

Table 5. Comparison of Data between the Experimental and Control Groups

Data	*Pretest Value*		*Posttest Value*	
	Eks.	Control	Eks.	Control
N	21	21	21	21
Mean	62,86	60,95	84,29	79,05
Median	65	65	85	75
Mode	60	65	85	75
Range	50	55	25	30
Mini	30	40	70	70
Max	80	95	95	100

The calculation results of the mean posttest scores for the experimental group and the control group

indicate that the mean for the experimental group (84.29) is greater than that of the control group (79.05). Therefore, it can be concluded that the DRTA teaching model is more effective than the CIRC teaching model in terms of IPAS learning achievement for fourth-grade students.

b. N Gain Test

The N Gain test is conducted to calculate the categorization of the effectiveness of the DRTA and CIRC teaching models. The Gain score is the difference between the pretest and posttest scores of students in the experimental and control groups.

Gain index calculation was performed using Microsoft Excel, and the results can be seen in the following table.

Table 6. N Gain Calculation

Class	N Gain	Categori
Eksperimental	0,57	Moderate
Control	0,46	Moderate

Based on the table above, it can be seen that the N Gain for the experimental group is greater than the N Gain for the control group. The calculation results show that the experimental group has a value of 0.57, while the control group has a value of 0.46. Based on the calculation, the N Gain for the experimental group is greater than the control group, indicating that the DRTA teaching model is effective because the N Gain test results for the experimental group are higher than those for the control group using the CIRC teaching model. The calculation for the experimental group is 0.57, falling into the moderate category ($0.30 < g \leq 0.70$) according to the effectiveness interpretation of the Gain index based on Hake (1991). Therefore, it can be said that the use of the DRTA teaching model is more effective in IPAs learning.

4. CONCLUSION

Based on the calculation of the N Gain test, the Gain score for the experimental group is larger than the Gain score for the control group. The calculation results show that the experimental group has a score of 0.57, while the control group has a score of 0.46. According to the calculation, the N Gain for the experimental group is greater than the control group, indicating that the DRTA teaching model is effective because the N Gain test results for the experimental group are higher than those for the control group using the CIRC teaching model. The calculation for the experimental group yields a score of 0.57, falling into the moderate category ($0.30 < g \leq 0.70$). Therefore, it can be said that the use of the DRTA teaching model is more effective in IPAS learning.

AUTHORS' CONTRIBUTIONS

Juliana Aningtyas and lecturer Muhardila Fauziah both cam up with the idea of classroom action research. Juliana analyzed the problems that occurred in the classroom and created the background. Muhardila Fauziah contributed to the methods used in the study. Both authors analyzed the work done. Then they discuss the results and conclusions of the research.

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