ALIFBATA: Journal of Basic Education
2025, Vol. 5, No. 2, | 163-175
Doi: https://doi.org/10.51700/alifbata.v5i2.1072 e- ISSN 2774-762X

The Effect of the Use of *the Rotating Trio Exchange* (RTE) Learning Model on the Cognitive Ability of Grade VIII Students in Islamic Religious Education Subjects at SMPN 4 Klari Karawang

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Abstract
This study aims to find the effect of rotating trio exchange learning model on students' cognitive abilities. This research was conducted at SMPN 4 Klari Karawang in class VIII G as the experimental class and class VIII J as the control class in the subject of Islamic Religious Education. The method used in this research is a quantitative approach experimental method with a quasi-experimental design with a pretest and posttest group design. With a population of 412 students and samples taken in the study as many as 80 students consisting of 40 experimental class students and 40 control class students. The increase in students' cognitive abilities can be seen from the increase in the average pretest and posttest results of the experimental class by 19.63, while in the control class by 17.22. To see the effect of using the rotating trio exchange model on students' cognitive abilities can be seen from the results of the N-gain test calculation showing that the average N-gain value for the experimental class of 0.4330 has a moderate category with a percentage of 43%. This it can be concluded that there is a significant influence between the use of the rotating trio exchange learning model on students' cognitive abilities.

Keywords: *Rotating Trio Exchange (RTE) Model, Cognitive Ability, Islamic Religious Education*

Abstrak
Penelitian ini bertujuan untuk menemukan pengaruh model pembelajaran pertukaran trio bergilir terhadap kemampuan kognitif siswa. Penelitian ini dilakukan di SMPN 4 Klari Karawang kelas VIII G sebagai kelas eksperimen dan kelas VIII J sebagai kelas kontrol pada mata kuliah Pendidikan Agama Islam. Metode yang digunakan dalam penelitian ini adalah pendekatan kuantitatif metode eksperimen dengan desain kuasi eksperimental dengan desain kelompok pretest dan posttest. Dengan jumlah penduduk 412 mahasiswa dan sampel yang diambil dalam penelitian terhadap 80 mahasiswa yang terdiri dari 40 mahasiswa kelas eksperimen dan 40 mahasiswa kelas kontrol. Peningkatan kemampuan kognitif siswa dapat dilihat dari peningkatan rata-rata hasil pretest dan posttest kelas eksperimen sebesar 19,63, sedangkan di kelas kontrol sebesar 17,22. Untuk melihat pengaruh penggunaan model pertukaran trio berputar terhadap kemampuan kognitif siswa, dapat dilihat dari hasil perhitungan tes N-gain yang menunjukkan bahwa nilai rata-rata N-gain untuk kelas eksperimen 0,4330 memiliki kategori medium dengan persentase 43%. Dengan demikian, dapat disimpulkan bahwa ada pengaruh yang signifikan antara penggunaan model pembelajaran pertukaran trio bergilir terhadap kemampuan kognitif siswa.

Kata kunci: *model pertukaran trio bergilir (RTE), kemampuan kognitif, pendidikan agama Islam*

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Introduction

Education is a learning process for students to be able to understand, understand, and make humans more critical in thinking. Learning can be defined as a process of behavior change that includes knowledge, attitudes, and abilities acquired over a long period of time. Such changes must occur without being affected by maturity or temporary changes caused by certain factors. The learning process itself is the formation of behaviors carried out through various activities, which include cognitive, affective, and psychomotor aspects. These three aspects have a significant influence on student learning outcomes (Komalasari in Faizah 2022).

Basically, learning is a process of interaction between teachers and students. This process can take place either directly through face-to-face activities or indirectly. This learning process consists of several stages, including preparation, planning, and implementation, which aim to create effective learning. Education and learning are interrelated concepts in the social sphere, where they are closely related to the value of processes and outcomes. Therefore, in every learning process there are efforts to achieve optimal results. Improvements in the learning process can have a significant impact on the final grades and the process gone through (Hairuddin, 2020). Students play the role of subjects in learning, where they have the ability to build learning experiences that support better development in the cognitive, affective, and psychomotor realms.. In accordance with the words of Allah in the Qur'an about the educational verse in Q.S An-Nahl verse: 125:

The Messenger of Allah (peace and blessings of Allaah be upon him) said: "O Messenger of Allaah (peace and blessings of Allaah be upon him) and I am the Messenger of Allaah (peace and blessings of Allaah be upon him).

This is the most beautiful thing in your Lord, He is the one who knows what is wrong with .you, and He knows what you are doing

Meaning: *"Call (people) to the way of your Lord with wisdom and good teaching and argue with them in a better way. Indeed, your Lord is the One who knows best who strays from His path and He knows best who is guided."*

From the above verse, it is explained that Allah swt commanded and obligated the Prophet Muhammad (saw) and his people to learn and teach using good learning methods, because from the learning process it can be seen that knowledge and the process of human development both in terms of ubudiyah and muamalah, as well as in the learning process of Islamic religious education.

One approach to overcome existing problems is to implement a learning model that can increase the active participation of students in the teaching and learning process. Thus, it is hoped that student learning outcomes will increase and learning activities become more meaningful. Islamic Religious Education is one of the subjects taught at SMPN 4 Klari. One of the goals of learning Islamic Religious Education is so that students can understand and practice Islamic religious values in daily life. In addition, it is hoped that students can implement and practice the principles of Islam in the right way, so that it can

increase students' obedience to Islamic teachings.

One of the learning models that can be applied in the teaching and learning process is the learning model *rotating trio exchange*. This method is an approach that involves students by dividing them into groups of three. In each round, the teacher gives a question or assignment with varying levels of difficulty. Thus, it is hoped that students can understand the material that has been taught more easily through this learning model (Rachman Habibur, Ismail Fajri, 2023).

A student's cognitive ability is an intellectual capacity that involves the thought process of acquiring, understanding, processing, and applying the knowledge learned in the context of learning. In education, cognitive abilities include mental activities such as remembering, understanding, analyzing, evaluating, and creating. Learning outcomes are also interpreted as the process of changing behavior in a person that can be observed and measured in the form of knowledge, attitudes and skills.(Husairi & Aminah, 2022)

All of this aims to help students achieve a deep understanding of the subject matter. The achievement of students' cognitive abilities is greatly influenced by the role of the teacher as a responsible educator in choosing a learning model that is in accordance with the goals and activities to be achieved. A learning model is an approach or strategy that is systematically designed before the learning process begins. To create an effective and engaging learning experience, good communication and interaction during learning activities are required. Therefore, teachers need to implement *multidirectional* communication, which not only focuses on the interaction between teachers and students, but also creates dynamic interactions between students. This aims to make learning more interactive and collaborative.

From the above explanation, in this case the researcher is interested in conducting a research entitled "The Effect of the Use of *the Rotating Trio Exchange* (RTE) Learning Model on the Cognitive Ability of Grade VIII Students in Islamic Religious Education Subjects at SMPN 4 Klari Karawang".

Method

This research uses a quantitative approach, the method used in this study is the experimental research method. The type of research used is research with experimental methods with *Quasi Experimental Design design.* In this study, *Quasi Experimental Design is used of the type of Nonequivalent Control Group Design* which is almost the same as *the Pretest-posttest control group design,* but in this type two groups are used, namely the control class and the experimental class. The control class is the one that cannot be treated, while the experimental class is the class that receives treatment in the form of an interactive learning model. This study uses test instruments to measure students' cognitive abilities after the *rotating trio exchange learning model is carried out.*The population in the study to be carried out is all grade VIII students of SMPN 4 Klari, which consists of 10 classes, with a total of 412 students.

The sampling technique in this study uses *non-probability sampling* (non-random selection) with *Purposive sampling* technique of determining samples with certain considerations or samples that are suitable for the population. So the sample in this study

amounted to 80 students. Data analysis used descriptive statistical analysis, normality test, homogenity test, hypothesis test, and n-gain test

Results and Discussion

Result

This research was carried out at SMPN 4 Klari Karawang from April 23, 2025 to May 08, 2025. The research was conducted in class VIII G as an experimental class using the *rotating trio exchange* learning model, and class VIII J as a control class using conventional methods, each class has a total of 40 students. This section presents data from the results of research that has been carried out on the influence of *the rotating trio exchange learning model* on the cognitive ability of grade VIII students in the subject of Islamic Religious Education at SMPN 4 Klari Karawang.

Table 1 Descriptive Analysis *Pretest* Eksperimen

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Hours of deviation
PreTest Experiments	40	26	86	56.15	12.998
PostTest Experiment	40	60	93	75.78	10.608
Valid N (listwise)	40				

Based on the results of the pretest *descriptive analysis test* in the experimental class with a total of 40 students, the minimum score obtained was 26, the maximum score was 86, the average score was 56.15 and the standard deviation was 12.998. The results of the posttest descriptive analysis test in the experimental class with the number of students were 40 people, the minimum score obtained was 60, the maximum score was 93, the average score was 75.78 and the standard deviation was 10.608.

Furthermore, the pretest *categorization of* the experimental class, the researcher made it in a frequency distribution table using the following category formula:

Table 2 Kategorisasi *Pretest* Eksperimen

Batas Category	Interval	Frequency	Presentase	Information
X < (m-1.0s)	X ≤ 43,16	5	13%	Low
(m-1.0s) ≤ X < (m + 1.0s)	43.16 ≤ X ≥ 69.15	28	70%	Keep
(m + 1.0s) ≤ X	69,15 ≤ X	7	18%	Tall
Sum		**40**	**100%**	

Based on the results of the categorization table above with a total of 40 students divided into 3 categories, data was obtained that 5 students (13%) were in the low category, then there were 28 students (70%) in the medium category, then there were 7 students (18%) in the high category. So it can be concluded that the *experimental pretest* is in the medium category.

Furthermore, the posttest *categorization* of the experimental class, the researcher made it in a frequency distribution table using the following category formula:

Table 3 Kategorisasi *Posttest* Eksperimen

Batas Category	Interval	Frequency	Presentase	Information
X < (m-1.0s)	X ≤ 65,14	6	15%	Low
(m-1.0s) ≤ X < (m + 1.0s)	65.14 ≤ X ≥ 86.14	22	55%	Keep
(m + 1.0s) ≤ X	86,14 ≤ X	12	30%	Tall
Sum		**40**	**100%**	

Based on the results of the categorization table above with a total of 40 students divided into 3 categories, data was obtained that 6 students (15%) were in the low category, then there were 22 students (55%) in the medium category, then there were 12 students (12%) in the high category. So it can be concluded that *the experimental posttest* is in the medium category.

Table 4 Descriptive Analysis *Pretest* Control

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Hours of deviation
PreTest Control	40	20	60	42.53	13.672
PostTest Control	40	33	80	59.75	11.628
Valid N (listwise)	40				

Based on the results of the pretest *descriptive analysis test* in the control class with a total of 40 students, the minimum score obtained was 20, the maximum score was 60, the average score was 42.53 and the standard deviation was 13.672. The results of the posttest descriptive analysis test in the control class with a total of 40 students, the minimum score obtained was 33, the maximum score was 80, the average score was 59.75 and the standard deviation was 11.628.

Next, the pretest *categorization* of the control class, the researcher made it in a frequency distribution table using the following category formula:

Table 5 Kategorisasi *Pretest* Control

Batas Category	Interval	Frequency	Presentase	Information
X < (m-1.0s)	X ≤ 28,86	12	30%	Low
(m-1.0s) ≤ X < (m + 1.0s)	28.86 ≤ X ≥ 56.20	19	48%	Keep
(m + 1.0s) ≤ X	56,20 ≤ X	9	23%	Tall
Sum		**40**	100%	

Based on the results of the categorization table above with a total of 40 students divided into 3 categories, data was obtained that 12 students (30%) were in the low category, then there were 19 students (48%) in the medium category, then there were 9 students (23%) in the high category. So it can be concluded that the *control pretest* is in the medium category.

Furthermore, the *posttest* categorization of the control class, the researcher made it in a frequency distribution table using the following category formula:

Table 6 Kategorisasi *Posttest* Control

Batas Category	Interval	Frequency	Presentase	Information
X < (m-1.0s)	X ≤ 48,12	6	15%	Low
(m-1.0s) ≤ X < (m + 1.0s)	48.12 ≤ X ≥ 71.38	24	60%	Keep
(m + 1.0s) ≤ X	71,38 ≤ X	10	25%	Tall
Sum		**40**	100%	

Based on the results of the categorization table above with a total of 40 students divided into 3 categories, data was obtained that 6 students (15%) were in the low category, then there were 24 students (60%) in the medium category, then there were 10 students (25%) in the high category. So it can be concluded that the *control posttest* is in the medium category.

Inferential Statistical Analysis with Pre-Trial Tests

Normality Test

The normality test is used to find out whether a data is normally distributed or not. A data can be said to be normally distributed if the GIS value > a = 0.05, if a data has a GIS value < a = 0.05, then the data is not normally distributed. The data test using the Kolmogorov Smirnov test with the help of SPSS statistic 25 was obtained as follows:

Table 7 Normality Test *Pretest-Posttest* Experimental Classes

Tests of Normality							
	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Itself.	Statistic	df	Itself.
Cognitive Abilities	*Pretest* Experiments	.159	40	.013	.962	40	.197
	Posttest Experiment	.132	40	.075	.927	40	.013

a. Lilliefors Significance Correction

Based on the results of the normality test, it is known that the significance value *of the experimental pretest* is 0.013 > 0.05 and the significance value of the experimental *posttest* is 0.075 > 0.05. It can therefore be concluded that both residual values are normally distributed**.**

Table 8 Normality Test *Pretest-Posttest* Control Class

Tests of Normality							
	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Itself.	Statistic	df	Itself.
Cognitive Abilities	*Pretest* Control	.157	40	.014	.900	40	.002
	Posttest Control	.159	40	.013	.928	40	.014

a. Lilliefors Significance Correction

Based on the results of the normality test, it was known that the significance value of *the control pretest* was 0.014 > 0.05 and the significance value of the *control posttest* was 0.013 > 0.05. It can therefore be concluded that both residual values are normally distributed **.**

Homogeneity Test

Homogeneity tests are needed to find out whether the variance of the data population between one group and another has the same or different variations. With the criterion if the significance value is > 0.05, the data is homogeneous. Meanwhile, if the significance value is < 0.05, the data is not homogeneous.

Table 9 Homogeneity Test *Pretest* Experiment and Control Class

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Itself.
Cognitive Abilities	Based on Mean	1.837	1	78	.179
	Based on Median	1.834	1	78	.180
	Based on Median and with adjusted df	1.834	1	66.834	.180
	Based on trimmed mean	1.841	1	78	.179

Based on the results of the homogeneity test, *the pretest* value of the experimental and control classes was obtained a significance value on the basis on mean of 0.179 > 0.05. So it can be concluded that *the Pretest* data is **homogeneous.**

Table 10 Homogeneity Test *Posttest* Experimental Classes and Control Classes

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Itself.
Cognitive Abilities	Based on Mean	.043	1	78	.836
	Based on Median	.023	1	78	.881
	Based on Median and with adjusted df	.023	1	74.604	.881
	Based on trimmed mean	.055	1	78	.816

Based on the results of the homogeneity test, the *posttest value of* the experimental and control classes was obtained a significance value on the basis on mean of 0.836 > 0.05. So it can be concluded that *the posttest* data is **homogeneous.**

Uji Hypothesis

In this study, the T-test was used as a hypothesis testing technique. The T-test test in this study uses SPSS Statistic 25, with the provision that if the significance value (2-tailed) < 0.05, then the null hypothesis (H0) is rejected and the alternative hypothesis (Ha) is accepted. The results of the calculation of the T-test through SPSS are as follows:

Table 11 Uji Hypothesis *Pretest-Posttest* Experiment and Control Class

Paired Samples Test									
		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Hours of deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	*Pretest* Eksperimen - *Posttest* Eksperimen	-19.625	11.792	1.865	-23.396	-15.854	-10.525	39	.000
Pair 2	*Pretest* Control - *Posttest* Control	-17.225	13.541	2.141	-21.556	-12.894	-8.045	39	.000

Based on the results of the T-test as a hypothesis test, it was found that the significance value (2-tailed) of 0.000 < 0.05 means that **H0** is rejected and **Ha** is accepted. It can be concluded that there is a significant influence on the improvement of cognitive ability of the experimental class, namely class VIII G which applies the *rotating trio exchange* learning model compared to the control class, namely class VIII J which does not apply the *rotating trio exchange learning model*.

Uji N-Gain

The N-Gain test is a test that can provide an overview of the increase in learning outcome scores between before and after the implementation of the *rotating trio exchange* learning model. In this study, the N-Gain test was carried out using SPSS Statistic 25 as follows:

Table 12 Uji N-Gain *Pretest-Posttest* Experimental Classes

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Hours of deviation

NGain Score	40	-0,35	0,83	0,4330	0,23766
NGain Percent	40	-35,00	82,50	43,2853	23,75339
Valid N (listwise)	40				

The N-Gain value has a category if the value of g > 0.7 is high, 0.3 ≤ g ≤ 0.7 medium and g < 0.3 low. Based on the results of the N-Gain test table above the gain value in the experimental class of 0.3 ≤ 0.4330 ≤ 0.7, it has a medium category.

Table 13 Uji N-Gain *Pretest post-test* Control Class

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Hours of deviation
NGain Score	40	-0,25	0,61	0,2775	0,22407
NGain Percent	40	-25,00	61,43	27,7823	22,38193
Valid N (listwise)	40				

The N-Gain value has a category if the value of g > 0.7 is high, 0.3 < g < 0.7 medium and g < 0.3 low. Based on the results of the N-Gain test table above the gain value in the control class of 0.2775 < 0.3, it has a low category.

Discussion

The rotating trio exchange *learning model* was carried out in class VIII G SMPN 4 Klari Karawang as an experimental class with a total of 40 students. To find out the learning process carried out during the research using the *rotating trio exchange learning model* in the subject of Islamic Religious Education in grade VIII G, the researcher provided test questions, the test was carried out twice, namely *pretest* (before being given *treatment*) and *posttest* (after being *given treatment*) in the experimental class. Based on the results of data obtained from the research on the *rotating trio exchange* learning model on students' cognitive abilities in Islamic Religious Education subjects processed through the assistance of *the Statistical Product and Service Solution (SPSS) 25* program, the following results were obtained:

Based on the results of the normality test *of pretest* and *posttest results* in the experimental and control classes which refer to the significance level of 0.05, it can be known that the significance value (Sig.) *of the experimental class pretest is 0.013 > 0.05 and the significance value* of the experimental *posttest* is 0.075 > 0.05. So it can be concluded that the two values are normally distributed. In the control class, it was known that the significance value of *the control pretest* was 0.014 > 0.05 and the significance

value of the *control posttest* was 0.013 > 0.05. So it can be concluded that the two values are normally distributed.

Based on the results of the homogeneity test of *the pretest* values of the experimental and control classes, a significance value on *the basis on mean* of 0.179 > 0.05 was obtained. Therefore, it can be concluded that *the pretest* data is homogeneous. Meanwhile, the homogeneity test *of the posttest* value of the experimental and control classes obtained a significance value on *the basis on mean* of 0.836 > 0.05. So it can be concluded that *the posttest* data is homogeneous.

In the results of the T-test as a hypothesis test, the result of a significance value (2-tailed) of 0.000 < 0.05 means that the nil hypothesis (H0) is rejected and the alternative hypothesis (Ha) is accepted. This indicates that there is a positive and significant influence in the use of the *rotating trio exchange learning model* on the cognitive ability of grade VIII students in the subject of Islamic Religious Education at SMPN 4 Klari Karawang.

Next, the researcher conducted an N-gain score test with the aim of determining the effectiveness of using a method in research. In N-gain testing, *pretest* and *posttest* scores are required. This N-gain test is performed when there is a significant difference between the average *posttest* score of the experimental group and the control through the paired sample t test. Based on the results of the calculation of the N-gain test, it was shown that the average N-gain value for the experimental class was 0.4330 or 43% in the medium category. The average N-gain value for the control class was 0.2775 or 27% in the low category. Therefore, it can be concluded that the effect of the use of *rotating trio exchange learning* on the cognitive ability of grade VIII students in the subject of Islamic Religious Education at SMPN 4 Klari Karawang has a medium category with a percentage of 43%.

Therefore, based on the results of the calculations that have been explained above, it shows that the *rotating trio exchange learning model* used during research on the subject of Islamic Religious Education material "becoming a tolerant generation to build internal harmony and between religious communities" is able to improve the cognitive abilities of students of grade VIII G SMPN 4 Klari Karawang, and can also be seen from the comparison of *posttest scores* between the experimental classes given *treatment using the* Rotating Trio Exchange *learning model* and the control class that was not given *treatment using the* Rotating Trio Exchange *learning model* .

Conclusion

Based on the results of the study, it can be concluded that the *rotating trio exchange learning model* affects students' cognitive abilities. The improvement in students' cognitive abilities can be seen from the increase in the average results *of the pretest and posttest* of the experimental class by 19.63, while in the control class by 17.22. To see the effect of using the *rotating trio exchange* model on students' cognitive abilities, it can be seen from the results of the calculation of the N-gain test showing that the average N-gain value for the experimental class of 0.4330 has a medium category with a percentage of 43%. Thus, it

can be concluded that there is a significant influence between the use of *the rotating trio exchange* learning model on students' cognitive abilities.

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